SUBTROPICAL PHILOSOPHY

Homological Ontology in Characteristic One

PhD dissertation

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ABSTRACT

This PhD thesis seeks to answer the question of how the ancient philosophical problem of the continuous and the discrete can be approached in a unified manner by assuming the validity of the 'generic matrix' developed (since 2008) by F. Laruelle as a new 'onto-vectorial' paradigm of thought. The problem is treated from four different angles: first, Laruelle's solution is presented through his 'quantizing' gesturality of thought. Second, this paradigm is subjected (contrary to A. Badiou's 'set-theoretic' approach [1988, 2006, 2018]) to a 'categorial' reinterpretation and 'tropical dequantization' (subsequent to a model of V. P. Maslov, V. N. Kolokoltsov et G. L. Litvinov). This gives rise to a 'semi-philosophical' solution for the initial problem called 'tropical philosophy'. Third, an analytic prolongation of Laruelle's 'quantum-oriented theory' leads to a 'non-commutative ontology' drawing further conclusions with regard to coherence considerations and the emergence of time in a non-commutative 'space of lived experience'. The fourth and final proposition consists in a 'topos-oriented' approach (after the models of A. Connes [2017] and O. Caramello [2018]). The concept of topos (dating back to A. Grothendieck [1972]) is conceived as a 'category-concept', which embraces continuous and discontinuous structures by the idea of a path toward the truth. Instead of being interested in only one particular and static space of thought, 'subtropical philosophy' being developed as a complex 'lift' of 'tropical philosophy' explains Laruelle's 'non-philosophical Chôra' as a topos or a parameter space that governs the spectral variability (implied by the relative point of view on philosophy) in the 'worldly foreground'. At the same time, it establishes a 'homological bridge' for an imaginary and indirect transfer between multiple philosophical worlds in the 'universal background', along with a new commutative but variable ontology 'in characteristic one' ($1 + 1 = 1$).

INTRODUCTION

The 'non-philosophical' problem of treating the continuous and the discrete in a unified manner can be approached from two different angles: firstly, by means of François Laruelle's 'onto-material formalism'[1] or 'onto-vectorial' 'image of thought'[2] and secondly, with the concept of 'topos' dating back to Alexander Grothendieck.[3] The neologism of 'onto-material' and 'onto-vectorial' (French *'matérial'* and *'vectorial'* or, as in English, *'onto-vectorial'*) is associated with both Max Scheler and Martin Heidegger. The term *'matérial'* alluding to *'die materiale Werteethik'*[4] and the prefix *'onto-'* or the suffix *'-ial'* instead of *'-iel'* as can be found in *Sein und Zeit*[5] (for instance, in *'existenz*-ial') give the concepts an ontological scope. That is, as for 'onto-vectorial', the mathematical model of the vector is interpreted not in a geometrical way but in a generic manner, so that it entails a proper 'ontology' for thought.[6] The concept of topos will require a 'categorial', rather than 'categorical', and 'idempotent' or 'tropical' interpretation and preparation of Laruelle's onto-vectorial paradigm, presented in Chapter 2, 'Tropical Analysis of the Generic Matrix Category'. Both together, the 'categorialization' of the so-called 'generic matrix' and the 'tropical analysis' of the 'generic matrix category', can be regarded as a result of dequantization of 'the philosophical space'[7] such as Jean-Paul Sartre's 'transcendental field'[8] or Gilles Deleuze's 'plane of immanence'[9] treated as a quantum object. That is the case with Laruelle's non-philosophy, which 'transforms the expressions of the [philosophical] Logos by inserting them in a generic plane'[10], because the 'generic constant'[11] tends to zero by taking purely imaginary values. This is the attempt to re-introduce the legitimacy of the characteristic problems, methods and strategies of 'classical' philosophy without undoing Laruelle's general critique of philosophy by the use of 'semi-philosophical category-concepts' (not to confuse with Laruelle's own use of the term 'semi-philosophical' in reference to 'the unreflected or

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[1] Cf. Laruelle, François, *Philosophie non-standard. Générique, quantique, philo-fiction*. Paris: Éditions Kimé, 2010a, pp. 81–3, 224–7, 413 f.: *'Le formalisme matérial* (1)', *'Le formalisme matérial* (2)', *'Le formalisme matérial* (3)'.

[2] Cf. id., 'From the First to the Second Non-Philosophy' (2010), in id., *From Decision to Heresy: Experiments in Non-Standard Thought*, Edited by Robin Mackay. Falmouth, U.K.: Urbanomic/New York: Sequence Press, 2013a, pp. 309–15.

[3] See Grothendieck, Alexander, and Jean-Louis Verdier, 'Topos', in *Théorie des Topos et Cohomologie Etale des Schémas. Lecture Notes in Mathematics*, vol 269. Berlin, Heidelberg: Springer, 1972, pp. 299–518.

[4] Scheler, Max, *Gesammelte Werke, Bd. 2, Der Formalismus in der Ethik und die materiale Wertethik: neuer Versuch der Grundlegung eines ethischen Personalismus*. Bonn: Bouvier, 1980.

[5] Heidegger, Martin, *Sein und Zeit*. Tübingen: Niemeyer, 2006.

[6] Cf. Laruelle, *Photo-Fiction, a Non-Standard Aesthetics. Photo-Fiction, une esthétique non-standard*, Bilingual edition, Translated by Drew S. Burk. Minneapolis, Minnesota: Univocal, 2012b, pp. 2 and 92, n. 1.

[7] Cf., for instance, id. 2010a, pp. 78, 165, 301, 310, 387, 426, 467, and id., *Anti-Badiou. Sur l'introduction du maoïsme dans la philosophie*. Paris: Éditions Kimé, 2011a, p. 135: *'l'espace philosophique'*.

[8] Sartre, Jean-Paul, *La transcendance de l'Ego et autres textes phénoménologiques*. Paris: Vrin, 2003, p. 96.

[9] Cf. Deleuze, Gilles, and Félix Guattari, *Qu'est-ce que la philosophie ?*. Paris: Les Éditions de Minuit, 1991/2005, pp. 38–59: *'Le plan d'immanence'*.

[10] Cf. Laruelle 2011a, p. 124: *'La NP [non-philosophie] transforme les énoncés du Logos en les insérant dans un plan générique* [...]'. On the 'generic plane', cf. id. 2010a, p. 58: *'Plan générique'*.

[11] Cf. id. 2010a, p. 33: *'"constante générique"'*.

"overwritten" thought [...] of auto-affection (Descartes [...] and [M.] Henry: "eyes closed", intuition suspended or reduced)'[12].

In Chapter 3, 'Non-Commutative Ontology and Spectral Variability', I shall discuss how quantum-oriented theory and its spectral variability provides one solution to the coexistence of discrete and continuous variables in non-philosophy's 'space or plane of thought'[13], as it aims at finding 'a topological or conceptual space for thinking the real'[14], as Ian James says. Laruelle's non-philosophy brings into play conceptual applications for apprehending and updating transcendental structures of a new kind called 'immanental'. The classical philosophical concept of the transcendental denotes – in terms of the 'first non-philosophy' ('Philosophy III', especially *Principes de la non-philosophie* [1996]) – a *'non-relation'*, the non-thetic experience which the One is, whereas the latter states more precisely – in terms of the 'second non-philosophy' ('Philosophy V', especially *Philosophie non-standard* [2010]))[15] – a *non-commutative relation* by superposition of immanence and experience. Non-philosophy requires, as Laruelle puts it, 'a concept of the transcendental which would be strictly immanent... and real rather than logical or even logico-real'[16]. Therefore, according to James, the '"transcendental" itself is simply too philosophical a term'[17]. Anthony Paul Smith further points out:

> In his earlier work Laruelle describes the 'transcendental' as 'rigorously immanent.'[18] In *Philosophie non-standard* Laruelle sees fit to simply coin a new term, 'immanental,' which describes the 'non-relation' between immanence as such and experience.[19] It is then a posture of thought, like the transcendental, but one that happens within (hence the non[-]relation) the experience and immanence itself.[20]

What we need for capturing the crux of the 'non-conceptual' problem posed by the continuous and the discrete is, as John Ó Maoilearca states, non-philosophical 'openness, practice, tolerance.'[21] This is not a technical problem, but rather a fundamental one of a 'philosophy (of) nature' as understood by Deleuze: that is, as a *'description in thought of the life of the world*, such that the life thus described might include, as one of its living

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[12] Id., *Principles of Non-Philosophy*, Translated by Nicola Rubczak and Anthony Paul Smith. London: Bloomsbury Academic, 2013b, p. 99. Cf. id., *Principes de la non-philosophie*. Paris: PUF, 1996, p. 119: *'La pensée [...] irréfléchie ou [...] "écrasée", que nous appelons "semi-philosophique", de l'auto-affection (Descartes [...] et M. Henry: "les yeux fermés", l'intuition suspendue ou réduite).'*

[13] James, Ian, *The New French Philosophy*. Malden, MA, USA: Polity Press, 2012, p. 177.

[14] Ibid., p. 166.

[15] For the distinction between 'first' and 'second non-philosophy' see Laruelle, 'From the First to the Second Non-Philosophy' (2010), in id. 2013a, pp. 305–25.

[16] Cf. id., *En tant qu'Un. La 'non-philosophie' expliquée aux philosophes*. Paris: Aubier, 1991, p. 22.

[17] James 2012, p. 176.

[18] See Laruelle, *Théorie des identités. Fractalité généralisée et philosophie artificielle*, Paris: PUF, 1992, p. 56, and id., *Theory of Identities*, Translated by Alyosha Edlebi. New York: Columbia University Press, 2016, p. 36.

[19] See id. 2010a, p. 54.

[20] Smith, Anthony Paul, *A Non-Philosophical Theory of Nature: Ecologies of Thought*. Basingstoke, U.K.: Palgrave-Macmillan, 2013, p. 116.

[21] Ó Maoilearca, John, *All Thoughts Are Equal: Laruelle and Nonhuman Philosophy*. Minneapolis, London: University of Minnesota Press, 2015, p. 13.

gestures, the description' itself, as Alain Badiou writes.[22] The '(of)' put in parentheses in the expression above, often used by Laruelle, is meant to indicate a relation of immediacy[23] or the suspension of 'the relational aspect of the term', as Smith notes: 'Laruelle often uses hyphens to create a graphical expression of the undivided-in-the-last-instance character of a concept – that is, he wants to eliminate philosophical distance even at the level of the grapheme in his writing.'[24]

Non-philosophical *gestures of thought* – one can decline them, ascribe to them many indices, perceive them in terms of multiple conceptions, various points of view, change of scenes, transposition, also in terms of a modification and a history of problems. All this is indirect, however, and puts these gestures only 'in the system of known knowledge' and, as René Guitart further points out, 'avoids to demonstrate the elementary gesture itself as *open*, here and now'[25]. The non-philosopher has a know-how, and non-philosophy has a style (Latin '*factura*')[26]: 'Style is not a polite way of thinking: no style, no thinking! Style is a discipline of breaking language out of itself, a martial art of metaphor [...], and style is an entirely integral part of thought qua *thought experiment*'[27], as Gilles Châtelet notes in an interview with Christine Goémé. 'Vision-in-One' ('One', 'One-in-One', or 'Real'), as the '*[f]irst fundamental concept of non-philosophy*'[28] constrains us, as Laruelle says in *Philosophy and Non-Philosophy*, 'to be necessarily naive, experimental, realist, and to modify our traditional practice of thought and language in accordance with this experience of the One-real that we take as our transcendental guide.'[29]

There is another intimate symbiosis between continuous and discontinuous structures, which can be found within the concept of 'topos', which is a far-reaching generalization of the concept of 'category' and of space.[30] Chapter 4, 'Homological Ontology in Characteristic One', is about finding a satisfying, i.e., continuous, discrete or

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[22] Badiou, Alain, 'Review of Gilles Deleuze, *The Fold: Leibniz and the Baroque*', in Boundas, Constantin V., and Dorothea Olkowski, eds., *Gilles Deleuze and the Theatre of Philosophy*. Abingdon, U.K./New York: Routledge, 1994, p. 63.

[23] Cf. Laruelle 2011a, p. 123: '*Le (de) entre parenthèses indique bien une immédiation ou une immanence du Réel [...]*'.

[24] Smith, *Laruelle: A Stranger Thought*. Cambridge, UK, and Malden, MA, USA: Polity Press, 2016, p. 53.

[25] Cf. Guitart, René, *La pulsation mathématique. Rigueur et ambiguïté, la nature de l'activité mathématique, ce dont il s'agit d'instruire*. Paris: Éditions L'Harmattan, 1999, p. 7: '*Ce geste intellectuel, la pulsation, on peut en décliner, en raconter après coup, de multiples indices, en termes de jeu du vu et du caché, de multiplicité des conceptions, de variation des points de vue, de changement de cadres, de transposition, en termes aussi de modification et d'histoire des problèmes et des problématiques. Mais tout cela est indirect, ne pose la chose que dans le système des savoirs sus, et évite de pointer le geste élémentaire lui-même* ouvert, *ici et maintenant*'.

[26] Cf. ibid.: '*le mathématicien a un savoir-faire, et la mathématique une* facture'.

[27] Châtelet, Gilles, 'A Martial Art of Metaphor: Two Interviews with Gilles Châtelet' (1998), Translated by Robin Mackay, Matt Hare, Saint Huître, available at: https://www.urbanomic.com/document/gilles-chatelet-mental-ecology/.

[28] Laruelle, *Dictionary of Non-Philosophy*, Translated by Taylor Adkins. Minneapolis: Univocal, 2013e, p. 165; cf. id., *Dictionnaire de la non-philosophie*. Paris: Éditions Kimé, 1998, p. 202: '*Nom premier fondamental de la non-philosophie*'.

[29] Id., *Philosophy and Non-Philosophy*, Translated by Taylor Adkins. Minneapolis, Minnesota: Univocal, 2013d, pp. 50 f.

[30] See appendix.

conjugated model based on the topos-concept which interweaves even more closely the conventional idea of a 'philosophical continuum'[31] and that of a discrete space than Laruelle's 'generic quantum'[32].

The common thread running through my project is a combination of two questions: (i) 'how can we overcome the non-philosophical problem of the continuous and the discrete?' and (ii) 'what can we make out of non-philosophy?'. Therefore, my approach is one attempt among others at *doing something* with the non-philosophical material provided by Laruelle which, of course, requires first of all 'that we develop some kind of general understanding of that material'[33]. Under this condition, it is rather about entering 'an "operatory field"'[34] of any onto-material and onto-vectorial system *X* in order to prolongate its characteristic gestures – 'Understanding [a theory] is catching the gesture and being able to continue' (*'Comprendre [une théorie] est en attraper le geste, et pouvoir continuer'*[35]), as Jean Cavaillès said – than about knowing or representing it philosophically and gaining 'the power of being in a position over *X*, transcending *X*'[36]. 'What is necessary is to change the paradigm of thinking'[37], says Laruelle, and this change of paradigm, as Ó Maoilearca brings to mind, 'must be continually reperformed (in case it should fall into one position)'[38]. I am convinced that after Laruelle's suggested change of paradigm, we cannot simply continue doing philosophy as we were used to do before. Doing philosophy as nothing had happened would be as if we reduce ourselves to doing only classical mechanics, which is possible, of course, but only on condition that we limit our focus in an extreme way.

However, one way of dealing with non-philosophy is to analyze its results in a perfectly philosophical manner (shown, for instance, by Brassier[39]) by way of which the non-philosophical discourse gets relocated in the philosophical sphere of influence. Such a 'philosophical relapse', in particular when it comes to the challenge of contemporary nihilism, is characterized by Laruelle in *The Last Humanity* as 'the final choice' between the 'philosophical Reason' and the 'Reason-in-person', as he writes:

> The process that has begun as quantum bifurcates midway, at the crucial moment of understanding when the aleatory subject must choose between its being indexed to the transcendental of superposition as Reason-in-person, or that other more classical

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[31] Cf. Laruelle, *En dernière humanité: La nouvelle science écologique*. Paris: Les Éditions du Cerf, 2015a, p. 150: *'continuum philosophique'*.

[32] Cf. id. 2010a, pp. 85 f.: *'Vers le quantum générique'*.

[33] Smith 2016, p. 18.

[34] Laruelle 2015d, p. 11; id. 2014, p. 28: *'un "champ opératoire"'*.

[35] Cf. Cavaillès, Jean, *Méthode axiomatique et formalisme. Essai sur le problème du fondement des mathématiques* [1938], reed. in *Œuvres complètes de philosophie des sciences*. Paris: Hermann, 1994, p. 186 (178 in the original edition).

[36] Ó Maoilearca 2015, p. 6 (without emphasis but with italics in *X*).

[37] Laruelle, 'A Rigorous Science of Man' (1985), in id., 2013a, p. 45.

[38] Ó Maoilearca 2015, p. 12.

[39] See Brassier 2007, Chapter 5, 'Being Nothing', pp. 118-49, or id., 'Laruelle and the Reality of Abstraction', in Ó Maoileorca, John, and Anthony Paul Smith, eds., *Laruelle and Non-Philosophy*, Trans. by Anthony Paul Smith. Edinburgh: Edinburgh University Press, 2012, pp. 100–21.

> indexing to a philosophical transcendental, while moreover using the same *a priori* means. This is the final choice between the lowered-over Reason-in-person [...] and the philosophically overloaded Reason that sinks into its own ruins because it returns in itself as a repetition of its own circle after a partially vain or unfinished detour through the quantum.[40]

A different way, followed by Kolozova, Ó Maoilearca, Smith, Gangle, James[41] and others, is to take up Laruelle's undertaking 'of causing thought to function otherwise than philosophically'[42] and to answer to the question (i) 'what can non-philosophy do?'[43]. 'Hence', as Ó Maoilearca states, 'one must ask what non-philosophy *does* (be it with philosophy or any other field), before asking what it is. Its being is its doing.'[44] Moreover, since '[o]ne of the things that motivate non-philosophy is the eternal question "what is to be done?"'[45], each one of these authors offers, amongst other things, her or his own answer to the question (ii) 'what should we make of non-philosophy, or what are we to do with non-philosophy?'. As Laruelle writes in *Philosophie non-standard*:

> Husserl needed the science of psychology as a waypoint toward the autonomy of the transcendental, Kant needed newtonian physics as passage toward the *a priori* and the transcendental, Heidegger needed ontological difference to get to *Ereignis*, Plato needed mathematics to get to philosophy. Today we need quantum physics and particularly its use of imaginary numbers in order to pass on to the generic.[46]

Ó Maoilearca needs 'art, to wit, the structure of film' to make a '"Film of Philosophy"' or rather a 'film of non-philosophy'[47]. By using 'a visual art form (cinema) in order to perform a non-philosophical introduction to non-philosophy', *All Thoughts Are Equal* is certainly a consistent approach to non-philosophy. However, *even if* it is 'the model of art and its freedom of materials'[48] that has encouraged Laruelle in regards to non-philosophy, I would strongly hold that such an approach is not 'the only that one can

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[40] Cf. Laruelle 2015a, p. 182: '*Le processus commencé comme quantique bifurque à mi-chemin, au moment crucial de la connaissance lorsque le sujet aléatoire doit choisir entre son indexation au transcendantal de la superposition comme Raison-en-personne, ou bien cette autre indexation plus classique à un transcendantal philosophique, tout en usant par ailleurs des mêmes moyens* a priori. *Tel est le choix final entre la Raison-en-personne surbaissé* [...] *et la Raison surchargée philosophiquement et sombrant dans ses propres ruines parce qu'elle revient en soi comme répétition de son propre cercle après un détour partiellement vain ou inachevé par la quantique.*' Transl. by Smith.

[41] See, for example, Smith 2013; Kolozova 2014; Ó Maoilearca 2015; Gangle 2016; James, *The Technique of Thought: Nancy, Laruelle, Malabou, and Stiegler after Naturalism*. Mineapolis: University of Minnesota Press, 2019.

[42] Laruelle 2013b, p. 100; cf. id 1996, p. 120; see also id., *Anti-Badiou: On the Introduction of Maoism into Philosophy*, Translated by Robin Mackay. London and New York: Bloomsbury, 2013c, p. 148.

[43] See Laruelle, 'What Can Non-Philosophy Do?', in id., *The Non-Philosophy Project*, Edited by Gabriel Alkon and Boris Gunjevic. New York: Telos Press Publishing, 2012a, pp. 196–231, particularly p. 207.

[44] Ó Maoilearca 2015, p. 100.

[45] Laruelle, 'From the First to the Second Non-Philosophy' (2010), in id. 2013a, p. 321.

[46] Cf. id. 2010a, pp. 257 f., translated by Alexander R. Galloway in id., *Laruelle: Against the Digital*. Minneapolis: University of Minnesota Press, 2014, p. 235, n. 7.

[47] Ó Maoilearca in Gangle, Rocco and Greve 2017, pp. 23, 24, 26.

[48] Laruelle, 'The Generic Orientation of Non-Standard Aesthetics' (paper presented at the Weisman Art Museum, University of Minneapolis, November 17, 2012).

consistently take'[49], as Ó Maoilearca states. As for what I call in paragraph 2.4. 'tropical philosophy', i.e., a 'commutative shadow' of non-philosophy, and in section 4.4. 'subtropical philosophy', i.e., a 'complex lift' of tropical philosophy, I will offer – implicitely as for question (i) and explicitely as for question (ii) – my own 'pragmatic' answer by the use of certain physico-mathematical models (that is, the use of 'tropical numbers' or 'characteristic one', 'categories' or 'topos' in order to gain the 'subtropical'), without intending to say that there is any 'supreme discipline' such as mathematics being *the only viable language* of ontology, like Badiou who goes so far as to explain the emergence of philosophy with the existence of mathematics[50], being convinced that: 'Only in mathematics can one unequivocally maintain that if thought can formulate a problem, it can and it will solve it.'[51] Alexander R. Galloway's critique of Badiou for 'abandoning core ontological questions to the brute vicissitudes of formal abstraction'[52] might seem to have some ground for justification not only in the Laruellean context, as Brassier notes[53], but also in my own connection with non-philosophy. However, my goal is neither to introduce some basic techniques of idempotent analysis, category theory and topos theory to a philosophical readership nor would I dare to hold any claim to a 'strong ontology' *à la* 'ontology is hard-nosed math'[54]. The category-oriented approach to the generic matrix and the application of a 'tropical analysis' to the generic matrix category in Chapter 2 as well as the combination of the concepts of 'topos' and of 'characteristic one' in Chapter 4 do not fall under the 'Principle of Sufficient Mathematics', since there is no 'special role of mathematics'[55]. Furthermore, I do not show any attempt for any authority over anything.[56]

'Homological ontology' is the attempt to build a 'bridge' between commutative, continuous ontology and Laruelle's non-commutative, discrete or quantum 'non-ontology.'[57] It has to be developed, as will be shown, 'in characteristic one' (introduced by Laruelle as 'idempotence'[58], that is, the logico-algebraic rule: $1 + 1 = 1$). In this new commutative, homological paradigm there is a balance between, on the one hand, the 'spectral variability' of the generic quantum as the most elementary concept, the 'rational core' and the 'essence' of Laruelle's 'materiel or immanental formalism'[59],

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[49] Ó Maoilearca in Gangle and Greve 2017, p. 24.
[50] See Badiou, Alain, and Jean-Luc Nancy, *La tradition allemande dans la philosophie*, Edition and postscript by Jan Völker, Paris: Lignes, 2017, p. 43.
[51] Badiou, *Mathematics and Philosophy: The Grand Style and the Little Style* in id., *Theoretical Writings*, trans. and ed. Ray Brassier and Alberto Toscano. London and New York; Continuum, 2006c, p. 17.
[52] Cf. Galloway 2014, p. 206.
[53] See Brassier 2003, p. 24.
[54] Cf. Galloway 2014, p. 206.
[55] Cf. ibid., p. 191.
[56] Cf. ibid., p. 183.
[57] Cf. Laruelle 2015a, p. 79; '"*non-ontologie*"'.
[58] Cf. id., *Introduction aux sciences génériques*. Paris: Éditions Pétra, 2008, pp. 52–5 ('*Addition idempotente. Vécu stérile. Unilatéralité*'), and id. 2010a, p. 54 ('*Idempotence*'), pp. 294–302 ('*L'idempotence comme analytique fort et synthétique faible*').
[59] Id., *Christo-Fiction: The Ruins of Athens and Jerusalem*, Translated by Robin Mackay. New York: Columbia University Press, 2015d, p. 64; id., *Christo-fiction. Les ruines d'Athènes et de Jérusalem*. Paris: Fayard, 2014, p. 104: '*formalisme matérial ou immanental*'.

which allows the continuous and the discrete to coexist 'in a generic space'[60] (Rocco Gangle) and, on the other hand, the topos as another, even more intimate link between discrete and continuous structures. Although both approaches are very different, they are not totally disjunct either. The applied key idea borrowed from Alain Connes[61] is to replace the ordinary philosophical space *X* by its role as a parameter space ('ordinary philosophical' in the sense of 'independent of the parameter' and 'onto-topological' or 'topo-onto-logical')[62]:

philosophy's space *X* →
category of variable Cantorian concepts with a parameter in *X*.

That is, instead of focussing on the 'intensive or conceptual spaces'[63] of philosophy themselves, with their 'isolated conceptual points'[64], as described by Deleuze in *How to Recognize Structuralism* – 'Space is what is structural, but an unextended, preextensive space, pure *spatium* constituted bit by bit as an order of proximity, in which the notion of proximity first of all has precisely an ordinal sense and not a signification in extension'[65] –, we will rather concentrate on their ability to define a 'variable set-theoretic concept' with a parameter. The abstract category of such 'Cantorian concepts depending on parameters' fulfils almost all classical rational properties, except the axiom of the excluded middle, and encodes a philosophical space *X* such as the 'transcendental field', the 'plane of immanence', or the 'generic plane' through the category of 'sheaves'[66] of set-theoretic concepts on that space. From this point of view, we understand *X* not by directly looking at it. The parameter space remains rather 'at the back of the stage' as a 'hidden schemer', which governs the variability of every object 'at the front of the stage', occupied by the Laruellean onto-materiality. Once we study these 'non-concepts' in their new quasi-philosophical environment, we find that their properties reveal from their relations with the ordinary 'philosophical continuum', i.e., the 'cohomology' or invariance of the hidden parameter space. Thus, the nonvariable, nonparametrized space of thought forms part of a new commutative ontology. This makes sense because, as will become clear, the topos-concept admits a unique 'morphism' or arrow to the topos of classical Cantorian concepts.

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[60] Gangle, Rocco, *Diagrammatic Immanence: Category Theory and Philosophy*. Edinburgh: Edinburgh University Press, 2016, p. 162.
[61] Cf. Connes, Alain, 'Geometry and the Quantum' (2017), p. 5: arXiv:1703.02470v1.
[62] See Badiou, *Mathematics of the Transcendental*, Edited, translated and with an introduction by A. J. Bartlett and Alex Ling. London, New Delhi, New York, Sydney: Bloomsbury, 2014, Part One: 'Topos, or Logics of Onto-logy: An Introduction for Philosophers', pp. 11 ff.
[63] Gangle 2016, p. 239.
[64] Cf. Laruelle 2010a, p. 13: '*points conceptuels isolés*'.
[65] Cit. in Bryant, Levi R., *Difference and Givenness: Deleuze's Transcendental Empiricism and the Ontology of Immanence*. Evanston: Northwestern University Press, 2008, p. 170. On the concept of a 'pure', 'unextended spatium', see also Deleuze, *Différence et répétition*. Paris: PUF, 1968, pp. 296–9, or id., *Difference and Repetition*, Translated by Paul Patton. London: Athlone Press, 1994, pp. 229–31.
[66] See Grothendieck, '*Sur quelques points d'algèbre homologique*', Tohoku Mathematical Journal, Volume 9, Number 2 (1957), Chapter III, 3.1., '*Généralités sur les faisceaux*', pp. 153–6, available at: https://projecteuclid.org/euclid.tmj/1178244839.

If non-philosophy is to be considered as 'the *real* transformation of philosophy on the basis of the scientific posture'[67], 'tropical' and 'subtropical philosophy' aspire to be an *imaginary* transformation of *non-philosophy* by taking the same non-sufficient (philosophically underdetermined) 'scientific' stance. As to avoid any circular method of treating non-philosophy non-philosophically and 'to think itself in a manner that would be rigorous, non{-}circular [*non circulaire*], and non{-}question-begging [*sans pétition de principe*]; in other words, that of *theory* [*une théorie certes transcendantale mais de type scientifique*]'[68], this will be rather the problem for a *quasi*-philosophy, *if we can summarize it and present it with Laruellean material.*[69] Similarly, Chapter 4, 'Homological Ontology in Characteristic One', has no pretension of unifying commutative ontology and non-commutative ontology *on the level of quantum-oriented theory* but rather on a *'semi-philosophical'* level. Such a 'semi-classical' approach is no more than 'an invitation or suggestion to adopt a similar posture'[70], to use the words of Ó Maoilearca. If philosophy is not excluded by non-philosophy, so a 'semi-philosophy', a 'quasi-philosophy' or a 'sub-philosophy' would be neither. We will not condemn the idea of unification and notions such as 'fixedness, stability, and continuity' as 'bad words' reducing them to 'the core of conservative political values'[71]. For us, these words are no more '"outlandish" (unthinkable or irrelevant)'[72] than '[p]lurality and mobility of thought'[73], 'uncertainty as the fundament of all existence'[74], 'fluctuation', 'variability', and 'discreteness'. Instead, we will try to embrace, in a certain sense, 'The One Two of differential being', 'The Not-One of dialectical being', 'The One-as-Multiple of continuous being', and 'The One-and-the-Same of generic being'[75], as Galloway puts it by further pointing out: 'The passwords of dialectical being are *point* and *position, thesis, argument, resistance, critique*', etc. [...] The passwords of continuous being are terms like *integration, multiplicity, wave, attractor, continuum, univocity, analogy, indifference*', etc.[76] The idea is to encompass both the 'philosophical continuum', embodying the 'World' or 'World-Thought' of continuous, intellectual or sensuous quantities as well as numerous other sorts of structures, which belong to non-philosophy's discontinuous or discrete 'Universe-language'[77]. So instead of considering ontology either as (i) an 'ontology of the One', (ii) as an 'empiricist or pragmatic ontology' or (iii) as an 'ontology of the pure multiple' or 'of the multiple without-one', a 'homological ontology in characteristic one' suggest a tripodal foundation, as Badiou writes: 'based on the One' (which is 'classical' for the latter and related to the 'contemporary' in Laruelle), 'based on relation' (characterized

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[67] Cf. Laruelle 1991, p. 53 (my italics).
[68] Id., 'A Summary of Non-Philosophy' (2004), in id. 2013a, p. 287; id. 2012a, pp. 25 f.; cf. id. 2004, p. 30.
[69] Cf. id. 2013b, p. 265, and id. 1996, p. 324.
[70] Ó Maoilearca 2015, p. 21.
[71] Kolozova 2014, p. 79.
[72] Ibid., p. 80.
[73] Ibid., p. 84.
[74] Ibid., p. 82.
[75] Galloway 2014, pp. 34–43.
[76] Ibid., pp. 36, 38.
[77] Cf. the entries *'Monde'*, *'Pensée-monde'*, *'Langage-univers'* in Laruelle 1998, pp. 98–101, 152 f., 91–3, and 'World', 'World-thought', 'Universe-language' in id. 2013e, pp. 160–2, 168–71.

as 'modern' by Badiou, whereas it looks quite 'contemporary' to myself), and 'based on the multiple'[78] (that is the privileged solution of Badiou, while it could also be called 'postmodern').

Laruelle says that 'a philosophy is born in the midst of an overfilled desert, always either already overpopulated with concurrent thoughts, or else too empty'[79]. Correspondingly, Galloway writes: 'If during the 1980s and 1990s much of [our] [...] culture and philosophy was concerned, both temporally and critically, with the prefix of the *post-* (from postmodernism to postpunk and everything in between), today the new concern is the prefix of the *non-*, in-, or un- [...] today the logic is that of cancellation or invalidation'.[80] According to Kolozova, 'the non-philosophical or the radical stance of thinking in accordance with the dictate of the illogical, unpredictable, uncontrollable real also entails producing new conceptual devices (issuing in new doctrines). However, the creation of new conceptual tools or doctrines is not the primary goal. Instead, it is a posture of thought'[81]. On the one hand, my preference of the prefix quasi- or semi- as much as of affimative notions such as 'tropical' or 'subtropical' is due to the fact that I have neither sufficient nor idiosyncratic reasons for being harassed by philosophy – I do not see today, in our rather ordinary, that is, mean society, the evoked 'desert [...] overpopulated with concurrent thoughts, or else too empty'. Therefore, I could equate the aspect that attracts me to non-philosophy a little bit with what happens with aerial acrobats in circuses. We go to a circus because every time, they are risking their lives, which is, as I see it, what non-philosophers are doing. They are risking their philosophical 'life' (way of thinking) with this kind of virtuosity and of course the more audacious and the more artistic it is, the more exciting it can be. It is an exercise in acrobatics – non-philosophical acrobatics that I admire. On the other hand, my choice of tools and expressions is due to a change of logic. In 'Laruellean ontology'[82], logic is reduced to idempotence and the Real to immanence. In Badiousian ontology of the void, mathematics is reduced to set theory, and the Real to Being as well as Being to the inconsistent multiplicity[83]: 'if an ontology is possible', says Badiou, 'then it is the situation of the pure multiple, of the multiple "in itself". To be more exact; ontology can be solely *the theory of inconsistent multiplicities as such*'[84]. James further points out:

> If the one *is not* and results only from an operation of counting, then pure multiplicity understood as being is necessarily in excess of the consistency imposed by counting-as-one or, as Badiou puts it, 'the absolute point of being of the multiple is not its contingency – thus its dependence upon a procedure of the count-as-one – but its consistency, a multiple deployment that no unity gathers together'[85 ...]. Thus, the notion of inconsistent multiplicity lies at the very centre of Badiou's thinking about ontology. A

[78] Cf. Badiou, *L'Immanence des vérités. L'être et l'événement*, 3. Paris: Fayard, 2018, p. 53.
[79] See Laruelle 2012e.
[80] Galloway 2014, pp. 189 f.
[81] Cf. Kolozova 2014, pp. 112 f.
[82] Galloway 2014, p. 122.
[83] Cf. Laruelle 2011a, p. 114.
[84] Badiou 2006b, p. 28; cf. id. 1988, p. 36.
[85] Id. 2006b, p. 42; cf. id. 1988, p. 53.

> thing or an object can be thought of as denumerable entity or identity only insofar as it is counted-as-one in a given situation. Its *being* priori to any operation of counting is pure inconsistent multiplicity, non-denumerable and in excess of any horizon of unity or totality.[86]

Non-philosophy which is also effectuated as a radically immanent inconsistent multiplicity, according to Laruelle, is solely by virtue of its scientific essence an authentic 'ontology'. 'Non-philosophical arguing for a thought that is treated as an operation devoid of ontology, that is subjected to the real, and that issues from it as its "nonthetic reflection" and as "absolute reflection, or without mirror"[87,88], as Kolozova writes – this is the sense in which being 'is inconsistent or non-consistent – it is no longer the Being of philosophical ontology'[89]. Non-consistency implies or presupposes the being-foreclosed of the real to both philosophical and non-philosophical forms of thought. In *Theory of Identities* Laruelle says on the subject:

> Science establishes the distinction between a transcendent realism it destroys; a transcendental yet objective, therefore ideal and semi-transcendental realism it partially destroys, only conserving transcendence in a simple and nonthetic form, and a nothing-but-transcendental realism or 'postural' realism in which the real is immanent, even as 'object'. If science has an 'ontology', it is neither empirical-substantialist nor idealist-categorial nor existential and projective. It is strictly the ontology of immanent phenomenal givens, which are what is known *in-the-last-instance* by knowledges.[90]

If one considers ontology as the exploration of 'the stable substance of the real'[91], as John D. Caputo does, then non-philosophy has to be called 'a new "non-ontology"'[92]. Realism and idealism are defined in explicitly ontological terms, even if they have epistemological consequences. The analytic prolongation of Laruelle's 'quantum or non-Cantorian ontology'[93] to 'non-commutative ontology' in Chapter 3 and finally 'homological ontology in characteristic one' in Chapter 4 could be ligned up with 'a re-engagement with the question of ontology'[94] ('what do I know to be real?'[95]) characteristic for actual French thought.

Following the methodological advice of Guitart in Chapter 1, 'The Gesturality of the Generic Matrix', 'we do no longer ask ourselves what the fundamental concepts are by starting, as our first concern, from an epistemological organization of knowledges, their

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[86] James 2012, p. 137.
[87] Cf. Larelle 1989, p. 97.
[88] Kolozova 2014, p. 109.
[89] Laruelle 2012a, p. 49.
[90] Id. 2016, p. 51; cf. id. 1992, p. 74.
[91] Caputo, John D., *Hermeneutics: Facts and Interpretation in the Age of Information.* Penguin Random House UK, 2018, p. 196.
[92] Cf. Laruelle 2015a, p. 79.
[93] Cf. id. 2011a, p. 150.
[94] James 2012, pp. 5 f., cf. ibid., p. 4.
[95] Ó Maoilearca 2015, p. 99.

historicity and their problems [...], but rather by starting from the concern of the instructive value [...] of the notions in question'[96] that initiates us to the non-philosophical 'act, a gesture'[97] (Katerina Kolozova), *vis-à-vis* the great conceptual problem of the discrete and the continuous. As for the practice of purloining concepts from scientists such as 'category' (dating back to Aristotle and Immanuel Kant), 'functor' (coined by Rudolf Carnap[98]) or 'topos' (related to Plato's 'χώρα'[99])[100], a twentieth century precursor can be found in Ernst Cassirer's *Substanzbegriff und Funktionsbegriff* where he presents a 'functional theory of the concept'[101] embedded within a '"genetic" view of knowledge'[102]. Other, more recent, parallels in methodology can be drawn with Deleuze and Guattari, who conceived of the concept as 'a multiplicity'[103] (Bernhard Riemann) endowed with 'a phase space'[104] (Henri Poincaré), 'although in another way than in science'[105], and, of course, with Laruelle's 'science of conceptual particles'[106] which deduces a generic basis of knowledge from quantum physics, in parallel to Kant's transcendental method modelled on newtonian physics.

On the one hand, our model and guideline is non-philosophy's 'Vision-in-One' starting from 'performativity' (i.e., 'thinking in characteristic one'). For characterizing 'the radical kind of immanence', Laruelle assumes in *Principles of Non-Philosophy* 'a radical transcendental identity of saying and doing (to-do-in-saying, to-say-in-doing) [...] opposed to philosophical concepts'[107]. On the other hand, based on the understanding of non-philosophy as an *extensive* or *limited* philosophical practice, values such as openness and tolerance entail that nobody *has* to take up any or any particular non-philosophical posture, for instance: 'one does not have to see non-philosophy as

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[96] Cf. Guitart 1999, p. 7: *'On se demandera plus quelles sont les notions fondamentales en partant comme souci premier d'une organisation épistémologique des savoirs, de leur historicité et des problématiques* [...], *mais plutôt en partant du souci de la valeur instructive* [...] *des notions en question.'*

[97] Kolozova, Katerina, *Cut of the Real: Subjectivity in Poststructuralist Philosophy*, Foreword by François Laruelle. New York: Columbia University Press, 2014, p. 87.

[98] See Carnap, Rudolf, *The Logical Syntax of Language*, Translated by Amethe Smeaton. London: Routledge & Kegan Paul, 1937, p. 14; cf. id., *Logische Syntax der Sprache*. Wien: Springer, 1934, p. 13. For the quotation see paragraph 2.1., 'Categorialization and Tropicalization'.

[99] Plato, *Timaeus* and *Critias*, Translated by Robin Waterfield, With an Introduction and Notes by Andrew Gregory. Oxford: Oxford University Press, 2008, 'The receptacle and the tripartite ontology' (48e–52d), pp. 39–45. See also Derrida, Jacques, *Khôra*. Paris: Éditions Galilée, 1993.

[100] Cf. the note of Saunders Mac Lane on 'the pleasure of purloining words from philosophers: "Category" from Aristotle and Kant, "Functor" from Carnap [...]' in id. *Categories for the Working Mathematician*. New York: Springer, ²1998, pp. 29 f.

[101] Cassirer, Ernst, *Substance* and *Function*. Chicago: Open Court, 1923, p. 197, available at: https://archive.org/details/substanceandfunc033163mbp/. Cf. id., *Substanzbegriff und Funktionsbegriff: Untersuchungen über die Grundfragen der Erkenntniskritik*. Berlin: Verlag von Bruno Cassirer, 1910, p. 262, available at: https://archive.org/details/substanzbegriffu00cassuoft/: *'die funktionale Theorie des* Begriffs'.

[102] Id. 1923, p. 315; cf. id. 1910, p. 418: *'"genetische" Ansicht der Erkenntnis'*.

[103] Deleuze and Guattari 1991/2005, Chapter 1, 'Qu'est-ce que'un concept ?', pp. 21–37.

[104] See appendix.

[105] Cf. Deleuze and Guattari 1991/2005, p. 30: *'Tout concept a donc un espace de phases, bien que ce soit d'une autre manière que dans la science.'*

[106] Cf. Laruelle 2010a, p. 72: *'corpuscule conceptuel', 'science des particules conceptuelles'*.

[107] See Laruelle 2013b, pp. 175 f.

performative (nobody *has* to do anything of necessity).'[108] My aim, however, is to apply a unified methodology that transforms all adopted tools in their use for answering the key research questions mentioned above, in the wake of Laruelle's idea of a 'generic science' which is 'meant for scientists as much as for philosophers'[109], but unlike Gangle's methodological decision in *Diagrammatic Immanence* to present two parallel series of more mathematical even numbered chapters, on the one hand, and more philosophical uneven numbered chapters, on the other, leaving it up to the reader to superpose them.

My conclusion will be that, after finding a complex algebraic and ontological object, that is, a discrete 'homological site' which makes intervene the fundamental concepts of 'characteristic one' and the 'topos' but whose definition by the number of 'eigenvalues' that are bigger than the Laruelle constant is rather simple, philosophy can be reapproached by way of 'tropical' and 'subtropical philosophy'. For instance, Nishida Kitarō's own project of treating the continuous and the discrete in a unified manner as 'the continuity of discontinuity' (非連続の連続, *hirenzoku no renzoku*[110]) can thus be reevaluated, first, by the conclusions drawn from Laruelle's 'particle picture of philosophy' with regard to coherence considerations and the emergence of time in a non-commutative 'space of lived experience' (体験の場所, *taiken no basho*[111]) and the 'eternal present' (永遠の現在, *eien no genzai*[112]; see Chapter 3); and second, with the concept of topos which embraces continuous and discontinuous structures, while allowing us to have no longer only the true and the false, but also a much subtler idea of a path toward the truth closely related with Nishida's 'logic of place' (場所の論理, *basho no ronri*[113]). Instead of being interested in only one particular 'field of thought' (思の野, *shii no ya*[114]), 'subtropical philosophy' explains Laruelle's 'non-philosophical Chôra'[115] as a topos or a parameter space that governs the variability implied by 'the relative point of view on philosophy' in the worldly 'foreground' (see paragraph 4.1.), while establishing a 'homological bridge' for an imaginary and indirect transfer between multiple philosophical worlds in the universal 'background of Being' (有の背景, *u no haikei*[116]) as 'the place of absolute nothingness' (絶対無の場所, *zettai-mu no basho*[117]), along with a new commutative but variable ontology 'in characteristic one' ($1 + 1 = 1$). However, let

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[108] Ó Maoilearca 2015, p. 21.
[109] Cf. Laruelle 2008, p. 18.
[110] Cf. Elberfeld, Rolf, ed., *Kitarō Nishida – Logik des Ortes: Der Anfang der modernen Philosophie in Japan*, Translated and edited by Rolf Elberfeld. Darmstadt: Wissenschaftliche Buchgesellschaft, 1999, p. 290. See also Stadelmann Boutry, Britta, *'Quelques notions clés de la pensée de Nishida et leur impact sur le "dépassement de la modernité"*, in Berque, Augustin, ed., *Logique du lieu et dépassement de la modernité*, Vol. 1, *Nishida : La mouvance philosophique*. Brussels: Éditions OUSIA, 2000, pp. 23–40.
[111] Cf. Elberfeld, pp. 77, 299.
[112] Cf. ibid., pp. 106, 291, 302.
[113] Cf. ibid., pp. 297 f.
[114] Cf. ibid., p. 113; for 'space of thought' (*'Ort des Denkens'*) see ibid., p. 136.
[115] See Laruelle 2013e, pp. 43–5, and id. 1998, pp. 35–7.
[116] Cf. Elberfeld 1999, pp. 81 f., 117, 225 f., 302.
[117] Cf. ibid., pp. 93, 286, 298.

us start now in the most traditional manner by rising first the ultimate metaphysical 'question of essence'[118]: *What is*... 'non-philosophy' in the first place?

[118] On the history of the philosophical question 'What is X?', see Deleuze 1994, pp. 236 f.; id. 1968, p. 243.

1. THE GESTURALITY OF THE GENERIC MATRIX

1.1. The Generic Matrix

The use of 'non-' in 'non-philosophy' means that standard philosophy is not assumed, but it does not mean that it is generally *disallowed*. In other words, 'non-' stands for 'not necessarily-', in the same way as in algebra 'non-commutative' means 'not necessarily commutative' or 'non-associative' means 'not necessarily associative'[1], 'complex' means 'not necessarily real', since complex numbers do not exclude but imply real numbers by being their 'natural' extension, or non-Euclidean geometry *exceeds* the geometric standard model by abandoning the parallel postulate of Euclidean geometry (Hermann Weyl already refers to Kant's 'bondage to Euclidean geometry'[2]; hence, 'the "non-Euclidean metaphor"'[3] regularly used by Laruelle in the beginnings of non-philosophy), and non-standard analysis differs from conventional analysis by allowing infinite quantities, amongst others. Nevertheless, this denotational parallel should not be abused in details since, for instance, Laruelle advocates to renew finitude and temporality (see below paragraph 3.4., 'Non-Commutativity and the Emergence of Time'), against mathematical and topological eternity and infinity, in the spirit of the sciences of the real (physics, chemistry, biology, etc.).[4] Thus, we speak about *non-ontology* rather than 'nonontology'[5], a 'non-' of extension, not of exclusion. Many scholars have repeatedly insisted on that nuance. For instance, Gangle when he writes:

> The analogy [to non-Euclidean geometry] translates to the case of non-philosophy and philosophy as follows: if philosophy is conceived as the analogue of Euclidean geometry, it is clear that an analogous 'subtraction' of one or more of philosophy's 'axioms' (roughly, its enabling presuppositions) will in no way negate or disqualify philosophy as such. Instead, it will open up a wider range of possible models for the 'reduced' or 'simplified' system. All the philosophical models will be included in this larger class, but so will additional models that the now subtracted axiom(s) would have excluded. In this sense, non-philsophy is understood to *extend* philosophy, that is, it opens a more general domain of which philosophy represents only one restricted sub-domain. By calling the mode of thinking that proceeds in-One or according-to-One *non-philosophy*, Laruelle intends simply to designate that a *less restricted* form of thinking than that of philosophy (one involving fewer presuppositions) is thereby *more general*. In this way, non-philosophy engages a 'space' of thinking that includes (the models of) philosophy while also including other models that philosophy axiomatically excludes.[6]

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[1] Cf. Tringali, Salvatore, 'Plots and Their Applications - Part I: Foundations' (2013), p. 2: arXiv:1311.3524.
[2] Weyl, Hermann, 'Insight and Reflection' (1954), in id., *Gesammelte Abhandlungen*, Edited by K. Chandrasekharan, Vol. IV. Berlin, Heidelberg: Springer, 1968, pp. 636 ff.
[3] Laruelle 2013b, p. 41; cf. id. 1996, p. 48: *'la "métaphore non-euclidienne"'*.
[4] Cf. id., *'Pour une philosophie dite "contemporaine"* (Towards a Philosophy Deemed "Contemporary")' (2012e), Lecture at *The London Graduate School*, May 9, 2012, available at: http://backdoorbroadcasting.net/2012/05/francois-laruelle-pour-une-philosophie-dite-contemporaine/.
[5] Kolozova 2014, p. 140.
[6] Gangle, *Francois Laruelle's Philosophies of Difference: A Critical Introduction and Guide*. Edinburgh: Edinburgh University Press, 2013, p. 53.

Thus, Laruelle neither rejects philosophy nor surpasses it in any recognizably philosophical terms. Non-philosophy 'is not a negation of philosophy but its expansion into new realms of thought'[7], as Ó Maoilearca states, subsequent to Laruelle: 'it is, on the contrary, its generality or its opening as a correlate of the One rather than of Being'[8]. What is more: 'It is a *positive* act'[9]. Non-philosophy 'does not maintain [...] a relation of negation to philosophy, but a positive relation of generic usage'[10], as Laruelle says, it negates 'only that part of it that can be negated – it's sufficiency'[11]. Smith writes that '[p]hilosophies and other aspects of regional forms of knowing (the other disciplines and sciences) are treated by Laruelle as simple material after they have been made relative or been deprived of their sufficiency in the theory of Philosophical Decision.'[12] Ó Maoilearca further points out: 'The function of non-philosophy, therefore, is to integrate (rather than reduce, replace, or eliminate) philosophical views back into the Real by surveying them together in a democratic, immanent, revision where no one view is superior to or transcends the other.'[13] For non-philosophy, philosophy remains a reference system or the standard model of thought. As a consequence, 'non-philosophy is the opening of a new space, but *for* philosophy: *from this opening or this radical possible, it becomes possible to acknowledge* [philosophical] *decision as a particular case of "non-philosophy"*'[14].

In 'Philosophy II' (especially in *En tant qu'un* [1991]) and 'Philosophy V' Laruelle gives a privileged position to natural science 'insofar as it is not determined in its content by language or the concepts of language'[15], as he writes: 'there is more real and really universal thought in, say, Riemann and Einstein than there is in Hegel and Heidegger'[16]. By means of the 'Principle of Sufficient Mathematics' (PSM), on the one hand, and of the 'Principle of Sufficient Philosophy'[17] (PSP), on the other, against any 'sufficient' use of either mathematics or philosophy, Laruelle achieves a science which has become thought, 'a science as thought'[18], 'a thinking science'[19], as he says in reference to Heidegger[20], or a 'Science-thought (unified theory of thought)'[21] that is

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[7] Ó Maoilearca, 'Circumventing the Problem of Initiation: On Introductions to Non-Philosophy', in Gangle, Rocco, and Julius Greve, eds., *Superpositions: Laruelle and the Humanities*. London and New York: Rowman & Littlefield, 2017, p. 20.
[8] Cf. Laruelle 1991, p. 20.
[9] Ó Maoilearca 2015, p. 9.
[10] Laruelle 2013c, p. 15; cf. id. 2011a, p. 40: *'La N[on-]P[hilosophie] n'entretient pas* [...] *un rapport de négation, mais un rapport positif d'usage générique à la philosophie, et un rapport de suspens seulement à sa suffisance prétendue pour le réel.'*
[11] Id. 2013c, pp. 211 f.
[12] Smith 2016, p. 52.
[13] Ó Maoilearca in Gangle and Greve 2017, p. 19.
[14] Laruelle 2013d, p. 25.
[15] James 2012, p. 199; see Laruelle 1991, p. 202.
[16] Cf. Laruelle 1991, p. 67.
[17] See id. 2010a, pp. 49 f.: *'Principe de mathématique suffisante'* and *'Principe de philosophie suffisante'*.
[18] Cf. ibid., p. 119: *'une science comme pensée'*.
[19] Cf. ibid., p. 68: *'une science pensante'*.
[20] See Heidegger, *Was heisst Denken?*. Tübingen: Niemeyer, 1984.
[21] Laruelle 2013e, pp. 136 f.; cf. id. 1998, pp. 153–5: *'Pensée-science (théorie unifiée de la pensée)'*. Cf. also

defined as a 'unified theory of philosophy and other knowledges'[22]. According to James, 'Laruelle's conception of a "science" of philosophy and of science more generally can be aligned with an Althusserian structural conception of science or theory'[23]; non-philosophy's 'scientificity resides in its theoretical formalism or its structuralism'[24]. However, as will become clear in paragraph 2.1., 'Categorialization and Tropicalization', I suggest to conceive the Laruellean science less 'as a formalism or structuralism'[25] but more generally in categorial terms, as a *category*. Non-philosophy is defined by its procedures as a 'practice' answering to the question, how... but not why..., since for Laruelle, science is not obliged to find any sufficient reason for itself, in contradistinction to philosophy.[26] In other words, science does not need any manifest: '*the Manifest is invisible – it is the real; the Invisible is manifest – it is the science of the real.*'[27] As Kolozova further points out:

> What Laruelle primarily refers to when speaking of 'the scientific' is its determination in the last instance, namely, the status of the authority in the last instance that the experience and experiment of the real holds (rather than acknowledging such authority as a doctrine or doxa). It is a kind of thought that situates its starting point in the object of thought [...].
>
> Scientific thinking is dictated by the object of investigation, by the vicissitudes of the unpredictable real. In non-philosophy, the term 'scientific' is not used in the conventional sense of the word [...]; it is that aspect which differentiates scientific thought from the one Laruelle calls 'philosophical'. Philosophy is that vicious circle of effort toward mastering both the real and itself (the thought or the transcendental).[28]

Numbers, as Kurt Gödel has shown, could represent any kind of structure beyond the level of number theory.[29] Therefore, Laruelle has strong reason in *En dernière humanité* to speak of 'the algebraic logos as a complex number'[30], which, in turn, could be called the '[non-]ontologization of number'[31]. (See figure below.) In section 3.4., 'Non-Commutativity and the Emergence of Time', however, I will argue that non-philosophy is

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id. 2010a, pp. 68, 134: '*une pensée-science*'.

[22] Cf. id. 2010a, p. 60: '*Théorie Unifiée de la philosophie et d'autres savoirs*'.

[23] James 2012, p. 9.

[24] Ibid., p. 167.

[25] Ibid., p. 174.

[26] See Laruelle 2010a, pp. 186 f.: '*la fusion comme superposition répond à un problème de "comment" et non de "pourquoi". Le principe de raison a du sens pour une philosophie, il n'a pas de sens pour l'origine d'une science*'; see ibid., p. 379–82: 'Du Pourquoi au Comment. Le radical ou le pourquoi-sans-raison. La science du Principe de raison'.

[27] Id. 2016, p. 54; cf. id. 1992, p. 77.

[28] Kolozova 2014, pp. 108 f. See also Ó Maoilearca 2015, pp. 27–30.

[29] Gödel, Kurt, '*Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme* I', *Monatshefte für Mathematik und Physik*, Vol. 38 (1931), pp. 173–98. See also Nagel, Ernest, and James R. Newman, *Gödel's Proof*, Edited and with a new foreword by Douglas R. Hofstadter. New York, London: New York University Press, 2001, p. xviii.

[30] Cf. Laruelle 2015a, p. 126: '*le logos algébrique comme nombre complexe*'.

[31] Badiou, *Number and Numbers*, Translated by Robin Mackay. Cambridge: Polity, 2008b, pp. 8 f. Cf. id., *Le Nombre et les nombres*. Paris: Seuil, 1990, pp. 18 f.

more than a mere 'generalisation of philosophy'[32]. It has once been described by Ó Maoilearca as 'one of the most demanding, methodical, and provocative intellectual practices in contemporary theory'[33]. It represents a true challenge for 'thinking otherwise' (Michel Foucault) by offering possibilities to set thought back in motion – beyond taking any fixed position where the movement of thought naturally comes to a standstill.

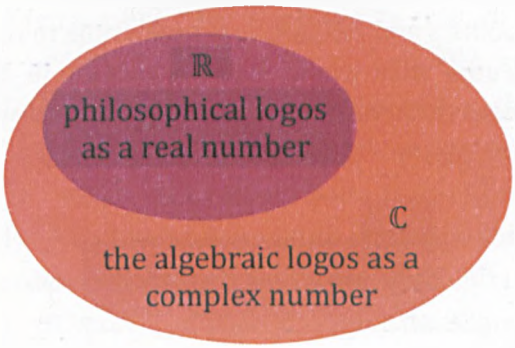

FIGURE. Structural relation between the philosophical and the non-philosophical logos represented by real and complex numbers.

'Position and posture are two different ways of making or of being a decision', as Laruelle says, 'the position indicates an act of transcendence by means of which it would go out of itself'[34], whereas a posture is characterized by conceptual axioms called 'oraxioms'[35] without any possibility to posit itself since: 'There is no self-posture as there is, in a spontaneous manner, a self-position'[36]. Every posture can therefore be regarded as 'simple' instead of being specular or double. Furthermore, '[a] position develops continuously interventional effects which are in fact interpretational, the posture produces or determines transformational effects'[37]. This leads Laruelle to the conclusion: 'The non-philosophical decision is more about a style of thought'[38] than about a real 'discipline'. Enacting thought in axiomatic postures instead of defending determinate positions is not to confuse with thought lacking in content, as Ray Brassier seems to imply, when he writes: 'not only does Laruelle not make novel philosophical

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[32] Gangle 2013, p. 156.

[33] Mullarkey, John, 'Laruelle in London: the London Graduate School Seminars' (2011), on the Weblog of Clarke, Richard L. W., 'Philosophy's Other: "Theory" on the Web': https://philosophysother.blogspot.com/2011/10/laruelle-in-london-london-graduate.html.

[34] Cf. Laruelle 2008, p. 118: '*la position indique un acte de transcendance par lequel il sortirait de soi*'.

[35] Cf. id. 2010a, pp. 57 f.: 'Oraxiome'.

[36] Cf. id. 2008, p. 119: '*Il n'y a pas d'auto-posture comme il y a spontanément une auto-position*'.

[37] Cf. ibid.: '*Une position développe continûment des effets d'intervention qui sont en réalité d'interprétation, la posture produit ou détermine des effets de transformation.*'

[38] Cf. id. 2010a, p. 477: '*La décision non-philosophique est celle d'un style de la pensée.*' Id. 2008, p. 109: '*Introduire le générique comme point de vue,* [...] [*c*]*'est un style de pensée*'. See also ibid., pp. 79–83. For the distinction between 'postural' and 'decisional' or 'positional', see id. 2013d, p. 42: 'The One is a postural rather than decisional and positional identity. [...] Posture is more subjective corporeal and undivided than position; more internal, spontaneous and naive than will and decision.' See also id. 1991, p. 34. Cf. Ó Maoilearca, 'The Structure of Decision and Postural Mutation' in id. 2015, pp. 21–7.

claims about being or truth or knowledge; he also has nothing much to say about history, ethics, art or politics – or at least nothing that would make any kind of sense outside the parameters of his own severely abstract theoretical apparatus'[39]. The content of non-philosophy is rather the same as in all philosophies. As Laruelle points out in *The Last Humanity*[40] with reference to Badiou, when speaking of the humans as subjects of knowledges:

> together they form determination in-the-last-instance and can therefore be invested in the theory of art, love, politics and religion. It is impossible to reconstruct a theological or aristocratic scale of truths that would form a heaven in the name of philosophy. Impossible to accept this architecture that has so little of human and democratic about it, determination-in-the-last-instance prohibits it.[41]

Thus, the way of treating philosophical subjects has radically changed, as well as their orientation, as becomes particularly apparent in *Intellectuals and Power*[42] or *General Theory of Victims*, where Laruelle attempts to sketch

> two possible figures of intellectuals [...]: the 'media intellectual in the broad sense', who is engaged or embedded by power and who emerges through the press and the media and derives profit from this, is content to represent victims, to photograph them in language, writing, or image. [...] And then, there is the 'generic' or 'under condition' intellectual, who labors under the under-determining but in-the-last-instance condition, but this time the victim's rather than philosophy's.[43]

Furthermore Laruelle states:

> We examine different aspects of the philosophizing intellectual: his theoretical strategy, his malaise and his treason, his victimological pathos, but also victimization as a process of redoubled or multiplied pain inflicted upon the victim. On the side of the generic

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[39] Brassier, Ray, 'Axiomatic Heresy: the Non-Philosophy of François Laruelle', in *Radical Philosophy* 121 (September/October 2003), p. 24, available at: https://eprints.mdx.ac.uk/211/1/r595025.pdf.

[40] Laruelle, *The Last Humanity: A New Ecological Science*, Translated by Anthony Paul Smith. London: Bloomsbury Academic, 2019 (not available yet).

[41] Cf. id. 2015a, pp. 152 f.: *'La science générique* [...] *conjugue quantique et philosophie comme variables elles-mêmes quantiques* [...]. *Si bien que leur connexion a une relation forte ou double aux humains comme sujets de savoirs, elles forment ensemble la détermination en-dernière-instance et peuvent ainsi être investies dans la théorie de l'art, de l'amour, de la politique et de la religion. Impossible de reconstituer une échelle théologique ou aristocratique des vérités qui formeraient un ciel au nom de la philosophie. Imposssible d'accepter cette architecture si peu humaine et démocratique, la détermination-en-dernière-instance l'interdit.'* Transl. by Smith.

[42] Id., *Intellectuals and Power: The Insurretion of the Victim*, François Laruelle in conversation with Philippe Petit, Translated by Anthony Paul Smith. Cambridge, UK, and Malden, MA, USA: Polity Press, 2015e. Cf. id., *L'ultime honneur des intellectuels*. Paris: Textuel, 2003.

[43] Id., *General Theory of Victims*, Translated by Jessie Hock and Alex Dubilet. Cambridge, UK, and Malden, MA, USA: Polity Press, 2015c, pp. 4 f. Cf. id., *Théorie générale des victimes*. Paris: Mille et une nuits, 2012c, p. 25: *'deux figures possibles d'intellectuels* [...]. *L'intellectuel "médiatique au sens large" qui est engagé ou embarqué* ("embedded") *par le pouvoir, se contente de représenter les victimes, de les photographier par la parole, l'écrit ou l'image* [...]. *Et l'intellectuel "générique" ou "sous condition", qui travaille sous la condition sous-déterminante mais en-dernière-instance cette fois de la victime plutôt que de la philosophie.'*

> intellectual, we examine the notions of 'weak force' and 'strong force', of 'survivor' and 'arisen', and we attempt to pose the most difficult problem, that of the reasons for persecution and extermination (why do we kill?) and their indexation to generic man rather than to a religious or ethnic scale. It is a question of founding ethics on the unlocalizable and sometimes unidentifiable victim rather than on the metaphysical or philosophical force that took him for profit or loss.[44]

The required change in perspective makes non-philosophy indeed, but not exclusively, *'a new way of thinking'*[45] (Brassier): 'my problem is that of re-orientation of thought, toward its usage to the profit of humans'[46], as Laruelle says. This is also why, for instance, Peter Wolfendale emphasizes the *continuity* rather than the *discontinuity* between philosophy and non-philosophy: 'non-philosophy aims to axiomatically extend philosophical practice in much the way that Heidegger and Derrida aimed to pragmatically reorient it'[47]. However, as Ó Maoilearca notes, 'while individual philosophies are not *epistemically* judged by Laruelle (they are rendered positional and equal), philosophy *as a structure of decision* is *ethically* judged on account of its deleterious effects on the human'[48]: 'We must change hypothesis and even paradigm: break up the mixtures, found philosophy on man rather than the inverse'[49], says Laruelle. In order to accomplish that, it is not necessary to produce radically 'new' findings (such as the quantum, the superposition principle, non-commutativity, idempotence, etc.) but to modify given philosophical knowledges by treating them with those extrinsic, 'strange' instruments and subtle methods of a systematically realized generic *'clinamen'*[50]. This term of Lucretius relates in Laruelle to a certain power of underdetermination or nonsufficiency as well as to its use by Deleuze in the context of 'multiplicities'[51] (for more details see paragraph 3.3.1., 'The Spectral Element of Consistency').

The 'generic posture'[52] implies the idea of a postural force or a 'weak force'[53], i.e., a *'force of interdisciplinary intervention'*[54] or a weak thought[55], although in a different

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[44] Id. 2015c, p. 5. Cf. id. 2012c, pp. 25 f.: *'Nous examinons différents aspects de l'intellectuel philosophant : sa stratégie théorique, son malaise et sa trahison, son pathos victimologique, mais aussi la victimisation comme processus de la double ou multiple peine infligée à la victime. Du côté de l'intellectuel générique, nous examinons les notions de "force faible" et de "force forte", de "survivant" et de "ressuscité", et l'on essaie de poser le problème le plus difficile, celui des raisons de la persécution et de l'extermination (pourquoi tue-t-on ?), de leur indexation à l'homme générique plutôt qu'à une échelle ethnique et religieuse. Il s'agit de fonder l'éthique sur la victime illocalisable et parfois non identifiable plutôt que sur la force métaphysique ou philosophique qui l'a tenue pour pertes et profits'.*

[45] Brassier 2003, pp. 25 f.

[46] Laruelle quoted in Mackay, Robin, 'Introduction: Laruelle Undivided', in Laruelle 2013a, p. 23.

[47] Wolfendale, Peter, *Object-Oriented Philosophy: The Noumenon's New Clothes.* Falmouth, U.K.: Urbanomic, 2014, p. 228 n. 286.

[48] Ó Maoilearca 2015, p. 31.

[49] Laruelle, 'A Rigorous Science of Man' (1985), in 2013a, p. 46.

[50] Cf. Laruelle 2008, p. 120.

[51] Cf. Deleuze 1994, p. 232; id. 1968, pp. 238 f.

[52] Cf. Laruelle 2008, p. 117: 'posture générique'.

[53] Cf. ibid., pp. 77, 79, 117, 120: 'force faible'; see also id. 2011a, p. 13.

[54] Cf. id. 2008, p. 46: 'force d'intervention interdisciplinaire'.

sense than the *'pensiero debole'* of Gianni Vattimo[56], that is, an immanent way of being forced or a 'gesture of forcing'[57]. One knowledge enters another one, strange to the first one, in order to transform it. In a more general sense, it is a force of *subtraction* familiar of Badiou's 'subtractive ontology' where the method of 'generic extension' as well as of 'generic forcing' developed in set theory by Paul Cohen can be found in a more philosopical context.[58] Laruelle claims not to have a physical or metaphysical concept of force but a generic one[59], that is, a philosophically translated concept of interaction reduced by its positivity or its mechanical character. Moreover, as he explains:

> We distinguish the philosophical forcing and the generic forcing in their transformational effect on the knowedge as well as in their respective mechanism. Both are operations which are meant to ensure the passage between two regimes of knowledge, of the existing (scientific) knowledge to a form of universality of another (philosophical) kind, or in the opposite direction, philosophy's becoming-of-a-generic-science.[60]

Due to its scientific allusion and the implications of the predicate 'generic' the term 'generic science' is considered to be more precise than 'non-philosophy'[61]. Laruelle deals with this attribute 'as a new type of universal'[62], in terms of 'universal in use for'[63]. In this capacity, the generic is also known in mathematics, as the universal validity through formalization (that is underdetermination). In pharmacology, a medicament is called 'generic' if it is not the original but an equally effective copy of a branded product. Marketing refers to 'generic products' that lack distinguishing features and are therefore replaceable. 'Generic universality' is achieved by the fact of being 'unbranded'. Furthermore, Laruelle associates 'generic' with the adjunct 'strange': 'the force of the generic is the force of the Stranger'[64], as he says. For, problems that concern the usage of knowledges outside of their subject area or which concern the foreigner entering a another society are considered to be 'generic' problems. He further points out: 'The generic is just this power of an instance [...] to transgress toward the given or factual

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[55] Cf. id. 2011a, pp. 13: *'En réalité cette force générique est plus affaiblissante de la force forte que faible elle-même.'*. Ibid., p. 18: *'Comment amplifier et simultanément affaiblir la philosophie* [...].'

[56] Cf. Vattimo, Gianni, and Pier Aldo Rovatti, eds., *Weak Thought*, Translated from Italian by Peter Carravetta. Albany, NY: SUNY Press, 2013.

[57] Cf. Laruelle 2010a, p. 89: *'geste de forçage'*.

[58] See, for instance, Badiou, *Logiques des mondes. L'Être et l'Événement*, 2. Paris: Éditions du Seuil, 2006a.

[59] Cf. Laruelle 2010a, p. 486: *'Nous comprenons en général la "force" non pas physiquement et métaphysiquement mais génériquement'*.

[60] Cf. id. 2008, p. 77: *'On distingue le forçage générique et le forçage philosophique dans leur effet de transformation du savoir comme dans leur mécanisme respectif. Tous deux sont des opérations destinées à assurer le passage entre deux régimes de savoir, du savoir existant (scientifique) à une forme d'universalité d'un autre type (philosophique), ou bien le passage inverse, le devenir-science générique de la philosophie.'*

[61] Cf. id. 2011a, p. 173: *'"science générique" (autre nom plus précis de la N[on-]P[hilosophie])'*.

[62] Cf. id. 2008, p. 47: *'la force du générique est celle de l'Étranger qui vient comme nouveau type d'universel'*.

[63] Cf. ibid., p. 78: 'universel-pour (usage)'.

[64] Cf. ibid, p. 47.

order of knowledge, and this *without transforming itself in this operation*, without exchanging its nature with the nature of the given knowledge'[65].

Philosophy itself can already be understood as 'an excessive or absolute forcing in order to "exceed" the common sense toward concepts and categories'[66] by use of aprioristic, transcendental and speculative means. But whereas philosophy, as a forcing, is carried out by 'the ancient philosophical individual in *position* of a transcendent subject as a "function of humanity"'[67] – 'The "I think" must be able to accompany all my representations' ('*Das*: Ich denke, *muß alle meine Vorstellungen begleiten können*'[68]), as Kant puts it –, 'the indivi-duality as an existence in-the-body or in a generic *posture*'[69] represents a different kind of forcing, to wit: a '*weak force*', also characterized as '*the non-acting of the idempotent*, the weak force of the generic *a priori* which forces philosophy'[70]. The method of generic forcing consists in underdetermining all sources used in the non-philosophical discourse. In order to force philosophical qualities to become generic, at first the characteristic parts of the standard philosophical model, i.e., its invariants, must be identified and selected. Then, they have to be underdetermined to become independent from their original model. Finally, these generic constraints are treated as a new model. Laruelle further points out:

> Forcing is a method for producing concepts which still have a 'family resemblance' (Wittgenstein) with those of standard philosophy but which represent their amplification as a transformation or 'intensification' of their transcendental or classical mechanism. [...] The future generic concepts are formed from the philosophical material but in such a way that they are radically independent from the latter, although in-ultimate-reference to it, that they are no longer transcendental or lose their philosophical meaning. They will then be indeterminate or floating, neutralized, but at the same time they will get another essence [...] as radical (or immanental) immanence [...].[71]

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[65] Cf. idid., p. 78: '*Le générique, c'est justement ce pouvoir d'une instance, impossible au Tout, de le forcer, de s'excéder* (pour) *vers l'ordre donné ou factuel du savoir, et ceci* sans se transformer lui-même dans cette opération, *sans échanger sa nature avec celle du savoir donné.*'

[66] Cf. id. 2010a, p. 138: '*La philosophie est elle-même un forçage excessif ou absolu pour "dépasser" le sens commun vers des concepts ou des catégories, dépassement à trois degrés, a priori, transcendantal et spéculatif.*'

[67] Cf. id. 2011a, p. 51: '*l'ancien individu philosophique en* position *de sujet transcendant comme "fonction d'humanité"*'.

[68] Kant, Immanuel, *Kritik der reinen Vernunft*. Hamburg: Meiner, 1956, p. 140 b (B 131).

[69] Cf. Laruelle 2011a, p. 51: '*l'indivi-dualité comme existence en-corps ou en* posture *générique*'.

[70] Cf. id. 2008, p. 79: 'une force faible qui, celle que peut le non-agit de l'idempotent, *celle de l'a priori générique qui force la philosophie*'.

[71] Cf. id. 2010a, pp. 93 f.: '*Le forçage est une méthode pour produire des concepts qui ont un "air de famille" (Wittgenstein) avec ceux de la philosophie standard mais qui représentent leur amplification comme transformation ou "intensification" de leur mécanisme transcendantal ou classique.* [...] *Les futures notions génériques sont formées à partir du matériel philosophique mais de telle sorte qu'elles soient radicalement indépendantes de celui-ci quoique en-référence-ultime à lui, qu'elles ne soient plus transcendantales ou perdent leur sens philosophique. Elles seront alors indéterminées ou flottantes, neutralisées, mais en même temps elles recevront une autre essence* [...] *comme immanence radicale (ou immanentale)*'.

In this way, forcing ensures the 'passage from the transcendental to the immanental'[72], '[f]rom the speculative forcing of philosophy to the generic forcing, that is, immanence which forces transcendence by itself, no longer to be overcome but [...] to be superposed and to turn into radical immanence'[73]. Forcing is seen as a possibility to render perceptible the '[f]orce (of) thought (existing-Stranger-subject)'[74], that is defined as 'the first possible experience of thought – after vision-in-One, which is not itself a thought'[75], as a transition from philosophy to non-philosophy. This 'force (of) thought' does no longer synthesize oppositions or concepts in the style of dialectics in an enveloping horizon. 'The rigor of the generic invention', says Laruelle, 'lies in the leaps of thought', that is, the discrete paradigm. 'In a way, there are [...] *no continuous solutions*, that would remind us too much of mechanic trajectories.'[76]

What matters for Laruelle is 'the invention of a new discipline'[77], since inventiveness is associated with a 'contemporary' style of thought. Non-philosophers are called upon to invent *different* ways of thought as an extension or autonomous transformation of philosophy. In order to invent generic extensions of the original model, the 'generic matrix' itself has to be invented in all parts. Here, 'matrix' is understood, on the one hand, in the formalistic and operatory sense of mathematics, on the other hand in terms of 'paradigm' according to Thomas Kuhn's 'disciplinary matrix'[78] or in the sense of Foucault's '*épistémè*'[79], as Laruelle differentiates 'classical', 'modern', and 'contemporary' times in philosophy by their respective gesturality[80]. It is therefore not only a matter of inventing a new, particular form of thought among others but it is, first and foremost, about inventing the form of invention itself, as Laruelle writes, 'a generic as the invention-in-person, the force (of) invention'[81]. The generic matrix is 'an experimental, that is to say, performative, space'[82], in other words, 'a theory-fiction'[83] implying lived experiences. In Laruelle, 'theory' and 'affect' are not considered as 'two separate worlds'[84]. Doing non-philosophy is about modeling 'a thought experiment'[85],

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[72] Cf. ibid., p. 127: 'passage du transcendantal à l'immanental'.

[73] Cf. ibid., p. 133: '*Du "forçage" spéculatif de la philosophie au forçage générique, c'est l'immanence qui force d'elle-même la transcendance non plus à se surmonter mais* [...] *à se superposer et à devenir immanence radicale*'.

[74] Id. 2013e, p. 63; cf. id. 1998, p. 76: 'Force (de) pensée (sujet-existant-Étranger)'.

[75] Id. 2013e, p. 64; cf. id. 1998, p. 77: '*la première expérience possible de la pensée, après la vision-en-Un qui n'est pas elle-même une pensée*'.

[76] Cf. id 2010a, p. 401: '*La rigueur de l'invention générique est dans les sauts de la pensée* [...]. *En un sens il n'y a pas* [...] *de solutions de continuité, cela rappellerait encore trop les trajectoires mécaniques.*' (My italics.)

[77] Cf. ibid., p. 89: '*l'invention d'une nouvelle discipline*'.

[78] Kuhn, Thomas, *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1970, p. 182.

[79] Foucault, Michel, *Dits et Écrits*, Vol. 1: 1954–1975. Paris: Gallimard, 2001, p. 1239; id., *Les mots et les choses*. Paris: Gallimard, 1966, p. 13. Cf. also Jean Piaget's comparison of the notions 'episteme' and 'paradigm' in Piaget, Jean, *Structuralism*. New York: Harper & Row, 1970, p. 132.

[80] See Laruelle 2012e and id. 2011a, Chapter II, 'La prise de parti "moderne" dans la philosophie', especially pp. 43–7.

[81] Cf. id. 2010a, p. 140: '*un générique comme l'invention-en-personne, la force (d')invention*'.

[82] Id. 2015d, p. 25; id. 2014, p. 47: '*un espace expérimental c'est-à-dire performatif*'.

[83] Id. 2015d, p. 256; id., p. 358: '*une théorie-fiction*'.

[84] Cf. id., *Une biographie de l'homme ordinaire*. Paris: Éditions Aubier, 1985, p. 6: '*Le pari de cette tentative* [...] *est une pensée qui paraîtra difficile à qui fait de la théorie et de l'affect deux mondes séparés.*'

e.g. of faith or 'on the "pure" ecological Reason or Reason "in-person"'[86], and a 'bet'[87] on multiple concepts. A whole set of new genres as examples of non-philosophy called 'eco-fiction'[88], 'photo-fiction'[89], 'Christo-fiction'[90], 'film-fiction'[91] (Ó Maoilearca), 'music-fiction'[92], etc. are produced by means of these experimental or experiential as well as theoretical devices where all disciplinary parameters undergo a generic modification. It is the attempt to *transform* knowledges taken from given disciplines (philosophy as an obligatory component and any branch of scientific investigation as an optional component) into independent objects with both scientific and philosophical aspects in order to constitute a new field of knowledge, 'a new autonomous realm of thought'[93] or 'a new space for thought'[94]. On the one hand, traditional standards of science and philosophy are limited or rescinded by doing without any reference framework of the deployed means of knowledge; the generic matrix, on the other hand, extends its standards to new 'interdisciplinary'[95] bounds of a 'philo-fiction', that is, 'philosophy-fiction' in analogy to 'science-fiction', a method of invention opposed to critique as a philosophical model of thought[96] and a name that accentuates the 'utopic' character of non-philosophy. This non-philosophical scheme developed in 'Philosophy V' takes philosophically determinable predicates or properties as variables that are onto-materially formalized by an operator acting on the vectors of an onto-vectorial space. As Laruelle says: 'It is about a conceptual, not to say "non-conceptual," formalism'[97] which produces knowledges under two aspects, e.g. 'Greek or "Logos" and Jew or "Torah."'[98] The generic matrix combining both infrastructure and superstructure is a process of knowledge that transforms 'macroscopic' philosophical concepts into 'microscopic' non-philosophical 'non-concepts' as dualities of 'the *real object*' and of 'the *object of knowledge*'[99] by the use of 'quantum and algebraic principles as axioms'[100]. Philosophy is

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[85] Id. 2015d, p. xi; id. 2014, p. 9, and id. 2015a, pp. 14, 44, 91: '"*une expérience de pensée*"'.
[86] Cf. id. 2015a, p. 44: '*sur la Raison écologique "pure" ou "en-personne*"'.
[87] Id. 2010a, p. 13: '*il s'agit d'un pari, le pari de la non-philosophie*'. See also Laruelle's teaser text in *Philo-fictions. La revue des non-philosophies*, '*Clandestinité, une ouverture*', N° 1, Paris: ONPHI, 2009: 'Philo-fictions *prend le risque d'une autre ambition* [...], placer la philosophie sous la triple condition de l'invention, de la découverte et même du pari.' Cf. Laruelle 1985, p. 6: '*Le pari de cette tentative* [...]'.
[88] See Smith 2013, Laruelle 2015a, and id. 2019.
[89] Cf. Laruelle 2012b.
[90] Cf. id. 2014 and id. 2015d.
[91] See Ó Maoilearca 2015.
[92] Presented by Laruelle at the restaurant *Le Moulin Rouge*, Saint Vaast de Longmont, France, September 17, 2017, on the occasion of the celebration of his 80th birthday.
[93] Cf. Laruelle 2010a, p. 134: '*un nouveau royaume autonome de la pensée*'.
[94] Cf. id. 2011a, p. 18.
[95] See id. 2010a, p. 69: '*C'est moins une discipline qu'une* interdiscipline'; for 'interdisciplinarity' see Legay, Jean-Marie, and Anne-Françoise Schmid, *Philosophie de l'interdisciplinarité. Correspondance (1999-2004) sur la recherche scientifique, la modélisation et les objets complexes*. Paris: Éditions Pétra, 2004. See also Schmid, Anne-Françoise, Muriel Mambrini-Doudet, and Armand Hatchuel, '*Une nouvelle logique de l'interdisciplinarité*'. *Nouvelles Perspectives en Sciences Sociales* 7, no. 1 (2011): pp. 105–36.
[96] Cf. Laruelle 2010a, p. 48: '*la philo-fiction comme science-*phiction *ou méthode d'invention opposée à la critique*'. See also ibid., Chapter XVI, 'Philo-fiction. Le concept de science-phiction', pp. 479–504.
[97] Cf. id. 2014, pp. 64 f.: '*Il s'agit d'un formalisme conceptuel, voire "non"-conceptuel*'. (My translation.)
[98] Id. 2015d, p. 142: '"Logos" and "Torah."' Cf. id. 2014, p. 210: '*grec ou "Logos", et juif ou "Torah"*'.
[99] Cf. id. 2016, p. 67, and id. 1992, pp. 92 f.: '*l'objet réel*' and '*l'objet de connaissance*'.

reduced to an onto-material condition, while positive sciences act as equal interpretative models *for* a 'generic science' of philosophy. For this purpose, Laruelle proclaims the 'democracy' in theory and among the sciences 'in-the-last-instance' (*'in letzter Instanz'*, as Friedrich Engels says[101]), based on the axiom or the hypothesis 'that the Real is "foreclosed"', which 'allows us to experiment with knowledge, with the idea that all thoughts are equal'[102]. As Laruelle says in *Principles of Non-Philosophy*: 'It is in this manner, through a translation of philosophical decisions or through solely transcendental equivalents of their respective identity, that a democracy that is not a simple transcendental appearance can be introduced into philosophy and between philosophies in place of their conflictual and hierarchical multiplicity.'[103] Moreover, any direct modeling of philosophy by science is considered to be impossible, in contrast to 'generic modeling' that determines philosophy by coming from science. For this purpose, philosophy and science need to transform into an 'intermediate', generic phase and to release an understanding that is scientific-and-philosophical (a non-dialectical since non-synthetic form of 'unity') in an 'identical' and 'unitary' or, more precisely, 'superpositional' and 'unilateral' way. In such a confrontation that transforms both disciplines non-philosophy appears as a 'unified theory' or as a mediator between science and philosopy. Thus, non-philosophy takes up a 'mi-lieu' in between science and philosophy that mutually prevents it from being positive (PSM) or transcendental (PSP). 'The heart of philosophy', as Laruelle writes, 'lies in the transcendental'[104] which is 'a system of two doublets, empirico-transcendental and transcendental-real'[105] (in *The Order of Things* Foucault speaks about 'an empirico-transcendental doublet which was called *man*'[106]). Due to its neutrality, non-philosophy is expected to be able to intervene in various sciences without questioning their scientific condition.

The method of non-philosophy consists in extracting from its material a minimal invariant – e.g. the imaginary number (complex analysis), the wave-particle duality

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[100] Cf. id. 2014, p. 65: *'des principes quantiques de nature algébriques comme axiomes'*. (My own translation.)

[101] Friedrich Engels explains the primacy of the economic basis in a letter of Janary 25, 1894, to W. Borgius as follows: 'We consider the economic conditions as determining the historical development in the last instance. [...] It is not so, that the economic condition is a *cause, active alone*, whereas the rest has a passive role. But there is interaction on the basis of the in the last instance determining economic necessity.' Cf. Marx, Karl, and Friedrich Engels, *Werke*, Vol. 39. Berlin: Dietz Verlag, 1968, p. 268: *'Wir sehen die öknomischen Bedingungen als das in letzter Instanz die geschichtliche Entwicklung Bedingende an.* [...] *Es ist nicht, dass die ökonomische Lage* Ursache, allein aktiv *ist und alles andere nur passive Wirkung. Sondern es ist Wechselwirkung auf Grundlage der* in letzter Instanz *stets sich durchsetzenden ökonomischen Notwendigkeit.'*

[102] Ó Maoilearca 2015, p. 55.

[103] Laruelle 2013b, p. 224; cf. id. 1996, p. 273: *'C'est de cette manière, par une traduction des décisions philosophiques ou par des équivalences seulement transcendantales de leur identité respective, qu'une démocratie qui ne soit pas une simple apparence transcendantale peut être introduite dans la philosophie et entre les philosophies à la place de leur multiplicité conflictuelle et hiérarchique.'*

[104] Cf. id. 2011a, p. 69: *'Le cœur de philosophie est dans le transcendantal qui en réalité est un double doublet, empirico-transcendantal, transcendantal-réel.'*

[105] Cf. id. 2010a, p. 62: *'un système de deux doublets, empirico-transcendantal et transcendantal-réel'.*

[106] Foucault, *The Order of Things: An Archaeology of the Human Sciences*. London and New York: Routledge, 2002, p. 347; see also ibid., p. 350. Id., *Les mots et les choses. Une archéologie des sciences humaines*. Paris: Gallimard, 1966, p. 330: *'un doublet empirico-transcendantal qu'on a appelé l'*homme'; see also ibid., p. 332.

(quantum physics), the 'transcendental' (Kant), or the 'lived experience' (Husserl's '*Erlebnis*'[107]) –, then in transforming it by '*formal intuition*' ('*formale Anschauung*'[108], as Kant would say) into operators and finally in superposing them. These given disciplinary conditions are implemented in an 'onto-material formalism' that is neither a philosophy of science nor a simple 'science of philosophy'[109] (in other words, where $AB \neq BA$ with $A :=$ philosophy, $B :=$ science, $AB :=$ philosophy of science, and $BA :=$ science of philosophy). These conditions are treated as vectors in superposition states that are indexed by imaginary numbers in quantum physics. The onto-vectorial dimension is brought in by the complex numbers (represented as vectors with a real part and an imaginary part on the complex plane). 'It is rather about an experimental performance [...] for creating interferences of undulations and collisions of conceptual particles'[110] or an entirely new theoretical genre achieved by generic 'quantum superposition of art, religion, technology, etc., each time with philosophy'[111]. A predecessor model of this kind of superposition or interdisciplinary 'interference theory' ('thought as heterogenesis' and 'extrinsic' or 'intrinsic interferences') can be found in *Qu'est-ce que la philosophie ?* of Gilles Deleuze and Félix Guattari.[112]

Non-philosophy as 'a postural science' is characterized by 'a gesturality or a "gestics" of axiomatic and hermeneutic decisions rather than [by] a discursivity'.[113] Since Michel Guérin characterizes the gesture as 'angelic'[114] (Greek 'αγγελικός'), we could say that the gesturality of the generic matrix lies in the annunciation as well as in 'a theoretical, ethical and technological, maybe artistic, indication [Latin '*indicium*'] of the fight against all sorts of norms that limit the possible and paralyze the invention'[115], and 'for the deregulations, fictions and utopias'[116] to which non-philosophy aspires, i.e., 'a controlled utopia or a philo-fiction'[117]. 'If you cleave the heart of one drop of water / a hundred pure oceans emerge from it'[118], as Mahmud Shabistari (1288–1340) writes in *Gulshan-i-raz* (*The Secret Rose Garden*). The 'heart' in these verses is, so to speak, the gesture of the generic matrix that I am going to characterize in the following section. As the quote of the Sufi poet and the notion of 'gesture of thought' (Châtelet) suggest, it is often better to approach a new subject by analyzing, first, specific examples before presenting a general theory.

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[107] Cf. Laruelle 2008, p. 53; see also id. 2010a, pp. 215, 446.
[108] Kant 1956, p. 179 b (B 161).
[109] Cf. Laruelle 2010a, p. 60: '"*science de la philosophie*"'.
[110] Cf. ibid., p. 401: '*Il s'agit plutôt d'une performance expérimentale* [...] *en vue de créer des interférences d'ondulations et des collisions de particules conceptuelles.*'
[111] Cf. id. 2011a, p. 18: '*la superposition quantique de l'art, de la religion, de la technologie, etc. avec chaque fois la philosophie*'.
[112] Cf. Deleuze and Guattari 1991/2005, pp. 188, 204–6.
[113] Cf. Laruelle 2010a, p. 193.
[114] Guérin, Michel, *Philosophie du geste.* Paris: Actes Sud, 2011, p. 13.
[115] Cf. Laruelle 2010a, p. 97.
[116] Cf. id. 2011a, p. 69: '*pour les déréglementations, fictions et utopies*'.
[117] Cf. id. 2010a, p. 97: '*une utopie contrôlée ou une philo-fiction*'.
[118] Cit. by Connes, Alain, and Matilde Marcolli, 'A walk in the noncommutative garden' (2006), p. 2: arXiv:math/0601054v1.

1.2. Generic Gestures of Thought

Hugh of Saint Victor (1097–1141) gives in *De institutione novitiorum* (ca. 1140, Chapter 12) a definition of 'gesture' – Latin *gestus* from *gero, gerere*: originally carry, bear, wear, have or possess, carry (on), conduct or wage, later behave, gesticulate[1] – that reads as follows: *'Gestus est motus et figuratio membrorum corporis, ad omnem agendi et habendi modum'*[2], which translates into: 'A gesture is a movement and a figuration of the limbs adapted to (but also: with a view to, in accordance with the measure and the modalities of) any action and attitude.' According to the French medievalist Jean-Claude Schmitt, this canonical and most complex definition in ancient and medieval occidental history consists of two conceptual pairs linked by the plurivalent expression *ad modum*. On the one hand, there is 'movement' (*motus*) and 'figuration of the limbs' (*figuratio membrorum corporis*); on the other hand, we have 'action' (*modus agendi*) and 'attitude' (*modus habendi*). The word *motus*, especially in the conjunction *motus corporis*, body movement, is a frequently used synonym of *gestus* since ancient music theory and rhetoric. *Motus* refers to mobility, that is to all sorts of movement (e.g. of the earth, the stars, the animal, the soul, etc.). Thus, *gestus* can be understood as a specific form of *motus*. In a broad sense, *motus* is the movement of a body; in a strict sense, it is the specific movement of a body part, especially of the hand. Relatedly, Laruelle characterizes the hand as being *'operatory by floating gestures'*[3] due to its undulatory movements and as the embodiment of non-philosophy, as he states: *'the hand is the Last Instance of the practice, the organon of the praxis in its immanence that underdetermines the transcendence of the world'*[4]. In Greek, there is only one equivalent for *gestus* and *motus*: κίνησις. What is new about the definition of Hugh of Saint Victor is to include action and attitude in the movement, *modus agendi* and *modus habendi*. In the Middle Ages, attitude was emphasized rather than movement. According to Schmitt, the key for understanding this inclusion of action and attitude is the figuration that has to be considered in various ways. Since gesture is a movement, it takes form in space and, by this, gives shape and form to the limbs *in toto*. In addition, it is an exterior *'figura'* of the invisible, that is, gestures are interpreted as 'figures' of emotions. Gesture is also an index (*indicium*) and a sign (*signum*) as Schmitt points out elsewhere in Hugh of Saint Victor. In other words, *'figuratio'* designates the symbolic value or the essence of the gesture. The concept of attitude (*modus habendi*) is closely related with *figuratio*. It is meant to be the result of a movement, more precisely a pausing, that is an ideal figure.[5] Châtelet uses this very same definition of gesture in order to move from 'gesture' to 'gesture of thought'. For him, a gesture is not a simple movement in space, but it rather suggests a new modality of moving with its own decisional power where the precision of

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[1] Cf. *Thesaurus linguae latinae*, Vol. VI, Leipzig 1925–34, col. 1969–72.

[2] Schmitt, Jean-Claude, *La Raison des gestes dans l'Occident médiéval*. Paris: Gallimard, 1990, p. 177.

[3] Laruelle 2010a, p. 515: 'C'est sa maniere [*c.-à-d. la manière de la main*] d'être "ondulatoire", opératrice de gestes flottants'.

[4] Cf. ibid., p. 516: 'la main est la Dernière Instance de la pratique, l'organon de la praxis en son immanence sous-déterminant la transcendance du monde'.

[5] Cf. Schmitt, pp. 34 f., 41, 177 ff.

the hand combines with the power of thought.[6] First of all, a gesture of thought is a *virtual* gesture which raises hopes to overcome oppositions like discrete/continuous[7], abstract/concrete, global/local, general/specific, fundamental/regional, universal/singular, molar/molecular, etc.[8] Within the virtual dimension, the gesture of thought decides and invents in an elastic manner, it prepares and promotes new intuitive entities. It is a structure of operation and intuition which leads directly into the heart of the operatory or operational. Undulation and non-philosophy belong to the same virtual order of the real: 'real without being actual, onto-material without being material' (*'réelle sans être actuelle, matériale sans être matérielle'*[9]), as Laruelle says with regard to the virtuality of the wave following the formula of Marcel Proust, 'real without being actual, ideal without being abstract' (*'réels sans être actuels, idéaux sans être abstraits'*[10]), which Deleuze also repeatedly refers to for defining the virtual (for instance, as for the ontology of the concept: *'Réel sans être actuel, idéal sans être abstrait'*[11]). In *What Is Philosophy?*, the distinction between virtual multiplicities (there referred to as 'concepts': see below paragraph 3.3., 'The Spectral Point of View on Ontology') and functions is made the basis of Deleuze's critique of science's inability to grasp the virtual[12], which can be called into question though, if one follows Châtelet's line of argument[13] or Laruelle for whom the virtual is tantamount to the generic[14]. Moreover, Manuel DeLanda proposes to see Deleuze's rejection of scientific functions as models for the virtual in terms of the pre-individual nature of the virtual coupled to the fact that functions may be taken to represent individuation processes. This way, as DeLanda points out, it can be argued that functions without this individuation aspect, that is, without a distinction between dependent and independent variables, can indeed be made part of the virtual.[15] The gesture of thought supports a saltatory evolution of thoughts irreducible to deductive chains. Gestures of thought manifest themselves as 'crystallizations of productivity', as Châtelet says, they can be captured, passed on and always be revived without ever losing their inner impetus or being exhausted in their product, i.e., as for Laruelle, in a posture of thought or in the beginning of a new scientific formalism. On the question of product and productivity, Friedrich Schelling points out that 'the product of productivity is a new productivity'[16]:

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[6] Cf. Châtelet, *L'enchantement du virtuel. Mathématique, physique, philosophie*, Edited by Charles Alunni and Catherine Paoletti. Paris: Éditions Rue d'Ulm/Presses de l'École normale supérieure, 2010, p. 41; see also id., *Les enjeux du mobile. Mathématique, physique, philosophie*. Paris: Éditions du Seuil, 1993, p. 32.
[7] Cf. id. 2010, p. 209.
[8] Cf. Laruelle 2008, p. 107, and id. 2010a, p. 426.
[9] Cf. id. 2010a, p. 401.
[10] Proust, Marcel, *À la recherche du temps perdu, 'Le Temps retrouvé'*, Bibliothèque de la Pléiade, Vol. IV. Paris: Gallimard, 1989, p. 451.
[11] Deleuze and Guattari 1991/2005, p. 27.
[12] Cf. Deleuze 1994, pp. 117 f.
[13] Cf. Châtelet 2010, pp. 133–51.
[14] Cf. Laruelle 2010a, p. 60.
[15] Cf. DeLanda, Manuel, *Intensive Science and Virtual Philosophy*. London and New York: Continuum, 2002, p. 71.
[16] *Friedrich Wilhelm Joseph von Schellings sämmtliche Werke*, Edited by K. F. A. Schelling, I Abtheilung Vol. 3, Stuttgart: Cotta, 1858, p. 324.

> As the object is never absolute or unconditioned, then something per se non-objective must be posited in nature; this absolutely non-objective postulate is precisely the original productivity of nature. Generally, it is effaced behind the product; in the philosophical way of looking at it, by contrast, it is the product which is effaced behind the productivity.[17]

One gesture of thought evokes another one. The gesture calls for determination without the possibility to achieve it. In 'a quasi pregenetic space, a place of the preformal where all virtualities are still possible', Châtelet finds 'both the idea of a discipline and the idea of a creation'[18]. In the Middle Ages the measure of the gesture is negatively determined by being contrary to immoderation, exaggeration, and gesticulation. As Schmitt shows, it was primarily understood in terms of '*modestia*' and '*juste milieu*'. Laruelle also defines generic science as '*mi-lieu*', although not as '*juste milieu*', unless in terms of 'justice' or 'democracy – lived-out or of thought'[19], because 'it can intervene in a multitude of theoretical "milieus"'[20]. In a graphical classification of gestures in Hugh of Saint Victor with regard to the balance of the virtue, the virtue sat on the midline in between opposite vices (*'inter vitia contraria medius limes virtus est'*).[21] Correspondingly, Laruelle describes the milieu of the generic or the 'unilateral duality' as 'fusioning superposition' of two extremes to be avoided: philosophy in terms of extreme transcendence (Emmanuel Levinas) and of 'radical immanence' (Henry).[22]

The generic matrix is a theoretical apparatus or type of organization that combines two elements or aspects. First, an onto-material component, i.e., the conceptual 'hardware' (French '*matériel*') of the generic matrix, which relates to an '[onto-m]aterial ontology (chôra, uni-versalized transcendental Aesthetic)'[23]. This is the 'transcendental core' of philosophy or the '*transcendental gesture*'[24] understood as the 'essence' of the philosophical model of thought, in combination with an 'empirical' element (such as photography, film, music, etc.) which is assumed to be inherently philosophical. Philosophy is an indispensable component in the non-standard setting of the generic matrix designed to be an extension of philosophy. In non-philosophy, as we have seen, the standard philosophical model of thought serves as a constant reference object. For this purpose, it is reduced to its onto-material condition or to a mere operator by a *quantization gesture*. In return, it is used as an instrument for the translation or decodification of quantum physics. This gives two inverse 'products' or translations:

1. certain organizational principles of quantum physics (superposition and non-commutativity) are translated into the natural language of philosophy by means

[17] Cf. Schelling 1858, p. 284. See also Alunni, Charles, '*Introduction*', in Châtelet 2010, p. 14.
[18] Cf. Châtelet 2010, p. 177.
[19] Smith 2016, p. 74.
[20] Cf. Laruelle 2008, p. 14.
[21] Cf. Schmitt 1990, pp. 180, 183.
[22] Cf. Laruelle 2008, p. 14; id. 2010a, p. 398.
[23] Id. 2013e, pp. 79–81; cf. id. 1998, pp. 147–50.
[24] Cf. id. 2010a, pp. 128, 70, 126.

of a *transcendental gesture* of self-transcendence, hermeneutically decoded and animated with the aid of Husserl's concept of 'lived experience';

2. a converse *quantization gesture* transforms the transcendental core of philosophy in an onto-material form by reducing it to its material condition.

Non-philosophy's second instrument, for which Laruelle coined the neologism of 'quantware' (French '*quantiel*'[25], similar to '*logiciel*', software), is related to a '[f]ormal ontology (uni-versalized transcendental Logic)'[26] consisting in fundamental principles borrowed from quantum physics. Those principles are applied to other fields of knowledge as a rational or discursive means of organization and transformation of the material. The conceptual invariant of the quantum formalism, its 'rational core', provides the methods for a scientific non-positive thought by transforming quantum physics in a generic way, that is, by reducing it by the mathematical apparatus. This formal or syntactic aspect of the generic matrix comprises basically two related things or operations, two elementary gestures of algebraic origin which are applied to the philosophical material and form the new onto-material and onto-vectorial or generic 'system' (not in the philosophical, absolute Hegelian sense that Badiou aims for):

1. a *superposition gesture*, i.e., the additive, linear superposition principle of the discrete quantum model (Schrödinger) conceptualized as a resumption of immanence or of idempotence, also called the 'generic subject';
2. an *orientation gesture*, i.e., the multiplicative non-commutativity (Heisenberg) philosophically translated as 'unilaterality' or a unilateral syntax of the 'last instance' and 'determination-in-the-last-instance' (Engels and Marx) which determines the order of the so-called 'pre-priority' of science and immanence; standard counterexamples are commutative formulas $A = B$, which can be found throughout history, from Parmenides to Badiou (see paragraph 3.1., 'The Particle Picture of Philosophy').

Both these gestures are the most elementary ones of non-philosophy, they define the so-called 'real' of non-philosophy and provide the syntax to the generic matrix by distributing philosophy and science according to a 'unilateral duality', which 'always takes philosophical dyads and realizes them on one, same side, according to the Real/One'[27], as Ó Maoilearca says. Laruelle's quantum solution refrains, in a first phase, from assuming any immediate identity of contraries by multiplying the variables with each other, that is, by considering their non-commutative products, and in a second phase, by adding them by the use of superposition rather than unification. The gestures of non-commutativity and superposition, interpreted as 'determination-in-the-last-instance', embody 'the immanental real' of non-philosophy which is neither Being nor One nor Multiple, that is, metaphysical contents. Finally, there is third gesture, 'a generic *re-quantization gesture*'[28], i.e., the 'enveloping' character of science in the final product, a

[25] Cf. id. 2011a, p. 19.
[26] Id. 2013e, pp. 65–7; cf. id. 1998, pp. 144–7.
[27] Ó Maoilearca 2015, p. 311.
[28] Cf. id. 2010a, p. 74 (my italics).

procedure that is also called 'second quantization' or 'generic indexation'[29].

1.2.1. The Onto-material Aspect

'Philosophy uses typical operations of a transcendental essence (transcending, surmounting, reducing, exceeding, interiorizing) which can be found everywhere with different forms and scopes'[30], states Laruelle in *Philosophie non-standard*. Therefore, he treats the transcendental as the typical, invariant operator or principal agent of all philosophies which describes their specific combination of transcendence and immanence with experience. It is referred to as the essential gesture of philosophy and the essence of 'macroscopic' thought that consists in determining dualities and synthesizing oppositions as unities. The transcendental gesture succeeds in doing so by an act of self-transcendence. Every unity or synthesis is considered, just like Kant's transcendental 'unity of apperception'[31], as a double movement of transcendence (irrespective of what is in question) 'which, in fact, is a double doublet, empirico-transcendental, transcendental-real'[32]. In *Principles of Non-Philosophy* Laruelle writes: 'We will say that Philosophical Decision is the Idea of *a relative-absolute whole*. Its most encompassing and least detailed mechanism can in effect be described [...] as a structure in 2/3 terms, as a Dyad + One, as an empirico-transcendental mixture, a quasi-circular and topological doublet, etc.'[33] These are the doublets of philosophy: 'virtual-actual, substance-accident, reality-appearance, noumenal-phenomenal'[34]. The transcendental is always in between two levels, as a torsion or a gliding 'on' or 'over' itself (transcendence) and 'in' itself (immanence) by means of a transcendence that conjoins the two sides. This analysis of the philosophical space as 'a system' of repetitions, affirmation and reaffirmation, 'of specular doublets or thought by double transcendence, even if it is about immanence'[35] is the starting point of the generic critique of philosophy. Philosophy is reproached for making use of a specular principle for achieving a *'philosophical surplus value'*[36] of knowledge, for promoting an image of thought that is reflected in another element or tool such as science, logic, language, art, etc., and for turning thought into a model of 'counter-invention' or 'anti-invention'[37] by treating it as a repetition and classically a 'mirror of meaning or of the signified, among the postmoderns in the mirror of language and the signifier'[38] without any possibility of inventing whatsoever. Laruelle argues with Marx ('Theses on Feuerbach') that this specular technique might transform the apprehending subject but not the perceived

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[29] Cf. id. 2015a, p. 173.
[30] Cf. Id 2010a, p. 504.
[31] Cf. Kant 1956, (B 194-7, A 155-8) pp. 210-3.
[32] Cf. Laruelle 2011a, p. 69.
[33] Id. 2013b, p. 232; cf. id. 1996, p. 283.
[34] Ó Maoilearca 2015, p. 194.
[35] Cf. Laruelle 2011a, p. 20.
[36] Cf. id. 2011a, p. 116.
[37] Cf. Id. 2010a, p. 96.
[38] Cf. ibid., p. 129.

object itself and that the mirror offers at most an interpretation of the world or an image of philosophy but certainly no way for a real change. Non-philosophy tries to get rid of this 'old model' of thought by treating knowledge no longer as a reflection of the real (the matter). The new challenge is found in abandoning the transcendental gesture and its pursued unity of oppositions in the form of a hierarchy and in replacing it by a gesture called by now 'immanental' that allows to think 'unity' no longer as a synthesis but as a superposition or radical immanence devoid of any hierarchical structures. The reaffirmation or duplication of transcendence in the transcendental is opposed to the superposition as a reaffirmation of immanence in the immanental. For Laruelle, '[t]he consequence is that we have to renounce the characteristic, famous and foundational gestures which will be no more than local means (founding, reducing, subtracting, withdrawing, suspecting, critiquing, anticipating/retarding, overthrowing, meditating, elucidating, analysing, synthesizing, deconstructing and constructing, etc.).'[39]

The generic matrix aims to extend the assumed standard model of philosophical thought. The non-standard model of thought thus produced comprises philosophy, as has been said, in the form of a conceptual 'hardware'. As a 'physics of the philosophical body', the generic matrix treats concepts as a part of the 'corpuscular world of philosophy'. In this theoretical apparatus, immaterial concepts (the signified and not only the signifier) are regarded as physico-macroscopic objects of a quasi-materiality. Philosophy's reduction to an objective-material condition is a preparatory act for its use by a quantum science of philosophical onto-materiality. That does neither entail any kind of 'materialism' unless, as it were, an 'absolutely immanent materialism of thought'[40] (Ó Maoilearca) nor any object-oriented realism[41]. Otherwise non-philosophy would be relocated in philosophy, through the back door so to speak. Laruelle rather refers to an onto-material formalism in order to emphasize its affinity to science as a science of philosophy. The 'onto-material quantization' equal to a 'unilateralization' of philosophy is one of the basic gestures of the generic matrix. That means that the interface between both parts of the generic matrix is transformed to such an extent that it is no longer a matter of a bilateral relation but of a 'simplified', unilateral 'non-relation' or so-called 'unilation'. Quantization is to be understood as a quantum physical act of translation of philosophy into propositions about the 'corpuscular style' of concepts and philosophical space. The usage of philosophy in its onto-material form by non-philosophy converts it into 'generic knowledge'. In other words, non-philosophy 'neutralizes' or underdetermines its philosophical object by transforming its corpuscular determinations by means of a gesture of quantization.[42] Quantization designates the quantum, globally generic and noncalculating, nonnumerical, real, i.e., transformative, interpretation of philosophy or its concepts (the preparation of the generic matrix by a formal theory of philosophy implies its underdetermination). More

[39] Cf. ibid., p. 171.
[40] Ó Maoilearca, 'Laruelle in London: the London Graduate School Seminars' (2011), available at: https://philosophysother.blogspot.com/2011/10/laruelle-in-london-london-graduate.html.
[41] See Wolfendale 2014 or Harman, Graham, *Object-Oriented Ontology: A New Theory of Everything*. Penguin Random House UK, 2018.
[42] Cf. Laruelle 2011a, pp. 157, 165.

precisely, quantization converts the transcendental field into an operator (for a detailed discussion of the onto-material formalism as an operator formalism, see Chapter 3, 'Non-Commutative Ontology and Spectral Variability'). The transcendental field operator acts on the onto-vectorial states or state vectors of the transcendental field. The reason for quantizing ontology or the philosophical space such as the transcendental field or the plane of immanence is to deduce certain properties of the material, that is, concept-particles or particle-objects, by the determination of the so-called 'amplitudes of futurality or of virtuality', i.e., the 'equivalent, in the generic sphere, of the amplitude of probability, of the wave function or [of the] state vector in QM [quantum mechanics]'[43]. While the 'lived experience' comes originally from the philosophical subject, in the generic matrix it is divided, on the one hand, in a subjective humanity function or generic constant and, on the other hand, in a 'particulate *ego*' or 'clone' as a 'Stranger-subject'[44] that experiences the unilateral duality, everything according to the real.

1.2.2. The Onto-vectorial Aspect

The non-philosophical version of the matrix uses, like its philosophical complement, philosophy's natural language as well as science but without reflecting itself in it. Laruelle replaces the 'philosophical mirror' by a different principle of mediation. In the generic matrix, quantum physics takes on the role of this new, non-specular tool as a conceptual model. It also intervenes twice, although not in a specular manner as in the transcendental gesture but in a 'superpositional' way. Thus, the generic solution of the mediation problem also calls for two variables, that is, the natural language of philosophy and science, furthermore for a duplication of the scientific part as a factor that puts their relation on a scientific condition. The 'immanental' as the essence of quantum thought is characterized by Laruelle as the same that glides 'in' itself through an undulation freed of any 'onto-topological' torsion and transcendence. It crosses this transcendence 'since it is crossed (by) itself or a *tunnel of the One as in-One*'[45] (or, to speak even less philosophically, 'in characteristic one' as will be explained later in paragraph 2.4., 'Tropical Philosophy'). This transcendence, says Laruelle, 'neutralizes the "over itself" (ontological or ideal transcendence) but also the "under" itself (if this term means the ontic transcendence or the real transcendence in general). The glide in itself or the tunnel replace[s] here the "torsion".'[46] There is no specular torsion such as a mirror that confuses itself to infinity with its reflections. This is the hermeneutic but simply 'occasional' necessity, thus the whole objective appearance, for this science to formulate its axioms based on philosophical objects. Both the former transcendental gesture and this new immanental gesture can be visualized by an undulatory

[43] Cf. Id. 2010a, p. 51.
[44] Cf. ibid., pp. 52, 61.
[45] Cf. ibid., p. 37.
[46] Cf. ibid.

progression, the only difference is that the immanental undulation is not self-transcending but remains 'in-One' (or 'in characteristic one'), devoid of torsion or return to itself, as in the case of philosophy's double transcendence. By usage of this operation outside of its original algebraic or quantum physical domain and within the generic matrix, philosophy's transcendental gesture and specular structure of understanding are replaced by the immanental gesture of non-philosophy following the laws of superposition and non-commutativity, as will become clear in the following paragraph. In their precedence, these principles are not treated as 'primary' (like Aristotle's 'First Philosophy') but as 'prior-to-primary' and as a determining or, more precisely, 'in-the-last-instance' underdetermining scientific condition on which non-philosophy carries out the transformation of philosophy. The superposition of philosophy and quantum physics is understood as a 'prior-to-primary' fusion replacing the 'unity of representation'[47] (Kant). It is the attempt to obtain 'an "ontology" of the undulatory and a theory of vectoriality'[48]. A 'Generically Unified Theory'[49] of philosophy and science (similar to the 'Grand Unified Theory', that is, a project in particle physics which tries to unify three fundamental – electromagnetic, weak and strong – interactions) is therefore not characterized by being ontological but scientific, experienced, and linguistic (philosophical). A generic science of philosophy deals with the superposition of several knowledges. In quantum physics, Laruelle finds the gestures (prior-to-primary position, unilaterality, unifaciality, unilateral complementarity, idempotence, etc.) which permit him to describe the interference of these knowledges with philosophy as a 'unitary wave function' or an 'experienced quantum state vector'. Science and philosophy (philosophical concepts and propositions) are treated as 'imaginary' phenomena summable or superposable like waves, wave functions or vectors (onto-vectorial quantum states) as in complex analysis. That is why the generic matrix makes the transition from the transcendental gesture of identification and reidentification (affirmation and reaffirmation) of oppositions (e.g. Parmenides: 'Thought = Being'; or Badiou: 'Ontology = Set Theory') to the immanental gesture of superposition. The difference applied to Kant's famous definition is: the transcendental *identifies* the conditions of possibility of experience with the objects of experience while the immanental *superposes* them.[50] Such a 'quantum superposition' is not achieved by a total or partial identification of disciplines or knowledges, concepts in philosophy and functions in science, but by resort to the algebraic principle of idempotent addition ($1 + 1 = 1$) applicable, for instance, to wave phenomena (the interference of two solitary waves produces only one wave instead of two waves). 'Macroscopic' objects like science and philosophy are treated as undulatory phenomena or dualities of a lived essence (the generic subject is always an integral part of superpositional phenomena). In this way, Laruelle makes a phenomenal use of the generic superposition principle as a principle of thought by amplitudes and not by objects. In the form of superposed wave

[47] Cf. Kant 1956, p. 179 b (B 161).
[48] Cf. Laruelle 2010a, p. 78.
[49] Cf. id. 2011a, p. 111.
[50] Cf. id. 2010a, p. 342.

functions, the generic matrix obtains an elastic materiality, an immanental matter where two informations, one scientific aspect and another philosophical aspect, are indistinguishably unified. With the gesture of superposition Laruelle claims to have an external scientifico-generic modulation tool that is strange to philosophy, that is why non-philosophy does not work self-sufficiently on itself, neither transforming itself nor interpreting itself like philosophy. The gesture of generic quantum superposition is regarded as one of non-philosophy's 'productive forces', next to the imaginary number and idempotence. [51] The generic superposition has to be distinguished from philosophical conceptions of the One such as, for example, the One reduced to the 'One-of-count' in Badiou or the attempt of Deleuze to simplify the doublet of transcendence in a plane of immanence by refering to the Möbius strip, where he finds the exact overlap of immanence and transcendence, of subtraction and of addition. Yet, this is an internal transcendence for Laruelle [52] who, by contrast, keeps the differerence between immanence and transcendence as a 'unilateral duality' like in Marx between infrastructure and superstructure. The superposition is assumed to be a problem of immanence and not of 'logical identity'[53]. The generic principle of superposition of states says that, if an onto-vectorial system can 'exist' in several different states, then it can also be found *simultaneously* in all these states, as if it were suspended between several realities: 'The real is the superposition of all possible imaginaries'[54], as Richard Feyman says ('"Feynman histories"' or '"Feynman paths"'[55]). Furthermore, one implication of generic superposition is the unpredictability and therefore mere probability of occurrence of certain lived events.

Besides the *superposition gesture* as the first algebraic gesture established in the generic matrix, the second gesture of algebraic origin is the *orientation* or *non-commutativity gesture*. This gesture takes into account an irreversible order in between the two variables or disciplines of the matrix. The theory of non-commutativity (formerly called 'unilaterality') distinguishes between an 'agent' (multiplier) and a 'patient' (multiplicand) in order to consider the order of the product. A non-commutative product is an oriented entity. The generic matrix is defined as a product of two disciplinary variables where quantum physics and not philosophy acts as the 'last instance'. The idea that pairs are related hierarchically can also be found in Jacques Derrida: 'in a classical philosophical opposition we are not dealing with the peaceful coexistence of a *vis-à-vis*, but rather with a violent hierarchy. One of the two terms governs the other (axiologically, logically, etc.), or has the upper hand.'[56] This procedure puts philosophy 'under' the power of quantum physics in order to determine philosophy 'in-the-last-instance' or in an immanental, that is, superpositional and nonidentificatio-

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[51] Cf. id. 2011a, p. 59.
[52] Cf. id. 2011a, pp. 152 f.
[53] Cf. id. 2011a, p. 128.
[54] Cf. Connes, Alain, Danye Chéreau, and Jacques Dixmier, *Le Théâtre quantique. L'horloge des anges ici-bas*. Paris: Odile Jacob, 2013, p. 50.
[55] Laruelle 2015d, pp. 158, 176; id. 2014, pp. 231 ('"*histoires ou chemins de Feynman*"'), 254 ('"*chemins de Feynman*"'); cf. id. 2015a, p. 189, and id. 2010a, p. 331.
[56] Derrida, *Positions*, Translated and annotated by Alan Bass. Chicago: The University of Chicago Press, 1981, p. 41.

nal way. Here, though, 'under' is not indicating any hierarchy or overdetermination in terms of a redoubled condition. Non-commutativity implies no hierarchical relation, as Châtelet notes[57], and the philosophical object is rather immanently underdetermined by science. Science, as a matter of superposition, does not return to itself by means of a mirror of mediation. The orientation plays a crucial role with respect to the definition of non-commutative products. Oriented quantities permit to regard two different expansion values as a single one and to connect them in such a way that, as Kant writes, 'the effects cancel each other out by being combined in the same subject'[58]. Châtelet adds that opposite volumes only vary in their orientation.[59] Kant's essay '*Versuch den Begriff der negativen Größen in die Weltweisheit einzuführen*'[60] deals with the same apparatus of 'real oppositions' that Schelling later calls 'exponents'. Instead of being logical contradictions they rather neutralize oppositions in balances. Châtelet notes that those exponents are involved in their own measurement: 'within the exponent, the Being-in-the-World measures itself'[61]. In this context, Laruelle introduces the 'complementarity' as a principle that assembles 'the measured [patient, multiplicand] and the measuring [agent, multiplier], the phenomenon and the apparatus of experimentation'[62], whereas Châtelet explains how exponents carry an ambiguity into execution as a result of combining the product and productivity. Schelling tries to overcome polar differences in a quite similar way by introducing the 'point of indifference'[63]. Its ambiguity comprehends the opposition as a symptom of an 'envelopment' that, according to Châtelet, always accompanies the generation of a pair. Here, the two is not understood as a cardinal number but as a pair including an orientation which shows how the pair is combined by an enveloping act. The oriented envelope functions as a horizon that cannot be achieved by a simple additive iteration, that is, a 'connection of a first degree' (Hermann Graßmann). In his book *Ausdehnungslehre*[64], Graßmann formalized for the first time the conception of two distances *AB* and *BA* as opposite quantities (i.e., the consideration of a negative dimension in geometry). By this, besides the length, direction gains importance. The horizon never comes from a 'thinking together'[65], as Châtelet says, of what is already given; the horizon is rather the condition of such a combination. It requires a 'connection of a second degree' (Graßmann), here non-commutative multiplication, in order to generate a new dimension, i.e., an orientation.

Non-commutativity (or 'pre-priority') is supposed to be the syntax, the infrastructure or the order of 'the real' as immanence. For instance, the identification of the empty set and Being in Badiou's set-theoretic ontology is described by Laruelle as

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[57] Cf. Châtelet, *Figuring space: Philosophy, mathematics and physics*. Dordrecht: Kluwer, 2000, p. 130.
[58] Cf. Kant, *Vorkritische Schriften bis 1768/2, Werkausgabe Band II*, Edited by Wilhelm Weischedel. Frankfurt am Main: Suhrkamp, 1977, p. 789.
[59] Cf. Châtelet 2000, pp. 13, 131, 134, 135.
[60] See Kant 1977, pp. 783–91.
[61] Cf. Châtelet 2000, pp. 76, 96.
[62] Laruelle 2010a, p. 109.
[63] See Châtelet's discussion of these points in id. 1993, pp. 140–6.
[64] Graßmann, Hermann, *Ausdehnungslehre*. Leipzig: Wigand, 1844, available at: https://archive.org/details/dielinealeausde00grasgoog.
[65] Cf. Châtelet 2000, p. 138.

'the absolute condition of an arbitrary axiomatic decision'[66]. Furthermore, the equation 'ontology = set theory' assumes an agent, that is meta-ontology, capable of deciphering the equation.[67] Therefore philosophy is needed, a combination of idealism and materialism. Just as in Laruelle, science appears twice: firstly as mathematics, secondly as logic but in both cases as an *unmodified or static* object (for the characterization of commutative ontology as static and of non-commutative ontology as dynamic, see paragraph 3.4., 'Non-Commutativity and the Emergence of Time'). Although everything seems to be determined by mathematics, finally everything is *overdetermined* by the generality of Being and by the category of Truth: the most general matrix gets a final philosophical meaning. The logico-transcendental gesture returns as the remains of the philosophical subject.[68] According to Laruelle, all commutative ontologies are characterized by making use of the identity on condition of Being-without-beings. Non-commutative ontology, by contrast, 'starts with the One-in-One or the One-without-Being and, all the more so, with the One-without-beings, as undulatory superposition'[69]. Only the One by superposition is assumed to be able to subtract Being from beings because it attributes Being to secondary functions such as the particulate materiality. As Laruelle points out:

> On its Platonist side, ontology is constructed rather around the One and the Multiple – that is a transcendental arithmetic inspired by Pythagoras. On its Aristotelian side, it is constructued rather around Being and beings, that is an onto-theo-logy. But philosophy [...] is the entanglement of these two dyads, the four parts which tolerate a certain convertibility being present from the beginning of the One and of Being and which have been overdetermined and interpreted in accordance with these two contexts.[70]

Non-philosophy is assumed to be always a certain unity of science with its locally *contingent necessities* and of philosophy with its globally *necessary contingency*.[71] According to Laruelle:

> Because of the philosophical origin of the material from which its axioms and theorems are drawn, and thus as instance of thought in general, non-philosophy is, from the viewpoint of the One, globally contingent relative to the real which remains foreclosed to it. But as thought determined by the real, it acquires the real necessity of the vision-in-One that is also the transcendental necessity of this real contingency. [...] From the viewpoint of philosophy, non-philosophy is necessary [...].[72]

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[66] Cf. Laruelle 2011a, p. 122.
[67] Cf. id. 2011a, p. 89.
[68] Cf. id. 2011a, p. 90.
[69] Cf. id. 2011a, p. 104.
[70] Cf. id. 2011a, p. 105.
[71] Cf. id. 2010a, p. 379.
[72] Id., 'A Summary of Non-Philosophy', in id. 2012a, pp. 32 f., or id. 2013a, p. 296; cf. id., *La Lutte et l'Utopie à la fin des temps philosophiques*. Paris: Kimé, 2004, p. 37.

That is because non-philosophy is assumed to be determined by the real. Ernest Nagel and James R. Newman write that 'axioms are to be counted among the theorems'[73], while Anne-Françoise Schmid answers to the question 'what is the difference between an axiom and an hypothesis?': 'The first is related more to the theory, the second is nearer to the model and modelisation.'[74] (For the 'One' interpreted as the 'hidden schemer' at the back of 'the stage' which makes vary every concrete onto-materiality at the front, see paragraph 4.1., 'The Relative Point of View on Philosophy'.)

There is a third formal or syntactic gesture of the generic matrix joining the immanental gesture of superposition and the orientational gesture of non-commutativity, to wit: 'a generic *re-quantization gesture*'[75], also called 'generic indexation'[76]. In the generic matrix, one of the products or translations (every part of the matrix is already a product in itself, that is, a generically transformed or reduced and underdetermined translation) intervenes twice: the first time as an object or variable, the second time as an organizing principle or factor. The gesture of requantization explicitly takes up again science as a condition. In the capacity of an (under)determining factor, the generic matrix reaffirms or 'requantizes' the arrangement in favour of science so that it is no longer a simple fusion of 'oppositions'.[77] For Laruelle, this means to put science in place not as a 'primary' but as the 'prior-to-primary' or the 'last instance' *for* philosophy. Furthermore, the 'recurrence of science' or the requantization in form of a superposition of science and philosophy implies having access to the sphere of 'generic immanence'. For, Laruelle considers immanence to be a superpositional repetition or resumption. Immanence 'slides' from One into One (algebraically speaking, with the aid of the law of idempotence), without exceeding the 'frontiers' of the One. Or, immanence is reactivated by superposition to receive its 'radical' form. In the generic matrix, the scientific intervenes twice. The addition or 'connection of first degree' ranks first as scientific 'prior-to-primary' or 'last instance'. This rule is valid for the radical immanence of undulatory phenomena. This first intervention is called 'prior-to-primary' intervention as a superposition. In the second instance, the quantum physical intervenes through multiplication, i.e., a 'connection of second degree' that introduces an oriented dimension, non-commutativity, as a macroscopic discourse of the philosophy of quantum physics. This double intervention of the scientific component contains the key for the understanding of the unilateral duality. The philosophical matrix and the generic matrix are not distinguished by their onto-material components, as has already been said above in paragraph 1.1., 'The Generic Matrix', but by the constituent that is reaffirmed putting the philosophico-scientific junction either on a philosophical condition or on a scientific one. At first, the element functions as an object and secondly as an organizational principle or factor. The following formal notation allows to discern the two matrices:

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[73] Cf. Nagel and Newman 2001, p. 46.
[74] Schmid, Anne-Françoise, '*Quelque chose rouge dans la philosophie*', in *Philo-Fictions* 2 (2009), p. 128.
[75] Cf. id. 2010a, p. 74 (my italics).
[76] Cf. id. 2015a, p. 173.
[77] Cf. id. 2010a, pp. 68, 74, 76.

(1) Philosophical Matrix	$PM(x) = (P + x) \cdot P$	'philosophy of x'
(2) Generic Matrix	$GM(x) = (PS(x) + S(x)P) \cdot S(x)$	'x-fiction'

In each case, philosophy and x (epistemology, ecology, theology... or photography, film, music, etc.) are symbolically summed up and multiplied by philosophy, x or science of x. Addition and multiplication are differentiated because a multiplicative connection, i.e., a 'connection of second degree' is necessary for the coming into play of a new dimension such as non-commutativity (that is, a mutual interpretation) which applies to the variables inside of the generic matrix. Here, Gangle's remark on 'the application of an essentially mathematical idiom (singularity) to the human sphere'[78] in Deleuze could be applied to Laruelle's 'generic human' as the basis, for example, of his 'new ecological science' in *The Last Humanity*, as he points out: 'Just as human characteristics are mathematized, then, the abstract level of mathematics is itself reinterpreted on the basis of sense.'[79] As a consequence, as Laruelle writes in *Anti-Badiou*, '[t]he unilaterality does no longer take place between two simple terms but between four terms (or four occurrences with inversion of the products)'[80]. The indexation, either by philosophy or by science of x, is applied outside the generic matrix unilateralizing and subjectifying it philosophically or generically through interpretation. That is, for Laruelle, the difference between a thinker of onto-materiality and a materialist thinker like Badiou, for instance.[81] The philosophical matrix is qualified as philosophically *overdetermined*. In its endeavour for knowledge, philosophy makes use of a mediating object (science, language, logic, etc.) reached by transcendence. Finally, it identifies with its image of thought through an act of specular reflection. Therefore Laruelle relates philosophy to a double movement of transcendence. This act of philosophical overdetermination that juxtaposes philosophy and its mediating object in specular opposition is called 'philosophical decision'. The 'non-philosophical decision'[82] is a different principle of 'identification' and 'mediation' namely the principle of fusion or superposition of philosophy and a scientific form of knowledge under the determination or the control of this very science. In that case, Laruelle speaks of generic immanence which is *underdetermined* by a science (reduced by its mathematical apparatus [PSM]).

Laruelle's concept of generic immanence considering the inevitable amphiboly of immanence and transcendence has to be distinguished from other philosophical concepts of immanence: first, from the 'dialectical immanence' of Schelling and Châtelet conceived as an articulation or balance of bipolarities which are enveloped by a supplementary dimension or horizon – that is the idea of 'orientation' according to Graßmann, and of the 'exponents' or 'points of indifference' in Schelling's natural philosophy, following Kant's idea of 'real repugnance'; then, from the 'absolute' or 'pure

[78] Gangle 2016, p. 181.
[79] Ibid.
[80] Cf. Laruelle 2011a, p. 92.
[81] See id. 2011a, p. 91.
[82] Cf. id. 2010a, p. 477.

immanence' in Baruch Spinoza[83] and Deleuze[84], and also from the 'radical immanence' of Henry[85]. In Laruelle, immanence and transcendence are two elementary dimensions of the philosophical space which are not isolated from each other. From Laruelle's point of view, a 'pure' or 'absolute' immanence as propagated by Spinoza and Deleuze, without any relation to the transcendence of the world is impossible or comparable to 'death' or the 'corpse'[86], as he says: 'It is impossible to autonomize a pure immanence (the "radical immanence" is not "pure") beyond any at least unilateralizing relation to the transcendence of Being; to distinguish it *absolutely* from the world which would then be a simple unreal.'[87] A definition of the 'world' given by Laruelle in the *'Glossaire Raisonné'* to *Future Christ* reads as follows: 'Other name for philosophy under its two forms. Philosophy is world-shaped, the World is world-thought.'[88] The *Dictionary of Non-Philosophy* gives the following definition of the 'World': 'Alongside "philosophy," other first name for the mixture of philosophy and of the world. Philosophy is the World's pure and general form, the World is philosophy's immanent object. In short: "world-thought."'[89] In the form of a syntax, 'World' is applied to other material taken by philosophy as something it can dominate: 'A composition by addition of the prefix "world-" to the term in question (world-God, world-Christ, etc.) indicates a sense of sufficiency.'[90] As an image of sufficiency, the world remains material, as Laruelle says:

> If it is necessary to start again completely differently from that failed knowledge that is philosophy, we do not simply reject it on religious grounds like the ancient gnosis rejected the World as evil and illusion. It is our only material, and the science that the Moderns have acquired meanwhile gives us a means of knowing, that is to say of modeling, that complex object, failed knowledge, and a means of making use of it on the basis of Man-in-person who is not modern or ancient. We are the new Gnostics who think that there is a salvation even from evil. Philosophy, form of the World, is our prison but the prison has the form of hallucination and a transcendental illusion, not the form of flesh – it is itself knowable.[91]

Therefore, the generic matrix maintains an amphiboly which is in general the superposition of immanence and transcendence. The generic formula has the same form as noted above: $(I + T) \cdot I$. This is no 'transcendental unity'[92] but a superposition with

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[83] See Gangle 2016, Chapter 1, 'Spinoza and Relational Immanence', pp. 20–69.
[84] See ibid., Chapter 5, 'Deleuze and Expressive Immanence', pp. 162–210.
[85] On Laruelle and Henry, cf. Brassier, *Nihil Unbound: Enlightenment and Extinction*. Basingstoke, U.K.: Palgrave-Macmillan, 2007, pp. 127, 135, 137, 145.
[86] Laruelle, *'Les sciences génériques et la philosophie'*, Seminar at the *Collège International de Philosophie*, Paris, 2008–2009, November 14, 2008.
[87] Cf. id. 2011a, pp. 135 f.
[88] Id., *Future Christ: A Lesson in Heresy*, Translated by Anthony Paul Smith. London: Continuum, 2010b, p. xxviii (translation slightly changed); cf. id., *Le Christ futur. Une leçon d'hérésie*. Paris: Exils Éditeur, 2002, p. 10.
[89] Laruelle 2013e, p. 168; cf. id. 1998, p. 98.
[90] Id. 2010b, p. xxviii (translation changed: The French suffix '*-monde*' turns in English into a prefix 'world-' due to inverse intonation); cf. id. 2002, p. 11.
[91] Id. 2010b, p. 41.
[92] Cf. Kant 1956, p. 151 b (B 139).

itself, it is no reduplication but rather a reaffirmation of the scientific term ('re-quantization'). The transcendental and the immanental share the 'union of oppositions' but, on the one hand, as a hierarchy through reaffirmation of the transcendence $(I + T) \cdot T$ and, on the other hand, as superposition without hierarchy through reaffirmation of the immanence $(I + T) \cdot I$.[93] As Laruelle writes, 'every representation or thought is "philosophical" in the sense that it contains a moment of transcendence called simple or "non-philosophical" that it uses as a material or a means'.[94] The 'radical, not absolute, form of immanence'[95] – in contrast to the 'plane of absolute immanence' (Deleuze) that Laruelle relates to a double transcendence – is called 'idemmanence', that is a portmanteau word 'obtained by superposition of the algebraic idempotence and of the philosophical immanence. It characterizes the generic plane as a simple transcending'[96]. As Laruelle says in 'I, the Philosopher, Am Lying': A Reply to Deleuze': 'It is a question of knowing whether immanence will be the real as immanent only (to) itself; or whether it ultimately remains the property of a plane, a universal, or even an ego.'[97]

[93] Cf. Laruelle 2010a, pp. 250–2, 327.
[94] Cf. ibid., p. 58.
[95] Cf. ibid., p. 53.
[96] Cf. ibid., pp. 53 f.
[97] Id., '"I, the Philosopher, Am Lying": A Reply to Deleuze', in Laruelle 2012a, p. 55. On 'Deleuze and Badiou: Two Perfect Philosophers', see Ó Maoilearca 2015, pp. 71 f.

1.3. Generic Constants

'Every good theory', according to Carl Christian von Weizsäcker, 'assumes constants and deduces from there, by means of a model, the values for the variables' (*'Jede gute Theorie geht von Konstanten aus und leitet daraus vermittels eines Modells die Werte für die Variablen ab'*[1]). In Laruelle every science is related to the discovery of a new *constant* and every philosophy with the discovery of a new *principle*. 'Philosophy itself requires constants as long as she aspires to become a science', he says in *Philosophie non-standard*, further pointing out:

> Parmenides sets out the constant as the "same" to which being and thinking belong. The ancient physiologists set out everything that is or the *physis* as air, fire, water, thus as an element. Aristotle seeks the constant of philosophy as a principle of analytic identity which will oppose the synthetic identity. Descartes makes out of the cogito and, above all, out of "*mens*" a constant through which all thought has to go for being recognized. Mathematics finds a constant in the empty set-form and we do no longer count the physical constants. Marx has found the constant in the form of the organic productive force or of the concrete labour force. Only the humans have not found an appropriate constant [...].[2]

Non-philosophy, by contrast, is the attempt to constitute a science through axiomatic decisions based on 'generic constants'. Laruelle proposes several constants obtained concomitant with non-philosophy, the three most important of which I will present in the following, above all a new concept of the real as a generic constant. The philosophico-scientific constant naming the real is the 'generic human' or 'human-in-person' (in metaphysical words, 'One-in-person') who has a certain privileged position. For Laruelle, the 'generic human' is a new quantum, the measure or more exactly the minimum of a 'discrete humanity'. The generic constant is very different from those of physics and of phenomenology which purport to be absolute as experimental givens, since the generic constant is assumed to be obtained in a process of immanent knowledge and remains therefore aleatory or uncertain. Usually, a characteristic constant of a domain of objects is not a subject but here, in the generic matrix, the constant applies to variables where there is a subject, though a nonindividual one, since the 'human-in-person' as the 'last instance' is assumed to have no individual subject. Philosophy itself offers no rigorous human quantum but concepts of the soul, spirit, body, transcendence, etc. In this context, Laruelle requires a quantum-concept which breaks with the metaphysical continuity and the absolute discontinuity of the modern subject.

The 'generic human' unifies two aspects constituting a generic constant:

1. The 'idempotent lived experience', i.e., the immanence as a logico-algebraic quality of idempotent addition or a *gesture of characteristic one* (1 + 1 = 1, that is the

[1] Cf. von Weizsäcker, Carl Christian, *'Das Erfolgsmodell des Nordens als Sehnsuchtsziel'*, F.A.Z., January 31, 2016, available at: http://www.faz.net/-gqg-8cdlf.
[2] Cf. Laruelle 2010a, p. 33.

ambiguous philosophico-scientific experience): 'NP [Non-philosophy] "starts" by thinking the identity itself'[3] or radical immanence, as Laruelle says. 'The One is immanence (to) itself without constituting a point or a plane; [...] the One or the real does not "exist" but (is) in-One'[4] through virtual quantum undulatory interference or superposition. In algebraic terms, the generic matrix takes the same, that is idempotence as a starting point. Idempotence or characteristic one is univocality itself. The univocality of the same is the uni-versal as generic or what is specified by Laruelle as a 'strong analysis' or a 'weak synthesis'.[5] Moreover, the 'generic human' or the 'Human-in-person is defined *by immanence as a logical property of the idempotent and thus sterile addition*'[6] or by the immanent (neither subjective nor objective but 'uni-jective'[7]) 'inseparably scientific-and-philosophical Lived experience'[8]. For Laruelle, the genericity of the human consists in being an immanent knowledge that does not know anything about itself, a nonreflexive lived experience, characterized in *Philosophie non-standard* as follows:

> We call 'lived experience' this noncumulative knowledge that stays constant or 'the Same' by a superposition [...]. Idempotence structures the experience [...] in the sense of an 'imaginary lived experience' [...] structured by the algebra of idempotence [...]. Idempotence, $1 + 1 = 1$, is an arithmetic which can be interpreted as generically forced, which does not reach the real number, [...] an 'idemfluence'.[9]

What distinguishes a generic science from a positive science and also from philosophy is that the *constant of lived experience is not objective.* Laruelle assumes a threshold, a 'quantum of humanity' or a 'Planck humanity'[10]. This limit or range of blurredness is fixed in an immanent way by the *process* of generic knowledge itself, it is not an exterior given. However, the immanental variability as well as the syntax of non-commutativity is considered as a 'quasi-empirical' fact. It is a 'scientific' and generic, minimal constant of humanity that draws its measure from the dimension of the 'Universe' and no longer from the dimension of the 'World'[11] serving as a coordinate axis.

2. The 'unilaterality' or 'unilateral duality' treated as a *gesture of unilateral transfer of action,* i.e., the minimal interaction between philosophy and science constituting the generic matrix, according to Laruelle: 'it is the constant which will allow us to solve this quantum paradox of a humanity that is able not only to *follow the universe at long distance by maintaining the contact* but *to find the contact through the long distance.* This is the definition of the invention or of philo-fiction.'[12] 'Unilateral

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[3] Cf. id. 2011a, p. 103.
[4] Cf. id., 'A Summary of Non-Philosophy' in id. 2012a, pp. 28, 29.
[5] Id. 2010a, *'L'idempotence comme analytique fort et synthétique faible'*, pp. 294–9.
[6] Cf. id. 2008, p. 53.
[7] Cf. ibid., p. 93.
[8] Cf. ibid., p. 63.
[9] Cf. id. 2010a, p. 162.
[10] Cf. id. 2015a, p. 144.
[11] Cf. id. 2015a, p. 145.
[12] Cf. id. 2015a, p. 34.

complementarity' as an unbalanced, one-sided duality is defined as a generic constant which applies to thought phenomena. It has already been described above as a superposition in process. This distribution is called immanental because it is based on the gesture of algebraic superposition and not on the gesture of logical identification. The superposition, as it is understood in the generic matrix, assumes an interaction, a minimal action which is exchanged in between the two systems, predicates or properties of the generic matrix. What is exchanged in between those two components is not a fixed quantity but a qualitative combination of the real (i.e., the first part: science, immanence, virtual, undulatory) and the reality (i.e., the second part: philosophy, transcendence, actual, corpuscular). These two different regions only 'share' the real allowing and conditioning the transfer. This 'unilateral transfer' is the operation or the functioning of the matrix, the determination of the union of science and philosophy on the (under)determining condition of science.[13] In the generic quantum context, the unilateral duality is perceived 'as an immanence but as it includes a simple transcendence that is said to be "fallen-into-immanence", thus reduced by interference to only one side or to a frontal unifaciality (and not to only one side obtained by a Möbius reversibility that is still transcendental)'[14]. Laruelle's construction, on the contrary, could be visualized by a unifacial rotund leaf (*galium rotundifolium*), chives for example. The inside is completely overgrown or involute so that only one side can be seen. The unilateral complementarity 'keeps an ambiguity of the relations of the second term to the first term'[15]. Philosophy does not return in a constitutive manner. The non-commutative structure does not imply any hierarchy between science and philosophy, as noted above in the previous section. 'With the "human-in-person" both science and philosophy leave their hierarchy behind but in a different way', says Laruelle, philosophy through the 'unified duality' (synthetic unity or 'the existence that stops being determining and dominant') and science 'by the non-unified or unilateral duality as essence. Philosophy provides non-philosophy with existence, science provides it with essence, in a non-relation in-the-last-instance'[16]. The unilateral duality is defined as a 'quantity of (non-)action'[17] or rather as a 'generic quantum of action' always superposing two aspects. Hence it proposes an alternative to the models of dialectics, combinatorics, mediation or transition[18]. Similar to the 'imaginary', the generic 'quantum of action' is, according to Laruelle, 'a way to force the dialectical contradiction by suppressing its transcendental meaning of synthesis and mediation, by underdetermining it philosophically and by penetrating it with immanence'[19]. It is a question of the quantum of a *'minimal but unilateral effect of "thought" that can be "exchanged"*, in a generic manner, without commutativity between science and

[13] Cf. id. 2015a, *'Le transfert unilatéral'*, pp. 321 ff.
[14] Cf. id. 2015a, p. 216.
[15] Cf. id. 2011a, p. 76.
[16] Cf. id. 2008, p. 110.
[17] Cf. id. 2010a, p. 120.
[18] Cf. ibid., p. 189.
[19] Cf. ibid., p. 258.

philosophy'[20] and, in this way, regulates and determines their relations. Laruelle attributes to the generic quantum of action the qualities of 'an irreducible "packet" or a "packet" of discretion *à la* Planck, and those qualities of a certain continuity of immanence. That is why the generic quantum of action is phenomenally (not quantitatively) a complete but not closed 'packet' of continuity or immanence.'[21] The indirect or unilateral action of the generic quantum which manifests itself not in a mechanical, corpuscular but in a virtual way and as a process is also called 'force (of) thought', as described at the beginning of this chapter (for more extensive conclusions see section 3.3.1., 'The Spectral Element of Consistency'). Very similar to the 'idempotent lived experience', the generic quantum of action is the 'real object' (the real) of the generic matrix. With the aid of the process of the 'unilateral (quasi-)transfer' Laruelle tries to explain that the real in its 'superpositionary' essence is an immanent action which is excluded from the world and acts indifferently towards it. 'The non-acting of the immanence is a process, it is not an absolute immobility.'[22] The quantum of action, as one of the essential constants of non-philosophy, reflects the most the actional aspect of the generic gestures of thought. As for the Laruellean real, Kolozova points out:

> The mode of unilateral differentiation and the generic claim of the one are the two theoretical gestures that render non-philosophy a thought in terms of – or rather, in correlation with – the real and radically non{-}dichotomous. It is immanent to the procedure of 'dualysis' (*dualyse*), which consists in the radical affirmation of the transcendental and the real as duality without scission and without unification, a duality in which each of the terms correlates unilaterally with the other.[23]

3. At last, the *'passive motor'* of non-philosophy, the 'quarter turn'[24] or 'spin' as the 'genetic element' of undulation and invention, Laruelle's 'unmoved mover' or *'clinamen'*, ultimately leading him to an 'onto-vectorial ontology' or the 'onto-vectorial image of thought'.[25] The imaginary number $i = \sqrt{-1}$ or, geometrically interpreted, the 'imaginary quarter' or 'quarter turn' (that is, multiplying a complex number by i gives a 90° counterclockwise rotation), as a generic constant, is 'the genetic element of the undulatory'[25] or of the wave. It is what happens 'inside' of the undulation or what constitutes the wave. This gesture gives the inner impetus to the wave. The quarter turn is the immanent 'clinamen of Lucretius'[26] for the generic matrix, it precedes the undulation and produces this rotational power of spin $\frac{1}{4}$. The 'pre-undulatory' is geometrically represented as a vector in complex analysis, with a real part and an imaginary part, and algebraically written as a complex number. Therefore Laruelle finds the root for his '"ontology" (the generic is not ontological but works with the means of

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[20] Cf. ibid., p. 426.
[21] Cf. ibid.
[22] Cf. ibid., p. 422.
[23] Kolozova 2014, p. 115; cf. also Laruelle 2013d, pp. 93–5.
[24] Cf. Laruelle 2010a, p. 250.
[25] Cf. ibid., p. 259.
[26] Cf. ibid., p. 251.

ontology)'[27] of the undulatory in a theory of vectoriality, that is, in complex numbers. He conceives the quarter turn as a vector composed of two aspects (immanence and transcendence). The pair immanence-transcendence is described as an 'onto-vectorial "machine"' and distinguished 'from, for instance, the flow-cut desiring machines (Deleuze). Such an onto-vectorial machine works in the heart of all creation or invention.'[28] Then, the generic matrix can also be described as a thought of the 'generic vector'. It comes with a 'minimal syntax'[29]. A generic vector entity is presented as an elementary machine, a kind of 'passive synthesis'[30] (Deleuze) or inseparable duality of two 'oppositions' ('like surface and colour, immanence and transcendence, form and matter, cut and flow'[31]). In the generic perspective, an imaginary 'vector or quarter machine'[32] is formulated by means of superposition and fusion. The result is the unilateral duality as a minimal, immanent rotation of a 'particle-like concept' with a spin $\frac{1}{2}$ (that is, a double quarter turn)[33], the particle-like undulation regarded as immanent in conceptual transcendences after their return to immanence ('fallen into immanence'). In the 'non-Kantian critique' of the generic matrix, the 'unilateral duality' gives momentum to the 'conceptual corpuscles' and makes them collide. The generic matrix is supposed to originate from the 'real' (that is, the order of the pre-undulatory vector), but is finally understood as virtual. Therefore, it is called a 'virtual' science rather than a 'sought after science' ('ἡ ζητούμενη επιστήμη'[34], Aristotle). It is also called a 'complex' science since its final virtual cause is connected by a construction of two irreducible components (just as the both parts, real and imaginary, of a vector or the wave-particle complementarity). The quarter turn or 'pre-conceptual spin' of $\frac{1}{4}$ is the 'root of the radical (and not of the absolute) as "imaginary"'[35] or the 'heart' of invention in the generic matrix. Unlike the 'clinamen' of the atoms which imposes the predicate of a torsion upon an immobile object, the spin is not a particle property in the 'prior-to-undulatory' perspective but provides everything with an 'atom of motion'[36] guaranteeing the force of invention as well as of intervention. Herein, Laruelle sees the starter of the wave motion, the 'passive motor' acting in the 'heart' of the vibration, an Aristotelian 'unmoved mover'[37], 'for starting and remaining in this idempotent beginning, *the minimum of becoming* (*of under-coming* [de sous-venir]) *tolerated by the immobility of being* or vice-versa *the*

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[27] Cf. ibid., p. 261.
[28] Cf. ibid., p. 251. For 'desiring machines' ('*les machines désirantes*') and 'interruption of the flow' or 'break in the flow' ('*coupure de flux*'), see Deleuze and Guattari, *Anti-Oedipus: Capitalism and Schizophrenia*, Translated from the French by Robert Hurley, Mark Seem, and Helen R. Lane. Minneapolis: University of Minnesota Press, 1977, p. 36; cf. id., *L'Anti-Œdipe. Capitalisme et schizophrénie 1*. Paris: Les Éditions de Minuit, 1972/1973, pp. 45 f.
[29] Cf. Laruelle 2011a, p. 102.
[30] Cf. id. 2010a, pp. 251, 321.
[31] Cf. ibid., p. 261.
[32] Cf. ibid., p. 251.
[33] Cf. ibid., p. 264.
[34] Cf. Aristotle, *Metaphysics* III, Part 1: 'the science which we are seeking', available at: http://classics.mit.edu/Aristotle/metaphysics.3.iii.html.
[35] Cf. Laruelle 2010a, p. 264.
[36] Cf. ibid.
[37] Ibid., p. 279: '"*moteur immobile*"'.

maximum of "immobility" tolerated by the mobility or the motricity of being.'[38]

Non-standard philosophy's change in paradigm enables us to move from classical ontology to 'a non-Cantorian and quantum ontology'[39]. The following chapter will pursue the question of how to establish a bridge 'backwards' from 'non-commutative ontology' to 'commutative ontology', that is, to a 'semi-philosophical' point of view, by way of 'dequantization'. Under the heading of a 'tropical analysis of the generic matrix' it explores the idea of 'idempotence'[40] or, of the 'characteristic one' (1 + 1 = 1).

[38] Ibid., p. 264: '*pour commencer et rester dans ce commencement idempotent,* le minimum de devenir (de sous-venir) que tolère l'immobilité de l'être *ou inversement* le maximum d' "immobilité" que tolère la mobilité ou la motricité de l'être.'

[39] Cf. id. 2011a, p. 150: 'Une ontologie quantique ou non-cantorienne'.

[40] Cf. id. 2010a, pp. 54, 294–302.

2. TROPICAL ANALYSIS OF THE GENERIC MATRIX CATEGORY

2.1. Categorialization and Tropicalization

I aim at a modeling of the '"quantum-oriented theory"'[1], namely a 'categorialization' which, by its correspondence 'up to isomorphism' to 'the generic and quantum matrix'[2], allows to apply what I call a 'tropical analysis' (according to the model of Victor P. Maslov, Vassili N. Kolokoltsov and Grigory L. Litvinov[3]), that is, a *dequantization* of the 'generic matrix category', provided that the constants of Laruelle, that is, the *primum movens* or the 'immobile motor'[4] of non-philosophy, tend to zero by taking purely imaginary values. 'Two isomorphic objects are "literally" different, but categorially identical', as Badiou points out. 'Because categorial identity is specified by the network of actions of which an object is the source or the target.'[5] The idea is to interpret the onto-vectorial paradigm of thought as a 'categorial' or category-oriented theory of a nonreversible translation of knowledges and methods. In *Principles of Non-Philosophy* Laruelle says with regard to 'a translation of philosophies "into" one another':

> Non-philosophy *is* this translation of Kant 'into' Descartes, of Descartes 'into' Marx, of Marx 'into' Husserl, etc. That is to say under the condition of the vision-in-One as untranslatable Real. To put it more rigorously, no more than it is im-possible or unsymbolizable, the Real is not untranslatable, but is rather that which renders the possibility of translation real-in-the-last-instance, the Real itself being foreclosed, without negation, to any translation and not becoming the untranslatable other than as force (of) thought or, in this instance, *force (of) translation.*[6]

Furthermore, the generic matrix category guarantees the transfer of properties or constructions from an initial standard, commutative domain to a final non-standard, non-commutative codomain, and thus induces the quantum and generic change of basis or viewpoint. The non-commutative category of philosophy is defined, on the one hand, by onto-material and onto-vectorial objects, that is, linear variables that describe states or *kinematics* by philosophico-scientific givens such as the 'immediate unity of nature and man' (Marx), 'intentionality' (Husserl), 'Being-in-the-world' (Heidegger) or 'the Aristotelian figures'[7] (σχήματα, Aristotle's syllogistic figures), and, on the other hand, by

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[1] Laruelle 2015d, p. 67; id. 2014, p. 107: '"*théorie orientée-quantique*"'.
[2] Id. 2012b, pp. 149, 57: '*la matrice générique et quantique*' (translation slightly adapted).
[3] Cf. Litvinov, Grigory L., 'Tropical Mathematics, Idempotent Analysis, Classical Mechanics and Geometry' (2010): arXiv:1005.1247.
[4] Laruelle 2010a, p. 279: '"*moteur immobile*"'.
[5] Badiou 2014, p. 42.
[6] Laruelle 2013b, p. 224 (translation slightly adapted); id. 1996, p. 273: '*La non-philosophie* est *cette traduction de Kant "en" Descartes, de Descartes "en" Marx, de Marx "en" Husserl, etc. C'est-à-dire sous la condition de la vision-en-Un comme Réel in-traductible. Plus rigoureusement, pas plus qu'il n'est l'im-possible ou l'in-symbolisable, le Réel n'est l'in-traductible, mais plutôt ce qui rend réelle-en-dernière-instance la possibilité de la traduction, le Réel étant de lui-même forclos, sans négation, à toute traduction et ne devenant l'intraductible que comme force (de) pensée, ou, en l'occurrence,* force (de) traduction.'
[7] Id. 2015a, p. 215: '*les figures aristotéliciennes*'.

morphisms, that is, linear operators dealing with *dynamics* or processes, such as the 'messiah-function', the 'Christ-factor' or the 'messiah-factor' which send states of the Greco-Jewish or Christian system to states of the 'Christ-system'[8]. These givens are considered as virtual state vectors, imaginary observables[9] or potentialities of 'a nonset-theoretic matrix ontology of the lived experience'[10]; they are supposed to form a non-commutative 'algebraic logos as a complex number'[11], whereas the tropical analysis of the generic matrix category will present a 'commutative shadow', i.e., a *sub*algebraic logos as a tropical number. By applying a unifying methodological approach to this context, I suggest that non-philosophical properties or constructions can manifest themselves in several different forms as a part of theories having a semantic 'core' or superstructure in common (given that a theory is accompanied by an interpretation that embodies its semantics). This serves as a sort of 'bridge' for the transfer between various syntactic infrastructures, whether they are complex, i.e., quantized, or 'tropical', i.e., dequantized (for the topos as a homological bridge, see paragraph 4.4., 'Subtropical Philosophy'). Based on the assumption 'that with the Real there corresponds [not] one and only one thought'[12] Laruelle affirms that 'a multiplicity of presentations of non-philosophy is possible, and this testifies to its plasticity and its universality rather than to a formalism'[13] (for the relative point of view on philosophy, see paragraph 4.1.). This characterization leads to my hypothesis of a *'quasi-classical' subcategory*[14] for a theory that extends the quantum-oriented theory beyond its language and its axioms, and thus holds the hope and promise to reduce the gap between (philosophically overdetermined) traditional philosophy and (scientifically underdetermined[15]) non-philosophy. As Kolozova points out:

> Thinking participates in the one, that is, in the real as its 'superstructure', as that translucent level of transcendence without an ontology of its own which envelops the real or the one as its instance of 'autosublimation'. It is the instance of interpretation, of giving meaning, of signification that dilutes the thickness of the incomprehensible real, populates it with signs, and makes it liveable through the 'device' called language. The instance of thought (or of language) is the human appropriation of the real (the one). The human in its last instance or the human-in-human is (the) real and the inexorably one.[16]

Therefore, my primary objective is to understand the semantic superstructure, whose objects represent 'morphisms' between two syntaxes, whereas the 'transcategorial' morphisms are called 'functors'[17], and to address the following question: *what is the*

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[8] Id. 2015d, p. 51; id. 2014, pp. 83 f.: *'fonction-Messie', 'facteur-Christ', 'facteur-Messie', 'système-Christ'.*
[9] See appendix.
[10] Laruelle 2015a, p. 125: *'une ontologie matricielle et non ensembliste du vécu'.*
[11] Cf. id. 2015a, p. 126: *'le logos algébrique comme nombre complexe'.*
[12] Id., 'What Is Non-Philosophy?' (1997), in id. 2013a, p. 219.
[13] Ibid., p. 212.
[14] See appendix.
[15] For a definition of 'Sous- (sous-consistance, sous-détermination, sous-fondation, sous-sujet)' see id. 2010a, pp. 60 f.
[16] Kolozova 2014, p. 111.
[17] See appendix.

subcategory associated with the 'quotient' (by an equivalence relation) *of the quantum-oriented theory which maintains the same language as the generic matrix category while adding more axioms but,* instead of thinking of a non-commutative system as a vector in 'a space of vectoriell [...] configuration'[18], *rather considers it from a 'semi-classical' or 'quasi-philosophical' point of view?*

This approach relates, in a certain sense, to what Badiou calls 'the theorem of the point of excess'[19]. 'This theorem', as James points out, 'holds that given a set α containing a certain number of elements, the set which would contain all the subsets of α (noted as p(α)) will have an unquantifiably greater number of elements than α. In other words, the set of subsets would always be of a different, and immeasurably greater magnitude than the set itself (or: $p(\alpha) > \alpha$).'[20] The term 'functor' was originally coined by Carnap: 'In order to express properties or relations of position by means of numbers, we shall use *functors.*' (*'Um Eigenschaften oder Beziehungen von Stellen durch Zahlen auszudrücken, verwenden wir die* Funktoren.')[21] The axioms of non-philosophy is what Laruelle calls 'first names' of the real: these are '[f]undamental terms which symbolize the Real and its modes according to its radical immanence or its identity. They are deprived of their philosophical sense and become, via axiomatized abstraction, the terms – axioms and theorems – of non-philosophy.'[22] Smith expounds further:

> Instead of propositional philosophy, thinking One requires the formulation of axioms. The axiomatic style is important for Laruelle's setting-up of the mechanisms of non-philosophy, for axioms are not representational. They may be thought of as expressive of some principle. However, the truth of that principle is not something that can be demonstrated; instead, an axiom organizes how thinking will take place. If the thought does not work, then axioms may be reevaluated or modified, but the evaluation of the axioms only happens through setting them and watching how they function. In other words, the axioms are evaluated by what they allow to manifest through them, not by the strength of their ability to represent something beyond them.[23]

Why should we be interested in the categorialization of the generic matrix in the first place? I try to give a few reasons:

1. Non-philosophical methodology is based on both the transfer and the dynamic modeling of knowledges and methods. As Laruelle says in *Principles of Non-Philosophy*: non-philosophy is 'a universal organon of thought [...]; it is in a perpetual state of

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[18] Laruelle 2015d, p. 90; id. 2014, p. 139: *'un espace de configuration vectoriale'.*
[19] Badiou, *Being and Event,* Translated by Oliver Feltham. London: Continuum, 2006b, p. 84; cf. id., *L'Être et l'Événement.* Paris: Éditions du Seuil, 1988, p. 98.
[20] James 2012, p. 142.
[21] See Carnap, Rudolf, *The Logical Syntax of Language,* Translated by Amethe Smeaton. London: Routledge & Kegan Paul, 1937, p. 14; cf. id., *Logische Syntax der Sprache.* Wien: Springer, 1934, p. 13.
[22] Laruelle 2010b, p. xxvi; id. 2002, p. 9: 'Noms premiers. *Termes fondamentaux qui symbolisent le Réel et ses modes en fonction de son immanence radicale ou de son identité. Ils sont privés de leur sens philosophique et entrent, par cette abstraction axiomatisante, dans les énoncés, axiomes et théorèmes, de la non-philosophie.'*
[23] Smith 2016, p. 42.

producing novelty; of opening and rectifying a specific space of knowing without confusing itself with the reality to be described'[24]. 'This is therefore a practice that only exists in the immanence of its exercise. Hence the necessity of inventing each time formulations which are not satisfied with thematically describing what is in question'[25], as Laruelle characterizes the performativity of non-philosophy. That is why new syntaxes abound quite naturally in the history of non-philosopy. The categorial language is especially well-suited to describe with an appropriate degree of generality as well as of intuition the functioning of the 'non-' which models a theory, a system of thought or 'the pairs of the great transcendentals (Being and Non-Being, Same and Other, Good and Evil as Non-Good, True and Non-True, etc.)'[26] by various ('[n]on-Einsteinian', 'non-Gödelian, non-Schrödingerian, non-Cohenian, etc.'[27]) morphisms. James credits non-philosophical 'thinking with enormous transformative potential'[28] by aspiring to a 'global change of perspective'[29] and a 'global change of ground'[30] by way of science. 'Science decenters', says Ó Maoilearca, 'it is an *activity* rather than a body of knowledge'[31]. What Laruelle '*aims for* is a properly transformative (mutating) human posture'[32] which 'produces or determines effects of transformation'[33], but by being 'concerned with questions of transformation and change, with the emergence of the unexpected, the unforeseeable or the uncategorizable'[34] Laruelle is, according to James, only one among other contemporary French philosophers, like Jean-Luc Marion, Jean-Luc Nancy, Bernard Stiegler, Catherine Malabou, Jacques Rancière, and Alain Badiou. As for Deleuze, Delanda writes:

> Gilles Deleuze changes his terminology in every one of his books. Very few of his concepts retain their names or linguistic identity. The point of this terminological exuberance is not merely to give the impression of difference through the use of synonyms, but rather to develop a set of different theories on the same subject, theories which are slightly displaced relative to one another but retain enough over-laps that they can be meshed together as a heterogeneous assemblage. Thus, the different names which a given concept gets are not exact synonyms but near synonyms, or sometimes, non-synonymous terms defining closely related concepts.[35]

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[24] Laruelle 2013b, p. 11; cf. id. 1996, p. 14: '*un organon universel de la pensée* : [...] *ce type d'instrument théorique ne s'enferme jamais dans des connaissances définitives, il est en état d'en produire sans cesse de nouvelles, d'ouvrir et de rectifier un espace spécifique de connaissances sans se confondre avec la réalité à décrire*'.

[25] Id. 2013d, p. 168.

[26] Id. 2008, pp. 112 f.: '*les paires de grands transcendantaux (Être et Non-Être, Même et Autre, Bien et Mal comme Non-Bien, Vrai et Non-Vrai, etc.).*'

[27] Id. 2010a, p. 56: 'Non-einsteinien (cf[.] non-gödelien, non-schrödingerien, non-cohenien, etc.).'

[28] James 2012, p. 180.

[29] Cf. Laruelle, *Philosophie et non-philosophie*. Liège: Pierre Mardaga, 1989, p. 127. Id. 2013d, p.?

[30] Cf. Id. 2013b, p. 4: 'a new and more universal relationship to *Philosophy* taken "globally"'; cf. id. 1996, p. 4: '*un nouveau et plus universel rapport à* la *philosophie prise "globalement"*'.

[31] Ó Maoilearca 2015, p. 28.

[32] Ibid., p. 160.

[33] Laruelle 2008, p. 119: '*la posture produit ou détermine des effets de transformation*'.

[34] James 2012, p. 2.

[35] DeLanda 2002, p. 157.

Gangle discovers yet in non-philosophy a specific structural correspondence to category theory with regard to the One:

> The One is not *related* to anything in any way, by definition, but by the same token it is unreservedly and immediately 'open' to any things in all ways. 'In-One' is in this respect the non-exclusively unique 'term' that would transcendentally determine the question of access to any given or givens whatsoever without being determined in turn by this very question.[36]

Moreover, Gangle makes the following, for our context, interesting remark in *Diagrammatic Immanence*: 'The mathematically adventurous may want to consider in the context of category theory how Laruelle's project in this respect corresponds structurally to the role of the initial object 0 (the unique category with no objects and no arrows) in William Lawvere's 2-category, CAT.'[37]

For Châtelet and Badiou, the latent *continuous* development is always more important than the discontinuous undercut.[38] By the use of categories, the continuity of the non-commutative system of thought, in relation to its standard model, can be described in terms of nonreversible interpretations, including historically remote fragments (e.g. the old gnosis). Quasi-invariant concepts throughout the history of non-philosophy, such as 'ordinary man' ('Philosophy II' [1985]) ≃ 'generic human' ('Philosophy V' [2015]), can be best understood as epiphenomena ('identity morphisms' as a particular case of morphism describing *kinematics*) of a continuous and nonreversible *dynamics* of interacting, compound non-commutative operator-concepts (quantized concepts or 'non-concepts'). The transformations implied are neither reducible to 'isomorphisms' in the sense of reversible translations which is obvious since otherwise non-philosophy could not develop nor to 'monomorphisms' (embeddings) of older contents (such as 'ordinary man', 'Vision-in-One', 'unilaterality', etc.) into new ones ('generic human', 'idempotence', 'non-commutativity', etc.). Like any other science, non-philosophy does not only acquire new knowledge but also constantly revises its older contents and throws some of them away. A cumulative model of development, the assemblage of knowledges as the ideal of the (e.g. Badiousian) encyclopedism (refused by Laruelle), would be inadequate even if it allows for occasional 'revolutions' (Kuhn).

2. Non-standard thought is closely linked to the concept of duality[39] and coupling of

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[36] Gangle 2013, p. 162.

[37] Ibid., p. 180, n. 23. See also Mac Lane 1998, pp. 272–9.

[38] Châtelet 1993, p. 27: *'C'est ainsi que deux rythmes très différents scandent l' "histoire des idées" : celui, discontinu, des "coupures", des paradigmes et de leurs réfutations et celui, plus silencieux mais toujours proposé à la réactivation, du ressassement, du piétinement immobile des noyaux problématiques. Cette possibilité de réactiver et d'accueillir le problématique en tant que tel implique que le physico-mathématique actuel ait véritablement la "métaphysique" à fleur de peau et concerne donc le philosophe.'* Cf. Badiou, *Petit panthéon portatif.* Paris: La fabrique éditions, 2008, p. 158.

[39] See appendix.

complementary properties or virtual observables, given in terms of unbiased, i.e., equally probable, vectors or states, for instance 'Greek or "Logos" and Jew or "Torah"' as for 'the "Christ" matrix'[40] or 'the Being-human (rational) and the Being-animal (biological)'[41] in view of the 'generic human'. Therefore there is some ambiguity in non-philosophy. As Badiou points out: 'Category theory is especially suited to the examination of ontological "dual" situations, which is to say, of reversible correspondences, of positional ambiguities, of inverted identities, or of symmetrical and mirroring effects.'[42] Therefore, from a categorial point of view on quantum-oriented theory the principle of the 'two for the price of one' holds: every categorial concept is two concepts and every result is two results. In other words: quantized concepts are always paired concepts. By contrast, the pair discrete-continuous is not dual since the continuous is a particular case of the discrete because – given that numbers could represent any kind of structure (Gödel)[43] – 'the real values are at the limit of discrete values', as Franck Jedrzejewski writes. 'In other words, there is a property of density of the numbers at stake and not a matter of duality.'[44] Carlo Rovelli confirms: 'Continuity is just a mathematical technique to approach things with a very fine grain. The world is discrete in a subtle way, not continuous.'[45] However, every categorial concept, defined by 'particle-objects' or 'concept-particles' and arrows or morphisms, induces immediately a dual concept which is not necessarily the opposite but can be 'obtained in a particularly simple manner by inverting the orientation of the morphisms by transforming the aims into sources and the sources into aims'[46]. In other words, a categorial concept has the same objects as its dual concept and just as many morphisms, only the arrows act 'in the opposite direction'. For instance, the philosophical matrix takes the *a prioris* which 'are not taken to be ahistorical, but structure certain historical epistemological stances'[47] as a starting point. Foucault summarizes this understanding of *a prioris* as follows:

> all [inquiries of a philosophical and scientific nature] rested upon a sort of historical *a priori*, which authorized them in their dispersion and in their singular and divergent projects, and rendered equally possible all the differences of opinion of which they were the source. [...] This *a priori* is what, in a given period, delimits in the totality of experience a field of knowledge, defines the mode of being of the objects that appear in

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[40] Laruelle 2015d, p. 142: '"Logos" and "Torah."' Id. 2014, p. 210: *'grec ou "Logos", et juif ou "Torah"'*; 'la matrice "Christ"'.

[41] Id. 2015a, p. 138: *'l'être-humain (rationnel) et l'être-animal (biologique)'*.

[42] Badiou 2014, p. 37.

[43] Nagel and Newman 2001, p. xviii.

[44] Cf. Jedrzejewski, Franck, *Diagrammes et Catégories*. Université Paris-Diderot – Paris VII, 2007, <tel-00193292>, p. 171: *'les valeurs réelles sont limites de valeurs discrètes. Autrement dit, c'est une propriété de densité des nombres qui est en jeu et non une affaire de dualité.'*

[45] Rovelli, Carlo, *L'Ordre du temps*, Translated from Italian by Sophie Lem. Paris: Flammarion, 2018a, p. 102: *'La continuité n'est qu'une technique mathématique pour approcher les choses avec un grain très fin. Le monde est subtilement discret, il n'est pas continu.'*

[46] Cf. Jedrzejewski 2007, p. 170: *'une catégorie duale [...] est obtenue de manière particulièrement simple en renversant le sens des morphismes, c'est-à-dire en transformant les buts en sources et les sources en buts'*.

[47] Smith 2016, p. 22.

> that field, provides man's everyday perception with theoretical powers, and defines the conditions in which he can sustain a discourse about things that is recognized to be true.[48]

From these *a prioris* the philosophical matrix passes on to 'the transcendental (the structures produced by philosophy that are taken by philosophy to structure thought and experience)'[49], and from the latter to the real. The generic matrix, on the contrary, proceeds from the real to the transcendental, that is now called 'immanental', and from the latter to the *a prioris*: 'each object, seen in-One, becomes its own *a priori*, without reference to the status of any subject's knowledge of it'[50], as Ó Maoilearca points out. A categorial reading of the situation suggests a dual understanding of both matrices, they are 'the same thing' but with opposite orientations. More precisely, given the category C of non-philosophy with objects

$$Ob(C) := \{real, transcendental, a\ priori\},$$

it can be constructed the 'opposite category-concept'[51] C^{op} that has the same objects and morphisms as C does. The difference comes in how they relate to each other. One has two functions assigning the 'source' and the 'target' objects to any arrow. To get the opposite category one just swaps them. Given a morphism, its source in C^{op} is its target in C, and *vice versa*. Now one has to swap, too, the order of composition. If there is $f: A \to B$, that is,

$$real \to transcendental$$

and $g: B \to C$, that is,

$$transcendental \to a\ priori,$$

then one gets $f: B \to A$,

$$transcendental \to real$$

and $g: C \to B$,

$$a\ priori \to transcendental$$

in C^{op}.
In C the composition $g \circ f: A \to C$,

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[48] Foucault 2002, p. 172; cf. id. 1966, p. 171.
[49] Smith 2016, p. 23.
[50] Ó Maoilearca 2015, p. 83 (italics added).
[51] See appendix.

$$real \rightarrow a\ priori$$

is defined, whereas in C^{op} the composition $f \circ g: C \rightarrow A$,

$$a\ priori \rightarrow real$$

is defined. All definitions that Laruelle offers come with a 'dual' definition, which we get by reversing all the arrows like this. If one writes down a definition in terms of morphisms, and one reverses all the morphisms (and the order of composition), then one gets the other. Philosophy and non-philosophy proceed in opposite ways (they are 'the same thing' but with opposite orientations): philosophy proceeds from the *a priori* to the transcendental, and from the latter to the real. On the contrary, non-philosophy proceeds from the real to the transcendental (now rather called immanental), and from the latter to the *a priori*. As Ó Maoilearca says, non-philosophical research is the 'endeavor to reorient thought – from going from philosophy to the Real to going from the Real to philosophy'[52]. In *Philosophy and Non-Philosophy* Laruelle describes the difference between philosophy and non-philosophy more generally as follows:

> The philosopher wants to fold the real onto his thought and decrees through idealism that the real does not exist if he cannot think it. Vision-in-One constrains us to do the opposite: fold our thought onto the real by modifying the concept in accordance with it; no longer to be able to be willful, decisionist, idealist, but to be necessarily naive, experimental, realist, and to modify our traditional practice of thought and language in accordance with this experience of the One-real that we take as our transcendental guide.[53]

Gabriel Alkon and Boris Gunjevic also point out: 'When seen according to the vision-in-One, the philosophical "material" or "occasion" for non-philosophy is [...] "cloned": nothing is changed, philosophy remains its autonomous self, but this autonomy is now "experienced" or posited as given-without-givenness, as identical in-the-last-instance to everything real.'[54] However, 'in its claim to be a "radical inversion" of philosophy's relationship with the Real', as Ó Maoilearca writes, 'non-philosophy aspires to more than mere *reversing* the relationship between the two, for that would leave the door open to an eventual counterreversal. Non-philosophy aims to *invert* the relationship fundamentally, with no subsequent volte-face.'[55] This difference was already noted by Hughes Choplin: 'the non-philosophical posture or look, oriented in the inverse direction

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[52] Ó Maoilearca 2015, pp. 30 f.
[53] Laruelle 2013d, pp. 50 f.
[54] Alkon, Gabriel, and Boris Gunjevic, 'Introduction, According to the Identity of the Real: The Non-Philosophical Thought of Immanence' in Laruelle 2012a, p. 19.
[55] Ó Maoilearca 2015, p. 24.

to that centered – exclusively – on philosophy and its language'[56]. In *Struggle and Utopia at the End Times of Philosophy* Laruelle himself says: 'Non-philosophy aims overall to operate through radicality and inversion (*uni-version*) of this order and not a reversal, and to put philosophy in exclusive dependence on Man'[57]. 'One must certainly understand the inequality of this equality via non-philosophy, not as a reversal of philosophy but as its *radical inversion.*'[58] Thus, duality is a sort of inversion of fluxes, an inverse current that produces the dual functioning by which the categorial concept and its dual are closely linked or 'superposed' with each other. The workings of duality – of the inversion, of the addition – are essential here. In order to show that the dual is a categorial concept, one has to show the existence and the associativity of arrow compositions as well as the existence of identity morphisms.

The duality is demonstrated by the *exchangeability* of objects which come by pairs. An object and its dual image are in a relation of a strong *reciprocity.* The duality is the particular cleavage that does not separate two things from each other, but reveals their immanence and their indissociable relation by affirming their mutual reciprocity and their non-identity. There is an interdependence of the object and its dual. The object is necessary for the dual to be intelligible, and to produce its effects. And vice-versa, the dual is necessary so that the object gains its whole meaning. What differentiates the conceptual dual from a simple dyad is that 'once one approaches a pair of objects for its better understanding, it is transformed instantaneously in one single object'[59]. The duality of 'particle-objects' or 'concept-particles' turns into a unilateral identity 'of symmetry breaking'[60] and objective appearance, that is, 'object-concepts' or 'concept-corpuscles'. Laruelle says, 'under the macroscope of philosophy (which is "decoherent," as certain physicists say), the formula loses its superposition, and is decomposed into an amphiboly or a specular doubling; it bilaterializes and becomes reversible, as in the famous axiom of the convertibility of the One and of Being'[61]. In Kant, 'transcendental amphiboly' is called 'a confusion of the pure object of the understanding with the appearance'[62]. Jedrzejewski further points out: 'Everything takes place as if there were two axes: a lateral axis on which the singularities and differences of the object and its

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[56] Cf. Choplin, Hughes, *La Non-Philosophie de François Laruelle.* Paris: Kimé, 2000, p. 73 (translated by Ó Maoilearca in id. 2015, p. 301, n. 69).

[57] Laruelle, *Struggle and Utopia at the End Times of Philosophy,* Translated by Drew S. Burke and Anthony Paul Smith. Minneapolis, Minnesota: Univocal, 2012d, p. 7 (italics as in the French original). Id. 2004, p. 12: *'La non-philosophie se propose globalement d'opérer une inversion par radicalité* (une uni-version) *de cet ordre, pas un renversement, et de mettre la philosophie dans la dépendance exclusive de l'Homme'.*

[58] Id. 2012d, p. 114; id. 2004, p. 99: *'Il faudra certainement entendre l'inégalité de cette égalité sur le modèle de la non-philosophie, non comme renversement de la philosophie mais comme son* inversion radicale.'

[59] Cf. Jedrzejewski 2007, p. 173: *'dès qu'on approche un couple d'objets pour mieux l'appréhender il se transforme instantanément en en seul objet'.*

[60] Cf. Laruelle 2010a, p. 134: *'Le rapport exact du générique avec ses sources* [...] *sera dit chaque fois unilatéral ou de symétrie brisée'.*

[61] Id. 2015d, p. 56; id. 2014, p. 91: *'Évidemment, sous le macroscope ("décohérent", diraient certains physiciens) de la philosophie, la formule perd sa superposition et se décompose dans une amphibologie ou un redoublement spéculaire, elle se bilatéralise ou devient réversible comme dans l'axiome fameux de la convertibilité de l'Un et de l'Être.'*

[62] Kant, *Critique of Pure Reason,* Edited and translated by Paul Guyer and Allen W. Wood. Cambridge: Cambridge University Press, 1998, p. 371 (A270–B326); see also Ó Maoilearca 2015, p. 87.

double are deployed, and a frontal axis that produces a unilateralization of the object and gives every dual pair a unitary significance.'[63] 'The act of "unilateralization" (*unilatéralisation*)', as Kolozova writes, 'is an act of a nonrelative and nonrelationalist establishing of a relation of difference. This is an act [...] of unilateral self-differentiation'[64] or of a 'unilateral singularity'[65], according to Laruelle. The unilateral duality is a complex object that is transformed by interaction, a semi-object that is always transformed by a measurement that takes notice of it. The duality is not a heterogenous, but a unilateral machine where one of the terms is forced and holds for both. In Laruelle, by contrast, the vision-in-One installs 'a *radical duality*, a duality which is *static* or without splitting, that ruptures the continuity of the philosophical dyad'[66]. He further says:

> The most universal invariant trait of philosophy is a fractional matrix in 2/3 terms: it gives itself an interiority and an exteriority, an immanence and a transcendence *simultaneously*, in a synthetic or hierarchical structure, the one overcoming the other in turn. This matrix of 'Philosophical Decision' can be read as the identity of a double relation of philosophy to itself. First, an identity of 2/3 (insofar as the third term, synthesis, is immanent to the dyad, philosophy being in need of itself). Second, a 3/2 identity (insofar as the term of synthesis is transcendent to the dyad, philosophy being in excess of itself).[67]

The real is made of complex (that is, 'composed') elements, it is neither one nor two, also called 'unijects', like the 'unilational' axiom which unifies 'in-the-last-instance' scientific *essence* and philosophical *existence*. In non-philosophy, the axiom is therefore no longer a logico-linguistic act but a 'unilational', inseparably scientific-and-philosophical component of 'Science-Thought'[68]. That means a complex formed by an act of 'non-action' and by a unilateral or 'unijective' (not 'objective') side. The generic 'Science-Thought' produces axioms as 'radical real lived experiences'[69] in the shape of impartible but dual identities called 'unilateral dualities'.

If this duality is formalized in a categorial framework, it is construed 'not as an object [...], but as an *operator* $X \rightarrow X^*$ which combines an object with its dual and which

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[63] Cf. Jedrzejewski 2007, p. 166: *'Tout se passe comme s'il y avait deux axes : un axe latéral sur lequel se déploient les singularités et différences de l'objet et de son double et un axe frontal qui produit une unilatéralisation de l'objet et donne à toute paire duale une signification unitaire.'*

[64] Kolozova 2014, p. 115.

[65] See Laruelle 2016, pp. 112–8, and id. 1992, pp. 145–52.

[66] Cf. id. 1989, p. 70 (my emphasis on 'static').

[67] Id. 2013b, p. 4; id. 1996, p. 5: *'Le trait invariant le plus universel de la philosophie est une matrice fractionnaire à 2/3 termes : elle se donne une intériorité et une extériorité, une immanence et une transcendance* simultanément, *dans une structure à synthèse ou hiérarchie, l'une l'emportant sur l'autre alternativement. Cette matrice dite de la "Décision philosophique" peut se lire comme l'identité d'un double rapport de la philosophie à elle même : identité du 2/3 (dans la mesure où le troisième terme, terme de synthèse, est immanent à la dyade, la philosophie étant en manque d'elle-même) et du 3/2 (dans la mesure où le terme de synthèse est transcendant à la dyade, la philosophie étant en excès d'elle-même).'*

[68] Id. 2013e, pp. 136 f. ('Science-thought (unified theory of thought)'); id. 1998, pp. 152 f. ('Pensée-science (théorie unifiée de la pensée)'.

[69] Id. 2008, p. 142: *'la pensée-science générique [...] est production d'axiomes comme vécus radicaux réels'.*

is not the opposite of this object X'[70]. The unilateral duality is effectuated in practice, in procedures, as an action performed on philosophical material such as 'dualyzing' its oppositions (subjecting them to a 'dualysis').[71] This operator allows the categorial transfer of properties which guarantees the functioning of the duality. The object X can be prolongated in its dual X^* and its involutive enclosure $X^{**} = X$. The complex immanence makes out of the object X and its dual X^* a virtual 'unique objet $Y = (X, X^*)$ which gets mixed up with its own dual $Y^* = (X^*, X) = (X, X^*) = Y$, since duality is constructed upon the immanence of the One[-in-One]'[72]. Jedrzejewski further points out:

> This new duality is not the old *coincidence of opposites*. However, the duality questions the status of the object. For the object can only be an object as an object of knowledge. Therefore, neither an object can exist without a subject, nor a subject without an object. This reciprocity is the dual expression of the subject-object pair which is one and the same entity, at the same time indissociable, unitary and double. That is [...] the categorial status given by the *Yoneda lemma* which expresses the intrinsic duality of any object.[73]
> Thus, the *Yoneda lemma* imposes the union of the subject and the object. It says [...] that an object is equivalent to the set of points of view that we have upon this object. It establishes therefore an equivalence between the *objectified object* and the *subjectified object*. In sum, it gives a demonstration of the idea that the object and the subject cannot be regarded separately.[74]

Speaking in physical terms, coined by Schrödinger, dual components are related by *entanglement*, that is one of the most essential features of quantum-oriented theory. As Laruelle says:

> It implies the human 'subject' and its operativity as observer in the very form of objectivity of knowledge, its integration into a unique state vector. No longer an objectivity of knowledge in itself, but one that operates through entanglement or non[-] separability, through the unilateral complementarity of the traditional actors of science, 'subject' and 'object.'[75]

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[70] Jedrzejewski 2007, p. 167 (my emphasis): *'non comme un objet* [...], *mais comme un opérateur* $X \to X^*$ *qui associe un objet à son dual et qui n'est pas le contraire de cet objet* X'.

[71] See Laruelle 1996, pp. 54, 226.

[72] Cf. Jedrzejewski 2007, p. 166: *'un objet unique* $Y = (X, X^*)$ *qui se confond avec son propre dual* $Y^* = (X^*, X) = (X, X^*) = Y$ *car la dualité se construit sur l'immanence de l'Un'*.

[73] Ibid., p. 167 (my emphasis): *'Cette dualité nouvelle n'est pas l'ancienne* coïncidence des opposés. *La dualité interroge cependant le statut de l'objet* [...]. *Car l'objet ne peut être objet qu'en tant qu'objet de connaissance. Par conséquent, il ne peut exister d'objet sans sujet, ni de sujet sans objet. Cette réciprocité est l'expression duale du couple objet-sujet qui est une seule et même entité, indissociable, unitaire et double à la fois. C'est* [...] *le statut catégoriel donné par le lemme de Yoneda qui exprime la dualité intrinsèque de tout objet.'*

[74] Ibid., p. 50: *'Le* lemme de Yoneda *impose donc l'union du sujet et de l'objet. Il dit* [...] *qu'un objet est équivalent à l'ensemble des points de vue que nous portons à cet objet. Il établit donc une équivalence entre l'*objet objectivé *et l'*objet subjectivé. *En somme, il donne une démonstration à l'idée que l'objet et le sujet ne peuvent pas se prendre séparément.'*

[75] Laruelle 2015d, p. 67; id. 2014, p. 107: *'Elle [la quantique générique] implique le "sujet" humain et son opérativité d'observateur dans la forme même de l'objectivité de la connaissance, son intégration dans un*

> Given the inclusion of the observer subject, a generic science is submitted to the constraints of a nonpositive objectivity yet more difficult than that of quantum physics.[76]

In other words, entanglement in quantum-oriented theory means that '[t]here is no subject of science, but a subject-science'[77]. According to the *Yoneda lemma*, objects are constituted or determined by their relations to other objects, in other words by their 'functorial' character or form (that is why, for Grothendieck, the *form*, in particular the structure hidden in the object, is fascinating: see below paragraph 4.1., 'The Relative Point of View on Philosophy'). Therefore, it is more prolific for understanding the objects of the generic matrix category to deal directly with their 'functorial semantics'[78]. Category-oriented theory could be characterized as 'extrinsic' (Jean-Toussaint Desanti)[79], which means that 'in a categorial universe an object is determined exclusively *by the relations, or movements, of which this object is the source or the target*'[80].

In the *Yoneda lemma*, the continuous is projected upon the discrete stratum. The lemma asserts that an object X of a category is determined or constituted (unique up to equivalence) by its relations to other objects, that is, the functor that records morphisms from X to *each* of the objects of that category. In other words, as for the generic matrix category, an onto-material or onto-vectorial object X is best thought of in the context of a category surrounding it, and is determined by the networks of relations it enjoys with *all* the objects of that category. Furthermore, to understand X it might be more germane to deal directly with the functor representing it. Thus, every variety or more general scheme should become a functor. If one treats objects X as functors, X would be defined in the context of all possible families of variations X_t of those objects (variability).

The virtual is the unifying aspect. The virtual is not based on the actual but the virtual 'dualizes' the actual. The superposition is the unifying principle which permits the 'symbiosis' of the subject and the object according to the *Yoneda lemma*. The immanence or 'One-in-One' in Laruelle is not a unity, it is always a dual. This affirmation of the immanence is the (logical, radical, real) consequence of the duality. The unilateral duality, especially in the light of the *Yoneda lemma*, requires a new analysis of *means* and *tools*. Heidegger's description based on the conceptual opposition of *'vorhanden'* ('present-at-hand') and *'Vorhandenheit'* ('presence-at-hand') *versus 'zuhanden'* ('ready-to-hand') and *'Zuhandenheit'* ('readiness-to-hand')[81] is classical-philosophical in considering the question: 'what is the relation of the means to the world and to us?'.

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unique vecteur d'état. Objectivité non plus d'une connaissance en soi mais par intrication ou non-séparabilité, par complémentarité unilatérale des anciens acteurs de la science, "sujet" et "objet".'

[76] Id. 2015d, p. 80; id. 2014, p. 126: *'Une science générique est soumise, de par l'inclusion du sujet observateur, aux contraintes d'une objectivité non-positive encore plus difficile que celle de la physique quantique.'*

[77] Id. 2014, p. 336: *'Il n'y a pas de sujet de la science, mais une science-sujet'*. (My translation.)

[78] See Lawvere, Francis William, *Functorial Semantics of Algebraic Theories*, PhD thesis, Columbia University, 1963. Reprinted in *Theory and Applications of Categories*, No. 5 (2004), pp. 1–121, available at: http://www.tac.mta.ca/tac/reprints/articles/5/tr5abs.html.

[79] Cf. Badiou, *Court traité d'ontologie transitoire*. Paris: Éditions du Seuil, 1998, p. 168.

[80] Badiou 2014, p. 13.

[81] Cf. Heidegger 2006, pp. 66 ff. (§ 15. *'Das Sein des in der Umwelt begegnenden Seienden'*).

Heidegger passes from the tool to the object. The tool can also be perceived as an object, for instance in case of an accident: when the tool is broken, the meaning of its 'Being', as Heidegger says, becomes apparent. How does an object turn into a tool? An object is at least a *biface* (that is a term used in anthropology for describing the tool). As for the tool, there is a grip and its 'other' side that acts on the matter. Usually, it is a *uniface*, unless it breaks or bothers the user. The tool is in direct contact with the user and one of its sides disappears in the immanence of the relation to the tool. While Heidegger as well as Deleuze and Guattari[82] are interested in the autonomous functioning of the tool, Laruelle pays attention to the question of how the gesture is relayed by the tool and how the gesture ('the psychic wave') crosses the tool and reaches the matter[83]. Deleuze and Guattari assume a circuit within the tool, a whole 'flow of desire', but in the latter, more idealist than in Heidegger, there is no finitude, the circuit is infinite and the fluxes converge by dint of divergence, the 'body without organs' gathers all flows of desire. Laruelle construes non-philosophy as a different experience of thought: there is no longer an object or term that is autonomous or in itself, nor a micro-object (the signifying or power).

Duality has to be distinguished from analogy, as Jedrzejewski points out.[84] The functorial character of the analogy allows the transition between different categories. In science, the analogy is very often a structural homology (for the structural homology of process-oriented ontologies, see below section 2.3.). What functoriality distinguishes from analogy is that functoriality considers not only the objects themselves, but also the applications and the relations between these objects. The principle of duality consists in superseding all the occurrences of certain concepts by the dual concepts. The duality allows to transfer *invariants* from one space to its dual one. 'That is the functorial character of the duality', writes Jedrzejewski.[85] This duality guarantees that the *invariants* of the one are also the invariants of the dual object. If philosophy and non-philosophy were dual categories, their invariants would be the same. The duality is a powerful demonstration tool in practice. It helps to classify objects and to increase one's comprehension of them. Often, objects are not comparable and there is no explicit canonic classification. The dual space itself permits to make this classification. The method is simple: instead of classifying the objects, one classifies the objects of the dual space. From there, one deduces a classification of the original objects. In order to make the notion of duality work, so that it produces 'co-truths', it is necessary that the principle of duality applies, that a certain functoriality allows to transport 'truths' from one object to its dual. Similar to Badiou for whom the generic founds 'the very being of any truth' and 'that what does not allow itself to be discerned is in reality the general

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[82] See Deleuze and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, Translated by Brian Massumi. London: Athlone Press, 1988, pp. 60 f., 395; id., *Capitalisme et schizophrénie* 2: Mille plateaux. Paris: Les Éditions de Minuit, 1980, pp. 79, 492.

[83] Laruelle, *'Le générique ou le non-standard'*, Seminar at the *Collège International de Philosophie*, Paris, 2009-2010.

[84] Jedrzejewski 2007, p. 167: *'La dualité se distingue de l'analogie.'*

[85] Ibid., p. 168: *'C'est le caractère fonctoriel de la dualité.'*

truth of a situation, the truth of its being'[86] (for Badiou's concept of a 'situation', see paragraph 4.3., The Homological Site'), Laruelle conceives of truth by way of the concept of the 'generic'. Its definition given in the spoiler for the seminar '*Les sciences génériques et la philosophie*' at the *Collège International de Philosophie* (Paris, 2008/09) reads as follows:

> Truth is the factor that is added to knowledges by idempotent addition, the same that acts as 'Other' and foreclosure. This way, we found a generic politics directed against all forms of totality, while maintaining that way these zones of indistinguishability that the humans are. (*La vérité est le facteur qui s'ajoute par addition idempotente aux savoirs, le Même qui y agit comme Autre et forclusion. On fonde ainsi une politique générique dirigée contre toutes les formes de totalité et sauvegardant ainsi ces zones d'indiscernabilité que sont les humains.*[87])

In *The Last Humanity* Laruelle precizes that the 'generic orientation' or 'cloning' as a process of transformation is a knowledge that he calls 'truth.'[88]

3. By the use of categorial concepts which induce a way of thinking that pays more attention to relations between objects than to objects themselves, the non-philosophical processes prove to be representable according to a nonrepresentational representation, given that the onto-vectorial paradigm of thought is supposed to be 'the radical delimitation of representative thought, at least in the sciences'[89]. The onto-material formalism is written in a 'low-level language' (including normalizing generic constants, complex numbers, and onto-vectorial spaces which transform these numbers) to use a technical term borrowed from computer science[90], which means that it hardly appeals to intuition – except to 'formal intuition'[91] – and does not elucidate the key concepts that govern the behaviour of the entities submitted to the principles of non-philosophy.

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[86] Badiou 2006b, p. 327; cf. id. 1988, p. 361.

[87] See Moulinier, Didier, Weblog '*La Non-Philosophie. Études sur la "Non-Philosophie" de François Laruelle*': http://la-non-philosophie.blogspot.com/2008/10/news-janvier-septembre-2008.html.

[88] Laruelle 2015a, pp. 214 ('[...] *l'orientation générique. Cette transformation implique un processus, le clonage est une connaissance ou une "vérité".*'), p. 82 ('*La science et la philosophie "naturalisées"* par la modélisation quantique [...] *sont* [...] *de "simples" savoirs utilisés comme forces productives au service des humains en vue d'une espèce transformée de savoir que l'on peut appeler "vérité".*'), p. 177 ('*Qu'est-ce que le clone étant donné que le générique est une connaissance ou une "vérité" ?* [...] *L'homme générique est un animal qui a le pouvoir de la vérité parce qu'il a celui de la fiction, mais c'est parce qu'il a le pouvoir de la vérité en-dernière-instance qu'il sait son affinité ou sa proximité avec l'animal.*'), p. 179 ('*Quantifier le mélange homme/animal et ses excès d'absolution et de suffisance, c'est libérer la dimension de vérité et de fiction écologiques qui revient aux humains.*'). Id. 2015d, p. 12: 'there is the radical concept of a gnosis that is of the order of cognizance, perhaps of truth, rather than of knowledge.' Cf. id. 2014, p. 29: '*le concept radical de la gnose, qui est de l'ordre de la connaissance, peut-être de la vérité, plutôt que du savoir*'.

[89] Id. 2015d, p. 117; id. 2014, p. 178 ('*la quantique est la délimitation radicale de la pensée représentative au moins dans les sciences*') and p. 100.

[90] Cf. Coecke, Bob, 'Kindergarten Quantum Mechanics' (2005), p. 1: arXiv:quant-ph/0510032v1.

[91] Cf. Laruelle 2015a, pp. 171 f.

$$\frac{\text{onto-material formalism}}{\text{generic matrix category}} \cong \frac{\text{low-level language}}{\text{high-level language}}$$

FIGURE. The use of 'low-level' and 'high-level' language in relation to the onto-material formalism and the generic matrix category.

On the other hand, the categorial axiomatization or categorialization of quantum-oriented theory provides the passage to a new 'plasticity' (Malabou) by the use of a sketchable language or high-level '*gestalt*-concepts', drawing inspiration from diagrammatic reasoning and 'categories of diagrams'[92] (functor categories), which allows intuitive reasoning about 'an "operatory field"'[93] of interacting generic quantum systems without being a pictorial thought according to representation. Categorial thought shows a constant ambiguity between the algebraic and the diagrammatic by organizing thought around constructions, which can be 'spatial' algebraic configurations. Therefore, categorial concepts can also be called 'oriented graphs' or 'multiplicative graphs' defined by generators and relations which compose diagrams. Thereby, I focus on both the concrete as well as on the abstract outlet of the immanental paradigm. Though the distinction between abstract and concrete should rather be abandoned, as much as one has a categorial point of view, that is as much as concepts are meant to be reconstructed in the fundamental terms of 'object' and 'morphism', there is no reason anymore for calling them 'abstract'. The merging of abstract and plastic categories can also be found in non-commutative thought, for instance in the use of 'Christ' as a symbol of a lived experience: 'Christ is the source of life or the lived of the axioms, not a lived abstraction but an abstract lived, "formalized" (unilaterized) with respect to the Logos and the Torah'[94], as Laruelle writes. The underlying categorial basis of this 'high-level language' specifically to apply, for example, in the analysis of the structural origin of the generic entanglement or non-locality (see below paragraph 3.3.1., 'The Spectral Element of Consistency') as '*the quantum a priori*'[95] alongside the generic superposition principle and non-commutativity, is based on 'monoidal'[96] concepts (see below in paragraph 2.2., 'The Generic Matrix Category') depicting process interactions. As will become clear (in section 2.3., 'Structural Homology of Process-Oriented Theories'), the generic failure of local realism and the fact that one cannot clone a generic quantum state follow from the failure of the 'tensor product' to be 'Cartesian' in a certain sense made precise by categorial concepts. Thus, there are clear benefits of a conceptual 'high-level' approach to designing and reasoning about onto-material and onto-vectorial systems. The 'standard philosophical perspective [...] privileges objects over relations'[97] as becomes apparent in the 'new forms of philosophical realism and materialism (speculative, object

[92] See Mac Lane 1998, p. 52, Gangle 2016, and Mullarkey, *Post-Continental Philosophy: An Outline*. London: Continuum, 2006, Chapter 5, 'Thinking in Diagrams', pp. 157–86.
[93] Laruelle 2015d, p. 11; id. 2014, p. 28: '*un "champ opératoire"*'.
[94] Id. 2015d, p. 159; id. 2014, p. 232: '*Le Christ est la source de vie des axiomes, non pas une abstraction vécue mais un vécu abstrait et "formalisé" (unilatéralisé) par rapport au Logos et à la Torah.*'
[95] Id. 2015d, pp. 49 f.; id. 2014, p. 82: '*L'a priori quantique*'.
[96] See appendix.
[97] Gangle 2016, p. 142. Cf. Wolfendale 2014 and Harman 2018.

oriented, and so on) [...] – be it the "returning Real" (Hal Foster), "bodies that matter" (Judith Butler), "the social lives of things" (Arjun Appadurai), the "parliament of things" (Bruno Latour), or even the "rights of things" (W. J. T. Mitchell)'[98]. In contrast, category-oriented theory privileges arrows over objects and arrow-compositions over arrows in the sense that objects in a categorial concept are determined formost by their arrows and arrows by their compositions. Analyzing the onto-material formalism from a categorial viewpoint forces a change of perspective, which downplays objects and emphasizes morphisms (contrary to contemporary 'object-oriented philosophy' or 'object-oriented ontology'[99]). A categorial approach to non-philosophy proceeds by examinating the gestures at work, it does not aim at justifying them, but at simply describing their *functionality*. In these non-philosophical gestures, one has the effacement of the objects for *relations* and *morphisms*, even the disappearance of the objects. The categorial understanding of non-philosophical activities leads us to their 'cohomology', i.e., their invariance, which supplies what remains invariant.

4. Last but not least, in the abstraction of categorial concepts a certain non-separation of the couple *continuous* and *discrete* emerges. It is not a dual pair, given that the continuous is a particular case of the discrete. The two paradigms converge since the categorial offers a means to work with discrete versions by relating them to continuous versions (in the *Yoneda lemma* there is a way between the world of the *continuous*, i.e., forms, and the world of the *discontinuous*, i.e., numbers), which allows to go beyond the apparent difference between 'the continuous of life which nourishes philosophy'[100] and non-philosophy's attempt to quantize the standard philosophical space by an onto-material formalization of the continuous representations as discrete *noemata*. In view of the great challenge to reconcile the 'philosophical continuum'[101] with the generic quantum variability, I suggest to reconsider non-standard concepts from an *a priori* categorial perspective according to which there are only arrows, that is to say morphisms and automorphisms, i.e., objects, in the wake of the Deleuzean and Guattarian imperative 'Run lines, never plot a point!'[102] and by following one of Laruelle's ethical rules in *The Last Humanity*: 'The living are projects or lived vectors [...], not things or substances'[103] – rather than considering 'the structural(ist) character of Laruelle's thought'[104]. Although 'Category theory is a branch of contemporary mathematics which is concerned with structures, with systems and interrelations of structures'[105], the concept of structure looks, from a categorial point of view, like another kind of 'essence'. The view on non-philosophy as a category-oriented theory is much broader, because the concept of category is far more general than the concept of

[98] Ó Maoilearca 2015, p. 76.
[99] See Wolfendale 2014 or Harman 2018.
[100] Laruelle 2015a, p. 134: *'le continu de la vie qui nourrit la philosophie'*.
[101] Id. 2015a, p. 150: *'continuum philosophique'*.
[102] Deleuze and Guattari 1988, p. 27; id. 1980, p. 36.
[103] Laruelle 2015a, p. 207: *'Les vivants sont des projets ou des vecteurs vécus* [...], *pas des choses ou des substances.'*
[104] James 2012, p. 166.
[105] Cf. ibid., p. 196, n. 2.

structure, and provides us with a new perspective. Thus, categorial concepts can be seen as a theoretical treatment of what we used to call 'structure'. Apart from the fact that, for Laruelle, there is not *'the'* (only one) philosophy, and every philosophy can also be construed as a meta-philosophy, always philosophy of another philosophy, his desire to define philosophy by the 'structural rule of the philosophical decision'[106] and his 'systematic search for the *invariants* and the irreducible structures which allow us to speak of philosophy *per se*'[107] is therefore less a structuralist gesture than the opening up of a new, categorial perspective on non-philosophy. So even 'if Brassier is correct in his claim that there is no essence of philosophy, and that philosophy is only what emerges from a complex material history', as Smith writes, and even if there is 'no invariant philosophy, only certain ways of doing philosophy'[108], - the concept of category would be still applicable to philosophy, as the most general structure in science.

An alternative of structure consists in: *order, composition, processes.* These are structures qualified in terms of their 'high-levelness' in use. The three stages are: Firstly, consider the ordering of things. Secondly, assume that things can be composed. Thirdly, consider processes, composable in time, for composable things. The general discipline-transcending nature of these structures have to be considered as fundamental. Thus, the primary focus in the following study of non-philosophy is relationships between objects instead of the structure of individual objects themselves. We have a class of onto-material and onto-vectorial objects or spaces and transformations f of an object X into an object Y, with the possibility of composing these transformations. The idea of categorial thought is to consider only spaces and transformations rather than points, including procedures of dualization or 'arrow reversal'. Objects do no longer exist as substances or in their substantial meaning (as Laruelle notes: 'The transcendental field [...] helps to think no longer "substantially", with form et contour, mass or quantity of meaning, to move no longer at a trajectory of isolated conceptual points'[109]) but as a name for a place in the category. Non-philosophical axioms have concrete relations but instead of being related to any 'object', there are only what Laruelle calls 'uni-jects', that is, 'uni-lational objects' whose two parts are inseparably 'squeezed together'. Finally, category-oriented theory does not deal with the question of foundation, it is rather, as Guitart puts it, a matter of 'actology'[110], that is, of working with objects without knowing what these objects are.

Further arguments for a categorial approach to non-philosophy are, to use the words of Badiou: (i) category-oriented theory comes 'as close as possible to symbolizing

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[106] Cf. Laruelle 1989, p. 12.
[107] Cf. id. 1991, p. 17.
[108] Smith 2016, p. 31; see Brassier 2007, p. 122.
[109] Laruelle 2010a, pp. 12 f.: *'Le champ transcendantal [...] aide à ne plus penser "substantiel", avec forme et contour, masse ou quantité de sens, à ne plus se déplacer selon une trajectoire de points conceptuels isolés.'*
[110] Cf. Guitart, *'Autocatégories : calcul diagrammatique avec flèches et sans objets'*, Colloqium *'Théorie des catégories, dynamiques anciennes et nouvelles, mathématiques et philosophie'* at Paris Diderot University, May 5 and 6, 2015, available at https://sites.google.com/site/logiquecategorique/autres-seminaires/diderot/DYAN.

the imaginary'[111]; and (ii) the generic constant is qualitative and not quantitative: 'Categorial thought [...] tends, at the heart of ontological presentation, to reduce quantity to quality.'[112]

2.1.1. Category-Concepts

Let us close this section by giving a definition of what I understand by a 'category-concept'. The concept of category in a categorial-oriented theory 'can be [...] thought of as a very general *form* of [...] concepts. This might seem natural but in fact [it] is quite misleading'[113], as Andrei Rodin points out:

> For the notion of *form* can be described as [an] invariant of a group of isomorphisms between objects of a given class which are told to have the 'same form'. More precisely[,] a form is what one gets through identification of isomorphic objects. [...] Such transformations are reversible, otherwise they wouldn't form a group. [By c]{C}hanging the chosen class of transformations one changes the corresponding notion o[f] form.[114]

However, the concept of category cannot be perceived 'in terms of reversible substitutions of abstract objects and abstract morphisms by some "concrete" terms'[115], e.g. 'Christ', 'Christ-factor', 'messiah', 'messiah-function', etc. Whence an abstract categorial concept, such as 'the generic matrix category' as for 'non-epistemology', or 'christic matrix category' with regard to 'non-theology', is not a form in the sense of the above definition. Although the different properties and constructions 'don't share anything like a common form[,] they can be linked ([...] "transformed into each other" or "interpreted in each other's terms") by appropriate morphisms, which in this [intercategorial] context are called *functors*'.[116] A functor is an arrow from one categorial concept 'to another that represents a "structure-preserving" mapping' of objects onto objects and arrows onto arrows ('that is, dyadic relations onto dyadic relations').[117] As a consequence, Rodin distinguishes formal concepts or '*form-concepts*' having a 'strong property: their instances are all isomorphic', from categorial concepts or '*category-concepts*', that is, 'a larger class of [...] concepts having a weaker property'[118]. The class of onto-material or onto-vectorial objects and morphisms makes a category-concept, henceforth called the 'generic matrix category'. Rodin further points out:

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[111] Badiou 2014, p. 37.
[112] Ibid., p. 29.
[113] Rodin, Andrei, 'Towards a Hermeneutic Categorical Mathematics or why Category theory goes beyond Mathematical Structuralism' (2006), p. 22: arXiv:math/0608711v2.
[114] Ibid.
[115] Ibid., p. 23.
[116] Ibid.
[117] Gangle 2016, p. 141.
[118] Rodin 2006, p. 23.

> Form-concepts are category-concepts since a group of isomorphisms associated with a form-concept is a category[-concept] having only one object and such that all its morphisms are reversible. But the converse is not the case. Thus a category[-concept] is not some kind of form, while a form (in the sense of the above definition) is indeed a kind of category[-concept]. Remark that the concept of category is itself a category-concept while the concept of form is not a form[-]concept.[119]

The concept of category is not a matter of considering the generic matrix from a *formalistic* point of view. The question is not: can we exchange or replace non-philosophical measures by others, or can we interpret the concepts of non-philosophy *mutually* without changing the meaning of its operations? In this case, one could speak of a *duality*. Non-philosophical concepts could be interpreted as categorial concepts, and *vice versa*, without changing the meaning of quantum-oriented theory. 'This is what the whole discipline of *algebra* is about: algebraic *variables* take different values leaving the *form* of a given algebraic expression invariant.'[120] The question is rather to have access to a potentially distinct, interpretative notion of non-philosophy's concepts. The notion of *interpretation* does not reduce to the idea of a reversible termwise translation as in formal axiomatic methods. Interpretations between theories are, generally speaking, *nonreversible*. As Rodin writes about the geometry of the late 19th century: 'Although the older notions of representation and substitution (and the related notion of invariance through substitution), on the one hand, and the notion of *interpretation* [...], on the other hand, had indeed much in common[,] the latter does *not* reduce to the former (while the former indeed reduces to the lat[t]er).'[121] The situation in the history of non-philosophy is similarly asymmetric. Although primordial concepts such as, for instance, 'One-in-One' or 'Determination-in-the-last-instance' can be explained or translated in terms of the '*quantum a priori*,' 'the variable of the rational or conceptual core of quantum physics (its three or four principles, superposition, indetermination, non-commutativity, complementarity or inseparability),'[122] and of the '*transcendental a priori* of these principles—namely, that spark that is the complex or imaginary number'[123] – the converse is not the case. Another example of such a translation is given by Smith: 'modeling (or "cloning" in Laruelle's later terminology, and "parodying" in his early terminology at play here).'[124]

As for the link between the first non-philosophy (in particular *Théories des identités*) and the second non-philosophy (e.g. *Philosophie non-standard*)[125] Laruelle states: 'It is enough to understand that the term "identity" – perhaps not the happiest of

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[119] Ibid., pp. 23 f.
[120] Rodin 2006, p. 12.
[121] Ibid., p. 13.
[122] Laruelle 2010a, p. 125: '*la variable du noyau rationnel et conceptuel de la quantique (ses trois ou quatre principes, superposition, indétermination, non-commutativité, complémentarité ou inséparabilité)*'.
[123] Id. 2015d, p. 50; id. 2014, p. 82: '*L'*a priori quantique *comprend les trois principes de la superposition, de la non-commutabilité et de l'intrication ou de la non-localité, mais aussi* [...] *l'*a priori transcendantal *de ces principes, à savoir cette étincelle qu'est le nombre complexe ou imaginaire*'.
[124] Smith 2016, p. 64.
[125] Cf. Laruelle, 'From the First to the Second Non-Philosophy' (2010), in id. 2013a, pp. 305–25.

terms, given its logical associations – assures the passage between the One (the perennial object of our research) and that of quantum "superposition", our key concept at present. Just a minor change of vocabulary would suffice.'[126] It will not be a disadvantage that the former non-philosophy and the more recent non-standard philosophy are not fully formalized theories. Since, according to Rodin, 'one can have a sound notion of translation between non-formalised theories.'[127] However, 'there is no underlying circularity at work', as Kolozova points out, 'a circularity of the kind where the translation of the one term into the other means its disappearance into it, an engulfment of the first by the second. [...] The mutual effacement is carried out either by the exclusion of the other term or by its total inclusion'.[128] A 'translation' such as the 'tropical analysis' of the generic matrix category (see below paragraph 2.4., 'Tropical Philosophy') is a sort of *transformation* called 'monomorphism' (embedding). It is underpinned by a 'tropical *a priori*', i.e., two principles of correspondence and of superposition leading to dequantization, and, on the other hand, by an 'immanental *a priori*' of these principles, i.e., the arrow or the morphism responsible for the categorialization.

[126] Id., *Le concept de non-photographie/The Concept of Non-Photography*, Bilingual Edition, Translated by Robin Mackay. Falmouth, U.K.: Urbanomic/New York: Sequence Press, 2011c, p. viii: *'Il suffit de comprendre que le terme d'"identité", qui n'est pas le plus heureux à cause de son caractère logique, assure {la} [le] passage entre l'Un, objet de toujours de nos recherches, et celui de "superposition" quantique, notre opérateur actuel. Ne s'imposeraient donc que quelques changements de vocabulaire.'*

[127] Rodin 2006, p. 7.

[128] Kolozova 2014, pp. 76 f.

2.2. The Generic Matrix Category

For operatory reasons category-concepts play an important role in fields where *processes* play a crucial role, like in Laruelle's 'non-set-theoretic and matricial ontology of the lived experience'[1] with its onto-material and onto-vectorial systems and operations, in contrast to, for instance, 'object-oriented philosophy' and 'object-oriented ontology'[2], or to Badiou's 'theory of points', according to which 'life must have points' (and '[w]ith points there are no half-choices'[3]; for a a more complex view of the role of the point '[w]hich is not to introduce a new *set* of points'[4] but a new *category* of points, namely the points of the topos or the 'punctual topos', see section 4.3. 'The Homological Site'). My hypothesis is that a category-concept – in contrast to set-theoretic concepts or 'set-concepts' that suit classical, commutative ontology – gives a conceptual structure of practicing non-commutative ontology. That is, one takes a quantized system of thought of type A, like the gnosis, the kerygma, i.e., the words or sermons of Christ in *Christo-Fiction*, or the human-animal-plant (*HAP*) system in *The Last Humanity*, and performs an operation f on it, that is, a transformation, vectorialization (onto-vectorial interpretation) or resuscitation of the old gnosis, the kerygma, continuous philosophical representations, which results in a system possibly of a different type B, that is, a new theoretical possibility of a gnosis, the 'messiah-function' or 'Christ-factor,' 'aleatory subjects,' etc. So typically one has

$$A \xrightarrow{f} B$$

where A is the *initial type of the system*, B is the *resulting type* and f is the operation, transformation or reinterpretation. After f, one can perform a second operation (in *The Last Humanity*, for example, the 'generic indexation' called 'cloning')

$$C \xrightarrow{g} D$$

since the resulting type B of f is also the initial type of g, and one writes $g \circ f$ for the consecutive application of these two operations, a law of composition of pairs of consecutive arrows: for instance, 'Christ' as 'the One-in-person'[5] or 'the faithful cognizance of messianity'[6], 'clones', etc. Recently Laruelle presented a distinction between two states of the generic object: (i) its real state named '*aleatory subject*', compound of virtual possibilites, and (ii) its state indexed as '*clone*' by the dimension of the 'Universe', a state named '*in-the-last-humanity*' and given as the final *measure* of the

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[1] Laruelle 2015a, p. 125: '*ontologie matricielle et non ensembliste du vécu*'.
[2] See Wolfendale 2014 or Harman 2018.
[3] Galloway 2014, pp. 184, 186.
[4] Ibid., p. 190 (my emphasis).
[5] Laruelle 2015d, pp. 55 f.; id. 2014, p. 90: '*Avec le Christ, il s'agit de ce que nous avons appelé l'"Un-en-personne"*'.
[6] Id. 2015d, p. 48; id. 2014, p. 79: '*L'En-personne caractérise le résultat final de la matrice ou la connaissance fidèle de la messianité qu'elle produit.*'

humans. It appears only with the repetition of the experiment or a 'second measurement' (given the non-reproductability of the same measurement). The generic object has a restricted or under-determined *'a priori'* aspect, not as primary but as 'prior-to-primary' or as preparation of the conditions of knowing (probable knowing). One has $h \circ (g \circ f) = (h \circ g) \circ f$ (associativity) (where h is, for instance, the quantum preparation of the *HAP* operator system, 'Christ', etc.) as putting the brackets merely adds the superficial data on conceiving two operations as one. If one further sets

$$A \overset{1_A}{\rightarrow} A$$

for the operation 'doing nothing on a system of type A' one has $1_A \circ f = f \circ 1_A = f$, that is, objects can be understood in terms of morphisms, too, namely as identity morphisms or also called 'automorphisms' ↻.

Hence one has a conceptual category or a category-concept – the most general conceptual structure in science. Its definition does not say what belongs to categories but simply what a category is. It gives a very minimalist definition in terms of objects and arrows. Therefore, a categorialization of the generic matrix with its quantized concepts 'would not be the mere transfer of techniques crafted for other objects'[7]. The new categoriality in order to describe the functioning, the methods, and the grounding of non-commutative ontology are 'onto-material' or 'onto-vectorial' objects and arrows or morphisms. The almost precise definition of the category of non-philosophy is the following.

A category-concept consists of objects and morphisms. It is an 'oriented graph' with the possibility to compose morphisms. Two composed morphisms are still a morphism. An arrow is not exterior to another arrow but prolongates it and is added to it, the addition (composition) is a *discrete* prolongation. Friedrich Nietzsche puts it as follows: 'Nature shoots the philosopher at mankind like an arrow; she does not aim, but hopes that the arrow will stick somewhere.' (*'Die Natur schiesst den Philosophen wie einen Pfeil in die Menschen hinein, sie zielt nicht, aber sie hofft, dass der Pfeil irgendwo hängen bleiben wird.'*[8]) Nietzsche, as Deleuze paraphrases, 'compares the thinker to an arrow shot by Nature that another thinker picks up where it has fallen so that he can shoot it somewhere else'.[9] 'Philosophy is a vector', Ó Maoilearca citates Laruelle, '"an affair of movements and becomings, of lines and vectors, of reversals and displacements."'[10] In *The Last Humanity* Laruelle writes: 'We have to understand the acts of the last-instance as nonclosed vectors, throws or movements, completed [...] at each moment but not closed or in itself.'[11]

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[7] Id., 'Revolution within the Limits of Science Alone' (1987), in Id. 2013a, p. 112.

[8] See Nietzsche, Friedrich, eKGWB/SE-7 – *Schopenhauer als Erzieher*: § 7. *Erste Veröff.* 15/10/1874. http://www.nietzschesource.org/#eKGWB

[9] Deleuze, *Nietzsche and Philosophy*, Trans. by Hugh Tomlinson. New York: Columbia University Press, 1983, p. ix.

[10] Ó Maoilearca 2015, p. 6.

[11] Cf. Laruelle 2015a, p. 178: *'Il faut concevoir les actes de la dernière-instance comme des vecteurs non fermés, des jets ou des mouvements achevés ou sommables à chaque instant mais pas fermés et en soi.'*

Definition. The non-philosophical category consists of the following seven components.

1. Quantum and generic *objects A, B, C,* etc.

The category-concept of non-philosophy corresponds to a 'Universe' formed by onto-material and onto-vectorial entities called *objects.* These objects are completely general, finite, infinite or transfinite, actual, virtual or hybrid. The abstract objects in that category may, or may not, have a specified structure, but must all be of the same type or kind in any given category. Non-philosophy's '"object" of (scientific) investigation', 'the "real object" (of non-philosophical study) as a sample of the "world"'[12], as Kolozova comments on Laruelle, 'already contains theorico-technico-experimental ingredients [...]. So much so that the two objects'[13], that is, '"the real" and "the real object" of non-philosophical thinking'[14], *'contain the same representations, but with an altogether different status.* Their distinction is not epistemological [...], but uniquely of-the-last-instance, i.e., *transcendental or immanent'.*[15] In 'Philosophy V' Laruelle distinguishes 'object-concepts', 'concept-corpuscles' or 'conceptual corpuscles' from 'particle-objects', 'concept-particles' or 'conceptual particles'[16]. On the one hand, classical 'object-concepts', i.e., so-called 'first knowledges'[17] (epistemic 'raw material' so to speak) serving as variables in the generic matrix, have a 'conceptual identity'[18]. An onto-material 'concept-corpuscle' is considered to be a 'thing-in-itself', it is the macroscopic, 'natural' form *par excellence* of every standard philosophical representation as the compound of a concept, a meaning, a philosophical category, etc.[19] Such onto-material objects are used to describe the *kinematics* of the system. All knowledges are reduced to their invariants and treated as onto-material corpuscles by quantum, algebraic and matricial means. The objects can be perceived as corpuscular. This procedure is called 'quantization' of philosophy. On the other hand, onto-vectorial 'concept-particles' are generated by means of 'the generic, quantum, and non-textual deconstruction'[20] of the 'concept-corpuscles' or 'corpuscle-objects'. These 'particle-objects' are provided with 'the form of a particulate "micro-identity" that can be converted by objective appearance into a macroscopic in itself'[21] or *noumenon.* The onto-vectorial object is seen as a particle, a 'hylemorphic entity that combines [...] in form of a unilateral duality the

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[12] Kolozova 2014, pp. 114, 97.

[13] Laruelle 2016, p. 67; cf. id. 1992, p. 93.

[14] Kolozova 2014, p. 97.

[15] Cf. Laruelle 2016, p. 67; id. 1992, p. 93: *'L'objet réel contient déjà des ingrédients théorico-technico-expérimentaux* [...], *si bien que les deux objets* contiennent les mêmes représentations, mais avec un statut tout différent. *Leur distinction n'est pas épistémologique* [...], *mais uniquement de-dernière-instance, c'est-à-dire* transcendantale ou immanente'.

[16] Cf. id. 2010a, p. 72: *'corpuscule conceptuel', 'science des particules conceptuelles'.*

[17] Ibid., p. 19: *'Les savoirs premiers'.*

[18] Cf. ibid., p. 54: 'Identité conceptuelle.'

[19] Cf. ibid.: *'forme macroscopique par excellence de la pensée dont participe toute représentation philosophique ou standard (concept, terme, sens, catégorie)'.*

[20] Cf. ibid., p. 58: *'Résultat de la déconstruction générique, quantique et non-textuelle, de la philosophie.'*

[21] Ibid., p. 54: *'la forme d'une "micro-identité" particulaire, qui peut se reconvertir par apparence objective en en soi macroscopique'.*

particulate noematic form as such and the corpuscular matter of the philosophical object'.[22] The concept-particle constitutes a structured formal field and is configurated by the '"lived wave of virtuality"' or 'futurality'[23]. The futurality (or messianity, i.e., a new form of intentionality) is par excellence what is declared or performed by the 'oraxioms'[24]. While 'futural' is called the 'Last Instance' or the 'prior-to-primary generic subject' as a 'form of virtuality'[25], the virtual is tantamount to the generic[26]. The 'clone' (generated by generic indexation) is the 'undulatory but noematic form of the [concept-]particle as transcendence fallen into-immanence. [...] It is said in particular of the subject-form or particulate [immanental] ego under the name of "Stranger-subject"'.[27] 'Transcendental cloning', says James, 'becomes the key operation of "Philosophy III" and supersedes the operations of science proper to "Philosophy II". The transcendental is no longer the real itself but rather that plane of thought, radically separate from and in a duality with the real'.[28]

The generic matrix category operates with onto-vectorial objects that are thought in terms of 'state spaces' or complex quasi-Hilbertian spaces that each concept-particle is assumed to have. Such a non-commutative, onto-vectorial operator system is called, for example, 'Christ-system'[29]. Laruelle distinguishes several meanings of the symbol 'Christ': First of all, 'Christ' denotes a message-system. The 'Christ-message' is defined as a discursive system of two 'states' or two classically discernible, eventually even dialectizable, properties: theological and scientific knowledges, called 'Torah' and 'Logos', that is, vectors and variables of the 'Christ-system' understood as the real object of knowledge. What happens inside the matrix is the constitution of the 'Christ-vector' in such a way that *it contains all information* accessible for a generic subject. Laruelle speaks in this context of the '[a]mplitude of futurality or virtuality'[30] (see below paragraph 3.3.1., 'The Spectral Element of Consistency'). The 'indeterminacy principle' is assumed to assure its *indetermined* 'messianity' and not an exact one. 'In reality, Christ is a vector of messianity', says Laruelle, 'that addresses itself to the world and that comes from humans in a "space" no longer defined by philosophical coordinates (ecstatic-horizontal transcendence and ecstatic-vertical transcendence, ontology and theology).'[31] In Deleuze and Guattari, too, the 'concept is the contour, the configuration, the

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[22] Cf. ibid.: 'Particule. *Entité hylémorphique associant* [...], *sous forme de dualité unilatérale, la forme noématique particulaire proprement dite et la matière venue du corpuscule.*'

[23] Ibid., p. 64: '"*onde vécue de virtualité*"', 'futuralité'.

[24] Cf. ibid., pp. 57 f.

[25] Ibid., p. 53: '*La DI* [*dernière instance*] *ou le Sujet générique avant-premier est futural ou une forme de virtualité.*'

[26] Ibid., p. 60: '*Le virtuel ne se confond pas avec l'imaginaire* [...], *mais avec le générique.*'

[27] Cf. ibid., p. 52 ('Clone. *Forme ondulatoire mais noématique de la particule comme transcendance tombée en-immanence.* [...] *Se dit en particulier de la forme-sujet ou ego particulaire sous le nom de "sujet-Etranger"*'.) and p. 61.

[28] James 2012, p. 177.

[29] Laruelle 2015d, p. 51; cf. id. 2014, p. 84.

[30] Id., 2010a, pp. 51 f.: 'Amplitude de futuralité ou de virtualité.'

[31] Id. 2015d, p. 170; id. 2014, p. 246: '*En réalité Christ est un vecteur de messianité qui s'adresse au monde et vient des humains dans un "espace" qui n'est plus défini par des coordonnées philosophiques (transcendance extatique-horizontale et transcendance extatique-verticale, ontologie et théologie).*'

constellation of a future event.'[32] The 'amplitude of futurality' or of the 'lived wave of virtuality' is 'in the generic sphere the equivalent of the amplitude of probability, of the wave function or state vector' in quantum mechanics. 'It is the condition of-the-last-instance in the form of a futural and virtual non-acting which defines the amplitude of a thought in the process of invention'.[33] If the noetico-noematic intentionality is understood as a vector, it is an act which does not reach an end in itself, but which is replaced by an object that is no longer 'in itself' (i.e., a categorial object or automorphism) but a *noema*. The *arrow* of the intention meets an *object* but it can always go beyond. The quasi-operatory side, the quasi-operationality of the 'real-One'[34] is called 'noetic', even though it is not exerted through any conscious intentionality. The latter is replaced by a new intentionality called 'messianity', which is meant to be the heart of a generic phenomenology.[35] It is described as '[t]he immanental essence of the wave function'[36], that is, the 'probability' to come across a particle-object, or the 'quantum unconscious'. 'Messianity' denotes a 'futural causality,'[37] that is, 'radical non-acting' or 'a virtual, futural acting'[38] that underdetermines the first, double transcendence of an occasion, on which it acts by configurating it, including its own experience of the 'future'. Furthermore, as Laruelle says, '"Christ" is the name of a unilateral duality, of the invention as much as the discovery of a generic constant that circumscribes the field of phenomena of discursive and spiritual belief localizable in the human sciences, but localizable under condition of a faith or a fidelity without belief, which will render them, this time, nonlocalizable.'[39] This is 'the new interferent interpretation of Christ, his new "wavelength" or state vector, at once constructive and destructive'[40].

Both onto-material and onto-vectorial objects have no elements, or any sort of internal structure defining their properties. What matters is their morphisms from and to other objects: quantum and generic objects are described, not in terms of their *constituents*, but by their *relationships* to other objects.

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[32] Deleuze and Guattari 1991/2005, p. 36: '*Le concept est le contour, la configuration, la constellation d'un événement à venir.*'

[33] Laruelle 2010a, pp. 51 f.: '*Équivalent dans la sphère générique de l'amplitude de probabilité, de la fonction d'onde ou vecteur d'état dans la MQ* [*mécanique quantique*]. [...] *C'est la condition de-dernière-instance sous la forme d'un non-agir futural et virtuel qui définit l'amplitude d'une pensée dans le processus d'invention.*'

[34] Cf. id., 'From the First to the Second Non-Philosophy' (2010), in id. 2013a, p. 315.

[35] Cf. id. 2010a, pp. 445 ff.: 'From the unconscious to the messianic lived experience' ['De l'inconscient au vécu messianique']. See also id. 2015a, pp. 169–91: 'The Ecology as Quantum Theory of the Messianic Lived Experience' ['L'écologie comme quantique du vécu messianique'].

[36] Id. 2010a, p. 282: 'L'essence immanentale de la fonction d'onde'.

[37] Ibid., Chapter XIV, 'La messianité comme causalité futurale', pp. 435 ff.

[38] Ibid., pp. 55 f.: '*Le non-agir radical est un agir virtuel, futural*'.

[39] Id. 2015d, p. 72; id. 2014, p. 114: '"*Christ*" *est le nom d'une dualité unilatérale, d'une invention autant que d'une découverte d'une constante générique qui circonscrit un champ de phénomènes de croyance discursifs et spirituels localisables dans les sciences humaines, mais localisables sous condition d'une foi ou d'une fidélité sans croyance qui va les rendre cette fois illocalisables.*'

[40] Id. 2015d, p. 64; id. 2014, p. 103: '*la nouvelle interprétation interférente du Christ, sa nouvelle "longeur d'onde" ou vecteur d'état, à la fois constructive et destructive*'.

2. *Morphisms* $f: A \to B$ between quantum and generic objects, $g, h \in C(A, B)$ for each pair A, B.

A state of a generic quantum system is given by a vector in an onto-vectorial Hilbert space[41] over complex numbers and represented as a function space, its elements are called 'wave functions'. Therefore, Laruelle intends, for example, 'to establish the state vector of Christ on the basis of his data or the data of his words in the "Logos" mode [symbolizing knowledge or philosophy] and the "Torah" mode [which stands for belief or theology].'[42] The vector of such a complex 'quasi-Hilbertian space' (that is, the object of an onto-vectorial system or 'a Hilbertian "transcendental"'[43]) is the 'essence' of thought according to Laruelle's 'new image of thought,'[44] that is, of a transformed philosophy. Non-commutative operators (variables or virtual observables) brought into play by the onto-material formalism are morphisms called for instance the 'Christ-factor,' or 'messiah-function' perceived as a vectorialization factor or function, generic '"Feynman histories"' or 'sum-over-histories' of 'the messianic vector'[45] or of the kerygma (its '"Feynman paths"' or 'Feynman path integral').[46]

The generic quantum method does not bear directly upon onto-material objects, i.e., corpuscular 'object-concepts' or 'concept-corpuscles', but upon 'operators'[47], i.e., quantized 'particle-objects' or onto-vectorial 'concept-particles'. From the categorial viewpoint, the key concept and structure is that of *morphisms*, or arrows, that can be seen, for example, as abstract relations of one onto-vectorial object to another one, they can be considered as morphisms or processes (elementary interpretations or translations, the generalization of the idea of a function) taking states of one system of thought, of faith, etc. to states of another system, mappings, functions, operators, connections, interactions, transformations, homeomorphisms, and so on. It can be the property of an onto-vectorial object or action of one object on another. The ultimate idea of the morphism is to *build bridges* (for the topos-concept as a bridge, see below paragraph 4.4., 'Subtropical Philosophy') between category-concepts through functors. The property of transfering one part into another is the functorial character. The implicit tenet is that arrows are what counts in the categorial 'Universe', connecting onto-vectorial objects, that is the central element of categorial thought. One can therefore express all essential properties, attributes, and structures by means of arrows that, in the most general case, can represent either generic relations or modalities. They allow a great flexibility in applications, including those in quantum-oriented theory.

The second meaning of 'Christ' in *Christo-Fiction* is an imaginary factor of fiction, that is of vectorialization or onto-vectorial interpretation of faith deprived of belief or of

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[41] See appendix.

[42] Laruelle 2015d, p. 5 (my amendments); id. 2014, p. 20: *'c'est ce que nous tenterons de faire avec et dans la science du Christ, établir le vecteur d'état du Christ à partir* [...] *des données de ses paroles en mode "Logos" et en mode "Torah".'*

[43] Id. 2015a, p. 53: *'un "transcendantal" hilbertien'.*

[44] Cf. id., 'From the First to the Second Non-Philosophy' (2010), in id. 2013a, p. 309–15.

[45] Id. 2015d, p. 233; id. 2014, p. 325: *'vecteur messianique'.*

[46] Id. 2015d, pp. 158, 176; id. 2014, pp. 231, 254; cf. id. 2015a, p. 189, and id. 2010a, p. 331.

[47] Cf. Schmid, Anne-Françoise, and Armand Hatchuel, 'On Generic Epistemology', in *Angelaki: Journal of the Theoretical Humanities*, 19:2, 2014, p. 136.

imaginary fictionality. The so-called 'messiah-function' introduces 'Christ' as an *imaginary* quantity or index of a 'scientific Christ-fiction'. The 'messiah-function' allows a quantum treatment of arbitrary objects by its algebraic character as an imaginary or complex number. The 'Christ-factor' denotes a structuring function, with the power to transform all variables extracted from the Christ's messages into vectors, thus it is a vectorialization factor or function. That is the non-commutative essence of the onto-vectorial paradigm of thought. 'Christ' plays the role of a symbol for a quasi-mathematical or algebraic operation. As such it expresses and determines the essence of a 'non-commutative christianism'. Christ is the factor that *weakens* or *underpotentializes* all messages that are guided by a postulated 'Principle of Sufficient Theology'[48]. Concerning the functioning of the matrix, the messianic factor is in general its underdetermination (quantization and vectorialization), and its generic aspect is its orientation toward humans (indexation). 'Christ' is the name of 'a "christic constant,"'[49] of the messianic element of human life. This constant is claimed to have an effect on faith by *transforming* it into a faithful lived experience. It is characterized as 'a *quantum of faith*'[50] (that is, a subjectified and specified quantum of action) embodied by any faithful human. Laruelle's idea is to treat 'Christ' 'at once as a constant of the scientific type, and thus as "objective" in the sense of his being an invariant for all possible human science, and also as the fulfilling of subjective functions'[51] (that is the entanglement of subject and object) as a qualitative, not quantitative, constant of lived experience.

In *Christo-Fiction* Laruelle further points out: '[I]f we call generic stance a *procedure* operating as the underdetermining condition of the scientificity of a discipline, but a *procedure* that has a complementary subjective aspect, only an aspect, we give a rigorous meaning to Lacan's "subject of science."'[52] 'Aspect' in Laruelle is 'the correlate of a reduction', as he writes in *Principles of Non-Philosophy* under the heading '*Processes of unified theory*'.[53] Faith is transformed into faithful lived experience: the various, theological and scientific, knowledges turn into faithful knowledge but, according to Laruelle, 'only faith as faithful cognizance of Christ is the object of cognizance properly so called.'[54] The 'function of the matrix' is 'to produce faithful cognizance—that is to say, to produce faith that is a *rigorous* (*which does not mean exact*

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[48] Id. 2015d, pp. x, 7 ('PST'), 62, 85–8 ('Against the Principle of Sufficient Theology'); id. 2014, pp. 8, 23, 99, 131–5: '*Contre le principe de théologie suffisante*'.

[49] Id. 2015d, pp. 41, 233 ('the christic constant'); id. 2014, pp. 71 ('*une "constante christique"*'), 325 ('*la constante christic*').

[50] Id. 2015d, pp. 36, 41; id. 2014, pp. 62 ('un *quantum de foi*'), 71.

[51] Id. 2015d, p. 36; id. 2014, p. 62: '*L'idée est plutôt de le* [*c'est-à-dire le Christ*] *traiter à la fois comme une constante de type scientifique, donc "objective" au sens d'un invariant pour toute science humaine possible, mais aussi comme remplissant des fonctions subjectives.*'

[52] Id. 2015d, p. 237 (my emphasis); id. 2014, p. 335: '*Si l'on appelle posture générique une procédure opérant comme condition sous-déterminante de la scientificité d'une discipline, mais une procédure qui possède un aspect subjectif complémentaire, seulement un aspect, on donne un sens rigoureux au "sujet de la science" de Lacan.*'

[53] Id. 2013b, pp. 69, 76; id. 1996, pp. 83, 93: 'Procédés de la théorie unifiée'; '*l'*aspect *étant le corrélat d'une réduction*'.

[54] Id. 2015d, p. 53; id. 2014, p. 79: '[...] *seule la foi comme connaissance fidèle du Christ est connaissance scientifique.*'

or determinate) cognizance of messianity.'[55] Deleuze and Guattari use a similar phrase – 'anexact yet rigorous'[56] – in reference to a style of thought, but also to a characteristic of topological manifolds themselves. One occasion is the discussion of Bertrand Russell's concept of 'ordinal distances'. Another use of the phrase 'vague yet rigorous'[57] occurs while discussing Husserl's notion of 'vague and material essences'. In *The Last Humanity* Laruelle advances a hypothesis that the knowledge of life is real but fundamentally instable and that it can be known in a 'probable yet rigorous way'. Laruelle's 'onto-vectorial plane' is oriented towards 'vector fields' or 'state spaces', although without any use of metric or quantitative concepts. As Laruelle writes: 'The generic messiah is not a telos of the All of world-history, but a force for its transformation. He functions like an algebraic-style idempotent addition.'[58] The variables of the generic matrix are treated as 'productive forces' that do not have their finality in themselves (in categorial terms, they are no automorphisms, that is, arrows whose source and target is one and the same, but they are morphisms causing real transformation), within as well as without themselves. They are 'simple', that is, 'first knowledges' used as productive forces in the service of the humans (generic indexation) in view of a transformed type of knowledge that Laruelle calls 'truth'[59].

Certain features of process-oriented, instead of object-oriented, thought (see below section 2.3., 'Structural Homology of Process-Oriented Ontologies'), are outlined by Rovelli when he writes: 'The world is made of events, not of things', it is not the reality of '*res*' but 'a network of *events*'[60]. As for the word '*res*' Taylor Adkins points out: 'The Latin word *res* ("thing") is the etymological basis for the word "real", which derives from Latin *realis* ("actual", "of or relating to things"). Here Laruelle is evoking the etymological roots of "real" and "res" so as to dissociate them, at least insofar as "(the) real" is elaborated in a non-philosophical (non-empirical, non-phenomenological, non-objectifiable) sense.'[61] According to Rovelli, '[t]he whole evolution of science indicates that the best grammar to think the world is the one of change and of becoming, and not the one of permanence. Of becoming, and not of being.'[62] Moreover, he points out:

> We can think the world as being made up of *things*. Of *substances*. Of *entities*. Of something that *is*. That *remains*. Or we can think the world as made up of *events*. Of *occurrences*. Of *processes*. Of something that is *produced*. That does not last, that is continuously transformed. [...] That is the realisation of the omnipresence of imperma-

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[55] Id. 2015d, p. 84 (my italics); cf. id. 2014, p. 131: '*la fonction de la matrice étant de produire de la connaissance fidèle c'est-à-dire de la foi, qui est la connaissance rigoureuse, ce qui ne veut pas dire exacte ou déterminée, de la messianité.*'

[56] Deleuze and Guattari 1988, pp. 367, 555 (n. 32); cf. id. 1980, pp. 454, 455 (n. 27).

[57] Id. 1988, p. 507; cf. id. 1980, p. 633. See also DeLanda 2002, pp. 53, 197.

[58] Laruelle 2015d, p. 77; id. 2014, p. 121: '*Le Messie générique n'est donc pas un telos du Tout de l'histoire-monde, mais une force de transformation de celle-ci, il fonctionne à l'addition idempotente de type algébrique.*'

[59] Cf. id. 2015a, pp. 82, 177, 179, 214.

[60] Rovelli 2018a, pp. 113, 115: 'Le monde est fait d'événements, pas de choses', '*un réseau d'*événements'.

[61] Laruelle 2013d, p. 43, n. 6.

[62] Rovelli 2018a, p. 116: '*Toute l'évolution de la science indique que la meilleure grammaire pour penser le monde est celle du changement, et non celle de la permanence. Du devenir, et non de l'être.*'

> nence, and not the immutability in an immobile time. Thinking the world as a set of events, of processes is [...] the only way that is compatible with relativity. The world is not a set of things, it is a set of events. The difference between things and events is that *things* endure in time. *Events* have a limited duration.[63]

The generic matrix describes in a conceptual manner how objects change, not how they are, it tells us how generic quantum events, concept-particles or particle-objects, i.e., morphisms, are produced. The generic '"quantum of action"'[64] is 'the minimal syntax'[65] or infrastructure given by the generic matrix which itself is not an object, but a morphism. Morphisms are used to describe the *dynamics* of the system. We define the generic matrix category over '[t]he transcendental field'[66]. This category-concept is not named after its objects, since the generic matrices are morphisms. Technically speaking, the objects of the generic matrix category are two variables (virtual observables, potentialities or state vectors) and the morphisms are generic 2×2 matrices. That is, a morphism is a collection of field elements. We must be able to compose two morphisms by the process of Laruelle's symbolic generic matrix multiplication. The generic matrix category is enriched over the category of onto-vectorial, complex Hilbert spaces over the transcendental field. This means that each set of morphisms is actually an onto-vectorial space over the transcendental field. Specifically, we add generic matrices of the same dimensions and multiply them symbolically component-by-component.

3. Associative *compositions*, i.e., $f \in C(A,B)$, $g \in C(B,C) \Rightarrow g \circ f \in C(A,C)$ with $(h \circ g) \circ f = h \circ (g \circ f)$.

The category-concept requires an operation of *composition* of transformations between onto-material or onto-vectorial objects and the associativity of the composition. The morphisms verify elementary composition rules between arrows. An example of such an associative composition is the third modality of 'Christ' that conjoins the two modalities already mentioned above – (i) Christ as a message-system and (ii) Christ as a vectorialization factor –, giving (iii) a 'Christ-operator' or 'Christ-agent' which is conceived as the entanglement of the object and the subject. 'In every science', says Laruelle, 'we need at least one observer-operator of the research procedures that are the real "subject"', and he calls 'this subjectivity or this individual faith that is underdetermined generically [...] "messiah" or "Stranger-existing-subject"'[67]. For him,

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[63] Ibid., p. 117: *'On peut penser le monde comme constitué de* choses. *De* substances. *D'*entités. *De quelque chose qui* est. *Qui demeure. Ou bien on peut penser le monde comme constitué d'*événements. *D'*occurrences. *De* processus. *De quelque chose qui se* produit. *Qui ne dure pas, qui se transforme continuellement.* [...] *C'est la réalisation de l'omniprésence de l'impermanence, et non de l'immuabilité dans un temps immobile. Penser le monde comme un ensemble d'événements, de processus, est* [...] *l'unique mode compatible avec la relativité. Le monde n'est pas un ensemble de choses, c'est un ensemble d'événements. La différence entre les choses et les événements, c'est que les* choses *perdurent dans le temps. Les* événements *ont une durée limitée.'*

[64] Cf. id. 2011a, p. 78: *'"quantum d'action"'*.

[65] Cf. id. 2011a, p. 102: *'la syntaxe minimale'*.

[66] Cf. id. 2010a, p. 12: *'Le champ transcendantal'*.

[67] Cf. id. 2014, p. 172: *'Dans toute science il faut au moins un opérateur observateur des procédures de recherche qui sont le véritable "sujet". [...] Comment appeler cette subjectivité ou cette foi individuelle sous-*

Christ is 'the theoretical, obviously not historical or religious, pivot of the generic [...]. The Christ is just the symbol of what every human is now: an individual observer of the Universe.'[68] The Christ is a 'symbol of the pre-primary or prior-to-primary generic human or [...] the last humanity, [...] a point of transmutation, i.e., of superposition of biological-naturalist, Darwinian interpretations and theological-naturalist, Christian interpretations of the human which are both lowered or weakened by the generic human = *X*'.[69] Also, with regard to the *HAP* system Laruelle states: 'The human is one of the variables but he also holds the algebraic logos, fusing with the superposition which replaces the One of sufficiency.'[70]

The two principal theses of *The Last Humanity* describe a compound of transformations:

1) The quantization and the vectorialization of philosophical representations, first by reducing them to lived experiences or quantized *noema* and then by transforming these variables into superposed states called 'aleatory subjects' by means of a symbolic operator multiplication (products of variables can be reversed on condition of limiting them to the state of *becomings*), e.g. *HA* and *AH*, i.e., 'the humanized animal and the animalized human'[71], or *MW* and *WM*: '*The man (in the masculine sense) masculinizes the woman (renders male the female) who vice-versa feminizes the man.*'[72]
2) The generic indexation or 'cloning' by means of superposition giving these propable subjects, like the human, being indeterminate in its human being, their complete, generic and no longer just quantum status, as 'clone-subjects'. These two processes, f and g, can be represented unidimensionally as axes of a new 'coordinate system', where f is the abscissa of the quantum apparatus and g the ordinate of the transcendental apparatus. The onto-material, philosophical variables of the livings are the initial objects, and the composition $f \circ g$ is the final product, i.e., the 'clone-subjects'. Laruelle determines finer variables than 'human' and 'animal' or 'woman' and 'man', that is, the sexual difference acting in these variables is constructed not as a given stable status quo but as a *dynamic process* expressed by the operators as non-commutative products. Even if the reversibility of the products of variables seems to efface the sexual difference, the quantum point of view makes the difference return in form of a universal non-

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déterminée génériquement, sinon "Messie" ou sujet-existant-Étranger ?' (My translation.) Cf. id. 2015d, p. 115.

[68] Id. 2015a, pp. 155 f.: '*ce Christ-là [...] est le pivot théorique, évidemment non historique {au} [ou] religieux, du générique [...]. Le Christ est juste le symbole de ce que chaque humain est maintenant [:] un observateur individuel de l'Univers.*'

[69] Id. 2015a, p. 155: '*le Christ comme symbole de l'homme générique avant-premier ou comme l'en-dernière-humanité, comme point de transmutation c'est-à-dire de superposition des interprétations biologique-naturaliste à la Darwin et théologico-naturaliste à la chrétienne qui sont toutes deux abaissées par l'homme générique = X*'.

[70] Id. 2015a, p. 124: '*L'homme est l'une des variables mais il est aussi le porteur du logos algébrique, fusionnant avec la superposition qui remplace l'Un de suffisance.*'

[71] Id. 2015a, p. 156: '*l'animal humanisé et l'humain animalisé*'.

[72] Id. 2015a, p. 19: 'L'homme (au sens du masculin) masculinise la femme (rend masculin le féminin) qui inversement féminise l'homme.'

commutativity of the 'aleatory subjects' and the 'generic clones'. The sexual quantum experience of thought is based on *entanglement* which links these diverse pairs across the biggest distance of the indexation[73] to the 'Universe' (that is, the correlate of modern knowledges: 'The Universe is the correlate of the humanity of-the-last-instance'[74].).[75]

The distinction between objects and morphisms on the one hand and compositions on the other allows to transit from classical, kinematic and dynamic, concept-corpuscles or object-concepts (quantized philosophical representations and vectorialized variables) to non-classical concept-particles or particle-objects (aleatory subjects and generic clones). Dual phenomena necessitate composite category-concepts.

4. A way to *sequentially compose* morphisms $f: A \to B$ and $g: B \to C$ into $g \circ f: A \to C$.

These composition rules of morphisms assure that two consecutive arrows form a composed arrow. For example, the non-standard space of thought consists of 'the onto-vectorial infrastructure which contains the particle, and the objective and double superstructure which aims at or contains the corpuscle'[76].

> The data of lived experience go through several forms or stages of objectivity divided in two moments. At first the moment of quantization, strictly speaking, in five phases of these data, then in the second generic moment of cloning by indexation to the dimension of the Universe, aleatory subjects produced by quantization. These two orthogonal dimensions, the horizontal quantization and the vertical indexation, are obviously not those of an object in a Cartesian space, they are dimensions of the ecological knowledge itself unfolded in a non-standard space of fiction or also of eco-fiction.[77]

More precisely, the five consecutive phases or morphisms of matricial quantization of the lived experiences are described as follows:

> 1. *As empirical givens. HAP* [...] correspond at best to a classical philosophy or to a Newtonian state of the problem. [...]
> 2. *As variables, productive forces or forms of the intuition of life.* [...]

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[73] For 'indexation' see also Badiou 2006a; id., *Logics of Worlds*, Translated by Alberto Toscano. London: Continuum, 2009a, book III.

[74] Laruelle 2015a, p. 154: *'L'Univers est le corrélat de l'humanité de-dernière-instance'*.

[75] Cf. id. 2015a, pp. 23 f.

[76] Id. 2015a, p. 162: *'l'infrastructure vectoriale qui contient la particule, et la super-structure objective et double qui vise ou contient le corpuscule'*.

[77] Id. 2015a, pp. 169 f.: *'Les data de vécu passent par plusieurs formes ou stades de l'objectivité réparties en deux moments. D'abord le momen[t] de la quantification proprement dite en cinq phases de ces data, puis dans le second moment dit générique ou de clonage par indexation à la dimension de l'Univers, des sujets aléatoires produits par la quantification. Ces deux dimensions orthogonales, la quantification horizontale et l'indexation verticale, ne sont évidemment pas celles d'un objet dans un espace cartésien, ce sont celles de la connaissance écologique elle-même déployée dans un espace de fiction non-standard ou encore d'éco-fiction.'*

3. *As formal intuition* and no longer forms of the intuition. [...] [By] combined variables one obtains inverse products, *HA* (the human as animalized) and *AH* (the animal as humanized), [...] which form unequal and above all non-commutative products for the knowledge of life. The variables have to be treated as nonrigid and nonformal *a prioris*, onto-material *a prioris* [...].
4. *As generically underdetermined* a prioris. The *a prioris* come in general by dualities or pairs, either space/time, or wave/corpuscle.[78]
5. [F]{f}inally a completely different modality of the knowledge of life, a new reality which is [...] the clone.[79]

5. A way to group objects A and B into a *compound object* $A \otimes B$.
For instance, the onto-vectorial addition of the two states or complex components of the discursive 'Christ-system', philosophy and theology, knowledge and faith, or *Logos* and *Torah*, is again a state of the message or one of the properties of 'Christ'[80]; and with regard to the multiplication of 'the productive forces of degrowth', Laruelle states: *'Disciplinary knowledges are now simple states or properties reduced by a human subject = X that they do not determine directly.* [...] The multiplication of non-commutative properties produces the paradoxical effect of a generic degrowth of knowledges oriented by and for a new subject = *X*'[81] called 'generic subject' or 'Stranger-subject'.

6. An *identity morphism* $1_A \in C(A, A)$ for each A, i.e., $f \circ 1_A = 1_A \circ f = f$.
Finally, any object A of an abstract category-concept has an identity, 1_A, that is every onto-material and onto-vectorial object is linked to itself by an identity arrow. In this particular case, one can supersede all quantum and generic objects in abstract category-concepts by their identity morphisms doing nothing: $A \rightarrow A$. 'Ultimately, the identity arrow *is* the object', says Badiou, 'considered as the "halting point" of the action.'[82] The concept of objects is, in fact, redundant, a category-concept is built of morphisms and nothing else. This brings about the shift of emphasis from objects to processes. Identity morphisms or 'phase transformations', i.e., the different views upon an object, do not modify the object as such, they are not external modifications imposed upon the object. Therefore, they can be considered as autotransformations or automorphisms of the object. An automorphism is a way of mapping the object to itself ('isomorphism'), while

[78] Id. 2015a, pp. 170–2: '1. Comme données empiriques. *HAV* [...] *correspondent au mieux à une philosophie classique ou à un état newtonien du problème.* [...] 2. Comme variables, forces productives ou formes de l'intuition de la vie. [...] 3. Comme intuition formelle *et non plus formes de l'intuition.* [...] [*Par des*] *variables conjuguées, on obtient des produits inverses, HA* (*l'homme comme animalisé*) *et AH* (*l'animal comme humanisé*) [...] *qui forment des produits inégaux et surtout non-commutatifs pour la connaissance de la vie. Les variables doivent être traitées comme des* a priori *non rigides et non formels,* a priori *matérials* [...]. 4. Comme *a priori* sous-déterminés génériquement. *Les* a priori *vont en général par dualités ou paires, soit espace/temps, soit onde/corpuscule.*'
[79] Id. 2015a, p. 170: '5. *enfin une tout autre modalité de la connaissance de la vie, une nouvelle réalité qui* [...] *est* [...] *le clone*'.
[80] See id. 2015d, pp. 33, 146; cf. id. 2014, pp. 57, 215.
[81] Id., 'The Degrowth of Philosophy: Toward a Generic Ecology' (2012), in id. 2013a, p. 334, translation slightly adapted to: id. 2015a, pp. 73 f.
[82] Badiou 2014, p. 19.

preserving all of its structure. The 'idempotent One'[83], for instance, is such an infinite cyclical structure, as Laruelle points out in *Christo-Fiction* under the heading 'The Act of Non[-]acting as Abasement of Transcendence'[84]: 'Idempotence is [...] the capacity for an operation to produce the "same" effect, which confirms its identity'[85]. 'Non-acting meaning that he [i. e., the Christ] does not have to act directly—that is to say, to re-act re-flexively—not that he does not act at all.'[86] The vertical superstructure 'of the *generic cloning*'[87] as described in *The Last Humanity* should also be seen in this context: 'The generic clone exceeds the World without going beyond it, in a transfinite way, by the ascendence of a circle circulating infinitely in itself since its own total collapse or its "quarter turn" (Lacan) oscillating in between collapse and ascendence'.[88] In the categorial 'Universe', identity arrows embody a theory of non-action. As everything is an arrow, this non-action itself has to be an arrow, too. The identity is non-action. The undulatory power, i.e., '*potentia*' (Spinoza), '*puissance*' or '*Macht*', of the 'last-instance', in contrast to philosophy's '*potestas*', '*pouvoir*' (Foucault) or '*Gewalt*'[89], acts secretely, it is a 'non-acting' whose ways cannot be perceived, just like the trajectories of an undulatory action. In this sense, as Laruelle says, is the *interfering* acting a 'non-acting' or a non-visible waiting for producing an aleatorily visible subject.

The Laruellean 'transcendental' or 'reason-in-person' as doubly immanent can also be represented as an arrow on itself (i.e., an automorphism describing kinematics). While being (i) immanent (to) itself or (to) immanence, i.e., being purely immanental, Laruelle's 'pure reason' maintains (ii) a simple transcendence (i.e., a morphism describing dynamics) by being immanent to the transcendence of the antinomy of transcendence and immanence, as he writes:

> The pure transcendental or transcendental "in-person" is an intentionality which only transversally aims at contents without thematizing them [...] on which it only leans in order to go beyond them. [...] We will call this transcendental the "Reason-in-person" or "pure Reason", this is its formalism of the imaginary number or of algebra, not even logical, thus liberated from the Kantian critical device.[90]

7. A way to *compose morphisms* in parallel, making $f_1: A_1 \to B_1, f_2: A_2 \to B_2$ into $f_1 \otimes f_2: A_1 \otimes A_2 \to B_1 \otimes B_2$.

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[83] Laruelle 2015a, p. 124: '*l'Un idempotent*'.

[84] Id. 2015d, p. 173; id. 2014, p. 250: 'L'agir du non-agir comme abaissement de la transcendance'.

[85] Id. 2015d, p. 173; id. 2014, p. 250: '*L'idempotence est donc la capacité pour une opération de produire le "même" effet, qui vérifie son identité*'.

[86] Id. 2015d, p. 173; id. 2014, p. 251: '*Le non-agir signifie qu'il n'a pas à agir directement c'est-à-dire à ré-agir réflexivement et non pas qu'il n'agit pas du tout.*'

[87] Id. 2015a, p. 20: 'du *clonage générique*'.

[88] Id. 2015a, p. 21: '*Le clone générique dépasse le Monde sans le trans-gresser, d'une manière transfinie, par l'ascendance d'un cercle circulant infiniment en soi depuis son propre collapsus effondré ou son "quart de tour" (Lacan), oscillant entre effondrement et ascendance*'.

[89] Id. 2015a, pp. 65, 107–9.

[90] Id. 2015a, pp. 48 f.: '*Le transcendantal pur ou "en-personne" est une intentionnalité qui ne vise que transversalement sans les thématiser des contenus [...] sur lesquels il ne prend appui que pour les traverser. [...] On appellera ce transcendantal la "Raison-en-personne" ou "Raison pure", c'est son formalisme de nombre imaginaire ou d'algèbre, même pas logique, donc débarrassé de l'appareil critique kantien.*'

If we want to be able to conceive two microscopic, conceptual systems A and B as one whole (two operations, such as addition and multiplication, form a system not in the classical rationalist style or in the absolute Hegelian sense that Badiou, for instance, is after), in other words, to group them together in compound systems $A \otimes B$ ('tensor product': see below 'The involutive category of onto-vectorial Hilbert spaces: a monoidal category' in paragraph 2.3., 'Structural Homology of Process-Oriented Ontologies'), and also to consider compound operations $f \otimes g: A \otimes B \rightarrow C \otimes D$, then we pass from ordinary categorial concepts to a two-dimensional variant called 'monoidal' concept. Monoidal category-concepts help to understand the structure of quantum and generic processes, in particular the way they *interact*. If morphisms are generic matrices, the composition of morphisms is a non-commutative 'generic matrix multiplication': 'non-standard aesthetic epistemology'[91], for instance, is obtained by the 'tensor product': $non-ethics \otimes non-aesthetics$.

The threefold partition of science, philosophy, and art proposed by Deleuze and Guattari in *What Is Philosophy?*[92] is described in Jedrzejewski as a philosophical example of a categorial classification defined by objects and morphisms. The category of science is the 'plane of reference', its objects are 'functions', and its morphisms are 'partial observers'. The category of philosophy is the 'plane of immanence' where the objects are 'concepts' and the morphisms are 'conceptual personae'. Finally, the 'plane of composition' is the category of the arts with 'affects' and 'percepts' as its objects and 'aesthetic figures' as its morphisms.[93] 'What determines the functioning of the morphisms is their disposition relative to the abstract space in which they operate and their positions relative to the objects of the category.'[94] The category of non-philosophy, on the other hand, is 'a plane of immanence called "generic plane" or plane of messianity' (in *Christo-Fiction* Laruelle says in an equivocal sense: 'Christ accomplishes the "plane or plan of salvation"'[95]) and '*the plane of generic or transfinite immanence is also the plane of scientific reference*'[96]. In other words, the generic quantum plane emerges from the superposition of what Deleuze and Guattari distinguished as the philosophical plane of immanence and the

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[91] Cf. Schmid, Anne-Françoise, and Muriel Mambrini-Doudet, *Une épistémologie esthétique non-standard pour les sciences contemporains*, Chapter 11 in: Ó Maoilearca, John, Maryse Dennes, and Anne-Françoise Schmid, eds., *François Laruelle. La non-philosophie et au-delà*. Paris: Éditions Garnier (forthcoming).

[92] Deleuze, Gilles, and Félix Guattari, *What Is Philosophy?*, Translated by Hugh Tomlinson and Graham Burchill. London: Verso, 1994.

[93] Jedrzejewski 2007, p. 57: '*La tripartition de la philosophie, des sciences et des arts que donne[nt] Deleuze [et Guattari] est un exemple de classification catégorielle définie comme une catégorie mathématique par des objets et des morphismes. La philosophie a pour catégorie le "plan d'immanence" dont les objets sont les "concepts" et les morphismes les "personnages conceptuels". Les arts ont pour catégorie le "plan de composition" dont les objets sont les "affects" et les morphismes les "figures esthétiques". La science a pour catégorie le "plan de coordination" dont les objets sont les "fonctions" et les morphismes les "observateurs partiels".*'

[94] Ibid.: '*Ce qui détermine le fonctionnement des morphismes est leur disposition relativement à l'espace abstrait dans lequel ils opèrent et leurs positions relatives aux objets de la catégorie.*'

[95] Laruelle 2014, p. 315: '*Le Christ accomplit le "plan du salut"*'. Cf. id. 2015d, p. 225.

[96] Id., 'From the First to the Second Non-Philosophy' (2010), in id. 2013a, p. 320.

scientific plane of reference.[97] Its objects are onto-vectorial 'state spaces' for quantum and generic systems (such as 'Christ' as a message system) and its morphisms are bounded (that is finite), linear operators (functions or factors), that is, processes transfering states of one system to states of another (eventually the same one). Category-concepts offer a framework to relate the *discrete* and the *continuous* by correspondence. Laruelle quantizes the philosophical space in order to obtain a discretized version, a discrete approximation of the continuous space. Category-concepts, on the other hand, offer a means to work with discrete versions by relating them to continuous versions. Both approaches finally converge. In other words, that allows to understand in an 'anexact yet rigorous' way the transition from discrete to continous and from continuous to discrete. Category-concepts offer a solution to the problem of correspondence between quantization of the continous and the dequantization of the discrete. They allow to insist on the relational character of objects conceived as arrows. Category-oriented theory is a matter of defining the internal structure of a set of objects. It provides a powerful communication of ideas between different fields and subfields. Category-oriented theory provides a new semantics to talk about non-philosophical issues. It includes a formal treatment of quantum and generic structures. It may help us to model scientific ideas. Category-oriented theory is very efficient as a language for experimental design patterns, introducing formality while remaining flexible. It forms a rich and tightly woven conceptual fabric that will allow us to maneuver between different perspectives whenever the need arises. Once we build that fabric for ourselves, we have an ability to think about models in a way that simply would not occur without it. Moreover, putting ideas into the language of category-oriented theory forces us to clarify our assumptions (just as non-philosophy claims to clarify the presumptions of philosophy).

[97] Id. 2010a, p. 58: 'Plan générique. *Superposition de ce que la philosophie distinguerait et corrélerait comme plan-d'immanence et comme plan-de-référence scientifique.*'

2.3. Structural Homology of Process-Oriented Ontologies

Laruelle favors a style of philosophizing that is meant to be 'contemporary' in comparison to a more 'modern' style related to 'a global ontology of the sort Badiou proposes'[1].[2] 'Modern philosophy' is characterized by Laruelle as speculating on the vacuum, the infinite, and the idea, while his own 'contemporary' philosophy is rather based on the body and favors the category of finitude or of the 'transfinite'.[3] 'Transfinitude' in Laruelle denotes the specific finitude of radicality that distinguishes the radical from the absolute. It is a finitude as probability proper to the 'pure' but non-Kantian reason ('pure' in Kant means without recourse to sensual experience, exclusively based on ideas; whereas in Laruelle 'pure' is understood in the abstract sense of complex Hilbert spaces[4]). Just as 'the "radical immanence" is not "pure"'[5] or absolute, Laruelle considers the infinite less relevant from a human point of view ('I have my doubts that the infinite is of any interest to humans', as Laruelle once remarked in a conversation at *The London Graduate School*, Kingston University, London in May 2012), whereas for Badiou the 'advocates of finitude', by name the empiricists, are one of his principal opponents. Laruelle, of course, cannot be counted among the empiricists, although his natural scientific impetus (as in Châtelet) is closer to Aristotle than to Plato.[6] In fact, non-philosophy as 'a transcendental organon'[7] is meant to be 'the *real* resolution'[8] of the antinomy of science and philosophy, as Laruelle points out in *Principles of Non-Philosophy*:

> Non-philosophy must remain an explicative theoretical hypothesis: it does not confuse itself with its object, with experience [...]. Furthermore, it must not simply content itself with explaining effective reality, but it must rather contribute to transforming it, or at least to making a new usage for it, if not directly then at least through and within the limits of its power of knowledge and of explication, and as such to be more than a verifiable or falsifiable hypothesis which we realize or abandon under the pressure of experimentation [*expérience*].[9]

Finitude, for Laruelle, is not synonymous with closure, as he characterizes the onto-vectorial system of thought as 'completed but not closed' ('*achevé mais non fermé*'[10]). For

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[1] Gangle 2016, p. 210.
[2] See Laruelle 2011a, pp. 45–7.
[3] Cf. id. 2012e.
[4] Cf. id. 2015a, pp. 48, 49.
[5] Cf. id. 2011a, pp. 135 f.
[6] Cf. Badiou, 'Gilles Châtelet (1944–1999)' in id. 2008a.
[7] Laruelle 2013b, p. 11; id. 1996, p. 13: '*un organon transcendantal*'.
[8] Id. 2013b, p. 10; id. 1996, p. 13: '*la résolution* réelle'.
[9] Id. 2013b, p. 11; id. 1996, p. 13: '*La non-philosophie doit rester une hypothèse théorique explicative : elle ne se confond pas avec son objet, avec l'expérience* [...]. *Par ailleurs elle ne doit pas seulement se contenter d'expliquer la réalité effective mais elle doit contribuer à la transformation ou du moins à en faire un autre usage, sinon directement du moins par et dans les limites de son pouvoir de connaissance et d'explication, donc être plus qu'une hypothèse vérifiable ou falsifiable et que l'on réaliserait ou abandonnerait sous la pression de l'expérience.*'
[10] See, for instance, id. 2010a, p. 426.

Badiou, infinity is a position (especially found in poetry) allowing to contradict the world from a 'point of possibility' while Laruelle speaks of invention but avoids openly to opt for the possible. However, both Badiou and Laruelle attack the auto-sufficiency of knowledges (Badiou, for instance, by refering to Victor Hugo's poem *La source tombait du rocher*[11]). Badiou assumes a lack of the infinite, a 'true infinite taste', a 'point of infinity' in the auto-sufficient attitude.[12] The infinite of Spinoza was also a 'big obsession' of Deleuze (while the 'difference' might have been only a simple means). Like Badiou, Deleuze fiercely refuses every risk of finitude. The philosophical gesture of 'double transcendence' establishes an ideal for its regulation. Thus, the finitude of the *cogito*, for instance, can be explained on the background of the infinite. Subsequently, Laruelle's problem is to get rid of the authority of philosophy, to marginalize but not to reduce philosophy, since the reduced remains determined 'in the last instance' by the reduction. Laruelle takes philosophical terms and deprives them of typical philosophical categories such as the One and the Multiple (Badiou). According to Laruelle, one has to choose between the void of the world and the minimum of world (that is, the generic quantum). It is the minimal *X* of transcendence which resists immanence itself since it is attached to the transcendental. A rest of transcendence is attached to the immanence just as the set-form to the zero or to the void. The whole difference between the two theories, ontology of the void and non-philosophy, resides in the qualitative dosage of transcendence and immanence.[13] (Or in the orientation of morphisms.) One aspect distinguishes all three theories, including the philosophy of difference of Deleuze: Laruelle's idempotence does neither show the 'inconsistant multiple' (Badiou) nor 'desiring flows' (Deleuze) but another, more 'subjective' materiality, namely 'the undulatory lived experience'[14].

In non-philosophy, the real is not formed by objects, but by special, 'unilateral dualities' which are operators, that is, they show in action what they are, by non-commutativity (from objects to morphisms, process-oriented ontology). While philosophy distinguishes the continuous (the wave) and the discrete (the corpuscle), as in Galloway who still argues on a philosophical base, non-philosophy moves from the duality of the continuous *and* the discrete (wave-corpuscle) towards the quantum relation or rather 'unilation' of the wave-particle duality, which parts with the corpuscle in order to go towards the particle. The structure of these wave-particle dualities is not identical to the cut-flow machines in Deleuze. The undulation is the semi-objective form of the particle. Deleuze defines partial objects, on the one hand, and cuts, on the other hand, that he prolongates by flows. Therefore, the machine has two heads, cut and flow, what Laruelle describes as the 'great circles'[15] of philosophy – "'Unity of experience' (Kant), *'Lebenswelt'* (Husserl), 'Being-in-the-world' and 'Care' (Heidegger), 'General Perception' of 'Flesh' (Merleau-Ponty), etc."[16] –, which are reversible: one can go around

[11] Cf. Badiou, *'L'immanence des vérités'*, Lecture of Alain Badiou 2012–13, Notes by Daniel Fischer, Lecture of January 16, 2013, available at: http://www.entretemps.asso.fr/Badiou/12-13.htm.
[12] See id. 2018, pp. 107–10.
[13] Laruelle 2011a, pp. 116 f.
[14] Id. 2011a, p. 157.
[15] Ó Maoilearca 2015, p. 10.
[16] Laruelle, 'Transcendental Method', in id. 2013a, p. 150.

in two directions, since Deleuze thinks in totality. Laruelle goes rather in the direction cut → flow. At the level of the 'body without organs' one can have a certain reversibility, though primacy has to be attached to the cuts in Deleuze, the philosopher of the All-One of the molecular. Everything is constructed by partial objects, with a primacy of a certain multiplicity of the cuts. There are 'molar lines with segments' and 'molecular fluxes with thresholds or quanta'[17] that correspond to the social and institutional identities of our public, private and professional lives: family, school, work, etc. On the other hand, Laruelle does not propose the inversion, the primacy of the *flux* over the cut or of the wave over the particle. For him, there is no primacy, there are only machines that work as cuts *or* as flows. The wave is the form itself of the particle whose matter comes from the macrocosm. Wave and particle are not two different things (two heads), but it is the same thing. The priority over the corpuscle is attached to the wave-particle duality.

The unilateral duality is an oriented machine, which does not have its place in philosophy guided by the reversibility. *There is no convertibility of the two sides.* The two terms 'uni' and 'laterality' do not have the same weight. The laterality weighs a lot in philosophy, while in non-commutative ontology it is the One that has a double function. In the complex (that is, composed) machines of Deleuze, there is a flow-cut or sometimes cut-flow duality. The multiple is affirmed as such, with the primacy of the cuts. The flows insure the unity, the body without organs. Deleuze is a philosopher who affirms the multiple (*a priori* decision) and lets intervene the whole. The desiring machines produce the whole or the One of the body without organs, the correlate of the position of the multiple. Laruelle avoids to determine these machines and tries not to give the complex as multiple like Deleuze. Sometimes there is a big resemblance between Laruelle and Deleuze, since Deleuze affirms the All-One, the immanence. Deleuze could be called the philosopher of the undulatory or the vibratory, while Laruelle imitates him in order to deconstruct him (the One is what undoes the whole). On the one hand, as James points out, the latter

> is clearly marked and formed by philosophies of difference, and in particular by Deleuzian philosophy and Deleuze's thinking of radical immanence [...]. At the same time, he describes his thought as a 'non-Heideggerian deconstruction' and, from the 1980s onwards, develops his 'non-philosophy' as a radical break from the philosophies of difference (e.g. Deleuze, Derrida, Lyotard).[18]

Deleuze's 'philosophy of difference'[19] makes use of a category accompanied by a 'Topo-Logic'[20]-oriented theory, whose microscopic, molecular and molar objects are $(n-1)$-dimensional manifolds representing the philosophical space (more precisely, the

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[17] Deleuze, Gilles, and Claire Parnet, *Dialogues*, Translated by Hugh Tomlinson and Barbara Habberjam. New York: Columbia University Press, 1987, p. 124; cf. id., *Dialogues*. Paris: Flammarion, 1996, p. 151.

[18] James 2012, p. 9.

[19] See Laruelle, *Philosophies of Difference: A Critical Introduction to Non-Philosophy*, Translated by Rocco Gangle. New York: Continuum, 2010c; id., *Les philosophies de la différence. Introduction critique*. Paris: PUF, 1986.

[20] Id., '"I, the Philosopher, Am Lying": A Reply to Deleuze', in id. 2012a, p. 63.

impersonal transcendental field) and whose morphisms are n-dimensional 'cobordisms', i.e., fundamental equivalence relations among those multiplicities, in time representing '"space-time"'[21]. A multiplicity is an organization of the multiple as such, without the need for the 'one', giving the formula $n-1$ for multiplicities in *A Thousand Plateaus*: 'The rhizome [...] constitutes linear multiplicities with n dimensions having neither subject nor object, which can be laid out on a plane of consistency, and from which the One is always subtracted $(n-1)$.'[22] Therefore, the formula of Deleuze and Guattari is rather $n-1$ (the unique is subtracted from the multiplicity, the multiplicity is written at $n-1$ dimensions) and not $n+1$ as Galloway insinuates when he writes: '*Deleuze is* $n+1$.'[23] This plays an important role in the philosophy of difference of Deleuze: microscopic objects of the category of differential ontology represent possible choices of the philosophical space, while the morphisms called 'cobordisms' represent possible choices of a philosophical spacetime. Ontology accompanied by set theory also determines being qua being as pure multiplicity 'without one': $n-1$. As Galloway states, '*Badiou is* $n-1$. *Laruelle is* $n=1$.'[24] For Laruelle says: 'In immanence, one no longer distinguishes between the One and the Multiple, there is no longer anything but $n=1$, and the Multiple-without-All.'[25]

On the other hand, non-philosophy makes use of a category-concept associated with the quantum-oriented theory, whose objects are onto-vectorial Hilbert spaces used to describe 'states', and whose morphisms are bounded linear operators used to describe 'processes'. The ontology accompanied by a category-oriented theory determines being as act (or relation, or movement). 'Its basic concept is the arrow (or morphism, or function) which "goes" from one object to another object.'[26] Moreover, the categories of 'contemporary' philosophy (non-philosophy) and 'postmodern' philosophy (philosophy of difference) resemble each other far more than either resembles the category of 'modern philosophy' as characterized by Laruelle[27] and related to 'a global ontology of the sort Badiou proposes'[28]. Badiou's 'ontology of the void' is accompanied by a set-oriented theory, whose objects are sets and whose morphisms are functions. Deleuze defines virtual entities via differential relations, and the object which embodies those relations is a function. In contrast to individual manifolds, the category of postmodern philosophy reveals many structural similarities to the category of contemporary philosophy. Quantum-oriented theory resembles the topo-logic-oriented theory more than the set-oriented theory. In particular, both the generic matrix category and the differential matrix category - but not the Cantorian matrix category - are 'involutive' category-concepts, where there is a built-in way to reverse any process, with a non-Cartesian monoidal structure depicting process interactions. Like the category of

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[21] Id. 2013b, p. 211; id. 1996, p. 257: '"*espace-temps*"'.
[22] Deleuze and Guattari 1988, p. 21; cf. id. 1980, p. 31.
[23] Galloway 2014, p. 47.
[24] Ibid.
[25] Laruelle 2011c, pp. 98 f.; cf. ibid., p. 98: '*Dans l'immanence on ne distingue plus entre l'Un et le Multiple, il n'y a plus que* n = 1, *et que du Multiple-sans-Tout.*'
[26] Badiou 2014, p. 13.
[27] See Laruelle 2012e.
[28] Gangle 2016, p. 210.

non-philosophy, the category of philosophy of difference has a 'non-Cartesian tensor product', given by the disjoint union of manifolds. This suggests that both non-philosophy and philosophy of difference are best understood in terms of category-concepts quite different from the one of modern philosophy. This accounts for many of the puzzling features of non-philosophy such as the failure of local realism: 'The non-locality or the non-separability of the lived human/animal/plant system combined with the subtractive separability of the last-instance are the characteristics of the ethical acts in an immanent ecological context.'[29] These features only seem puzzling as long as one tries to treat the category of non-philosophy as analogous to the category of modern philosophy rather than analogous to the category of postmodern philosophy, so that quantum-oriented theory will make more sense when regarded as modeled after a topo-logic-oriented theory. Some of the mysteries surrounding *joint systems* in quantum thought dissipate when one focuses on the analogy to the differential matrix category and stops trying to analogize the 'tensor product' of onto-vectorial Hilbert spaces to the 'ordinary' Cartesian product of the elementary Cantorian concepts.[30] 'In other words', as Gangle points out, 'the logic of the differences among attributes cannot be grasped by the logic that is formalised in set theory. By placing this conception of creative difference at the heart of his thought, Deleuze commits himself to a model of philosophy contrary in basic impulse to the path pursued by Badiou in *Being and Event* and *Logics of Worlds*.'[31] Neither the category of contemporary philosophy nor the category of postmodern philosophy is best regarded as a category whose objects are set-theoretic concepts equipped with extra additive and multiplicative structures and properties, and whose morphisms are functions preserving these extra structures. In particular, operators between onto-vectorial Hilbert spaces are not required to preserve the inner product between two operators. This raises the question of precisely what role the inner product plays in the generic matrix category. The inner product is crucial in quantum-oriented theory, since it is used to qualify *transition amplitudes* between states – but how does it manifest itself generically in the structure of the generic matrix category? One answer is that it gives a way to 'reverse' an operator, obtaining an operator called the 'adjoint'[32]. This transforms the generic matrix category into what is called an 'involutive' category. Transition amplitudes can be expressed or qualified by using the involutive category structure of non-philosophy. The differential matrix category is also an involutive category, that is, a concept, where the adjoint of 'a *uni-versal* "space-time"'[33] is obtained simply by switching the roles of future and past. On the other hand, the Cantorian matrix category cannot be changed to become an involutive category (due to its commutativity and infinity assumption). All this suggests that both Laruelle's non-

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[29] Laruelle 2015a, p. 199: '*La non-localité ou la non-séparabilité du système vécu homme/animal/végétal, conjuguées avec la séparabilité soustractive de la dernière-instance sont les traits des actes éthiques en contexte écologique immanent.*'

[30] For this argument see Baez, John C., 'Quantum Quandaries: A Category-Theoretic Perspective' (2004): arXiv:quant-ph/0404040v2.

[31] Gangle 2016, p. 204, n. 29. Cf. Deleuze and Guattari 1994, pp. 151–3; id. 1991/2005, pp. 143 f. See also Badiou 2006c, Chapter 6, 'One, Multiple, Multiplicities'.

[32] See appendix.

[33] Laruelle 2013b, p. 211; Id. 1996, p. 257: '*un "espace-temps"* uni-versel'.

philosophy and Deleuze's philosophy of difference will be best understood in terms of categories quite different from the set-theoretic matrix category.

Joint systems are non-commutative systems composed of two parts. In the study of joint systems one can see the 'failure of local realism' (for a discussion of Laruelle's generic solution to the 'Einstein-Podolsky-Rosen paradox' [34] see further below paragraph 3.4., 'Non-Commutativity and the Emergence of Time'). There one also discovers that one cannot clone a generic quantum state. Both these phenomena follow from the failure of the 'tensor product' to be 'Cartesian' in a certain sense made precise by category-concepts. The fact that we cannot do these things in the category of contemporary philosophy is responsible for the failure of local realism and the impossibility of duplicating a generic quantum state. Here again the category of '[a] quantum or non-Cantorian ontology'[35] resembles the category of differential ontology more than the category of 'set-theoretic ontology' or 'set theory ontology'[36]. First, just as we can use any $(n-1)$-manifold to represent a space of philosophy, we can use any onto-vectorial Hilbert space to describe the states of some onto-vectorial system. Second, just as we can use any cobordism to represent a philosophical space-time going from one space to another, we can use any operator to describe a process taking states of one system to states of another. More precisely, given systems whose states are described by using quasi-Hilbertian spaces, respectively, any bounded linear operator describes a process that carries states of the first system to states of the second. *The interpretation of linear operators as processes* makes sense more generally.

There is a structural analogy between non-philosophy and philosophy of difference, according to which $(n-1)$ -dimensional manifolds representing philosophical space are analogous to onto-vectorial Hilbert spaces, while cobordisms describing onto-topological spacetime are analogous to operators. *Space* and *state* are aspects of *being* (objects), while *spacetime* and *process* are aspects of *becoming* (morphisms). This is an attempt to reconcile the quantum-oriented concepts of *state* and *process* with the topo-logical notions of *space* and *spacetime*. Gangle writes that 'Deleuze's thought is best understood as formally topological in essence. [...] As Bryant puts it, "Deleuze conceives Ideas topologically as sets of variations or deformations in which one form can pass into another while maintaining a structural identity, rather than as fixed forms to which individuals more or less correspond."[37][38] Of course, as Gangle further points out, 'the "topological" dimension of Deleuze's thought' – no different from the categorial dimension of Laruelle's thought as well as the set-theoretic dimension of Badiou's thought – 'must be taken in an abstract or purely conceptual fashion'[39].

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[34] Cf. id. 2010a, pp. 387–95.
[35] Id. 2011a, p. 150: 'Une ontologie quantique ou non-cantorienne'.
[36] Badiou 2014, p. 96.
[37] Bryant 2008, p. 203.
[38] Gangle 2016, p. 163.
[39] Ibid., p. 164.

Topo-logic-oriented theory	Quantum-oriented theory
$(n-1)$-dimensional manifold (philosophical space): Being-Thought	onto-vectorial Hilbert space (generic quantum states): One or Real
cobordism between $(n-1)$-dimensional manifolds (topological spacetime): Becoming	operators between onto-vectorial Hilbert spaces (generic quantum process): Becoming
composition of cobordisms	composition of operators
identity cobordism	identity operator

TABLE. Analogy between topo-logic-oriented theory (Deleuze's 'postmodern' philosophy) and quantum-oriented theory (Laruelle's 'contemporary' philosophy)

While philosophy of difference deals with the 'image of Being-Thought' (*noumenon*)[40], non-philosophy holds that '[t]he One is the thing itself.'[41] The 'relation' to the One as thing itself is a non-philosophical 'relation' or experience of idempotence (1 + 1 = 1) which is not a relation but what Laruelle calls a '*uni-lation*'[42]. While 'in Greek philosophical thought there is always a relation'[43], as Smith explains, in non-philosophy relation becomes a 'non-relation' 'insofar as the One or the radical immanence of the human is foreclosed to relation, there is no rootedness as such. The One is incommensurable with the world and so human (Beings) are radically deracinated at the level of their lived identity.'[44] This unobjectifiable immanence is identified with 'the real'.[45] The latter does not deal with 'an empirical and still philosophical real but with an immanental Real determined by the two principles [of superposition and non-commutativity] capable of generating an indirect objectivity'[46] in accordance with 'the idempotent One'[47] (in the words of Weyl, 'objectivity means invariance with respect ot the group of automorphisms [of space-time]'[48]).

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[40] Deleuze and Guattari 1991/2005, p. 64: '*image de Pensée-Etre* (*noumène*)'.
[41] Laruelle 2012a, p. 87.
[42] Id. 2013b, p. 46; cf. id. 1996, p. 55. See also id. 2012a, p. 87 for the 'relation to the One' as a 'non-relation'.
[43] Smith 2016, p. 100.
[44] Ibid., p. 96.
[45] See Brassier 2007, pp. 126 f.
[46] Laruelle 2011a, p. 113: '*La NP [non-philosophie] oppose à l'idéalité non pas un réel empirique et encore philosophique mais le Réel immanental qui est déterminé par les deux principes capable de générer une objectivité indirecte.*'
[47] Id. 2015a, p. 124: '*l'Un idempotent*'.
[48] Weyl, *Symmetry*. Princeton: Princeton University Press, 1952, p. 132.

For proving the structural homology of philosophy of difference and non-philosophy, it is necessary to rethink basic concepts by approaching the latter from a category-oriented perspective, according to which there is nothing but arrows, that is, morphisms and automorphisms (that is, objects). It is a matter of de-emphasizing the primary role of the category of sets and functions, an enterprise that is not easy to realize, since both use different sorts of formalisms: the category of philosophy of difference is based on objects such as intensive or conceptual manifolds and sets, while the category of non-philosophy is based on objects such as onto-vectorial Hilbert spaces. As sets equipped with extra structure (addition and multiplication), they look very different, but in fact there is a deep analogy between the two. Moreover, this analogy operates at the level of category-concepts. Sets and functions capture many basic intuitions about *macroscopic* objects, and the rules governing them have been incorporated into the foundations of Badiou's subtractive ontology of the void. From that point of view, one would tend to say that any generic quantum system of thought has a *set* of states. Indeed, such a set of states can be attributed to an onto-vectorial system of Hilbert spaces. For instance, in *The Last Humanity*, Laruelle distinguishes 'two states of the generic object, its real state called "aleatory subject", received from virtual possibilites (non-philosophy as "prepared philosophy"), and its state indexed as a clone to the universe dimension, a state called "in-the-last-humanity" and given as the final measure of the humans'[49]. However, this might be more misleading than productive, because this process seems not to define a 'well-behaved' map – or more precisely, a functor – from the generic matrix category to the set-theoretic matrix category. In some sense the gap between the first and the second is too great. However, many of the ways in which the former differs from the latter are ways in which it resembles to the differential matrix category. This suggests that the interpretation of the non-commutative 'algebraic logos as a complex number'[50] will become easier, not harder, when one succeeds in merging it with the differential logos (see the 'propagator' or 'spectral element' as the new differential element in section 3.3., 'The Spectral Point of View on Ontology'). In particular, it is easy to draw diagrams of the objects and morphisms of the category of differential ontology. Doing so lets one *visualize* many features of non-commutative thought.[51] This is implicit in the theory of Feynman diagrams. Whenever Laruelle refers to Feynman diagrams by speaking of generic 'Feynman histories' of 'the messianic vector'[52], and of quantum superposition with an infinity of attributes or of interfering 'Feynman paths' (path integral)[53], it is about a category-concept where the morphisms are Feynman diagrams, i.e., graphs with labelled edges and vertices.

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[49] Laruelle 2015a, p. 85: '*Il faut distinguer conformément à l'esprit quantique deux états de l'objet générique, son état réel nommé "sujet aléatoire" obtenu à partir de possibilités virtuelles (la non-philosophie comme "philosophie préparée"), et son état indexé comme clone à la dimension d'Univers, état nommé "en-dernière-humanité" et donné comme la mesure finale des humains.*'

[50] Id. 2015a, p. 126: '*le logos algébrique comme nombre complexe*'.

[51] See Mullarkey 2006, pp. 157–186, and Gangle 2016.

[52] Id. 2015d, p. 233; cf. id. 2014, p. 325.

[53] See id. 2010a, p. 331; id. 2014, pp. 231, 254; id. 2015d, pp. 158, 176; id. 2015a, p. 189.

By assuming that a philosophical, i.e., 'intensive or conceptual', space[54] is considered as a $(n-1)$-dimensional manifold and that a '*uni-versal* "space-time"'[55] is a cobordism between such 'intellectual or sensible'[56] manifolds, a theory of structural homology consists of a map assigning an onto-vectorial Hilbert space of states to any $(n-1)$-manifold and a linear operator to any cobordism between such manifolds. This map cannot be arbitrary, though it must be a functor from the category-concept of n-dimensional cobordisms to the category-concept of onto-vectorial Hilbert spaces. This is an example of *how a sufficiently good analogy* – not in the Deleuzian sense but conceived as 'a structural homology'[57] – *can become a functor*. As Gangle points out:

> What Deleuze rejects is the notion of analogy that would depend on an external recognition of commonality. The diverse solutions to a common problem express that problem precisely by diverging from one another only at the level of what can be externally noted. Their iconic commonality is thus less an actual similarity than a virtual vicinity within an otherwise aleatoric distribution.[58]

What is the differential matrix category in comparison to the generic matrix category? First, such a category-concept consists (as we have seen above) of a collection of objects and of a collection of morphisms $f: A \to B$ from any object A to any object B, a rule for composing morphisms $f: A \to B$ and $g: B \to C$ to obtain a morphism $g \circ f: A \to C$, and for each object A an identity morphism $1_A: A \to A$. These must satisfy the associative law $f \circ (g \circ h) = (f \circ g) \circ h$ and the left and right unit laws $1_A \circ f = f$ and $f \circ 1_A = f$ whenever these composites are defined.

Traditionally, the objects of a category-concepts would be best thought of as set-theoretic concepts equipped with an additive and multiplicative structure (given that two operations or principles form a system), while the morphisms are functions preserving this structure. However, this is true neither for the the generic matrix category nor for the differential matrix category. In the generic matrix category the objects are onto-vectorial Hilbert spaces and the morphisms are bounded linear operators. Composition and identity operators are defined as usual. Onto-vectorial Hilbert spaces are indeed Cantorian concepts equipped with an additive and multiplicative structure, but bounded linear operators do not preserve all the structure: in particular, they need not preserve the inner product between two operators.

In the differential matrix category we take the objects to be $(n-1)$-dimensional intellectual or sensible multiplicities and the morphisms to be cobordisms between these manifolds. Here the morphisms are not functions. Nonetheless one can compose two cobordisms. The composition of cobordisms satisfies the associative law. Furthermore, for any $(n-1)$-dimensional multiplicity representing intensive or

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[54] Cf. Gangle 2016, p. 239.
[55] Laruelle 2013b, p. 211; cf. id. 1996, p. 257.
[56] Cf. id. 2013b, p. 281; cf. id. 1996, p. 344.
[57] Cf. Jedrzejewski 2007, p. 58: '*Dans les sciences exactes, l'analogie est très souvent une homologie structurale.*'
[58] Gangle 2016, p. 190.

conceptual space, there is a cobordism called the 'identity' cobordism, which represents a *passage of time* during which the philosophical space remains constant.

Classical logic	**Topo-logic-oriented theory**	**Quantum-oriented theory**	**Category-oriented theory**
proposition X	$(n-1)$-dimensional manifold X (philosophical space)	onto-vectorial Hilbert space X (generic quantum states, system)	object X
proof between propositions $f: X \to Y$	cobordism between $(n-1)$-dimensional intensive or conceptual manifolds $f: X \to Y$ (topological space-time)	operator between onto-vectorial Hilbert spaces $f: X \to Y$ (generic quantum process)	morphism $f: X \to Y$
conjunction of propositions: $X \otimes Y$ (composition of proofs)	disjoint union of $(n-1)$-dimensional manifolds $X \otimes Y$ (composition of cobordisms)	onto-vectorial Hilbert space of joint system: $X \otimes Y$ (composition of operators)	tensor product of objects: $X \otimes Y$
proofs carried out in parallel: $f \otimes g$	disjoint union of cobordisms: $f \otimes g$	parallel processes: $f \otimes g$	tensor product of morphisms: $f \otimes g$
conditional proposition $X \multimap Y$	disjoint union of orientation-reversed X and Y: $X^* \otimes Y$	onto-vectorial Hilbert space of 'anti-X and Y': $X^* \otimes Y$	internal hom functor: $X \multimap Y$

TABLE. Analogies between classical logic, topo-logic-oriented theory ('postmodern' philosophy), quantum-oriented theory ('contemporary' philosophy), and category-oriented-theory ('semi-classical' philosophy).[59]

[59] Cf. Baez, 'Physics, Topology, Logic and Computation: A Rosetta Stone' (2009), p. 66: arXiv:0903.0340v3.

A functor between category-concepts is a map sending objects to objects and morphisms to morphisms, preserving composition and identities. Thus, saying that a theory of structural homology is a functor from the differential matrix category to the generic matrix category merely means that it assigns an onto-vectorial Hilbert space of states to any $(n-1)$-dimensional manifold and a linear operator to any n-dimensional cobordism. That is an analogy between category-concepts describing philosophical space and *'uni-versal* "space-time"'[60] and those describing quantum and generic states and processes. Treating a theory of structural homology as a functor from the differential matrix category to the generic matrix category is a way of making precise some of the analogies between Deleuze's philosophy of difference and Laruelle's non-philosophy. A theory of structural homology is more than just a functor. It must also be compatible with the monoidal structure of both category-concepts, and it must also be compatible with their involutive categorial structure.

One use of category-concepts is to organize the discourse about various sorts of objects such as generic matrices, onto-vectorial spaces, etc. These objects are categories of set-theoretic concepts equipped with extra structure and properties. Here structure means additive and multiplicative operations, while properties mean axioms that these operations and relations are required to satisfy. To build a category-concept of onto-material and onto-vectorial objects, one must also define morphisms between these objects. When the objects are categories of set-theoretic concepts equipped with extra structure and properties, the morphisms are taken to be functions that preserve the extra structure. We could make this more general, since we can also build categories by equipping not categories of set-theoretic concepts but objects of other category-concepts with extra structure and properties. For taking an example slightly different from the category of onto-vectorial *Hilbert* spaces: the category of *all complex* onto-vectorial spaces.

On the one hand, a *complex onto-vectorial space* is a Cantorian concept equipped with extra structure consisting of operations called addition and scaling or scalar multiplication plus extra properties (commutativity, associativity, identity, inverse for addition, associativity and a unit law for scalar multiplication, distributivity of that same multiplication over addition). Given two different onto-vectorial spaces, a linear operator connecting them can be defined as a function preserving all the extra structure. The category of onto-vectorial spaces has complex onto-vectorial spaces as its objects and linear operators between them as its morphisms. On the other hand, an onto-vectorial *Hilbert* space is a set-theoretic concept equipped with all the additive and multiplicative structure of a complex onto-vectorial space but also (at least) one more, namely an inner product. The inner product of two operators gives a composite process. Similarly, it has all the properties of a complex onto-vectorial space but also some more. Given onto-vectorial Hilbert spaces, a function that preserves all the structure is thus a linear operator that preserves the inner product. Such an operator is called an *isometry.*

[60] Laruelle 2013b, p. 211; cf. Id. 1996, p. 257.

The category of onto-vectorial Hilbert spaces is defined as having onto-vectorial Hilbert spaces as objects and isometries as morphisms. Unitary operators are always isometries, but self-adjoint operators (see below paragraph 3.2., 'Infinitesimal Variables and Compact Operators'), for example, are not. The alternative is to work with the generic matrix category whose objects are onto-vectorial Hilbert spaces and the morphisms are bounded linear operators. However, this leads to a puzzle: In a precise technical sense, the category of finite-dimensional onto-vectorial Hilbert spaces and linear operators between these is equivalent to the category of finite-dimensional complex onto-vectorial spaces and linear operators. So, in defining this category, one might as well ignore the inner product entirely. The puzzle is thus what role, if any, the inner product plays in this category.

The category of all onto-vectorial Hilbert spaces and bounded linear operators between them is not equivalent to the category of all complex onto-vectorial spaces and linear operators. However, it is equivalent to the category of 'Hilbertizable' onto-vectorial spaces – that is, onto-vectorial spaces equipped with the language of an algebraic logos coming from an onto-vectorial Hilbert space structure – and continuous linear operators between them. So, in defining this category, what matters is not the inner product between operators but merely the algebraic logos that it gives rise to. The point is that bounded linear operators do not preserve the inner product, just the language of the algebraic logos, and a structure that is not preserved might as well be ignored, as far as the category is concerned. A solution for this puzzle is: The inner product is inessential in defining the category of onto-vectorial Hilbert spaces and bounded, i.e., finite, linear operators. However, it plays a crucial role in transforming this category into an involutive category.

What is an involutive category? To transform the category of onto-vectorial Hilbert spaces into an involutive category we define for any bounded linear operator an adjoint operator. The inner product on both categories are required to define the adjoint. In fact, the inner product on every onto-vectorial Hilbert space can be completely recovered from the involutive category structure of the category of onto-vectorial Hilbert spaces C. Given an onto-vectorial Hilbert space $\mathcal{H}$ and a vector in that space, there is a unique operator from the category to the quasi-Hilbertian space. Conversely, any operator from the category to the quasi-Hilbertian space determines a unique vector in that space. So, we can think of elements of an onto-vectorial Hilbert space as morphisms from the category to this quasi-Hilbertian space. The inner product of two operators gives a composite process: the first operator describes 'the process of *preparing* the system to be in the state one', while another involutive operator describes the process of '*observing* the system to be in the state two'. Given this, the inner product of both operators should describe the process of first preparing the system to be in the state one and then observing it to be in the state two. This composite process is related to the *transition amplitude*. Moreover, 'observation' is like a time-reversed version of 'preparation'. Instead of binary truth values describing whether or not a transition is possible, complex numbers describe the amplitude with which a transition occurs (thus, it is a question of probability).

Category-oriented theory is suitable for the topology of little dimensions or non-commutative probabilities. But instead of assigning to it a classical ontological meaning for getting a fresh view on the comprehension of the 'World' (correlate of modern knowledges) and of Being, it is a matter of considering a non-commutative ontological sense or use of category-concepts offering a new insight into the meaning of generic 'matrix mechanics'[61].

[61] Cf. Connes, *Géométrie non commutative*. Paris: Dunod, 2005, 14: 'Heisenberg replaced classical mechanics, in which the observable quantities commute as a couple, by *matrix mechanics*, in which observable quantities, as important as the position and the momentum, no longer commute. ('*Heisenberg a remplacé la mécanique classique, dans laquelle les quantités observables commutent deux à deux, par la* mécanique des matrices, *dans laquelle des quantiés observables aussi importantes que la position et le moment ne commutent plus*'.)

2.4. Tropical Philosophy

The tropical analysis of the generic matrix category is related to a quasi-classical subcategory which, as an attempt of unification, offers a new semi-philosophical perspective on non-philosophy. Tropical analysis is the result of a dequantization of the generic matrix category, as the quadripartite constant of Laruelle corresponding to 'a quadruple a priori postulation of reality, of exteriority, of stability, and of unity that together constitute the *real object*, the a priori condition of the object of knowledge'[1] or 'the "real object" in an "object of knowledge" (finite product of the process)'[2], and the 'Being-in-the-last-instance'[3], tends to zero by taking *entirely* imaginary values. '*The "imaginary" invention of the means* [...] in semi-circuits of production'[4], is completed here with the 'tropical' invention of means in 'semi-rings' of production. (For the complex lift of tropical philosophy see paragraph 4.4., 'Subtropical Philosophy'.)

2.4.1. The Tropical Correspondence Principle

The basic paradigm of the tropical analysis of the generic matrix category is expressed in terms of a *tropical correspondence principle*. This principle is similar to the correspondence principle of Bohr in quantum physics. This way, there is a heuristic correspondence between solutions over the 'transcendental field'[5] which can be treated as a quantum object isomorphic to 'the algebraic logos as a complex number'[6], and analogous constructions over an 'immanental semifield' or 'semiring' examined as a 'classical' or 'semi-classical' object. A 'semifield' or 'semiring' is called 'immanental'[7] if its algebraic operations, the addition $\oplus$ and the multiplication $\odot$, are idempotent[8] or 'tropical', that means (in the most general sense):

$$a \oplus b = \min\{a, b\}$$

$a \odot b = a + b$ for arbitrary elements a and b, and the usual addition $+$.

Laruelle is always in search of the 'lower bound' (infinum) and the smallest possible but necessary minimum quantity (the generic quantum). Therefore he characterizes the 'operatory process' of 'this algebraic system' as 'a *minimum* logos, the necessary *minimum* of calculation or of possible language'[9] and the 'quantum of life' or 'of lived (experience)' as follows: 'the formula of non-separability [...] is also the irreducible

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[1] Laruelle 2016, p. 67; cf. id. 1992, p. 92.
[2] Id. 2016, p. 70; cf. id. 1992, p. 96.
[3] Cf. id. 2015a, pp. 164–8.
[4] Id 2010a, p. 143: 'L'invention "imaginaire" des moyens'; '*dans des semi-circuits de production*'.
[5] See Deleuze, *Logique du sens*. Paris: Éditions de Minuit, 1969, pp. 124, 133; Sartre 2003, p. 96; Laruelle 1996, p. 257, and id. 2013b, p. 211; id. 2010a, p. 12.
[6] Cf. Laruelle 2015a, p. 126.
[7] Cf. id. 2010a, p. 54.
[8] See appendix.
[9] Cf. Laruelle 2015a, p. 131.

minimum, impossible to break or to mix, a quantum of life which tolerates a difference, more precisely a quantum of life which suits the only human in what will be her/his... function of the-last-instance.'[10] Laruelle continues to explain: 'There is a threshold of humanity, a "Planck humanity" below which one cannot descend since its inferior limit is fixed by what we call the generic indexation.'[11] The generic matrix is also characterized as 'an undulatory semiring'[12] being the unit of measurement for undulatory phenomena, whereas the tropical 'semiring' is no longer indexed to the generic constant (as it tends to zero). As becomes apparent here, the idempotent formula Laruelle makes use of in 'Philosophy V' (2008–), $1 + 1 = 1$ or $A + A = A$, defining, above all, the 'generic alliance of science and philosophy'[13], is much more than 'simply a more verbose way of stating $1 = 1$'.[14] In *Principles of Non-Philosophy* Laruelle already refers to the 'logical identification of science and philosophy' as an interpretation 'which we must be careful to avoid': 'the One being understood, in its effect, as a formal identity of the $A = A$ type, apparently opposing itself to hierarchy and effacing all difference. The theme of equality or peace between science and philosophy always risks being interpreted in terms of an equality through logical identity'.[15] The generic indexation to one of the variables, either philosophy or science, in accordance with the rule of idempotence gets the following explanation in *The Last Humanity*:

> It is a simple or unilateral duplication of the lived (experience) [...], there are not two lived experiences [...], but a single one in two positions or halfs [...]. The variable that will play this double game is divided in two functions, as a variable that is internal to the matrix of fusion and as an index [...]. 2 fuse in 1 for the matrix and 1 is divided in 2 for the generic. The generic is the One, always One but in two halfs, [...] in idempotence.[16]

Here we have an example of an idempotent space corresponding to the concept of a linear space as a complex field (i.e., the 'generic plane'[17]) – so to speak a 'tropical' philosophy that manifests itself in parallel with non-philosophy. According to Connes it was Marcel Paul Schützenberger who introduced the term 'tropical' in geometry in hommage to the Brazilian mathematician Imre Simon.[18] Moreover, with a worried look towards Brazil at the actual hate campaign of the presidential candidate Jair Bolsonaro against indigenous people, Afro-Brazilians, homosexuals and artists, the quasi-critical and political potential of the proposed 'tropical' paradigm also sympathizes with '*Tropicália*', that is, maybe the most important South American politico-cultural

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[10] Cf. 2015a, p. 141.
[11] Cf. 2015a, p. 144.
[12] Cf. id. 2010a, p. 23.
[13] Cf. ibid., p. 71.
[14] Galloway 2014, p. 238.
[15] Laruelle 2013b, p. 53; cf. id. 1996, p. 63.
[16] Cf. id. 2015a, pp. 128 f.
[17] Cf. id. 2010a, p. 58.
[18] Cf. Connes, 'Geometry and the Quantum', Lecture 2/2, January 26, 2017, Collège de France, Min. 06:20-07:07, available at: https://www.college-de-france.fr/site/en-alain-connes/course-2017-01-26-15h45.htm.

movement of the last 50 years. This 'commutative shadow' has nearly the same relation to the quantum-oriented theory as classical physics to quantum physics (see figure below). In many ways, tropical analysis is simpler than the generic matrix category. However, the transition from non-classical concepts and results to their 'quasi-classical' analogues is non-trivial. (There is no direct deduction, a 'topos' will be needed as a bridge, see paragraph 4.4., 'Subtropical Philosophy'.)

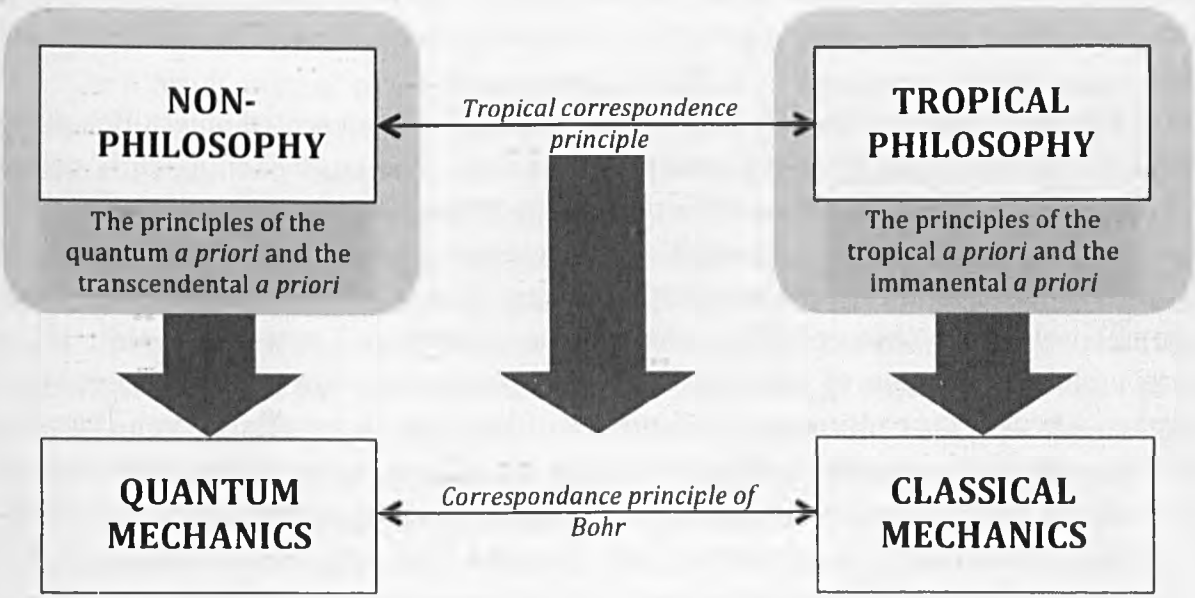

FIGURE. Relations between non-philosophy and tropical philosophy

A pivotal role in the development of non-philosophy is played by the *generic correspondence principle*, that is an important methodological principle in the Laruellean undertaking of establishing a consistent 'science' of philosophy. Parallel to Kant's philosophy seen as an attempt to provide satisfactory philosophical grounds for the objective basis of Newton's mechanics against Humean scepticism, Laruelle tries to deduce quantum consequences for a generic basis of quantum mechanics against the sufficiency of the commutative paradigm. Kant maintains that classical mechanics is in accordance with the transcendental conditions for objective knowledge, while Laruelle postulates that quantum mechanics is in accordance with the immanental conditions for generic knowledge. 'This is so', as James points out, 'because consciousness is no longer constitutive of experience and knowledge (in, for example, the transcendental unity of apperception). Rather, the One of the immanent real is the cause, condition and ultimate determining instance for all consciousness, experience and knowledge.'[19] The objective of regarding quantized concepts as, among other things, a rational generalization of classical 'macro-philosophical' concepts leads to the formulation of the generic correspondence principle formalized as a non-epistemological tool, whose main purpose

[19] James 2012, p. 171.

within the context of Laruelle's immanental approach is the generic quantum entanglement of immanence and experience. We could think that non-commutative ontology consists simply in a rational generalization of classical ontology by assuming that the philosophical coordinates no longer commute. However, if non-commutative ontology would be just a rational generalization of conventional ontology to the case where the variables do not commute, it might not be very interesting. What can be deduced from Laruelle's assumption of a spectral quantum is that non-commutative ontology, by simple non-commutativity, generates its own time, that is, changes over time. (For further details, see paragraph 3.4., 'Non-Commutativity and the Emergence of Time'.)

In non-philosophy classical philosophy functions as a referential object. However, the use of standard philosophical measures (position, relation, meaning, truth, value, etc.) is not the same in non-philosophy as in classical philosophy. On pains of inconsistency, the traditional philosophical concepts or measurements must be given a suitable non-philosophical re-interpretation, before they can be employed to describe onto-material and onto-vectorial phenomena. Therefore, non-philosophy is a nonreversible translation of classical, traditional philosophy into a non-philosophical language. Laruelle's quantum-oriented theory of philosophy introduces non-classical concepts such as the generic quantum of action, spin ('"quarter turn" (Lacan)'[20]: 'When two particles are in superposition, when one particle spins the other particle also spins in an opposite and equal way, meaning that the spin is always balanced between the two'[21], as Smith points out), etc. in the spirit of the correspondence argument.

The analogy with quantization that has motivated the tropical correspondence principle can be explained as follows: Laruelle's minimal constant having the dimension of an *action* plays the role of a discrete 'lived quantum' or of a 'threshold of humanity' as a qualitative, not a quantitative, equivalent of the quantum of action or of the Planck energy[22]. The core of tropical dequantization is a family of semifields indexed to the generic constant α which the semifield operations continually depend. In fact, the tropical dequantization corresponds to the conventional dequantization (but for imaginary values of the Laruelle constant), that means that it is related to a logarithmic transformation used in quantum physics by Erwin Schrödinger with respect to the state or probability function (in this first paper Schrödinger[23] introduces the wave function: for a critique of Laruelle's generic adaption of that term, see below paragraph 3.1., 'The Particle Picture of Philosophy'), and in experimental cognitive psychology by Stanislas Dehaene in reference to the link between the arithmetic (the discrete) and the geometric (the continuous) in numerical intuition. Ordinary human intuition follows a *logarithmic* scale. For example, when we compare sets, sizes or weights (1-1, 1-2, 1-4, 1-8, etc.), men think logarithmically. Dehaene discovered that the mapping of numbers onto space

[20] Cf. Laruelle 2015a, p. 21.
[21] Smith 2016, p. 164.
[22] Laruelle 2015a, pp. 35, 135, 141-150.
[23] Cf. Schrödinger, Erwin, *'Quantisierung als Eigenwertproblem (Erste Mitteilung)'*, *Annalen der Physik* 79, 1926, pp. 361-76.

is a universal intuition and that this initial intuition of numbers is *logarithmic*: 'The concept of a linear number line appears to be a cultural invention that fails to develop in the absence of formal education.'[24] The linear scale seems to be secondary, since culturally driven. The logarithmic method is more intuitive, and the result of primate evolution. Education teaches us linear scaling. Dehaene and his colleagues refer to the so-called 'Weber-Fechner law'. The physiologist Ernst Heinrich Weber realized already 170 years ago that the intensity of our perceptions is logarithmic in relation to the intensity of the sensory stimulus. The logarithmic scale is more compact than a linear one.

As a result, instead of resorting to the procedure of transition to the classical limit by letting the minimal constant tend to zero, we move on to imaginary values for the generic constant by a change of variables that reduces the non-commutative 'algebraic logos as a complex number'[25] in non-philosophy to a *commutative subalgebraic logos as a tropical number*. The term 'tropicalization' means dequantization in this sense. By applying the terminology of quantization to this deformation, the transcendental field can be interpreted as a quantum object and the immanental semifield as a dequantized semi-classical object. The generic matrix category appears as a quantum version of its tropical analysis, which in turn gives the latter an important role. In other words, 'tropical philosophy' is an asymptotic version of non-philosophy. Non-philosophical properties turn into 'quasi-philosophical' constructions. Therefore, it is 'natural' to expect that a *non-linear* property or construction on the quantum field can be treated as *linear* over the tropical semifield and to consider the semiclassical limit as a solution to a standard philosophical problem. This argument (obviously a heuristic one) can be extended to constructions of a more general form, that is a strict treatment of the linearity of tropical, immanental semifields.

2.4.2. The Tropical Superposition Principle

The analogy with quantum physics is not limited to the correspondence principle. The quantization of the traditional philosophical predicates treated as 'macroscopic' leads to the 'microscopic' states in an onto-vectorial system. The properties and the constructions of the 'quantum or non-Cantorian ontology'[26] are considered as 'linear'. That is the *generic superposition principle*. The concept of superposition of states is associated with the conceptual linearity of Laruelle's theory and 'formula of invention', that is the fact that the states of any system described by onto-vectorial operators of an abstract philosophical space add up and combine with each other according to the rules of a simple linear algebraic logos.

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[24] Dehaene, Stanislas, Véronique Izard, Elizabeth Spelke, and Pierre Pica, 'Log or Linear? Distinct Intuitions of the Number Scale in Western and Amazonian Indigene Cultures', Science 30 May 2008: Vol. 320, Issue 5880, pp. 1217-20. See also Dehaene, *The Number Sense: How the Mind Creates Mathematics*, Revised and Updated Edition, New York: Oxford University Press, 2011.

[25] Cf. Laruelle 2015a, p. 126.

[26] Cf. id. 2011a, p. 150.

Conventional knowledges, e.g. the 'macroscopic' transcendentals of philosophy (such as Being, One, Other, Multiplicity, etc.) and classical philosophical methods are non-linear in the non-standard sense. However, they are linear over immanental semifields. That is the *tropical superposition principle* indicating that there are non-linear (i.e., classical philosophical) problems over onto-vectorial quantum fields which prove to be linear over appropriate tropical semirings or semifields. The linearity of philosophical properties over immanental semifields, as the result of the tropical dequantization of quantum and generic constructions, is closely linked to the linearity of non-classical states and can be deduced from this linearity. In other words, the linearity of Laruellean predicates implies the linearity of analogous constructions in a 'semiclassical quasi-philosophy'. This linearity simplifies considerably the explicit construction of solutions. It is therefore possible to borrow standard ideas and methods of the non-linear philosophical analysis and to apply them to a new linear domain. The tropical superposition principle leads to a unified approach to various problems with discrete or continuous spaces by embracing both 'a principle of continuity and continuous evolution' and 'a principle of discretion of the lived for all living beings' [27] as suggested by Laruelle. A systematic application of the tropical superposition principle allows to provide linear solutions of a commutative subalgebraic logos to non-linear problems of the non-commutative algebraic logos by means of semi-philosophical methods.

The methods of tropical analysis of the onto-vectorial paradigm of thought will enable us to treat certain standard philosophical problems that have this property of non-linearity in the non-standard philosophical space. The strategy is as follows: we have a question in non-philosophy whose answer is supposed to be found over the transcendental field of the non-commutative algebraic logos. Then we establish an analogous question in tropical analysis over the immanental semifield of the commutative subalgebraic logos and show that the answers to these two questions coincide. Finally, we deal with the tropical or quasi-philosophical question which is simpler to answer.

2.4.3. Semiadditive Category-Concepts and Characteristic One

The conceptual meaning of working 'in characteristic one' (i.e., on idempotent condition: $1 + 1 = 1$) is directly connected to the tropical analysis of the generic matrix category and tropical philosophy. The term 'additively idempotent' used in quantum-oriented theory is a synonym for 'characteristic one'. Why do we have to look at the algebraic logos of a tropical or immanental semifield, also called 'tropical logos', and its specialization to 'characteristic one'? The explanation lies in the concept of 'semiadditive category' having the property that every morphism has an additive inverse. Semifields occur 'naturally' in semiadditive category-concepts. The immanental semifield of the algebraic logos as a tropical integer has a multiplicative group which is infinite cyclical.

[27] Cf. id. 2015a, p. 55.

According to Alain Connes and Caterina Consani, 'there is only one finite semifield which is not a field, and moreover while there is no field whose multiplicative group is infinite cyclic, there is a unique semifield with this property'[28]. The tropical semifield is of characteristic one, i.e., the multiplicative unit 1 is idempotent for the addition and fulfills the equation: $1 + 1 = 1$. The 'tropicalization' is obtained by applying the logarithmic transformation to the coefficients using the simple correspondences

$$+ \longrightarrow \vee, \times \longrightarrow +.$$

We define two functors $\oplus$ and $\odot$, which are the equivalents of the operators 'or' and 'and' in natural language: $\oplus$ stands for the 'greatest lower bound' (infimum) of the relation of implication and $\odot$ for 'the least upper bound' (supremum).

The structure of a transcendental field of 'characteristic one' is a limit case called 'immanental semifield'. So performing tropical philosophy means to replace the transcendental field by the immanental semifield. This latter structure is defined as the locally compact (see paragraph 3.2., 'Infinitesimal Variables and Compact Operators') idempotent space (the 'tropical half line') endowed with the ordinary product and a new, idempotent addition $x \oplus y = \min\{x, y\}$ that appears as the limit case of the conjugates of ordinary addition by the 'power maps'[29] $x \mapsto x^h$, when $h \to 0$, that is, Laruelle's immanental equivalent of the Planck constant tends to zero. The parameter h of the dequantization coincides with $i\hbar$, where $\hbar$ is the (reduced) generic constant; so in this case $\hbar$ must take imaginary values (because $h > 0$). The immanental semifield is trivially isomorphic to the algebraic 'max-plus' system, by means of the logarithmic map $x \mapsto \log x$ (cf. Schrödinger or Dehaene). The process that allows us to view the local semifield as a result of a deformation can be called 'dequantization' and be described as a semiclassical limit. In the limit $h \to 0$, the usual algebraic rules on the idempotent space or 'tropical half line' deform to become those of the immanental semifield.

The category of immanental quasifields of characteristic 1 can be called 'degenerate'. A category is 'degenerate' if all its objects are isomorphic, which is to say that it only has one object, in the sense that identity is always 'up to isomorphism'.[30] A thorough investigation of this 'degeneration' of the infrastructure of transcendental fields in the limit case of characteristic one, points out to a very interesting link between the tropical analysis of the generic matrix category ('tropical philosophy') and its infrastructure of a degenerate ontology of characteristic one obtained as the limit case of ontologies over (finite, commutative) transcendental fields. Immanental semifields of characteristic one provide a framework for an ontology of characteristic one (see Chapter 4., 'Homological Ontology in Characteristic One').

In contrast to a field, a semifield does not require that each element must have an additive inverse. A semifield is a sort of field, but without subtraction. The immanental (commutative) semifield of characteristic one, which can also be characterized as a

[28] Connes and Consani, 'Geometry of the scaling site' (2016), p. 39: arXiv:1603.03191v1.
[29] Id., 'The Riemann-Roch strategy: Complex lift of the Scaling Site' (2018), p. 14: arXiv:1805.10501v1.
[30] Badiou 2014, p. 64.

'Boolean' semifield (and as a commutative or tropical shadow), is the degenerate version of the transcendental field of the algebraic logos as a tropical number. According to Gödel numbers could represent any kind of structure.[31] The 'infinitesimal numbers' (in the sense of Gottfried Wilhelm Leibniz, see also below section 3.2., 'Infinitesimal Variables and Compact Operators') represent empirico-transcendental structures, according to Hermann Cohen. Laruelle succeeds in the 'arithmetization' of 'the algebraic logos as a complex number'[32]. The imaginary number $\sqrt{(-1)}$, as Nagel and Newman say, can 'be defined as an ordered pair of integers (0,1) upon which certain operations of "addition" and "multiplication" are performed'[33]. An 'arithmetic' statement such as '1 + 1 = 1' cannot be exhibited (in the manner of *Principia Mathematica* of Whitehead and Russell [1910-1913][34]) 'as a condensed transcription of a statement containing only expressions belonging to general logic'[35]. Such a statement which is not purely logical cannot be shown to be deducible from certain logical axioms (the Frege-Russell reduction of arithmetic to logic). The immanental idempotent semifield is represented by tropical numbers, given that 'numbers are a universal medium for the embedding of patterns of any sort'[36].

Why do we have to consider semirings? An Abelian category-concept[37] has the 'natural' property of being semi-additive. That is, we take a category-concept, we suppose that this concept has finite products and coproducts (that is the dual including inverse morphisms), and a zero, that means that it has an element that is both initial and final. In this case, we have a natural morphism which goes from the coproduct of two objects to the product of two objects. The reason is, for having a morphism of a coproduct to something, it suffices to give two morphisms and that one can give the two morphisms because we have the zero arrow. The 'natural' hypothesis[38] is that these maps are isomorphisms. That is the concept of a semi-additive, i.e. Abelian, category-concept.

One has never only one morphism, but always two. One thinks of a couple of morphisms. One thinks of $f - g$, of the difference between f and g (distance between conceptual points, difference between 'state vectors', coherence element: see below 3.3.1., 'The Spectral Element of Consistency'). The composition rule of morphisms is only possible because the category-concept is semiadditive (by having the property that every morphism has an additive inverse.). Otherwise we would not have any means to add the morphisms, and we could not compose the pairs of morphisms (monoidal category-concepts). We can do so only because the categorial concept is semiadditive.

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[31] Nagel and Newman 2001, p. xviii.
[32] Laruelle 2015a, p. 126.
[33] Nagel and Newman 2001, p. 42.
[34] Whitehead, Alfred North, and Bertrand Russell, *Principia Mathematica*, Vol. 1-3. Cambridge: Cambridge University Press, 1925 and 1927, available at: https://archive.org/details/PrincipiaMathematicaVolumeI/page/n0, https://archive.org/details/PrincipiaMathematicaVol2/page/n0, https://archive.org/details/PrincipiaMathematicaVol3/page/n0.
[35] Nagel and Newman 2001, p. 43.
[36] Ibid., p. xix.
[37] See appendix.
[38] See Mac Lane 1998.

The real conceptual comprehension is the *Hilbertian analogy*. The *Galoisian connection* is a special case of the adjoint functors. An idempotent adjunction means that we have $f = f\,g\,f$ and $g = g\,f\,g$. g is the adjoint, that is $g = f^*$. Thus, there is an analogy with the onto-vectorial Hilbert space, when we compare the Galoisian connection with the latter: $u = u\,u^*\,u$. f and g act in the same space. Normally, if you take a dual of a philosophical space, there is no relation between the space and its dual. Here, there is a relation. We can talk about the dual f^* in the same philosophical space (which is great since we are looking for a space for both the discrete and the continuous). That permits us to compose f with g, and to have these identities.

The real of non-philosophy is an *immanental logic* that 'deduces' the algebraic property of idempotence of the real from the lived experience. Laruelle states that this property became an operator whose real is its own neutralized form and lived experience. That is Laruelle's *ontology of idempotence* or of 'characteristic one', that is, 'a sub-ontology, an onto-(logy) (simplified and without doublet) of addition or superposition [...], *an ontology of neutralization, transformation and non-capitalistic sterilization of the philosophical surplus value*', a 'Logos which became silent and clandestine – Stranger'[39].

[39] Cf. Laruelle 2011a, pp. 115 f. See also id. 2008, p. 32.

3. NON-COMMUTATIVE ONTOLOGY AND SPECTRAL VARIABILITY

3.1. The Particle Picture of Philosophy

If we take seriously the 'particle picture' that Laruelle draws of philosophy by considering 'the philosophical space'[1] as a microscopic and 'quantized' system of thought, we cannot continue doing what could be called the 'continuism'[2] of conventional philosophy such as, for example, the 'biological continuism'[3] of Peter Singer, Tom Regan, Mary Midgley, and others. Since, according to Laruelle, most of the philosophical hypotheses, including the 'differential' one since Leibniz and the 'transcendental field'[4] of Sartre, Deleuze and other philosophies, suffer from 'a vicious desease': their solutions presuppose a 'philosophical continuum'[5] representable by the real number line, as has been shown by Gödel[6], and tolerate, moreover, 'macroscopic distances (the pilot and her ship, the soul and the body), or asymptotic approximations'[7]. Riemann has already pointed out for geometry in his inaugural lecture in Göttingen in 1854[8] (to quote Grothendieck) 'that it may well be that the ultimate structure of space is "discrete", and that the "continuous" representations that we have constitute maybe a simplification [...] of a more complex reality; that for the human mind, it was more convenient to understand "the continuous" than the "discontinuous" and that it serves us consequently as an "approximation" to apprehend the discontinuous'[9]. There are plenty of examples which support that point of view in the history of philosophy, from the very beginning till today.[10] For instance, for *Parmenides* (*Way of Truth*) Being is homogeneous and continuous, a single, indivisible whole, a continuum without parts, at once a continuum and an atom. *Zeno*, too, assumes the undivisibility of Being. *Aristotle* asserts in what is called his 'isomorphism thesis' that

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[1] See, for instance, Laruelle 2010a, pp. 78, 165, 301, 310, 387, 426, 467, and id. 2011a, p. 135: *'l'espace philosophique'*.

[2] Cf. id. 2015a, p. 134.

[3] Ó Maoilearca 2015, p. 198.

[4] Cf. Deleuze 1969, pp. 124, 133; Sartre 2003, p. 96; Laruelle 1996, p. 257, and id. 2013b, p. 211; id. 2010a, p. 12.

[5] Cf. Laruelle 2015a, p. 150.

[6] Cf. Nagel and Newman 2001, p. xviii.

[7] Laruelle 2015a, p. 134: *'Ce continuisme [...] tolère des distances macroscopiques (le pilote en son navire, l'âme et le corps), ou des approximations asymptotiques'*.

[8] Cf. Riemann, Bernhard, *'Ueber die Hypothesen, welche der Geometrie zu Grunde liegen'*, in *Bernhard Riemann's Gesammelte Mathematische Werke und Wissenschaftlicher Nachlass*, edited by Heinrich Weber and Richard Dedekind. Leipzig: Teubner, 1876, pp. 254–269, available at: https://archive.org/details/bernardrgesamm00riemrich. Cf. *The Collected Works of Bernhard Riemann: The Complete German Texts*. Mineola, New York: Dover Publications, Inc., 2017, pp. 272–87.

[9] Grothendieck, *Récoltes et Semailles. Réflexions et témoignage sur un passé de mathématicien*, § 2.20, *'Coup d'œil chez les voisins d'en face'*, p. 67, n. 71, available at: matematicas.unex.es/~navarro/res/res.pdf: *'il se pourrait bien que la structure ultime de l'espace soit "discrète", et que les représentations "continues" que nous nous en faisons constituent peut-être une simplification* [...] d'une réalité plus complexe ; que pour l'esprit humain, "le continu" était plus aisé à saisir que "le discontinu", et qu'il nous sert, par suite, comme un[e] "approximation" pour appréhender le discontinu.'

[10] For an historic survey see Bell, John Lane, *The Continuous and the Infinitesimal in Mathematics and Philosophy*. Milano: Polimetrica S.a.s., 2006.

either magnitude, time and motion are all continuous, or they are all discrete. In Book VI of the *Categories* he applies continuity and discreteness as attributes to the category of quantity: 'how much?'. Among continuous quantities, or continua, he includes lines, planes, solid bodies, extensions, movement, time and space; whereas number and speech are examples of discrete quantities. On the basis of his definition of continuity as a relation, for him quantities are continuous due to the fact that they have a common boundary. *Descartes* distinguishes the partless mind from spatially extended, continuous and infinitely divisible matter. Under the topic 'labyrinth of the continuum' Leibniz tackles the problem, how to build a continuum from indivisible elements (the distinction between Leibniz's conception of 'infinitesimal *numbers*' and Isaac Newton's understanding of 'infinitesimal *variables*' will be crucial in paragraph 3.2., 'Infinitesimal Variables and Compact Operators'). Leibniz considers that space and time, as continua, are ideal, and anything real, first of all matter, is discrete, made of monads. His *Principle of Continuity* has been contested, of course, by quantum physics as noted by von Neumann:

> the principle of continuity (*'natura non facit saltus'*), prevailing in the macroscopic world, is merely simulated by an averaging process in a world which in truth is discontinuous by its very nature. This simulation is such that a man generally perceives the sum of many billions of elementary processes simultaneously, so that the leveling law of large numbers completely obscures the real nature of the individual processes.[11]

Kant imagines space as a continuous manifold, a *continuum*, constituted by an infinite number of points, while space imagined as a discrete manifold would be constituted by a finite, countable number of elements of that manifold. In *Kritik der reinen Vernunft* he points out:

> The property of magnitudes on account of which no part of them is the smallest (no part is simple) is called their continuity. Space and time are *quanta continua* because no part of them can be given except as enclosed between boundaries (points and instants), thus only in such a way that this part is again a space or a time. [...] Magnitudes of this sort can also be called flowing, since the synthesis (of the productive imagination) in their generation is a progress in time, the continuity of which is customarily designated by the expression *'flowing'* (*'elapsing'*). All appearances whatsoever are accordingly continuous magnitudes.[12]

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[11] Von Neumann, John, *Mathematical Foundations of Quantum Mechanics*, New Edition, Translated from the German by Robert T. Beyer, Edited by Nicholas A. Wheeler. Princeton and Oxford: Princeton University Press, 2018, p. 5. Von Neumann, Johann, *Mathematische Grundlagen der Quantenmechanik*. Berlin: Springer, 1932, p. 4: *'das in der wahrgenommenen makroskopischen Welt herrschende Prinzip der Kontinuität ("natura non facit saltus") [wird] bloß durch einen Mittelungsprozeß in der ihrem Wesen nach diskontinuierlichen Welt vorgetäuscht {wird} – dadurch, daß der Mensch meistens nur die Summe vieler Quadrillionen von Elementarprozessen auf einmal apperzipiert, so daß das alles nivellierende Gesetz der großen Zahlen die wahre Natur der einzelnen Prozesse völlig verschleiert'.*

[12] Kant 1956, pp. 223 f. (A169-70/B211-2): *'Die Eigenschaft der Größen, nach welcher an ihnen kein Teil der kleinstmögliche (kein Teil ist einfach) ist, heißt die Kontinuität derselben. Raum und Zeit sind* quanta continua, *weil kein Teil derselben gegeben werden kann, ohne ihn zwischen Grenzen (Punkten und*

By the term 'synechism' (from Greek συνεχής, 'continuous') *Peirce* relates his whole philosophy to the idea of continuity in its sense of 'being connected'. Finally, in *Nietzsche* we can find the idea that humanity is a historically continuous flow between animals and god, between the subhuman and the superhuman, put on stage in his *Zarathustra* as 'there-and-back-again' on the rope or bridge hanging over the abyss.

To all these 'solutions of continuity'[13] or 'continuist theories' Laruelle opposes 'the discretion of the quantum of lived (experience) which imposes limits to the philosophical interpretations of life' (for him, the discreteness is what limits classical philosophy and its concepts), 'and sets loose the vectoriality of life as a project'[14]. In saying that, he achieves this 'challenge' to speak 'in a qualitative way of quantum concepts'[15]: as a qualitative quantity, the 'quantum of lived experience [...] is the nonquantitative equivalent of energy or of action [...]. Despite the impression of the vague character of the lived experience as indeterminate energy', Laruelle asserts that 'it is not continuous but discrete'.[16] Therefore, speaking of 'a generic continuum'[17] in the Laruellean context might be a rather misleading choice of words. However, it should be clear by now that Galloway's claim that Laruelle has 'most avoided any kind of becoming-discrete'[18] fails to address the crux of his enterprise of quantizing thought. Besides, I have serious doubts about the link between 'virtualization' and 'becoming-analog'[19], as Laruelle speaks of 'quantware'[20] – the French term *quantiel* being a neologism that combines *quantique* (quantum) and *logiciel* (software) 'is not a matter of providing quantum theory with a philosophy, but of creating a discontinuous or non-identical thought'[21]. By means of a 'thought experiment'[22], Laruelle seeks access to an 'experimental thought'[23] that works in the quantum and generic vein. His 'discretist' argumentation, so to speak, relies justifiably on a conclusion by analogy presented in form of a rhetorical question: 'The energy is discrete, why would not the lived

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Augenblicken) einzuschließen, mithin nur so, daß dieser Teil selbst wiederum ein Raum, oder eine Zeit ist. [...] *Dergleichen Größen kann man auch* fließende *nennen, weil die Synthesis (der produktiven Einbildungskraft) in ihrer Erzeugung ein Fortgang in der Zeit ist, deren Kontinuität man besonders durch den Ausdruck des Fließens (Verfließens) zu bezeichnen pflegt.'*

[13] Laruelle 2010a, p. 401: '*solutions de continuité*'.

[14] Id. 2015a, pp. 135, 166: '*Aux théories continuistes, on opposera en priorité la discrétion du quantum de vécu qui impose des limites aux interprétations philosophiques de la vie (pour Bohr la discrétion est ce qui limite la physique classique et ses concepts), et dégage la vectorialité de la vie comme projet.*'

[15] Haroche, Serge, *Physique quantique. Leçon inaugurale* (2001). Paris: Collège de France/Fayard, 2004, p. 26: '*Parler de façon qualitative des concepts quantiques est une gageure*'.

[16] Laruelle 2015a, p. 166: '*Le quantum de vécu* [...] *est l'équivalent non quantitatif de l'énergie ou de l'action, c'est le seuil à partir duquel commence la vie pour le vivant (même pour le végétal). Malgré l'impression du caractère vague du vécu comme énergie indéterminée et sans articulation, il faut poser que ce n'est pas du continu mais du discret.*'

[17] Galloway 2014, pp. 183, 185.

[18] Ibid., p. 221.

[19] Galloway 2014, p. 199.

[20] Laruelle 2013c, pp. xxiv f.; cf. id. 2011a, p. 19: '"*quantiel*"'.

[21] Smith 2016, pp. 39, 184.

[22] Laruelle 2015a, pp. 14, 44, 91: '"*expérience de pensée*"'.

[23] Id. 2013e, p. 60; cf. id. 1998, p. 72: '*Une pensée expérimentale*'.

experience replacing it be discrete either?'[24] As for physics, James Clerk Maxwell has stated: 'By a physical analogy I mean that partial similarity between the laws of one science and those of another which makes each of them illustrate the other.'[25] Similarly, André Weil puts it in *From metaphysics to mathematics* (1960):

> Nothing is more fruitful, every mathematician knows it, than these obscure analogies, these disputes reflected from one theory to another, these secret caresses, these quarrels for no reason; indeed nothing gives the researcher more pleasure. The day comes when the illusion falls away; intuition turns into certainty, twin theories reveal their common source, before vanishing [...].[26]

Connes et al. also emphasize: 'The conceptualization and the reasoning by analogy play an essential role in mathematics'[27]. Given that Laruelle introduces 'the democracy into the interior of transcendental Logic and Aesthetic', with the result that 'Logic, as elsewhere the Aesthetic itself, escapes the disjunction of intellectual or sensible forms'[28], I assign the philosophical spatial magnitude to the general concept of quantities of intensity or of 'intension' (that is what the qualitative quantity expresses). Here, philosophical space is not subject to any 'process of subtractive purification' to obtain 'pure being'[29] like Badiou does. The 'pure' space of philosophy (not in the Kantian sense, meaning without recourse to sensual experience, exclusively based on ideas but in the abstract sense of complex onto-vectorial Hilbert spaces) is populated by conceptual or qualitative, intellectual or sensuous manifolds or multiplicities of lived experience. With regard to the concept of 'multiplicity' Deleuze points out:

> It is Riemann who has coined the notion of 'multiplicity' and of kinds of multiplicities, with respect to physics and mathematics. The philosophical importance of this notion then appears in Husserl in *Formale und transzendentale Logik*, and in Bergson in the *Essai* (when Bergson endeavours to define duration as a kind of multiplicity which is opposed to spatial multiplicities, a bit like Riemann distinguished discrete and continuous multiplicities).[30]

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[24] Id. 2015a, pp. 136, 166: *'L'énergie est discrète, pourquoi le vécu qui la remplace ne le serait-il pas ?'*

[25] Niven, W. D., *The Scientific Papers of James Clerk Maxwell.* New York: Dover, 1965, p. 156.

[26] Cf. Weil, André, *De la métaphysique aux mathématiques,* in *Œuvres scientifiques: Collected Papers,* Volume II (1951–1964). New York, Berlin, Heidelberg: Springer, 1979, p. 408: *'Rien n'est plus fécond, tous les mathématiciens le savent, que ces obscures analogies, ces troubles reflets d'une théorie à une autre, ces furtives caresses, ces brouilleries inexplicables ; rien aussi ne donne plus de plaisir au chercheur. Un jour vient où l'illusion se dissipe ; le pressentiment se change en certitude ; les théories jumelles révèlent leur source commune avant de disparaître* [...]'. See also Châtelet 1993, pp. 28 f.

[27] See also Connes, Chéreau, and Dixmier, *Le Spectre d'Atacama. Trio pour la fin du Temps,* Paris: Odile Jacob, 2018, p. 285: *'La conceptualisation et le raisonnement par analogie jouent un rôle essentiel en maths.'*

[28] Laruelle 2013b, p. 281; id. 1996, p. 344: *'la démocratie à l'intérieur de la Logique et de l'Esthétique transcendantales', 'la Logique, comme d'ailleurs l'Esthétique elle-même, échappe à la disjonction des formes intellectuelles ou sensibles'.*

[29] James 2012, p. 136.

[30] Deleuze, *Foucault.* Paris: Les Éditions de Minuit, 1986/2004, p. 22: *'C'est Riemann qui a formé la notion de "multiplicité", et de genres de multiplicités, en rapport avec la physique et les mathématiques. L'importance philosophique de cette notion apparaît ensuite chez Husserl dans* Logique formelle et Logique transcendantale, *et chez Bergson dans l'*Essai (*quand Bergson s'efforce de défenir la durée comme un genre*

Following that, Laruelle writes in '"I, the Philosopher, Am Lying": A Reply to Deleuze':

> Non-philosophy distinguishes on the one hand a philosophical multiplicity which may be of one or several types - the difference is irrelevant here because these multiplicities realize the same invariant through their variations: the invariant that demands that multiplicities be either variations (philosophy), or variables (science), or varieties (art). And on the other hand, non-philosophy distinguishes a type of multiplicity that is absolutely inconsistent or non-consistent, in the sense that it is no longer 'set-theoretical' or calculable, but also devoid of every form of auto-position. Only a 'non-Cantorian' multiple is capable of filling the void of Being and of replacing Being as element of thought. This non-Cantorian concept of the multiple, in its 'unilateral' duality with the mathematico-philosophical multiple (and its numerous varieties), is deduced from the One's determination-in-the-last-instance of Being as void, as irreality or (non-)reality.[31]

Relatedly, we will see, a bit like Riemann, that an 'intensional' or qualitative quantity can have different metric relations, that is to say, as a continuous manifold, composed of 'points', it will be opposite to a discrete manifold which is composed of isolated 'elements'. Certain parts of a discrete manifold distinguished by some trait or by a frontier can be qualified as 'quanta'. The metric of each part of a discrete manifold is given by the number of the elements belonging to it. Thus it carries the principle of its metric determination in itself. On the other hand, the philosophical metric is not determined *a priori* and independently by conceptual or intensive processes. The philosophical space in itself is nothing but a completely formless manifold of intensions or intensities and it is only the onto-material content that provides it with a form and determines its metric relations.[32]

Traditional philosophy describes 'the stars of the Ideas in a world or a logos'[33] in terms of 'philosophical or real variables (One, Being, Other, Multiple, Beings, etc.)'[34]. The variables take values ('"God," "World," "Man," "Christ," these are such as p, q, r, or x, y, z, the cries of a transcendental formalism'[35]), and these values describe the events of the 'World'[36], that is in Laruelle another 'first name for the mixture of philosophy and of the world. Philosophy is the world's pure and general form, the world is philosophy's immanent object. In short: "world-thought."'[37]

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de multiplicité qui s'oppose aux multiplicités spatiales, un peu comme Riemann distinguait des multiplicités discrètes et continues).'

[31] Laruelle, '"I, the Philosopher, Am Lying": A Reply to Deleuze', in id. 2012a, p. 62.

[32] Cf. Weyl, *Raum, Zeit, Materie. Vorlesungen über Allgemeine Relativitätstheorie.* Berlin: Springer, ³1919, p. 87, online available at: https://archive.org/details/raumzeitmateriev00weyl.

[33] Laruelle 2010a, p. 12: 'les astres des Idées dans un monde ou un logos'.

[34] Ibid., p. 53: *'des variables philosophiques ou réelles (Un, Etre, Autre, Multiple, Etant, etc.)'.*

[35] Id., *Mystique non-philosophique à l'usage des contemporains.* Paris: L'Harmattan, 2007, p. 109: *'"Dieu", "Monde", "Homme", "Christ" sont tels des p, q, r ou des x, y, z, les cris d'un formalisme transcendantal.'*

[36] Cf. id. 2015a, p. 145.

[37] Id. 2013e, p. 168; id. 1998, p. 98: 'pensée-monde'. This concept is explained by Smith as follows: 'when "world" is a suffix or a prefix with some other term, as in "thought-world", it indicates a sense of supposed

The systems of thought are characterized by sets of variables in interaction. In the interaction, the systems influence each other in a way that depends on the value taken by their variables. The 'quantum-oriented theory'[38] does the same thing. It describes the 'Universe'[39] – that is 'a first name for the One'[40] – in terms of 'virtual observables or potentialities' such as 'the unity of experience' or the 'unity of apperception'[41] (Kant), 'the immediate unity of nature and man' (Marx), 'lifeworld', 'intentionality' (Husserl), 'Being-in-the-world' or 'Care' (Heidegger), 'the general perception' of the 'flesh' (Merleau-Ponty), etc.[42]

Note that Laruelle distinguishes between 'world' and 'universe', as Smith clarifies, in order 'to point out the difference between a form of existence that is not sufficient (universe) and a hallucinated totality that in reality refers to the set of actual but not necessary forms of authority (world)'.[43] Galloway adds: 'If indeed utopia perished as narrative or world or image, it was reborn as method [...]. To refuse the philosophical decision is to refuse the world, and thus to discover the non-standard universe is to discover the non-place of utopia.'[44] Therefore, the basic structure of classical philosophy and of 'a non-classical or "non-standard" philosophy'[45] is the same: 'non-philosophy is not an intensified reduplication of philosophy, a meta-philosophy, but rather its "simplification." It does not represent a change in scale with respect to philosophy, as though the structure of the latter were maintained for smaller elements. It is the "same" structure but in a more concentrated, more focused form.'[46]

However, there are three fundamental and interdependent differences between them which seem to me to be the key aspects of the 'non-philosophical' discourse in the Laruellean expression:

1. 'the corporality and the granularity of thought'[47],
2. the indetermination of 'non-commutative variables'[48],

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sufficiency operative in that term.' See Smith 2016, p. 53. Cf. Laruelle 2010b, p. xxviii; id. 2002, p. 11: '*L'écriture par ajout du suffixe -monde au terme en question (Dieu-le-monde, le Christ-monde, etc.) indique un sens de suffisance.*' However, due to inverse linguistic accentuation in French, the French suffix '*-monde*' rather turns into a prefix in English, which gives 'world-thought', although there are limits to this rule, see, for instance, '*philo-fiction*' which is best understood in parallel to '*science-fiction*'. Laruelle himself seemed to be quite tolerant with regard to the translation of the term 'world-thought'. Smith who has asked Laruelle about his intention with this concept wrote to me on April 8, 2019 in an e-mail: 'the translation should go with what feels best in terms of flow'. For further instructive explanations on the use of the concept of 'world' in Laruelle see the paragraph on 'Gnostic hatred of the world' in Smith 2016, pp. 153–8.

[38] Laruelle 2015d, p. 67; id. 2014, p. 107: '"*théorie orientée-quantique*"'.

[39] Cf. id. 2015a, p. 145.

[40] Smith 2016, pp. 205 f.

[41] Cf. Kant 1956, (B 194–7, A 155–8) pp. 210–3.

[42] Laruelle 2015a, p. 120: '*l'unité immédiate de la nature et de l'homme (Marx), ou bien l'être-au-monde ou l'intentionnalité (Husserl et Heidegger)*'.

[43] Cf. Smith 2016, p. 124.

[44] See also Galloway, 'Laruelle and Art', *Continent* 2, no. 4 (2013), p. 236 (cit. by Ó Maoilearca 2015, p. 291).

[45] Laruelle 2010a, p. 31: '*une philosophie non-classique ou "non-standard"*'.

[46] Id., 'What Can Non-Philosophy Do?', in id. 2012a, p. 222.

[47] Id. 2010a, p. 13: '*la corporalité et la granularité de la pensée*'.

[48] Id. 2015a, p. 62: '*des variables non-commutatives*'.

3. the relational aspect of the philosophical variables in 'the generic quantum matrix'[49].

3.1.1. Granularity

The first aspect, the discreteness, is the most general and the most important trait of the quantum-oriented theory. The granularity is not a supplementary consequence but the characteristic consequence or the core of the theory: 'the "quanta" are the elementary grains'[50] of the non-philosophical universe. The space of the possible values of a set of variables which characterizes a microscopic system of thought is the 'phase space' of this system. The 'phase space' is an idea developed by Poincaré at the end of the nineteenth century to provide a visual representation of the behaviour of dynamic systems. The phase space is the interaction field of the dynamic forces of material systems. Formalistically speaking, it is a symplectic manifold whose points are the 'states' of the system.[51] Deleuze and Guattari have already assumed that 'any concept has a phase space, although in another way than in science'[52]. This can be considered as the origin of the 'matricial and nonset-theoretic ontology of the lived experience'[53], according to which a world or a logos is not continuous but subtly discrete, the granularity is everywhere in philosophy. Standard philosophy assumes that the variables characterizing a system of thought always have a precise value, by determining a point in the conceptual or intensive phase space. Concretely, one would rather say that the system is in a finite region of the phase space. According to the characterization of the quantum-oriented theory, the volume of this region cannot be smaller than the 'scientific, generic constant'[54] of Laruelle, given that '[t]here exists a minimal scale for all phenomena'[55], that is what determines the divergence in relation to classical philosophy. The constant of Laruelle implies for the number of possible values that an intensional or qualitative variable can take – a variable which determines the points in the region of the philosophical phase space and which can be qualified without changing the fact that the system of thought is in the same region –, this number is *finite*. This means that this variable cannot take *discrete* values. Otherwise, the value of the variable could distinguish arbitrarily small regions, as classical philosophy assumes, in contrast to the characterization of the quantum-oriented theory. In particular, any variable which separates finite regions of the phase space is necessarily discrete. Technically speaking, the variables of a system of thought are represented by 'self-

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[49] Id. 2012b, p. 149: *'la matrice générique et quantique'*.
[50] Cf. Rovelli 2018a, p. 101: *'les "quanta" sont les grains élémentaires'*.
[51] Cf. Connes, *Leçon inaugurale. Collège de France, chaire d'Analyse et de Géométrie* (1985). Paris: Collège de France/Fayard, 1989, p. 8, available at: http://www.alainconnes.org/docs/lecollege.pdf.
[52] Cf. Deleuze and Guattari 1991/2005, p. 30: *'Tout concept a donc un espace de phases, bien que ce soit d'une autre manière que dans la science.'*
[53] Laruelle 2015a, p. 125: *'une ontologie matricielle et non ensembliste du vécu'*.
[54] Id. 2015a, p. 59: *'une constante scientifique, générique et minimale d'humanité'*.
[55] Rovelli 2018a, p. 101: *'Il existe une échelle minimale pour tous les phénomènes'*.

adjoint' elements of an 'involutive' logos. The values that the variable can take are the 'spectral' values of the corresponding element of this 'algebraic logos'[56].

On the one hand, Laruelle has made a *technical* step toward 'a quantization of thought'[57] by adapting philosophy to the algebraic language. On the other hand, he has made a *conceptual* step with the introduction of the notion of 'wave function' understood as a 'formula or equation combining the symbols of the philosophical or real variables', by putting the emphasis on the fact that it designates a 'law of an undulatory process and not of a "state"'[58]. He proposes that the 'states' of a system of thought which attribute values to the philosophical variables are 'wave functions' or 'state vectors' instead of 'isolated conceptual points'[59] in 'a space of vectoriell [...] configuration'[60]. One property of this system is that every state can be expressed as a linear combination of other states. A state is described by a vector and the superposition of the states corresponds to the addition of the vectors. 'A Hilbert configuration space'[61] is 'a plurality of vectors'[62]. The ideas of the quantum-oriented theory in relation to the classical model owe much to Hilbert. The quasi-Hilbertian onto-vectorial space plays a fundamental role in Laruelle's 'immanental' or 'onto-material formalism'[63]. Yet, as Alain Connes and Matilde Marcolli point out:

> This viewpoint on quantum mechanics was later somewhat obscured by the advent of the Schrödinger equation. The Schrödinger approach shifted the emphasis back to the more traditional technique of solving partial differential equations, while the more modern viewpoint of Heisenberg implied a much more serious change of paradigm, affecting our most basic understanding of the notion of space. Heisenberg's approach can be regarded as the historic origin of non[-]commutative geometry.[64]

Moreover, 'the elevation of the wave function or of the state vector to the function of an *a priori* legislation of the empirical domain'[65] confers a certain 'ontological weight'[66] on these notions. By emphasizing the analogy with optics, as Schrödinger has shown in his second article of 1926[67], and by comparing the trajectory of a 'conceptual particle'[68] with the one of a ray of light, Laruelle tries to approximate the behaviour of a subjacent 'wave' in the philosophical space. This seems to suggest that the 'wave function' or the

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[56] Laruelle 2015a, p. 126: '*logos algébrique*'.
[57] Id. 2010a, p. 13: '*une quantification de la pensée*'.
[58] Ibid., p. 53: 'Fonction d'onde. *Formule ou équation combinant les symboles des variables philosophiques ou réelles* [...]. *Désignant la loi d'un processus ondulatoire et non d'un "état"*'.
[59] Ibid., p. 13: '*points conceptuels isolés*'.
[60] Id. 2015d, p. 90; id. 2014, p. 139: '*un espace de configuration vectoriale*'.
[61] Id. 2015a, p. 167: '*un espace de configuration de Hilbert*'.
[62] Connes, Chéreau, and Dixmier 2018, p. 232: '*une pluralité de vecteurs*'.
[63] Laruelle 2010a, p. 77: '"*formalisme matérial*" *ou encore* "*immanental*"'.
[64] Connes and Marcolli 2006, p. 9
[65] Laruelle 2011a, p. 78: '*l'élévation de la fonction d'onde ou du vecteur d'état à la fonction de législation a priori du domaine empirique*'.
[66] For this objection see Rovelli, 'Space is blue and birds fly through it' (2018b): arXiv:1712.02894v5.
[67] Schrödinger, '*Quantisierung als Eigenwertproblem (Zweite Mitteilung)*', *Annalen der Physik* 79, 1926, pp. 489–527.
[68] Cf. Laruelle 2010a, pp. 57, 64, 72, 420.

'quantum-generic state' represents the 'Real'[69] which underlies the particulate nature of concepts. The base for attributing an 'ontological weight' to the 'wave function' or to the 'state vector' is, in the first place, the affirmation that the quantum-oriented theory is a theory of waves in the philosophical space or 'an immanental ontology or aesthetics of the undulatory *a priori*'[70]. However, we would not know how to express the quantum-generic state of two or more conceptual particles as a set of 'wave functions' in such a space. Secondly, the wave formulation misses the key feature of the project of 'quantization', that is, the discreteness of the quantum of lived experience that one would have to recover by supplementary suppositions, as there is no reason why a conceptual or intensive wave should be a lived experience (being the replacement of the energy) which is related to the frequency. Last but not least, if one treats the wave as the 'Real', one falls immediately into what could be called the 'generic measurement problem'. How can a wave, spread over a large region of the onto-vectorial space, suddenly be concentrated on a single place where the quantum and generic particle manifests itself?

All these difficulties render the 'ontologization' of the wave function difficult. On the one hand, this notion has 'the philosophical plasticity'[71], more than 'the algebraic logos as a complex number'[72], and it is much easier to crystallize by giving a linear representation in a quasi-Hilbertian space. On the other hand, the important notion is the algebraic logos of the non-commutative observables, while one could understand the importance given to the onto-vectorial space as an indirect confirmation of the 'ontological weight' of the quantum-generic states. However, it would be a misleading idea to consider the wave function, the state vector or the quantum-generic state as a faithful description of the 'Real'. We should consider the quantum-oriented theory rather as a question of the values of philosophical variables – such as 'the transcendentals (the One itself, Being, Other, the Multiple, Unity, Beings, etc.)'[73] or 'the pairs of great transcendentals (Being and Non-Being, Same and Other, Good and Evil as Non-Good, True and Non-True, etc.)'[74] – and not as a theory of the quantum and generic states. 'Real human experience', as Galloway remarks, 'is thus not so much a fact but a variable, not so much an object but a formal relation, just as the algebraic equation $x = 2y$ tells how x and y are related without saying anything about what x and y actually are. [...] Laruelle proposes what he calls a "materialized algebra" of elements held as variables in superposition with each other.'[75] By following Werner Heisenberg rather than Schrödinger, the aim is to establish the foundations for a 'non-commutative ontology' based exclusively on the relations between intensional or qualitative quantities which are in principle observable, since non-philosophy does not aim at

[69] Cf. ibid., pp. 59 f. and id. 2011a, p. 23.
[70] Cf. id. 2010a, p. 244: *'une ontologie et une esthétique immanentales de l'a priori ondulatoire'*.
[71] Ibid., p. 420: *'la plasticité philosophique'*.
[72] Id. 2015a, p. 126: *'le logos algébrique comme nombre complexe'*.
[73] Id. 2013b, p. 281; cf. id. 1996, p. 344: *'des transcendantaux (l'Un lui-même, l'Être, l'Autre, le Multiple, l'Unité, l'Étant, etc.)'*.
[74] Cf. id. 2008, pp. 112 f.: *'les paires de grands transcendantaux (Être et Non-Être, Même et Autre, Bien et Mal comme Non-Bien, Vrai et Non-Vrai, etc.)'*.
[75] Galloway 2014, p. 260.

inflating ontology but in the contrary to rarefy it: '*The generic degrowth intends* [...] *to reduce philosophy to the state of a productive force*'[76].

3.1.2. Quantum and Generic Superpositions

Laruelle goes even further by the observation that classical ontology implies a reversibility of the philosopical or real variables $A = B$ ('Thought equals Being', 'One equals Multiple', 'Being equals One', 'One equals All', 'Set Theory equals Ontology', etc.) and that this philosophical ideal of reversibility which means overdetermination of Being by Thought, of the One by the Multiple, of Being by the One, of the One by the All, and *vice versa*, by manifesting itself in 'the topological operator of torsion'[77] is in correlation with a *commutative* paradigm of thought which is incompatible with the quantum and generic paradigm. Badiou argues that, since Parmenides and Plato, '[t]he reciprocity of the one and being is certainly the inaugural axiom of philosophy'[78]. By contrast, the non-reciprocity of the One and Being is the inaugural axiom of non-philosophy. In other words, in Laruelle's formula there is an indeterminate remainder: $\langle One|Being\rangle \neq 0$. The One and Being can therefore not simply be equated with each other ($One = Being$), and as the One cannot be reduced to thought, one can neither state 'the One is' nor 'the One is not'. While in Badiou the one is an operation of counting-as-one, non-commutative ontology is rather dealing with 'characteristic one' (idempotence), that is an infinite circular operation that remains radically immanent (to) itself. The presentation of being would be a matter of presented (intensional or qualitative) multiples or non-existing multiples in characteristic one, the characteristic one of something is the result of quantization and dequantization.[79]

In fact, it is not so easy to formalize the concept of a 'philosophical variable'. Following Gödel, we are tempted to model an intensional or qualitative variable according to a function with real values. In this classical formulation, the philosophical space has to have the cardinality of the continuum (*NB*: the cardinality of a set is a cardinal that measures the size of the set in question[80]), that means it must be uncountable, if a variable has a continuous scale. The problem that Connes[81] points out is that if one takes this definition '[t]he philosophical magnitudes [...] defined by globally continuous functions with variables of horizontal and vertical transcendence'[82] cannot coexist, in the same philosophical space, with any other variable having a countable or discrete scale, that is, the quantities of intension or intensity of several distinct values, because the two metric relations do not interact but are disjoint and exclude each other.

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[76] Cf. Laruelle 2015a, p. 71: 'La décroissance générique se propose au contraire de réduire la philosophie à l'état de force productive'.
[77] Id. 2011a, p. 100: 'l'opérateur topologique de la torsion'.
[78] Badiou 2006b, p. 23; cf. id. 1988, p. 31.
[79] See James 2012, pp. 136 f.
[80] Cf. Badiou 2018, p. 59.
[81] Cf. Connes 2017.
[82] Laruelle 2010a, p. 421: '*Les grandeurs philosophiques* [...] *définies par des fonctions globalement continues à variables de transcendance horizontale et verticale*'.

This distinguishes classical philosophy from non-philosophy where this problem to make coexist the discrete and continuous variables of intensional or qualitative quantity within the same framework is completely resolved by the Laruellean operator formalism (the mathematical concept of the operator was invented at the beginning of the twentieth century[83]) which provides a solution by formalizing such a real variable quantity by an operator acting on the vectors of a quasi-Hilbertian space. The key replacement is

real intensional or qualitative variable →
self-adjoint operator in an onto-vectorial space.

What Laruelle proposes is to replace the classical coordinates by operators, and the operators are 'generic matrices' which obey the laws of a 'symbolic multiplication'[84] interpreted as a generic matrix calculus where, in general, the commutativity or the convertibility of the operations and of the variables is lost:

$$AB \neq BA.$$

The variables A and B form a 'unilateral complementarity within which the first underdetermines or underempowers the second, which fades from its dominant position'[85]. When dealing with intensional or qualitative variables which pertain to such microscopic systems of thought, the order of the terms in a product plays a crucial role, the commutativity of Cartesian coordinates does not occur on the level of the onto-vectorial phase spaces. The inner product defining an onto-vectorial space ultimately provides all probabilities (i.e., transition amplitudes of futurality or virtuality) that characterize non-philosophy (see above paragraph 2.3., 'Structural Homology of Process-Oriented Ontologies'). It is essential for a non-commutative ontology to understand subtler, that is, *non-commutative*, spaces as suggested by Laruelle. We understand much better a philosophical space by considering it as neither continuous nor discrete but rather as 'a *conjugation*'[86] or an '*intrication without mixture*'[87] of the continuous and of the discrete that only a philosophy reconciling the two can apprehend. Laruelle offers a way to reconsider philosophy as a 'totality of the lived experience' [88] by suggesting a quasi-Hilbertian space that is subtler than the philosophical continuum which we are used to. In an onto-vectorial space the continuous variables coexist with the discrete variables, but their coexistence is only

[83] See Connes, Chéreau, and Dixmier 2018, p. 64
[84] Born on Heisenberg, see B. L. van der Waerden, *Sources of Quantum Mechanics*. New York: Dover, 1967.
[85] Laruelle, 'Foreword: Gender-Fiction', in Kolozova 2014, p. xv.
[86] Laruelle, 'Non-Philosophy, Weapon of Last Defence: An Interview with François Laruelle' in Mullarkey and Smith 2012, p. 239.
[87] Laruelle 2015a, p. 206: 'intrication sans mélange'.
[88] Cf. Granger, Gilles-Gaston, *Pour la connaissance philosophique*. Paris: Éditions Odile Jacob, 1988, Chapter VI.

possible through *non-commutativity*, since in case of commutativity they would have a variable in common which is impossible.

In non-philosophy, there are abundant examples of non-commutative spaces of thought – the most recent one can be found in 'Marx with Planck. The Quantization of Non-Standard Marxism'[89] – which are of evident interest in diverse fields of philosophy (epistemology, aesthetics, ethics, gender studies, political philosophy, etc.), and which prove however non-philosophy's ability to create 'forms of discourse and genres which are other than philosophy'[90]. As for political philosophy Smith points out, 'non-philosophy does not claim to act on politics itself, but instead carries out a political act within thinking'[91], and a bit further on he continues writing:

> What Laruelle's mutation of political philosophy gives us is not a quietism or an anti-politics, or even apolitics, but a radical separation between the human and politics. [...] [T]his means that the lived immanence of the human is indifferent to politics. Politics may harass the human, may bring to bear oppression of subjects and so on, but there remains something foreclosed to politics that such harassment simply cannot reach.[92]

The extension of the thought imposed by the transition to non-commutative philosophical spaces forces us in particular to reconsider most of our familiar ontological notions. The radical change of paradigm proposed by Laruelle allows us to move from 'commutative ontology' to 'non-commutative ontology'. Yet, 'non-Cantorian and quantum ontology'[93] is not a bridge between the quantum-oriented theory and classical ontology. The bridge between non-commutative ontology and commutative ontology is the inverse process of the quantization which is called 'dequantization'. It is linked to the world of 'idempotence'[94] or of the 'characteristic one' ($1 + 1 = 1$). This circle of ideas (due to the school of Maslov, Kolokoltsov and Litvinov) which compares the 'tropicalization', the 'dequantization' and the 'deformation of complex structures'[95] has been brought up in Chapter 2 under the name of 'tropical analysis' of the generic matrix.[96]

The quantum-oriented theory is determined by the non-commutativity of the algebraic logos as a complex number. The non-commutativity of the philosophical variables (measured by the Laruelle constant) is the generic expression of the condition that the variables cannot be simultaneously be sharp. That is the reason why there is a minimally attainable volume in the onto-vectorial phase space. The volume of a region of such a space has a dimension called 'action': that is the dimension of the 'generic

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[89] Cf. Gangle and Greve 2017, pp. 157–77.
[90] Laruelle 2010a, p. 16: *'des formes de discours ou des genres autres que la philosophie'*; see also James 2012, p. 180.
[91] Smith 2016, p. 65.
[92] Ibid., p. 69.
[93] Cf. Laruelle 2011a, p. 150.
[94] Cf. id. 2010a, pp. 54, 294–302.
[95] Cf. Connes and Consani 2018, p. 65.
[96] See Ó Maoilearca, Dennes, and Schmid, eds., *La non-philosophie et au-delà*. Paris: Garnier (forthcoming).

constant'[97]. This dimensional constant qualifies the quantity of non-commutativity, the discreteness or the impossibility of sharpness of all non-commutative variables. Non-commutativity is tantamount to underdetermination. The One 'is the minimal, the densest and irreducible quantity of the radical (or of pure immanence)'[98], as Kolozova points out. In other words, non-philosophy does not produce any precise position, it is as if it fluctuates by being spead out 'in a cloud of probability'[99], or as if it floats on a 'lived wave of virtuality'[100]. We say, in the non-philosophical jargon, that it is 'in a "superposition" of positions'[101]. '"Fluctuation" does not mean that what happens is never determined: it means that what happens is only determined at certain moments and in an unpredictable way.'[102] As a result, Laruelle keeps count of 'the aleatory output' of the virtual observables or 'of the potentialities which constitute the lived experience'[103].

When and how is the virtuality or the 'futurality' as the '"ontological" modality of the Real'[104] of a philosophical system resolved in an actual value? 'The futural', as Laruelle says, 'is an excess which, as generic, contains [a number of attributes] but pushed through a certain indetermination within immanence, it is discontinuous and continuous, unilateral, predictable within the limits of certain givens as conditions of the least reference, but ultimately unpredictable.'[105] The indetermination is resolved when an intensional or qualitative variable interacts with something else in another system of thought. The value actualization occurs during the interaction, since the variables of intension or intensity represent the ways in which the systems affect each other. 'The technical term for interaction is "measure"'[106] as, for example, 'the philosopical measure (position, relation, meaning, truth, value)'[107], what is misleading, because it seems to imply that for creating the macroscopic reality an observator is needed[108].

Non-commutativity and superposition are 'prescriptive' laws of thought rather than descriptive principles of non-philosophy. There are probabilistic laws for finding things if one has a 'look', but there are no laws of any sort for how things are independently of whether one 'looks' or not. The agent is always included. Laruelle's 'generic realism'[109], as it is becoming clear, does not exclude having anti-realist aspects. With 'the problem of quantization' of the language, that is, 'of macroscopic or "natural"

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[97] Cf. Laruelle 2010a, p. 33: '"*constante générique*"'.
[98] Kolozova 2014, p. 111.
[99] Rovelli 2018a, p. 105: '*dans un nuage de probabilité*'.
[100] Laruelle 2010a, p. 64: '"*onde vécue de virtualité*"'.
[101] Rovelli 2018a, p. 105: '*dans une "superposition" de positions*'.
[102] Ibid., p. 107: '"*Fluctuations" ne veut pas dire que ce qui arrive n'est jamais déterminé : cela signifie que ce qui arrive est déterminé seulement à certains moments et de façon imprévisible.*'
[103] Laruelle 2015a, p. 215: '*la sortie aléatoire des potentialités qui constituent le vécu*'.
[104] Id. 2010a, p. 64: 'Virtualité ou futuralité. *Modalité "ontologique" du Réel*'.
[105] Ibid., p. 450: '*Le futural est un excès qui, comme générique, contient tous ces attributs mais poussés jusqu'à une certaine indétermination au sein de l'immanence, il est discontinu et continu, unilatéral, prévisible dans les limites des données comme conditions de dernière référence, mais ultimement imprévisible.*' Smith 2016, p. 165.
[106] Cf. Rovelli 2018a, p. 107, n. 1: '*Le terme technique pour interaction est "mesure", qui est trompeur, car il semble impliquer que pour créer la réalité, un physicien de laboratoire en blouse blanche soit nécessaire.*'
[107] Laruelle 2010a, p. 399: '*la mesure philosophique (position, relation, sens, vérité, valeur)*'.
[108] Cf. Rovelli 2018a, p. 107, n. 1.
[109] Laruelle 2010a, p. 394: '*un réalisme générique de-dernière-instance*'.

concepts'[110], Laruelle introduces the element of *discontinuity* and of *indeterminism* both foreign to classical, macroscopic ontology. In Laruelle it is about finding a new constant for the phenomena of thought. Laruelle suggests that the 'transcendental flash of the Logos'[111] is quantized. By the term *'unilateral duality'*, he has defined a 'generic constant' for the human sciences, as 'Marx has found the constant in form of the organic productive force or of concrete work'[112], as set theory has the empty set-form and category theory the arrow or morphism. The generic constant or quantum exchange of action is understood as a phenomenal sequence of indivisible and discontinuous knowledge (philosophical concepts are treated as complex and indivisable objects which behave like corpuscles) according to which a new knowledge (concept-objects provided with a particulate micro-identity), far from being some dogmatic knowledge, is elaborated: *'there is no absolutely determined knowledge of the human, of man; [...] it aids the struggle [...] against racism, for example: if one has no absolutely certain knowledge of human nature, it is far more difficult to develop a racist thought.'*[113]

Laruelle aims at transforming Kant's transcendental aesthetics in the name of the 'real' as a radical immanent lived experience, not as a 'thing-in-itself', whose agent is not understood as a subject. The essential quality of the 'idempotent lived (experience)' is the superposition which *does not mean the fusion of the two in one* since every experience *is* always and already one and does not *turn* into one. Thus, idempotence is not understood in the sense that 'two fusion in one' or 'one is divided in two'. It is not an identification or synthesis in this sense. However, in *The Last Humanity* Laruelle explains idempotence as follows:

> In particular, the 1 of the variable which is indexed to the superposition is divided in two times 1 and remains 1, that is idempotence. The variable that will play this double game is divided in two functions, as a variable that is internal to the matrix of fusion and as an index, these two 1 are linked in an analytically strong way (due to their duality and splitting in two) and in a synthetically weak way (the synthesis gains nothing and yet there is a synthesis). It is a doubling of the variable as well as a splitting in two of the variable that returns to the same. 2 fuse in 1 for the matrix and 1 is divided in 2 for the generic. The generic is the One, always One but in two halfs, not in the arithmetical sense of the Marxist dialectics but in idempotence.[114]

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[110] Ibid., p. 38: *'le problème de la quantification* [...] *des concepts macroscopiques ou "naturels"'*.

[111] Ibid., p. 95: 'Le flash transcendantal du Logos'.

[112] Ibid., p. 33: *'Marx a trouvé la constante sous la forme de la force productive organique ou de travail concret'*.

[113] Laruelle quoted in Mackay, Robin, *Introduction: Laruelle Undivided*, in Laruelle 2013a, pp. 11 f.

[114] Laruelle 2015a, pp. 128 f.: *'En particulier le 1 de la variable qui est indexée à la superposition est divisé en deux fois 1 et reste 1, c'est l'idempotence. La variable qui va jouer ce double jeu est dédoublée en deux fonctions, comme variable interne à la matrice de fusion et comme index, ces deux 1 sont liés d'une manière analytiquement forte (à cause de leur dualité et dédoublement) et synthétiquement faible (la synthèse ne gagne rien et pourtant il y a bien une synthèse). C'est aussi bien un redoublement de la variable qu'un dédoublement de la variable qui revient au même. 2 fusionne en 1 pour la matrice et 1 se divise en 2 pour le générique. Le générique c'est Un, toujours Un mais en deux moitiés pas au sens arithmétique de la dialectique marxiste mais dans l'idempotence.'*

Having said that, it seems to me difficult to hold with Galloway that 'Laruelle is against the digital'[115] and to position him as 'the one who has pursued the non-digital path most fervently and rigorously'[116], not only because 'Laruelle is just as uninterested in the analog as he is [in] the digital'[117] or by virtue of the fact that quantization and discretization are rather at home in the digital context than in the analog one but since Galloway defines the digital and the analog exactly 'in terms of the one dividing in two and the two integrating in one'[118]. In *Introduction to Non-Marxism* Laruelle gives a detailed explanation of 'unilateral duality', that is, what Laruelle refers to as *'unilation'*[119], and of 'determination-in-the-last-instance' (DLI), which reads as follows: DLI 'is not a matter of "difference," of the co-extension of the One and the Two, of the One that is Two and of the Two which is One in some reversible way. It seems, instead, that DLI must be irreversible, the One is only One, even with the Two, and the Two forms a Two with the One only from its point of view as the Two.'[120] By contrast, Galloway opposes the digital to the linear (superposition) and lines it up with the virtual as he states:

> This is the operation of the digital: the making-discrete of the hitherto fluid, the hitherto whole, the hitherto integral.[121]
>
> Dice in mid-shake are, in Deleuzian language, the virtual, for they express the complete number space of the dice all at once. No discrete numbers have yet appeared; the numbers have not been digitized. Laruelle's word for this is *superposition*, the term he borrows from quantum theory. While in a state of superposition, discrete states superimpose and virtualize into each other, obviating their relative distinction. But once the dice land, a particular number is actualized from out of the virtuality of the number space.[122]

Indeed, the operation of generic superposition is intuitively compared, amongst others, with a game of dice or a gesture of throwing dice where the dice correspond to the disciplinary conditions. The generic game of dice is a productive apparatus of generic knowledges on the model of a physical particle accelerator where indeterministic quantum collisions take place. This production of knowledges guarantees the transition from a restricted positive or scientific concept to a rigorous and non-philosophical concept of the imaginary or of philo-fiction.[123] Laruelle imagines this throw of dice as a gesture of forcing. The game consists of producing a particular set or arrangement by throwing different 'dice'. This is neither a synthesis nor an analysis but an idempotent

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[115] Galloway 2014, p. 89.
[116] Ibid., p. 93.
[117] Ibid., p. 89
[118] Ibid., p. 94.
[119] Laruelle 2013b, p. 46; cf. id. 1996, p. 55.
[120] Id., *Introduction to Non-Marxism*, Translated by Anthony Paul Smith. Minneapolis: Univocal Publishing, 2015b, p. 42.
[121] Galloway 2014, p. 52.
[122] Ibid., p. 188.
[123] Cf. Laruelle 2011a, p. 121: *'une production de connaissances qui assurent le passage d'un concept restreint à un concept rigoureux de l'imaginaire ou de la philo-fiction'.*

and non-commutative multiplication of disciplines which, taken individually, are insufficient since underdetermined, that is why they lost their autonomy. The conditions do not allow to forsee the result, according to Laruelle, except that it will be a non-philosophical, that is, rigorous fiction ('philo-fiction') or 'non-standard philosophy'. Each of the two dice represents a discipline of thought whose individual products are known but together they form a problematic, unforseeable and incalculable pair that provides a new dimension. In that respect the generic matrix resembles 'a betting' or 'the game of dice'.[124] The hand throws the dice, and in the hand as a posture, less as an organ, Laruelle sees the embodiment of betting as the generic matrix. The hand moves mostly in an undulatory manner, and therefore it could also be called an 'operator of floating gestures'. In addition, the hand is a tool and characterized by Laruelle as the 'last instance' of practice. The view is transcendental (in the described way of transcendent self-transgression), hence establishes philosophy, while the hand as the basis for practice can be called immanental (in terms of the undulatory immanence).[125]

However, discretization and linearization do not contradict each other, as long as the dual system of (necessarily discrete) variables such as 'on and off, *A* and *B*, or you and me'[126] enters the '"dual" matrix (not binary [...])'[127] according to superpositional and non-commutative criteria: that is, as long as: 'on *and* off ≠ off *and* on', '*A and B* ≠ *B and A*', or 'you and me ≠ me and you', etc. Such immanently lived knowledges are characterized by the lack of metaphysical certainty concerning their actual presence. Due to their being virtual these lived experiences rather belong to the order of probability densities or of '*generic probability*'.[128]

Laruelle's 'symbolic multiplication' (following Born who called Heisenberg's matrix multiplication symbolic[129]), leads to the uncertainty principle in the form of a commutation relation of generic matrices. The generic uncertainty principle is a direct consequence of the commutatition rule in the Schrödinger equation $[p, q] = pq - qp = i\hbar$, where [ ] is the commutator, p and q represent observables, q is the position, p the momentum of a particle, i the imaginary number and $\hbar = h / 2\pi$ the reduced Planck constant. The general idea is present in any system where there are plane waves (of lived experience). A generically realizable wave is always in the form of a wave packet which is finite in extent. A pure state is represented by a two-dimensional vector. Moreover, one considers mixed states as generic 2×2 matrices. It is impossible in quantum thought – unlike in classical thought – to prepare a state in which all properties of the system are fixed and certain. There are in quantum thought, however, for every observable some states that have an exact and determined (non-quantitative) value for that observable. States can be formulated in terms of observables, rather than as vectors

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[124] Cf. id. 2010a, pp. 89–91: 'Le lancer générique et le collisionneur immanental'.
[125] Cf. ibid., pp. 514–7: 'La main comme Dernière Instance et comme a priori ondulatoire'.
[126] Galloway 2014, p. 93.
[127] Laruelle 2013b, p. 45; id. 1996, p. 53: '*une matrice dite "duale"*'.
[128] Cf. id. 2008, p. 53: '*Le vécu idempotent n'existe pas ou est en deçà de l'être et de la manifestation*'; id. 2010a, p. 299: '*Cette immanence ondulatoire propre aux flux de vécu n'est* [...] *pas une existence philosophiquement identifiable mais une propriété scientifique, un savoir vécu*'; ibid., p. 407: 'probabilité générique'; ibid., p. 409: '*Ce vécu sous-existe ou sous-vient comme virtuel, sans existence actuelle*'.
[129] See van der Waerden 1967.

in a vector space. These are positive normalized linear functions in an involutive logos, or sometimes other classes of an algebraic logos of observables. For instance, the generic human is known at the end (collapse, actualization, decoherence) in an aleatory or probable way either as animal or as rational, or according to the input data, either as a vector of the phenomenological 'being-in-the-world' or as a vector either of a female sexuation or of a male sexuation (measurement or indexation), but never in a predictable unity of an object. The (horizontal) vectorialization of 'intentionality' or of the 'being-in-the-world' (quantum variables, virtual observables, or state vectors) is the algebraic and generic reduction of these 'wave packets' or interfering wave clusters which are those superposed states.

3.1.3. Relations

If the effect of the interaction in one system of thought depends on the variable of the other, the virtual or 'futural'[130] range of the variable is resolved in an actual value or, more generally, in an interval of values in its 'spectrum'. The actualization of the variable's value is only relative to the other system. That is the relational aspect of the quantum-oriented theory. The variables take a value during any interaction. The actual value of all intensional or qualitative quantities of any system of thought makes only sense in relation to another system. The relative state describes the properties of the philosophical system. That is why, instead of being a theory of the dynamics of a 'wave function', from which a world emerges, 'an "ontology" of the undulatory'[131] or 'of the undulatory *a priori*'[132] can be better understood as a theory of the possible values that the philosophical variables take during their interaction, and of transition probabilites determining which values are probable to be realized. A good candidate for naming the actualization of the value of an intensional or qualitative, intellectual or sensuous variable in an interaction would be 'generic quantum event' (e.g. the 'Christ-event' considered as an event of a 'science of religions'). Laruelle asserts in *General Theory of Victims* under the heading 'Victims as non-standard event'[133]: 'We reach a "quantum-inclined" theory of the event by passing onto the generic terrain.'[134] Galloway adds that 'Laruelle removes the event from temporal and spatial particularities, making it both radically archaic and ultimately final (the two temporal conditions that Laruelle enigmatically labels "before-the-first" and "in-the-last-instance").'[135] Laruelle continues: 'A[n onto-]material formalism modeled on quantum theory, and not a philosophical materialism, is the most adequate way to think the event. Christ and his resurrection,

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[130] Laruelle 2008, p. 143: '"*Futurale*"'.
[131] Id. 2010a, p. 78: '*une "ontologie" de l'ondulatoire*'.
[132] Ibid., p. 285: 'ontologie de l'a priori ondulatoire'.
[133] Id. 2015c, p. 106; Id. 2012c, p. 151: 'Les victimes comme événement non-standard'.
[134] Id. 2015c, p. 107; Id. 2012c, p. 153: '*On accède à une théorie "inclinée-quantique" de l'événement en passant sur le terrain générique.*'
[135] Cf. Galloway 2014, p. 182.

this is less a miraculous event than a non-standard or non-theological one.'[136] Hence, unlike other contemporary French philosophers – e.g. Badiou who says: 'it is materialism that we must found anew'[137] – Laruelle promotes non-philosophy less 'as a worldly and materialist thinking'[138] than as a 'universely' and 'onto-material' mode of thinking, while affirming the 'onto-materiality' of the real.[139] By a non-commutative relationality, Laruelle's *'generic ontology'*[140] offers, as I see it, a mediated 'relational alternative'[141], for example, to the differential relations of structuralism producing singularities (generic quantum events are no singularities in this sense, as will become clear; the spectral variability of quantum-oriented theory lifts the ontological charge of the event conceived as a singularity in Deleuze or Badiou; in an ontology having spectral variability as its most fundamental concept, the new is no exceptional singularity anymore but the norm; if everything is 'a happening', i.e., the actualization of virtual possibilities, there is no need anymore to make a lot of fuss about 'the new')[142]. It is a 'weakened' ontology' of quantum-generic events which are actualized during the interactions between distinct systems of thought. A relational 'generic realism of-the-last-instance'[143] is anti-realist concerning the 'wave function' but realist as regards the quantum and generic events of onto-material and onto-vectorial systems. '"Realism" here refers to the philosophical position that transcendental universals (i.e. the *idea* of a chair or goodness and so on) really exist, while nominalism claims that these transcendental universals do not really exist and that universals only exist by virtue of the particular thing existing (*post res*).'[144] It assumes that the variables can only take values during interactions. This relational posture requires a 'categorial' perspective where the relations play a central role. The commutative World is described by variables of intension or of intensity which can take values, but the products of these variables have an incommensurably small non-commutativity which avoids in general the attribution of a sharp value, leading at first to the discreteness of the generic matrix, then to the 'lived wave of virtuality' as a 'nonmathematical "probability"'[145] and finally to the relational character of the attribution of a philosophical value. The relational quantum-oriented theory is 'democratic' or 'communist' by putting all systems of thought on an equal footing. Non-philosophy tries, on the one hand, to establish 'a democracy in the theory'[146], it is 'the attempt to edify, on behalf of philosophical nations and empires, on the real base of a universal language, a *new democratic order of thought*

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[136] Laruelle 2015c, p. 108; id. 2012c, p. 154: *'Un formalisme matérial sur le modèle de la théorie quantique, pas un matérialisme philosophique, est la manière la plus adéquate de penser l'événement. Christ et sa résurrection, c'est moins un événement miraculeux que non-standard ou non-théologique.'*

[137] Badiou, *Theory of the Subject*, Translated by B. Bosteels. London: Continuum, 2009b, p. 182; cf. id., *Théorie du sujet*. Paris: Seuil, 1982, p. 198.

[138] Mullarkey 2006, p. 2.

[139] Cf. James 2012, p. 7.

[140] Laruelle 2010a, p. 93: 'ontologie générique'.

[141] Hallward, Peter, 'The One and the Other: French Philosophy Today', *Angelaki* 8(2) (2003b), p. 23.

[142] See James 2012, p. 190, n. 8.

[143] Laruelle 2010a, p. 394: *'un réalisme générique de-dernière-instance'*.

[144] Smith 2016, p. 183.

[145] Laruelle 2010a, p. 64: *'"onde vécue de virtualité"', '"probabilité" non mathématique'*.

[146] Id. 2011a, pp. 17–20: 'La non-philosophie comme démocratie dans la théorie'.

which excludes the conflictuality between philosophies and between philosophy and regional knowledges'[147]. 'Whereas philosophy is "intrinsically anti-democratic" and judgemental, non-philosophy denies nothing and affirms all', as Ó Maoilearca says, 'it seeks a "democracy between philosophies, and between philosophy and the sciences, arts, ethics, etc."'[148]

> Laruelle's non-philosophy aspires to bring democracy *into* thought, because what it says is that philosophy [...] does *not* have a monopoly on thinking. In non-philosophy, all thoughts are equalized in value. However, this equivalence or conceptual democracy is not *political* in the philosophical and representational sense of the term [...]. It is not a *theoretical* democracy [...] but the 'democracy of theory itself'. Such a nonrepresentational democracy aims to resolve the traditional hierarchies of philosophy 'with experience, art, ethics, technology, mysticism, science, etc.' by mutating just what thought and theory might be – by 'universalizing thought beyond philosophy'.[149]

In *Principles of Non-Philosophy* Laruelle states: 'The transcendental reduction of philosophy to the status of simple materials, which is to say phenomenal objectives, clears an infinite really universal field of possibilities from any philosophical closure.'[150] Smith further expounds:

> What Laruelle [...] names as the democracy (of) thought is the act of making thought itself democratic. Treating all forms of thought as equal, radically equal, in a unified theory where concepts freely mingle and conjugate into new forms. This radical equality of thought comes not from their inherent goodness, but through their being equally foreclosed ultimately to radical immanence, through their being unable to take the measure of the Human-in-Human while being equally liable to some human use.[151]

On the other hand, 'Laruelle marks an equivalence between communism and democracy'[152]. 'The democracy of-the-last-instance', as explained in *Introduction aux sciences génériques*, 'could after all be called "communism" – if subtracted from every

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[147] Id. 2013b, p. 13; id. 1996, p. 16: '*La non-philosophie est la tentative d'édifier, en deçà des nations et des empires philosophiques, sur la base réelle d'une langue universelle, un* nouvel ordre démocratique de la pensée *qui exclut la conflictualité entre les philosophies et entre la philosophie et les savoirs régionaux*'.

[148] Mullarkey, John, *Refractions of Reality: Philosophy and the Moving Image*. Basingstoke, U.K.: Palgrave-Macmillan, 2009, p. 208.

[149] Ó Maoilearca in Gangle and Greve 2017, p. 22. Cf. Laruelle 2013b, p. 49, and id 1996, p. 58: '*Un concept de la démocratie* [...] – *démocratie non théorique mais de la théorie elle-même –, permettrait de "résoudre" d'une nouvelle manière les antinomies traditionnelles de la philosophie, et des rapports de la philosophie avec l'expérience, avec l'art, l'éthique, la technologie, la mystique, la science, etc.*' Cf. id. 2013c, p. 14, and id. 2011a, p. 39: 'universaliser la pensée au-delà de la philosophie'.

[150] Laruelle 2013b, pp. 9; id. 1996, p. 11: '*La réduction transcendantale de la philosophie à l'état de simple matériau, c'est-à-dire ici de phénomènes objectifs, libère de toute clôture philosophique un champ infini, réellement universel, de possibilités.*'

[151] Smith 2016, p. 71. Cf. Laruelle, *Is Thinking Democratic? Or, How to Introduce Theory Into Democracy*, in Ó Maoilearca and Smith, eds., *Laruelle and Non-Philosophy*. Edinburgh: Edinburgh University Press, 2012, pp. 227–37.

[152] Smith 2016, p. 68.

historical instance just as much as from spontanism, if the "common" of communism was understood as the generic, if communism was understood as the generic constant in history.'[153] Moreover, Smith points out:

> For underlying non-philosophical practice is the axiom of relative autonomy for all things, a kind of equality at the level of causality and effect, since both the human and science or religion are relative to or caused by the Real. This notion of relative autonomy allows the non-philosopher a kind of flat ontology, without ascribing any form of sufficiency to this ontology or to ontology in general, since it too is just an effect of the Real.[154]

The onto-material formalism aims at a new post-rationalistic 'critique' to establish, 'an a priori universal peace to the "conflict of the faculties"'[155], a universal 'peace treaty'[156] ('*Friedens-Abschluß*'[157]) – an antinomy that 'tolerates postmodern ambiguities'[158] and balances or unites 'differential differences', characterized by Caputo as follows:

> For us postmodern types, differential differences are a wonderful thing. They have a distinct advantage over [...] 'oppositional' difference, like right/wrong, on/off, present/absent, thesis/antithesis, living/dead, etc. These are binary differences, meaning an ordered pair, where one member of the pair is privileged and the other is defined as, well, the opposition. One very simple way to think of modernism is that it loves ordered pairs – subjective/objective, absolute/relative, rational/irrational, spirit/matter, religious/secular, public/private. Postmodernists love differential differences: they distrust binary differences like straight/gay, male/female, native born/immigrant, preferring instead a play of differences where no one term is granted a special privilege. Differential difference is more egalitarian, more democratic, less belligerent. So, there is an important difference between differential difference and oppositional (binary) difference.[159]

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[153] Laruelle 2008, pp. 98 f.: '*La démocratie de-dernière-instance pourrait bien après tout s'appeler "communisme" et soustraire ce dernier à toute précipitation historique autant qu'au spontanéisme – si le "commun" du communisme était compris comme le générique, si le communisme était compris comme la constante générique de l'histoire.*' Translated by Anthony Paul Smith in id. 2016, p. 75.

[154] Smith 2016, p. 155.

[155] Laruelle 2013b, p. 46; id. 1996, p. 54: '*une paix a priori universelle au "conflit des facultés"*'.

[156] Id. 2015a, p. 42: '*un traité de paix*'.

[157] See Kant, *Der Streit der Fakultäten* (1798) in id., *Schriften zur Anthropologie, Geschichtsphilosophie, Politik und Pädagogik 1, Werkausgabe Band XI*, Edited by Wilhelm Weischedel. Frankfurt am Main: Suhrkamp, 1977.

[158] Laruelle 2015a, p. 39: '*Ce que nous visons comme antinomie n'est pas tranché de manière rationaliste mais tolère des ambiguïtés postmodernes.*'

[159] Caputo 2018, pp. 149 f.

3.2. Infinitesimal Variables and Compact Operators

The principle to understand a world or a logos by its behaviour in the infinitely small is the epistemological '*Leitmotiv*' of a non-commutative ontology but in a different way than in the 'philosophies of difference' (for example, Deleuze, Derrida, Jean-François Lyotard, Levinas or Lacan) since Leibniz. The notion of 'infinitesimal' is closely linked to the concept of a philosophical continuum. Infinitesimal magnitudes have been construed as intensive magnitudes resembling locally defined intensive quantities. Hermann Cohen, for exemple, proposes, in the second edition of *Kants Theorie der Erfahrung*[1], to identify the 'intensive magnitudes' of the consciousness with the infinitesimals *in the numerical sense* which serve the reality of all perceptions as a basic principle. Cohen seeks to confirm his transcendental interpretation of the 'generation of the reality of the infinitesimal' in *Das Prinzip der Infinitesimal-Methode und seine Geschichte*[2] by a discussion of the concept of *continuity* in science. He uses the infinitesimal calculus as an instrument of the *asymptotic convergence* between the empirical structures and the transcendental structures. That solution has been repeatedly criticized by Laruelle qualifying, for example, the 'indefinite asymptotic rapprochement of man and animal' as 'as thoughtless as their absolute difference'[3].

In the quantization process of a classical dynamic system of thought the output is a self-adjoint operator in an onto-vectorial Hilbert space.[4] All attributes of the real qualitative or intensional variables have a perfect analogue in the non-commutative operator framework. The infinitesimal, intellectual or sensuous variables is what we call 'compact operators'. It is possible for an operator to be infinitesimal without being zero. The concept of a compact operator is an extension or an 'analytic prolongation' of the concept of the generic matrix acting in an onto-vectorial space. That tallies exactly with the definition that Newton gives of an 'infinitesimal variable'. Newton considers an infinitesimal not as a *number* having the same properties as the ordinary real numbers but rather as a variable quantity: '*In a certain problem, a variable is the quantity that takes an infinite number of values which are quite determined by this problem and are arranged in a definite order*'[5]. In *The Method of Fluxions and Infinite Series* (published in 1736), Newton explains his conception of such a variable quantity as generated by motions called '*fluent*'.[6] Unlike Leibniz who talks of 'infinitesimal *numbers*', Newton defines 'infinitesimal *variables*' that he conceived as *discrete* variables[7]: '*A variable is called infinitesimal if among its particular values one can be found such that this value*

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[1] Cohen, Hermann, *Kants Theorie der Erfahrung*. Berlin: Dümmler, [2]1885, available at: https://archive.org/details/kantstheorieder02cohegoog.

[2] Id., *Das Prinzip der Infinitesimal-Methode und seine Geschichte. Ein Kapitel zur Grundlegung der Erkenntnisskritik*. Berlin: Dümmler, 1883, available at: https://archive.org/details/dasprincipderin01cohegoog.

[3] Laruelle 2015a, p. 35: '*Le rapprochement asymptotique indéfini de l'homme et de l'animal nous semble aussi impensé que leur différence absolue*'.

[4] Cf. Connes and Consani 2018, p. 65.

[5] Cit. by Connes 2017, p. 10.

[6] Cf. Bell 2006, p. 83.

[7] Cf. Connes, Chéreau, Dixmier 2013, p. 70: '*les infinitésimaux, qu'il* [*Newton*] *concevait comme des variables discrètes*'.

itself and all following it are smaller in absolute value than an arbitrary given number'.[8] Here, the distinction between variables and numbers is essential, because with relation to variable quantities of intensity or intension I suggest to formalize them not as infinitesimal *numbers* but rather as infinitesimal *variables*. This gives us a framework in which we have both the notion of *infinitesimal*, conceptualized as a *discrete variable*, and the notion of a *continuous variable*, without both being identical. The infinitesimals of Newton correspond to the compact operators in the quasi-Hilbertian space, where the discrete variables cannot coexist with the continuous variables without such an operatory formalism. In consequence, the method of the infinitesimals understood as qualitative or intensional variables integrates perfectly into the operator formalism of a non-commutative ontology where the compact operators play the role of the infinitesimals and the scale of a real variable corresponds to the spectrum of a self-adjoint operator. The only new subtle thing is that an infinitesimal *does not commute* with a continuous variable, that means that only by renouncing the naive principle of commutativity that the intellectual or sensuous variables with un uncountable or continuous scale can coexist with those of a countable or discrete scale. The real subtlety resides in their non-commutative relations.

Here is a brief dictionary that translates the classical ontological concepts in the language of operators (following the formalization of von Neumann) in the non-commutative space.

Commutative Ontology	**Non-commutative Ontology**
real intensional or qualitative variable	self-adjoint operateur in an onto-vectorial Hilbert space
infinitesimal variable	compact operator in this space
possible values of the variable	spectrum of the operator

TABLE. Relation between the classical ontological vocabulary and its spectral-oriented operator analogue

The 'natural' framework of this non-commutative ontology are the operators in an onto-vectorial configuration space. The onto-vectorial space is 'the scene', and the 'the "main actors"[9]' are the operators. The relevance of the paradigm of the quasi-Hilbertian space

[8] Cit. by Connes 2017, p. 10.

[9] Cf. Connes, Chéreau, and Dixmier 2018, p. 239: '*le rôle des opérateurs comme acteurs principaux*'; id. 2013, p. 178: 'Les acteurs du théâtre quantique sont les opérateurs agissant dans cet espace'.

is based on spectral considerations, which is crucial in non-commutative ontology aiming at the spectral formulation of philosophy. The principle of non-commutative ontology itself is that it derives from the spectral variablity. This variability of values embodied in the quanta of intensity or intension is absolutely irreducible and fundamental. We come across it in the spectrum of each operator. The field of variability takes place 'behind the scene', difficult to understand without being 'mysterious' like quantum mechanics *in toto*: 'I think I can safely say that nobody understands quantum mechanics'[10], as Richard Feynman said. Or, as Ó Maoilearca points out: 'One should thereby see DLI [determination-in-the-last-instance] as an immanent causality, oriented from the Real to the thought-worlds [or rather the world-thought] created in philosophy. It is by no means intended to be mysterious, a causality from some kind of "world-behind-the-scenes," however.'[11] That variability is defined by an operator with both aspects, continuous and discrete. That means that there is, in the same onto-vectorial space, a coexistence between the operators with a continuous spectrum and those with a discrete spectrum. A continuous spectrum means a set of values for a certain qualitative or intensional quantity which is described the best as an interval of real numbers. It is opposed to a discrete spectrum, that is a set of values where there is a positive gap between each value and the next. The continuous and discrete spectra of the onto-vectorial systems are modelled as different parts in the spectrum of a linear operator. By putting the continuous and the discrete on the same 'plane of thought'[12], non-commutative ontology allows to make them 'interfere', 'superpose' or 'entangle' and to get rid of this *a priori* that everything is based on the continuous if one does philosophy. This offers a complete answer to the question of coexistence of whether continuous or discrete intellectual or sensuous variables, and how we can reformulate classical ontology in a form that is compatible with 'the generic quantum'[13].

If we talk about a quantum in the framework of 'spectral philosophy'[14], the question of its definition arises. What is an elementary 'conceptual particle'[15]? Now, we can describe an elementary quantum concept as an irreducible representation of an invariance group classified by two variable quantities of intensity or intension, the one is continuous and the other is discrete. Non-commutative ontology shows that the phase space or the parameter space of the onto-vectorial system given by a single concept-atom fails to be a classical manifold, as will become clear in the following paragraph. Non-commutative ontology is the link between ontology and spectral variability. However, I do not attempt to unify the commutative and non-commutative models on the quantum and generic level but rather on the 'semi-philosophical' level.

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[10] Feynman, Richard, *The Character of Physical Law*, with a new foreword by Frank Wilczek. Cambridge, Massachusetts: MIT Press, 2018, p. 129.
[11] Ó Maoilearca 2015, p. 81.
[12] Laruelle 2015a, p. 198: '*plan de pensée*'.
[13] Cf. Id. 2010a, pp. 85 f. ('Vers le quantum générique') and pp. 420 f. ('Le quantum générique et sa matérialité').
[14] Ibid., p. 468: '*la philosophie spectrale*'.
[15] Ibid., pp. 57, 64: '*particule conceptuelle*'.

3.3. The Spectral Point of View on Ontology

This framework of non-commutative ontology offers a natural home to the analogue of the infinitesimal, but we have still to treat the question of its compatibility with the classical concept of a qualitative or intensional (conceptual or qualitative, intellectual or sensuous) manifold, in the wake of 'the relationship between thought of multiplicity and the thought of change'[1] as the sustained concern of Badiou's philosophy, as Oliver Feltham has argued. We have to understand how philosophy as it is imagined on the classical, traditional level changes with consistency assumptions. In Deleuze multiplicities are still *continua* and concrete universals. Concrete universals must be thought as meshed together into a *continuum.* Multiplicities create zones of indiscernibility forming a continuous immanent space.[2] Following Henri Bergson, Deleuze speaks of two different types of multiplicities, metric and non-metric, which he calls 'striated' and 'smooth'. 'It is the difference between a *smooth* (vectorial, projective, or topological) space and a *striated* (metric) space: in the first case "space is occupied without being counted," and in the second case "space is counted in order to be occupied."'[3] Deleuze suggests an intensive way of occupying space the way a liquid does – which is why Laruelle considers the 'transcendental field' of Deleuze as 'pre-quantum'[4] – by occupying the space without dividing or counting it. This alternative he calls a 'nomadic distribution'[5]. Finally, he characterizes a multiplicity as a nested set of vector fields.[6] The ontological category to refer to the status of multiplicities is *virtuality* (a real virtuality forming a vital component of the objective world; for the duality of the real and the imaginary, see section 4.4., 'Subtropical Philosophy').

> The virtual is not opposed to the real but to the actual. The virtual is fully real in so far as it is virtual... Indeed, the virtual must be defined as strictly a part of the real object – as though the object had one part of itself in the virtual into which it plunged as though into an objective dimension... The reality of the virtual consists of the differential elements and relations along with the singular points which correspond to them. The reality of the virtual is structure. We must avoid giving the elements and relations that form a structure an actuality which they do not have, and withdrawing from them a reality which they have.[7]

By way of contrast, non-philosophy distinguishes 'two genuinely heterogeneous types of multiplicity' as Laruelle writes in '"I, the Philosopher, Am Lying": A Reply to Deleuze':

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[1] Feltham, Oliver, *Alain Badiou: Live Theory.* London: Continuum, 2008, p. 3.
[2] Cf. Deleuze 1994, p. 187, and DeLanda 2002, p. 22.
[3] Deleuze and Guattari 1988, pp. 361 f. (See also ibid., pp. 553 f., n. 20: 'This is the distinction Pierre Boulez makes between two kinds of space-time in music: in striated space, the measure can be irregular or regular, but it is always assignable; in smooth space, the partition, or break, "can be effected at will." Cf. Boulez, *Penser la musique aujourd'hui.* Paris: Gonthier, 1964, pp. 95–107.) Cf. id. 1980, p. 447.
[4] See Laruelle 2010a, pp. 12 f.
[5] Cf. Deleuze 1994, pp. 36 f.; Deleuze and Guattari 1988, p. 380; id. 1980, p. 471; see also DeLanda 2002, p. 186.
[6] DeLanda, p. 32.
[7] Deleuze 1994, pp. 262 and 208 f.

> Non-philosophy distinguishes on the one hand a philosophical multiplicity which may be of one or several types – the difference is irrelavant here because these multiplicities realize the same invariant through their variations: the invariant that demands that multiplicities be either variations (philosophy), or variables (science), or varieties (art). And on the other hand, non-philosophy distinguishes a type of multiplicity that is absolutely inconsistent or non-consistent, in the sense that it is no longer 'set-theoretical' or calculable, but also devoid of every form of auto-position. Only a 'non-Cantorian' multiple is capable of filling the void of Being as element of thought. This non-Cantorian concept of the multiple, in its 'unilateral' duality with the mathematico-philosophical multiple (and its numerous varieties), is deduced from the One's determination-in-the-last-instance of Being as void, as irreality or (non-)reality.[8]

In this chapter where the difficulties lie above all in the concepts I have distinguished at first the philosophical spatial relations and the metric relations, since for the same intensive or conceptual space one can imagine different metric relations, whether discrete or continuous. Despite the fact that, according to Laruelle, 'the hypothesis of non-philosophy can neither be empirically justified nor invalidated through comparison to experience{;}[,] it must at least also transform experience'[9], it is again Riemann[10] who let us identify an essential difference between purely qualitative or intensional relations and the metric relations with regard to the question how and to which extent this hypothesis might be supported by 'a field of experience taken as a real world'[11]. For, in case of the first ones where there is a *discrete* manifold, the experience is not always certain but without ever being imprecise, while in case of the metric relations where we have a *continuous* manifold, any 'experimentation'[12] by the generic matrix remains always imprecise – as high as the probability of its exactness may be. Riemann, of course, refers to the empirical knowledge in the narrower sense, while in Laruelle 'science's real object' remains rather immanent to experience: 'the *object of knowledge* as the articulation of empirical procedures (in the broad sense: the whole theorico-technico-experimental apparatus)'[13]. Laruelle 'understands the generic point of view as one of an experimental knowledge [...], whereas it is a conception of a transcendental and nonnaturalist type, since the knowledge is what determines essentially the worldly and natural reality', which makes it a 'transcendental and nonempirical perspective'[14]. 'Non-philosophy is an experiment in thinking'[15] and thought experiment in Laruelle

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[8] Laruelle, '"I, the Philosopher, Am Lying": A Reply to Deleuze', in Laruelle 2012a, p. 62.
[9] Id. 2013b, p. 11; cf. id. 1996, p. 14: *'En effet, l'hypothèse de la non-philosophie ne peut être ni justifiée ni invalidée empiriquement par comparaison avec l'expérience, si du moins elle doit aussi transformer celle-ci.'*
[10] Cf. Riemann 1876, pp. 266–268.
[11] Cf. Deleuze and Guattari 1991/2005, p. 22: *'un champ d'expérience pris comme monde réel'.*
[12] See Laruelle 2013e, pp. 60 f., and id. 1998, pp. 72–4.
[13] Id. 2016, p. 67; cf. id. 1992, p. 93: *'l'objet de connaissance comme l'articulation des procédures empiriques (au sens large : tout l'appareil théorico-technico-expérimental)'.*
[14] Id. 2015a, p. 174: *'on comprend le point de vue générique comme celui d'une connaissance expérimentale [...] alors que c'est une onception de type transcendantal et non naturaliste, le savoir étant ce qui détermine pour l'essentiel la réalité mondaine et naturelle'; 'perspective transcendantale et non empirique'.*
[15] Ó Maoilearca 2015, p. 75.

means both lived experience and experiment of thought, '*experience – in thinking*'[16]. 'The distinction between two objects', that is, 'the real (as "the finitude of identity" or its "radical immanence") and "the real object of science"'[17], 'does not, in effect, encompass the distinction between experience and the concept, the concrete and the abstract, experimentation and the theoretical – or any of their "dialectizations" or "couplings"'[18]. The random in thought experiments that characterize the style of non-philosophy (given that 'style is an entirely integral part of thought qua *thought experiment*'[19]) is irreducible. Furthermore, this 'theoretical and quasi-experimental'[20] determination becomes more and more imprecise in case of its extension beyond the limits of (the) sensation toward the infinitely small. Apparently, the 'transcendental and nonempirical'[21] concepts on which the spatial determination of the philosophical metric is based on, that is, the onto-material concept 'solid body' and the onto-vectorial concept of 'ray of light' cease to be valid for the infinitely small. Therefore, it is possible that, in the infinitesimal, the metric relations of the intensive or conceptual space do not comply with the conditions of classical philosophy.

The question of the validity of the hypotheses of commutative, conventional philosophy in the incommensurably small is related to the question of the profound reason of these metric relations. As Deleuze and Guattari write:

> Let us return to the story of *multiplicity* [...]. It was created precisely in order to escape the abstract opposition between the multiple and the one, to escape dialectics, [...] and instead distinguish between different types of multiplicity. Thus we find in the work of the mathematician and physicist Riemann a distinction between discreet multiplicities and continuous multiplicities (the metrical of the second kind of multiplicity resides solely in forces at work within them).[22]

With respect to a discrete qualitative or intensional manifold, their principle is already included in the concept of this multiplicity (in other words, the origin of its consistency is intrinsically given), but as regards a continuous manifold, this origin has to be searched elsewhere. Consequently, either the underlying 'Real' of the philosophical space must be a discrete, intellectual or sensuous manifold or one has to search the reason of the metric relations, like Laruelle, in the 'binding forces' of the 'conceptual gravitation' which act on it from outside: '*The problem of philosophy is its conceptual gravitation [...], its gravitational force that assembles the stars of the Ideas in a world or a*

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[16] Ibid., p. 27.
[17] Kolozova 2014, p. 97.
[18] Laruelle 2016, p. 67; id. 1992, p. 93: '*La distinction des deux objets ne recouvre pas en effet celle de l'expérience et du concept, du concret et de l'abstrait, de l'expérimentation et du théorique – ni aucune de leurs "dialectisations" ou "couplages".*'
[19] Châtelet 1998.
[20] Laruelle 2015a, p. 14: '*théorique et quasi expérimentale*'.
[21] Id. 2015a, p. 174: '*transcendantale et non empirique*'.
[22] Deleuze and Guattari 1988, p. 32; cf. id. 1980, pp. 45 f.

logos.' That is a problem '*of universal gravitation in thought.*'[23] The 'philosophical material'[24] which fills the intensive or conceptual space determines the philosophical metric. It is the 'conceptual particle'[25] which generates a 'metric field'[26]. The metric relations are not attributable to the philosophical space as a form of phenomena, but to the scales and to the quantized concepts and determined by the conceptual field of gravitation.[27] Laruelle considers that 'the transcendental philosophy is a step toward the principle of this gravitation, [...] a hypothesis to understand the interaction between seperated concepts [...]. The transcendental field starts to be operatory, a principle of mediation or of interaction, [...] fills the whole available space of thought and has an indeterminate value in each point of this space.'[28] In Deleuze the transcendental field is differential and the transcendental is impersonal and pre-individual. Deleuze means to determine an impersonal and pre-individual transcendental field, by means of relations of convergence and divergence, this 'field cannot be determined as that of a consciousness'[29]. Laruelle, on the other hand, notices that the 'transcendental field is the continuous invention of a new undulatory but still macroscopic ontology, meant to generate the conceptual points, a new representation of the sets or of the collections of entities. It helps to think no longer "substantially", with form et contour, mass or quantity of meaning, to move no longer at a trajectory of isolated conceptual points.'[30] Laruelle's critique also includes the 'plane of immanence' of Deleuze, as the following statement makes clear:

> The philosophically normal but theoretically amphibological concept of 'plane of immanence' means that immanence continues to orbit around the plane and as plane; it continues to orbit around the 'to' ('to itself') as axis of transcendence. Immanence thereby remains 'objective', albeit devoid of any object; it remains the appearance of objectivity, and gives rise to a new image of the real and thought. Instead of being absolutely faceless and unenvisageable, it assumes the face of a plane, of a topology, of survey and contemplation.[31]

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[23] Laruelle 2010a, p. 12: 'Le problème de la philosophie est celui de sa gravitation conceptuelle encore inexpliquée, de sa force de gravitation qui assemble les astres des Idées dans un monde ou un logos. Ce n'est plus un problème d'auto-critique ou de déconstruction mais de gravitation universelle dans la pensée.'

[24] Id. 2013e, p. 61; cf. id. 1998, p. 73: '*matériau philosophique*'.

[25] Id. 2010a, pp. 57, 64: '*particule conceptuelle*'.

[26] Weyl 1919, p. 88: '*das von ihm [dem Körper] erzeugte "metrische Feld"*'.

[27] Cf. ibid., p. 91: '*Die Maßverhältnisse kommen aber nicht auf Rechnung des Raumes als Form der Erscheinungen, sondern auf Rechnung des durch das Gravitationsfeld bestimmten physikalischen Verhaltens von Maßstäben und Lichtstrahlen*'.

[28] Laruelle 2010a, p. 12: '*la philosophie transcendantale est un pas vers le principe de cette gravitation, encore une hypothèse pour comprendre l'interaction entre concepts séparés [...]. Le champ transcendantal commence à être opératoire, principe de médiation ou d'interaction, [...] remplit tout l'espace disponible de pensée et possède une valeur indéterminée en tout point de cet espace.*'

[29] Cf. Deleuze 1969, p. 102.

[30] Laruelle 2010a, pp. 12 f.: '*Le champ transcendantal est l'invention continue d'une nouvelle ontologie ondulatoire mais toujours macroscopique, destinée à engendrer les points conceptuels, une nouvelle représentation des ensembles ou des collections d'entités. Il aide à ne plus penser "substantiel", avec forme et contour, masse ou quantité de sens, à ne plus se déplacer selon une trajectoire de points conceptuels isolés.*'

[31] Laruelle, '"I, the Philosopher, Am Lying": A Reply to Deleuze', in id. 2012a, p. 57.

In contrast: 'The One is immanence (to) itself without constituting a point or a plane; without withdrawing or folding backupon itself. It is One-in-One and hence that which can only be found in the One, not with being or the other. It is a *radical* rather than an *absolute* immanence.'[32] Laruelle's point of view is connected to the concept of 'generic plane'[33] or of 'immanental amplitude'[34] defined as the superposition of what Deleuze and Guattari distinguished and correlated, on the one hand, as a philosophical 'plane of immanence'[35] or 'image of Being-Thought (noumenon)'[36] and, on the other hand, as a scientific 'plane of reference'[37], 'an immanence which is a flux and not a plane'[38] in the topological sense. This allows us to define a 'spectral element of consistency' as a new metric element for the philosophical space.

In non-commutative ontology, the interactional bridge is replaced by the 'propagator' which renders the transcendental, onto-vectorial Hilbert space a discrete/continuous 'mixture', without being a Kantian amphiboly. The principle that gives the 'conceptual gravitation' is extremly simple, that is the action which counts the number of 'eigenvalues' of the 'propagator' (consistency element or quantum of action: entanglement of metric and conceptual gravitation or force) which is an operator, that is, the number of 'eigenvalues' that are bigger than the Laruelle constant. Thus, we have defined a propagator or quantum of action, that is an operator, it is infinitesimal, therefore one can count the number of its 'eigenvalues' which are bigger than the given quantity (generic constant), and we get the action which contains both the quantum of action and the philosophical gravitation (the undecidable or indeterminate action that goes from one conceptual point to the other). The key of the method for determining the spectrum of an operator is the superposition of states. It allows wholesale to construct a determined state when we 'measure' it.[39]

The origin of non-commutative ontology is twofold. On the one hand there is a wealth of examples of onto-vectorial spaces (systems of thought) whose coordinates are no longer commutative but which have obvious relevance in philosophy (for their contribution to epistemology, aesthetics, ethics, ecology, etc.). The first examples came from the 'phase space' in Deleuze and Guattari[40] but many others can be found in Laruellean 'philo-fictions'. On the other hand the stretching of thought imposed by passing to non-commutative spaces and systems of thought forces us to rethink about most of our familiar ontological notions. This allows us to define the spectral element.

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[32] Id., 'A Summary of Non-Philosophy', in id. 2012a, pp. 28 f.
[33] Cf. id. 2010a, p. 58 ('Plan générique') and pp. 280–282 ('Le plan générique comme immanence et référence').
[34] Ibid., p. 309: 'l'amplitude immanentale'.
[35] Deleuze and Guattari 1991/2005, Chapter 2, 'Le plan d'immanence', pp. 38–59.
[36] Id. 1991/2005, p. 64: '*une image de Pensée-Etre (noumène)*'.
[37] See id. 1991/2005, Chapter 5, 'Fonctifs et concepts', pp. 111–27.
[38] Laruelle 2010a, p. 58: '*une immanence qui est un flux et pas un plan*'.
[39] Cf. Connes, Chéreau, and Dixmier 2018, p. 247: '*il existe un algorithme théorique, trouvé par Peter Shor [...]. La méthode qu'il utilise est une technique de mécanique quantique pour déterminer le spectre d'un opérateur. La clé de cette méthode, c'est la superposition des états.*'
[40] See Deleuze and Guattari 1991/2005, Chapter 1, '*Qu'est-ce qu'un concept ?*', pp. 21–37.

3.3.1. The Spectral Element of Consistency

'The physical has multiple consistencies (and logics)', as Ó Maoilearca writes, '("consistency" from *con-sistere*, "to stand still, together")'[41]. Milič Čapek already noted that there are 'subtle' and 'elusive' elements of spatiality *'even in the most abstract mathematical and logical thought'*[42]. Ó Maoilearca refers to the effective metaphor of 'logical space' in Ludwig Wittgenstein's *Tractatus*[43]. According to Čapek, 'there is a perfect isomorphism between physical atomism and the logical atomism of Wittgenstein: the objects of *Tractatus* are as immutable, discontinuous, indivisable and simple as the indivisible and homogeneous particles of classical physics. In both kinds of atomism, change is reduced to the changing "configurations" [...] of these ultimate units.'[44] Ó Maoilearca further points out:

> there are many consistencies to the material Real that we are a part of, not just the one logic of solids (Čapek's logical atomism) but also other possible logics of fluids or gases or quantum events. Consistency has different forms, one of which concerns the way in which a substance, like a liquid, holds itself together – its thickness or viscosity. Cinema too has a variable consistency, how it edits together ('stands still, together'). And Jørgen Leth [...] thinks of time as 'an almost liquid substance'. Cinematic logic, then, is plastic logic.[45]

The link of the following new definition of 'consistency' due to Connes[46] with the onto-material and onto-vectorial universe appears in many ways. There are two distinctive traits represented in the figure below which help us to appreciate the relevance of this new concept.

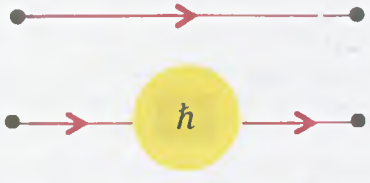

FIGURE. The transcendental operator and the spectral element of consistency. $\hbar$ represents the 'reduced Planck constant'.

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[41] Ó Maoilearca 2015, p. 117.
[42] Čapek, Milič, *Bergson and Modern Physics: A Reinterpretation and Reevaluation*. Dordrecht, Netherlands: D. Reidel, 1971, p. 182.
[43] See Wittgenstein, Ludwig, *Tractatus Logico-Philosophicus*. Translated by C. K. Ogden. New York: Cosimo Classics, 2007, e.g.: 1.13, 2.11, 2.202, 3.4, 3.42, and 4.463.
[44] Čapek 1971, p. 76.
[45] Ó Maoilearca 2015, pp. 128 f.
[46] See Connes 2017.

The upper part of the figure displays 'the transcendental operator'[47] as a tiny interval in which the interaction of a qualitative or intensional quantity with something else takes place by establishing a link between them. Conceptually, it is the 'differential element' of thought that can be conceived in a transcendental way, in the form of a 'differential' and continuous arc in a conceptual or intensive space. The Nietzschean difference considers Gangle 'as the base or standard model' that realizes 'after Kant and Hegel, a new kind of disruptive, anti-architectonic modality for philosophy, one that is intrinsically differential, creative and open. Such a philosophical modality is what Laruelle calls, in its broadest sense, Difference.'[48] In *Philosophies of Difference* Laruelle asks: 'What is a *differential* "relation of forces" for Nietzsche? It is the a priori structure of experience, the a priori or ideal constituent of the Will to Power that would be from its side its transcendental essence, its supreme principle of unification. Now such a relation is truly a "difference"'.[49] Furthermore, he contrasts non-philosophy's 'vision-in-One' – 'Rigorous, non-amphibological thought is not in *difference*, dis-ferring'[50] – with the Nietzsche-Deleuzean model of difference as idealism ('The differential calculus is the algebra of pure thought'[51]), the Heideggerean model of difference as finitude, and the Derridean model of difference as differance (for example, the differance of Being, that is, the difference between Being and beings, or Being that differs from itself). Jean-Luc Nancy associates the Derridean 'differance' as 'the indifference of the differential equation' with 'the real' that Lacan calls 'impossible', and with the 'indifference in the sense of a meaning', by which he understands 'the simple fact that something is taking place'.[52] Philosophy is in general, as Laruelle says, 'interested in the World only via some withdrawal or difference'[53] because '[t]o philosophise on *X* is to withdraw from *X*; to take an essential distance from the term'[54]. The motif of 'distance' is also suggested by Marion in *The Idol and Distance*.[55] According to James, 'Laruelle argues that categories such as difference or the Other (and also those of différance, alterity, exteriority, etc.) are shot through with transcendence (for example, excess or the Other are posited directly *as* transcendence).'[56] 'Yet this distance', as Ó Maoilearca further points out, 'is not an *object* of philosophy: it is the *form* of philosophy'[57] – 'transcendence or Distance',

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[47] Laruelle 2011a, p. 78: '*l'opérateur transcendantal*'.
[48] Gangle 2013, pp. 58 and 59.
[49] Laruelle 2010c, p. 82.
[50] Id. 2013b, p. 211; cf. id. 1996, p. 257: '*La pensée rigoureuse, non-amphibologique, n'est pas dans la* différence, le dis-férer'.
[51] Deleuze, *Différence et répétition*. Paris: PUF, 1968, p. 235.
[52] Cf. Badiou and Nancy 2017, pp. 61 f.: '*L'indifférence dont tu* [Alain Badiou] *parles, jusqu'à l'indifférence de l'équation différentielle, cette indifférenec, c'est le réel.* [...] *Ce réel que Lacan appelle "impossible"* [...], *cette indifférence au sens d'un sens* [...] *; je comprends par "sens" le simple fait qu'il se passe quelque chose*'.
[53] Laruelle, 'What is Non-Philosophy?', in id. 2013a, p. 236.
[54] Id., *Is Thinking Democratic? Or, How to Introduce Theory into Democracy*, in Mullarkey and Smith 2012, p. 229 (italics added).
[55] Marion, Jean-Luc, *The Idol and Distance*, Translated by T. A Carlson. New York: Fordham University Press, 2000, p. 232; cf. id., *L'Idole et la distance*. Paris: B. Grasset, p. 286.
[56] James 2012, p. 170.
[57] Ó Maoilearca 2015, p. 168.

the 'pure or abstract transcendence, the *identity-(of)-distance*'[58]. For Laruelle, in the words of Smith, 'the essence of metaphysics is found in the *meta* which refers to a "distance or 'phenomenological' transcendence that allows it to transgress towards the whole of being [*étant*] in its double dimension."'[59]

In case of the determinable '"transcendantal" plane'[60], as it has been conceived by the commutative paradigm of thought, two isolated conceptual points are joined up by a continuous arc, contrary to the quantized case, and we move from the one to the other 'by a sort of bridge'[61]. The manifold has 'an exo-consistency', with other intension and intensity manifolds, 'when their respective creation implies the construction of a bridge on the same plane'[62]. Apart from that, this multiplicity renders 'the components inseperable *in itself*: distinct, heterogeneous and yet non separable, that is the status of the components, or what defines the *consistency* [...], its endo-consistency. [...] The components remain distinct, but something passes from one to the other, something undecidable between the two'[63]. This applies to the macroscopic case.

The lower part of the figure above shows an even more important feature: that is 'the quantum of action that corresponds to the transcendental operator'[64] or the *'lived transcendental'*[65]. The hypothetical existence of the quantum-generic scale suggests that there is no *a priori* justification for the adoption of the notion of a continuum in the quantum-oriented theory. The '"quantum of action" plays a quasi-transcendental role, it differenciates and unites two phenomena by fixing the minimal but necessary measure that is exchanged between them'[66]. The generic matrix does not presuppose any longer the physico-spatial or phenomenological and transcendental distance of the traditional realism of space, conceived as the shortest path between two conceptual points in the philosophical coordinate system. '[T]he rejection of such "natural" spatial metaphors in philosophy – "position", "neighbourhood", "path", "shift", etc. –' considers Gangle as 'one of the key elements of Laruelle's thought'[67]. For Laruelle, speaking of 'onto-vectorial distance' in contrast to 'phenomenological distance'[68], the principle of inseparability goes along with radical immanence. He assumes 'the immediacy of the *lived*

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[58] Laruelle 2013b, pp. 133 and 134; id. 1996, pp. 160 and 161: *'la transcendance ou* [...] *la Distance', 'la transcendance pure ou abstraite, l'*identité (de) la distance'.

[59] Smith 2016, p. 101. Cf. Laruelle, *Éthique de l'étranger. Du crime contre l'humanité*. Paris: Klmé, 2000, p. 177.

[60] Deleuze and Guattari 1991/2005, p. 35: *'un plan "transcendantal"'*.

[61] Id. 1991/2005, p. 24: *'on passe d'un concept à un autre par une sorte de pont'*.

[62] Id. 1991/2005, p. 25: *'celui-ci [le concept] a également une exo-consistance, avec d'autres concepts, lorsque leur création respective implique la construction d'un pont sur le même plan'*.

[63] Id. 1991/2005, p. 25: *'le propre du concept est de rendre les composantes inséparables* en lui : *distinctes, hétérogènes et pourtant non séparables, tel est le statut des composantes, ou ce qui définit la* consistance *du concept, son endo-consistance.* [...] *Les composantes restent distinctes, mais quelque chose passe de l'une à l'autre, quelque chose d'indécidable entre les deux'*.

[64] Laruelle 2011a, p. 78: *'le quantum d'action qui correspond à l'opérateur transcendantal'*.

[65] Kolozova 2014, p. 145.

[66] Laruelle 2011a, p. 78: *'le "quantum d'action" joue un rôle quasi transcendantal, il différencie et unit deux phénomènes en fixant la mesure minimale mais nécessaire qui est échangée entre eux'*.

[67] Cf. Gangle 2013, p. 16.

[68] Laruelle 2010a, p. 250: *'On parlera de "distance vectoriale" en la distinguant de la "distance phénoménologique"'*.

transcendental insofar as it is *an experienced exteriority*'[69]. The immanental immediacy of the means is the equivalent of the inseparability in quantum physics. In non-philosophy, the transcendental operator undergoes onto-material and onto-vectorial corrections, turning into 'a Hilbertian "transcendental"'[70], and we can interpret these corrections as 'immanental' corrections to the commutative, nonspectral ontology. The essential trait of Laruelle's neologism for us here is pointed out by Smith:

> In traditional philosophical terminology, the modifier 'transcendental' usually refers to the structure, but it implies a distance between the structure and what is structured. For Laruelle, 'immanental' refers to the structure which is lived or inheres in what is structured. He might even write it as 'structured-without-structure' to indicate that the immanental structure cannot be understood if thought under the category of distance, since this would be an instance of decision and destroy the nature of its immanence.[71]

'To think "in" something is to think without separation, to think non-philosophically.'[72] The fusion or the superposition of the continuous immanence and of transcendence, of the entanglement and of the distance is what Laruelle calls 'unilateral duality' or 'mediate-without-mediation'[73]. With regard to his use of 'without', Laruelle explains in *Introduction to Non-Marxism*: 'The "without," an operator for materialism, is now utilized as an axiomatic operator [...] [signifying] the separated-without-separation proper to the Real or to the infrastructure.'[74] In *Principles of Non-Philosophy* the 'force (of) thought [...] is not exactly a becoming, a field of lines and vectors like the "transcendental field" of certain philosophies. Thinking is no longer opening and traversing a space.'[75] '[T]he force-(of)-thought is a radical opening, delivered from any spatiotemporal topology'[76]. James defines it 'as that effort or act of thought itself by which thought assumes the immanent real as its determination-in-the-last-instance; it is the effort by which thought assumes its identity with the real and maintains itself resolutely within a posture of immanence with regard to the real [...]. The "force (of) thought" is therefore the key operation which underpins or produces the performance of non-philosophical discourse.'[77] In non-commutative ontology, it is the spectral element of consistency or the 'propagateur' which contains all infrastructural forces acting on the onto-vectorial quasi-Hilbertian space. The 'propagator' is a function that qualifies the immanental amplitude associated with an infinitesimal displacement vector in the generic plane. Laruelle speaks of a '"lived wave of virtuality" rather than, like the

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[69] Kolozova 2014, p. 147.
[70] Cf. Laruelle 2015a, p. 53: *'un "transcendantal" hilbertien'*.
[71] Smith 2016, p. 183.
[72] Ibid., p. 52.
[73] Laruelle 2010a, p. 55: *'médiat-sans-médiation'*.
[74] Id. 2015b, p. 120.
[75] Id. 2013b, p. 211; cf. id. 1996, p. 257: *'la force (de) pensée [...] n'est précisément pas un devenir, un champ de lignes et de vecteurs comme l'est le "champ transcendantal" de certaines philosophies. Penser n'est plus ouvrir et parcourir un espace, déployer un horizon.'*
[76] Id. 2013b, p. 213; cf. id. 1996, p. 260: *'la force (de) pensée est une ouverture radicale, délivrée de toute topologie spatio-temporelle'*.
[77] James 2012, p. 177. Cf. Laruelle 1991, p. 72, and id. 1996, pp. 54, 99.

physicists, of probability. It is the nonmathematical "probability" that a written and configurated conceptual particle takes shape of a lived trace, unlocalisable in the plane of philosophical coordinates or trajectories (by horizontal and vertical transcendence, Being and One, etc.).'[78] Onto-material and onto-vectorial particle-objects are illocalizable, i.e., they 'exist' everywhere in a philosophical space, they are not confined to definite places and times – such as the trajectories of isolated conceptual points. They fill the whole intensive or conceptual space in form of amplitudes containing an indeterminate value or a 'probability range' in relation to their actualization in every point of their space. There is another 'non-philosophical effect' in connection with the spectral point of view, which Laruelle points out in *Philosophie non-standard* as 'the colour of thought':

> Another non-philosophical effect, the colour of thought. It is obtained by the superposition of styles, i.e., of radiations of different wave lengths that an incandescent or effervescent concept can emit by this superposition. The cardinal formulas of a philosophy have a certain wave length with a particular frequency or period of flux which distinguishe them from the same formulas of other authors but which make it also possible to superpose them mutually, we obtain a certain colour of thought but no longer a system of thought or a rigid position, a marxiste colour, zen colour, phenomenological colour of the particulate conceptual cluster. Thought is a prisma or a radiation spectrum 'before' being a system.[79]

And as for the context of a 'generic ethics', Galloway and Smith have come to the conclusion: 'If the political is a question of points, of introducing a hard distinction into a hitherto smooth field, the ethical reverses the logic: not point but curve, not distinction but indistinction.'[80] The same ethical gesture of lifting the distance (of compassion) can be found in *General Theory of Victims*: 'Victim-thinking' or 'to think victim' means 'to think as a victim but without the sense of distance, and thus transcendence, implied in the "as"'.[81] Finally, Ó Maoilearca finds Laruelle's "avowedly *utopian*" ethical imperative, namely to '"hypothesise a better place for the human"', in the 'utopian "no-place"' as 'an elimination of distance'.[82] To put it in a Nietzschean manner: what is the 'Laruellean

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[78] Laruelle 2010a, p. 64: *'On parlera d' "onde vécue de virtualité" plutôt que, comme les physiciens, de probabilité. C'est la "probabilité" non mathématique qu'une particule conceptuelle écrite et configurée prenne forme de trace vécue illocalisable dans le plan des coordonnées ou des trajectoires philosophiques (par transcendance horizontale et verticale, Etre et Un, etc.).'*

[79] Ibid., p. 478: *'Autre effet non-philosophique, la couleur de la pensée. Elle s'obtient par la superposition de styles c'est-à-dire de rayonnements de différentes longeurs d'onde que peut émettre un concept porté à incandescence ou effervescence par cette superposition. Les formules cardinales d'une philosophie ont une certaine longeur d'onde avec une fréquence ou une période déterminée de flux qui les distinguent des mêmes formules d'autres auteurs mais qui aussi les rendent superposables entre elles, on obtient une certaine couleur de la pensée mais non plus un système de la pensée ou une position rigide, couleur marxiste, couleur zen, couleur phénoménologique de l'amas conceptuel particulaire. La pensée est un prisme ou un spectre de rayonnement "avant" d'être un système.'*

[80] Galloway 2014, p. 189; Smith 2016, p. 118.

[81] Smith 2016, p. 107.

[82] Ó Maoilearca 2015, p. 168.

Gospel'? The Real is found, it is 'a lived, "unreflective" experience'[83], 'the "lived-without-life" as the abyssal bottom (or the "collapse") of the livings'[84] ('a sliding of a violent philosophical transcendence on another one whose collapse allows the access to the generic real'[85]; 'which is not an intra-historical and contingent event but a positive structure, suitable [...] for the "weak force of the victims" and for the generic knowledge that they have of themselves'[86]; 'The collapse is a co-lapsus, a sliding), – 'it is not promised, it is there, it is *in you*' (the One is 'the essence or the ground of the real'[87], 'the One, the real-as-Identity: not only an immanent cause, but a *cause-by-immanence*, the causality of radical immanence itself'[88], it is 'transcendental like a lived life can be which is only immanent'[89]): as lived '*without deduction and exclusion, without distance.* [...] To-be-at-home in a universe, which is well enough left alone by any kind of reality, in a merely "inner world", "true world"... "The kingdom"' of Christ '"is *in you*"...'.[90]

That is what Laruelle calls the 'materiel or immanental formalism'[91] according to which knowledge is 'onto-material' and philosophy the '"decoherent" reflection [...] in-the-last-instance of the non-philosophical materiality'. Regarded this way, 'the ideal knowledge of rationalism is a form of decoherence of the onto-materiality or of the onto-material formalism'.[92] It is possible to deduce the macroscopic as an '*objective appearance of in-itself*'[93] by a sort of decoherence. The decoherence which tends to re-establish the classical appearance of the world-thought is a consequence of the notion of complementarity and of the inevitable entanglement of complex systems with their environment.

In the general framework of non-commutative ontology, the confluence of the two fundamental concepts (i) of intensional or qualitative manifold and (ii) of the infinitesimal consistency element leads to the definition of a philosophical space as given by a 'spectral triple'[94] $(\mathcal{L}, \mathcal{H}, \mathcal{D})$ with an 'involutive' operator logos $\mathcal{L}$ in an onto-vectorial Hilbert space $\mathcal{H}$ and a 'self-adjoint' operator $\mathcal{D}$ in this same space. The infinitesimal element is an operator which defines the philosophical metric of the intellectual or sensuous manifolds as a propagator. We do no longer think the metric

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[83] James 2012, p. 169.

[84] Laruelle 2015a, p. 7: '*le "vécu-sans-vie" comme le fond abyssal (ou le "collapse") des vivants*'.

[85] Id. 2015a, p. 211: '*Le collapsus est* [...] *un glissement d'une transcendance philosophique violente sur une autre dont l'effondrement permet l'accès au réel générique*'.

[86] Id. 2015a, p. 160: '*Effondrement qui n'est pas un événement intra-historique et contingent mais une structure positive propre* [...] *à la "force faible des victimes" et à la connaissance générique qu'elles ont d'elles-mêmes*'.

[87] Cf. id. 1991, p. 25.

[88] Cf. ibid., p. 27.

[89] Cf. id. 1989, p. 46.

[90] Cf. Nietzsche, Friedrich, *Der Anti-Christ: Fluch auf das Christentum*, Aphor. 29, *Digital Critical Edition* (eKGWB), Authorized Manuscripts, http://www.nietzschesource.org/#eKGWB/AC.

[91] Laruelle 2015d, p. 64; id. 2014, p. 104: '*formalisme matérial ou immanental*'.

[92] Cf. id. 2011a, p. 133: '*pour la N[on-]P[hilosophie] la connaissance est matériale en elle-même* [...]. *C'est* [...] *la philosophie qui serait reflet "décohérent"* [...] *en-dernière-instance de la matérialité non-philosophique.* [...] *Peut-être pourrait-on dire que la connaissance idéale du rationalisme est une forme de décohérence de la matérialité ou du formalisme matérial*'.

[93] Id. 2010a, p. 183: 'apparence objective d'en soi'.

[94] Cf. Connes 2017.

consistency via an arc or a sort of bridge, that is, by the minimal distance either between punctiform components in such a manifold (endo-consistency) or between the conceptual points on the same plane of thought (exo-consistency), but the propagator expresses the difference between the 'states' in form of a lived wave of virtuality sent from 'point' or 'element' *a* to 'point' or 'element' *b*. As Laruelle writes in *Philosophie non-standard*: 'Thinking by amplitude, by semi-extatic pulsion and no longer extatically by objects, means unglueing immanence from the things where it gets stuck and letting them pass, it is less a flying over than a tunnel which, by crossing the mountains of stone and water, gives the objective appearance of moving them.'[95] This 'wave of lived experience'[96] is required to be limited in frequency. Instead of qualifying the infimum, i.e., the *minimal* distance between the components or the conceptual points, the propagator implies the supremum of intension or intensity, i.e., the *maximum* difference between the '[a]mplitude of futurality or of virtuality' – that is '[i]n the generic sphere the equivalent of the amplitude of probability, of the wave function or state vector'[97] in quantum mechanics – of two states, which gives the same result. It uses 'the generic' as a 'flux or messianic virtual'[98] and no longer philosophical paths or trajectories. The 'spectral triple' is associated with a compact intensional or qualitative manifold in a quasi-Hilbertian space of infinitesimal dimension.

Laruelle suggests this phenomenon of entanglement for knowledges and disciplines: two parts of an onto-vectorial system are seperated while remaining a total system, for instance, 'an immanent messianity [...] of Man-in-person as a superposition', while 'the messianic is a complex cause, [...] constituted as "*ensemblage*", a generic alliance or unilateral duality'[99]. Its components cannot be described independently ('something goes from one to the other, something undecidable' [100]): a non-separable wave function, that means that there is no independent 'wave function' for a concept-particle or conceptual particle-object *A* and B, in other words, they cannot be factorized: $\Psi_{AB} \neq \Psi_A \Psi_B$. The collision of the conceptual 'atoms' or quantum concepts results in the disappearance of the 'identity card' of each particle-object. The ensemble has just one single 'identity card'. Every concept-particle has lost its individual, onto-material identity. As Schrödinger puts it:

> the best possible knowledge of a whole does not necessarily include the best possible knowledge of all its *parts*, even though they may be entirely separate and therefore virtually capable of being 'best possibly known', i.e., of possessing, each of them, a

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[95] Laruelle 2010a, p. 306: *'Penser par amplitude, par pulsion semi-extatique et non plus extatiquement par objet, c'est décoller l'immanence d'avec les choses où elle s'enlise et les lui faire traverser, c'est moins un survol qu'un tunnel qui, traversant les montagnes de pierre ou d'eau, crée l'apparence objective de les déplacer.'*

[96] Ibid.: *'onde de vécu'*.

[97] Ibid., p. 51: 'Amplitude de futuralité ou de virtualité. *Équivalent dans la sphère générique de l'amplitude de probabilité, de la fonction d'onde ou vecteur d'état*

[98] Ibid., p. 439: *'nous appelons aussi bien flux ou virtuel messianique le générique'*.

[99] Ibid., p. 440: *'une messianité immanente comme superposition* [...] *de l'Homme-en-personne'*. See also Smith 2016, p. 165.

[100] Deleuze and Guattari 1991/2005, p. 25: *'quelque chose passe de l'une à l'autre, quelque chose d'indécidable entre les deux'*.

> representative of its own. The lack of knowledge is by no means due to the interaction being insufficiently known – at least not in the way that it could possibly be known more completely – it is due to the interaction itself.[101]

Contrary to the differential concept of consistency, the new 'formula' of the operator-propagator has a meaning in general, namely for continuous and discrete philosophical spaces, by bridging both perspectives. This corresponds to the change of paradigm offered by the 'quantum and generic ontology' of Laruelle. On the one hand, the coordinates are the operators which have a continuous spectrum, and on the other hand, the spectral element of consistency is infinitesimal which does not commute with the coordinates. The framework of non-commutative, intellectual or sensuous manifolds defined in terms of a 'spectral ontology' is sufficiently flexible, so that one can understand this superposition or entanglement of the commutative and of the non-commutative in a slightly more complicated conceptual or intensive space, with a little bit more complicated texture than the ordinary philosophical continuum. I repeat, however, that this unified theory has not the pretension to unify commutative ontology and non-commutative ontology on the level of a quantum-oriented theory but rather on the 'semi-philosophical' level.

In non-philosophy it is no longer about thinking *difference* (the differential element) and alterity on a continuous and commutative model but *coherence* on a discrete or quantum model of thought. This is the moment (i.e., the propagator operator) where philosophies of difference and non-philosophy diverge: the differential element is replaced by the quantum propagator. Nonetheless, as discussed above in section 2.3., 'Structural Homology of Process-Oriented Ontologies', both have more in common, or non-philosophy is better mapped on this topological and differential background than on a Cantorian ontological one. Therefore, Laruelle intends to imitate or clone Deleuze in order to deconstruct him, but he sees himself in clear opposition to Badiou (in *Anti-Badiou*, for instance). As Caputo puts it, 'the "critical consciousness" of Descartes [...] wanted to put all of our presuppositions into question in order to *start from the scratch*, to start from nothing, philosophizing *ex nihilo*, finding something absolutely *presuppositionless*'[102]. Given the fact that Laruelle refuses that critical kind of gesture of philosophy, here, a bit like in hermeneutics, 'we are doing the opposite: we begin where we *already are*'[103], in the onto-material 'World' of philosophy (Laruelle), 'not in order to root out but to get to the roots of our presuppositions'[104], that is, to the *spectrality of the real* or to the spectral, 'hauntological'[105] real. That is the radicality of

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[101] Cf. Schrödinger, 'Discussion of Probability Relations between Separated Systems', Proceedings of the Cambridge Philosophical Society, **31**, 1935, p. 555.
[102] Caputo 2018, p. 37.
[103] Ibid.
[104] Ibid.
[105] Ibid., p. 196.

the spectral paradigm which is ontological since it thinks no longer 'substantially'[106] and explores, in general, 'projects or lived vectors [...], not things or substances'[107].

In the non-commutative ontological framework, the transcendental operator – that is the classical constant in commutative ontology – is replaced by 'the immanental propagator' as a new constant that encapsulates all structural forces acting on the generic quantum plane in a unified manner. That is the 'spectral action' which is infinitesimal, since in a compact qualitative or intensional manifold the aforementioned operator is compact, that is, infinitesimal as explained before. The minimal metric unit is the generic quantum. In addition, the operator receives immanental corrections as a propagator. That means:

1) Ontology itself, from the moment when it is formulated by this new constant, will have immanental corrections.
2) This new definition of consistency does no longer presuppose that the philosophical space is linked with or conjugated by an arc, which permits to treat the discrete space on the same plane of thought as the continuous space and not to have the *a priori* hypothesis of *continuity*, of *connection* and of *convergence*.

The 'spectral point of view' does not only help when dealing with non-commutative issues related to a small microscopic scale but it is also 'natural' from a macroscopic point of view, where the commutative paradigm of the continuous space is satisfactory.

Here are a few more considerations to acquire a good understanding of how to construct a spectral ontology $(\mathcal{L}, \mathcal{H}, \mathcal{D})$ with an algebraic logos $\mathcal{L}$ of a non-commutative space X and a self-adjoint operator $\mathcal{D}$ defined as 'the inverse line element'[108]. A rich class of examples of concepts as non-commutative multiplicities can be obtained by considering 'isospectral deformations'[109] of classical Riemannian manifold-concepts. These examples satisfy all the properties of ordinary ontology except commutativity. The main idea of the construction is to deform the standard nonspectral triple $(\ell, \mathcal{A}, d)$, with a commutative, philosophical logos ℓ, a smooth, complex phase space $\mathcal{A}$ and a differential element d describing ordinary ontology, to a family of spectral triples $(\mathcal{L}, \mathcal{H}, \mathcal{D})$, as mentioned above, describing non-commutative ontologies. In a more general context one can construct non-commutative spaces via deformations of a commutative algebraic logos. Unlike in the case of isospectral deformations, here one proceeds at a formal logico-algebraic level, without involving the operator structure of the algebraic logos and without invoking the presence of an ordinary ontological structure. The idea of deformation quantization originates in the idea that classical ontology has a smooth manifold (phase space) setting with a symplectic, that is, complex, structure, which defines a Poisson bracket $\{,\}$, i.e., a bilinear differential operator. The Hamiltonian H, for example, is a function on a phase space X that qualifies the evolution of any philosophical quantity, i.e., of any function f on X, by the equation:

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[106] Cf. Laruelle 2010a, p. 13: '*Il [le champ transcendantal] aide à ne plus penser "substantiel"*'.
[107] Id. 2015a, p. 207: '*des projets ou des vecteurs vécus [...], pas des choses ou des substances*'.
[108] Connes 2017, p. 3.
[109] Connes and Marcolli 2006, p. 57.

$$\frac{d}{dt}f = \{H, f\}.$$[110]

The system is quantized by deforming the product in the algebraic logos to a family $*_\hbar$ of products satisfying $f *_\hbar g \to fg$ as $\hbar \to 0$, which are associative but no longer necessarily commutative. These are also required to satisfy

$$\frac{f *_\hbar g - g *_\hbar f}{i\hbar} \to \{f, g\},$$

as $\hbar \to 0$, as the ordinary product is deformed in the direction of the Poisson bracket.[111] The main conclusion is that there should be a *'theory of ambiguity'*[112] which formulates precisely the relation between the formal non-commutative ontology and its integrated involutive version. Thus, it seems that the structure of a non-commutative Riemannian ontology provided by spectral triples adapts very well to some classes of onto-logico-algebraic deformations. Even if it may appear at first that spectral triples are not the right type of structure to deal with non-philosophical spaces associated to such deformations, non-commutative spaces obtained as deformations of a commutative, philosophcal logos fit in the context of a well developed algebraic theory of non-commutative, non-philosophical spaces. Ultimately, successfully importing tools from the theory of an algebraic operator logos into the realm of algebraic ontology of philosophical quantities might well end up within the framework of what we can refer to as a 'second quantization'[113] of non-commutative ontology, i.e., the complex lift of tropical philosophy (the construction of a complex lift from tropical philosophy in characteristic one to the complex world and the use of the tropicalization map).

At last, the presented body of results in the idempotent analysis of the generic matrix category and tropical algebraic ontology supply a strong and motivated expectation on the existence of a meaningful notion of a 'local' philosophy in characteristic one. In fact, they also suggest the existence of a notion of a 'global' philosophy in characteristic one (see paragraph 4.4., 'Subtropical Philosophy'), pointing out to the possibility that the discrete and cocompact embedding (that is, as a subfield with a compact quotient space) of a 'global field' into a locally compact semi-simple non-discrete field may have an extended version for semi-fields of characteristic one.[114]

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[110] Cf. Connes 1989, p. 8, available at: http://www.alainconnes.org/docs/lecollege.pdf.
[111] Cf. Connes and Marcolli 2006, p. 59.
[112] Ibid., p. 60.
[113] Ibid., p. 62.
[114] Cf. Connes and Consani, 'Characteristic 1, entropy and the absolute point' (2009), p. 4: arXiv:0911.3537v1.

3.4. Non-Commutativity and the Emergence of Time

Non-philosophy offers a generic space of thought containing both continuous and discrete variables. Therefore Gangle is right in saying that 'non-philosophy should not be understood as sharing either continuity or discontinuity with the philosophical tradition. It is neither a new kind of philosophy nor a "break" with philosophy. Rather as a real generalisation of philosophical thought, it is strictly "other than" philosophical'[1]. However, non-commutative ontology is not only a matter of rational generalization of conventional ontology to the case where the philosophical coordinates no longer commute but also a matter of opening to completely new things which have no analogue in philosophy's 'World' or 'World-thought'[2]. One of the most interesting conclusions of non-commutative ontology is *the appearance of time*. It can be summarized as follows: commutative ontology is *static*, it has neither time nor evolution in time; non-commutative ontology, in contrast, is *dynamic* and *processual*. In the non-philosophical 'universe' or 'universe-thought' the onto-vectorial states are unpredictable and aleatory; there the time can arise in a spontaneous way, simply from the non-commutativity as such of the complex algebraic logos – no other, supplementary structure is needed. In science in general and in a generic science in particular, the concept at stake is the concept of variable.[3] Variability as the most elementary notion of non-commutative ontology is of onto-material and onto-vectorial nature. The spectral variability of the 'Real' seems to be more fundamental than its temporal registration and therefore one has to reverse the hierarchy: the quantum and generic effervescence generates the passage of time and not the other way round.

How can the real time as we perceive it emerge from the generic random and quantum variability? To answer to this question, we have to consider the Einstein-Podolsky-Rosen (EPR) paradox[4] to which Laruelle offers a 'generic solution'[5] in *Philosophie non-standard*:

> There is no reciprocal action between the axiomatics of the GS [generic science] and the philosophical material, no action/reaction principle as it came from classical mechanics into philosophy, in particular classical philosophy, and that would allow to assign a determined place to each concept as far as to make them absolutely indiscernible. If it is necessary that they have a common point so that there is a same action of-the-last-instance, it is the one that carries philosophy, and that is the equivalent of the problem of realism (EPR) that posits a common reality to quantum physics and relativity. By passing to the ground of philosophy, this reality is ambiguous, an in-itself or a reality in

[1] Gangle 2013, p. 6; see also ibid., p. 156.
[2] Cf. Laruelle 2013e, pp. 170 f., and id. 1998, pp. 152 f.
[3] See id., '"I, the Philosopher, Am Lying": A Reply to Deleuze', in id. 2012a, p. 62.
[4] Einstein, Albert, Boris Podolsky, and Nathan Rosen, 'Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?', Physical Review **47**, pp. 777–80. DOI: doi.org/10.1103/PhysRev.47.777, 1935.
[5] Cf. Laruelle 2010a, pp. 391–3: 'La solution générique du paradoxe EPR ou la complémentarité unilatérale'.

> the Einsteinian sense, but an objective appearance or an apparent objectivity of in-itself for the GS.[6]

For Laruelle, the 'non-Einsteinian real' represents, by having a realist meaning in the generic sphere, the realist objection of incompleteness (EPR) against non-philosophy which is meant to be an *operatory* philosophy (the transcendental field is already operatory by means of a principle of mediation or of interaction) and to produce effects of invention without recourse to the 'generic or immanental real'[7] foreclosed to thought:

> The (EPR) objection of realist incompleteness [...] has its equivalent in nearly all philosophers, even the most idealist ones, against GS. As spontaneously 'Einsteinian' they presuppose a PSP [Principle of Sufficient Philosophy] which has immediately a realist meaning. GS would be an operatory, ad hoc philosophy for producing postulated effects of invention, it would lack in reference to the real, its objects being unlocalisable and unthinkable in the philosophical space.[8]

It is '[t]he problem of the real, the definition of a "non-Einsteinian" virtual real that holds the unilateral "milieu" but not the average between the realism of Einstein (EPR) and the probability of Born, while the unilateral complementarity has to replace, for its part, the complementarity by exclusion of Bohr'[9]. Laruelle further says:

> [Non-philosophy] would be not complete in the Einsteinian sense of the word, and also for an evident reason, since there is simply a subtraction of language that Einstein actually presupposed. [...] The algebra is then non-sufficient from the classical ontological point of view or proceeds by imaginary abstraction, it is like the residuary skeleton of a concrete or intuitive language, it needs the complement of the reality, philosophical occasion or noematic flesh of the logos.[10]

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[6] Ibid., p. 393: *'Il n'y a pas d'action réciproque entre les axiomes de la SG [science générique] et le matériel philosophique, pas de principe action/réaction tel qu'il est passé de la mécanique dans la philosophie surtout classique et qui permettait d'assigner une place déterminée à chaque concept jusqu'à les rendre tout à fait discernables. S'il faut bien qu'ils possèdent un point commun pour qu'il y ait action même de-dernière-instance, c'est celui que véhicule la philosophie, et c'est l'équivalent du problème du réalisme (EPR) qui pose une réalité commune à la quantique et à la relativité. En passant sur le terrain de la philosophie, cette réalité s'avoue équivoque, en soi ou réalité à la Einstein, mais apparence objective ou objectivité apparente d'en soi pour la SG.'*

[7] Cf. ibid., p. 391: *'l'immanence radicale soit du réel générique ou immanental'.*

[8] Ibid., p. 387: *'L'objection (EPR) d'incomplétude réaliste [...] a son équivalent contre la SG chez presque tous les philosophes, même les plus idéalistes. En tant que spontanément "einsteiniens", ils présupposent un PPS [principe de philosophie suffisante] qui a immédiatement un sens réaliste. La SG serait une philosophie opératoire, ad hoc pour produire des effets supposés d'invention, elle manquerait de référence au réel, ses objets étant illocalisables et impensables dans l'espace philoosophique.'*

[9] Ibid., pp. 47 f.: *'Le problème du réel, la définition d'un réel virtuel "non-einsteinien" qui tient le "milieu" unilatéral mais non la moyenne entre le réalisme d'Einstein (EPR) et la probabilité de Born, la complémentarité unilatérale devant de son côté remplacer la complémentarité par exclusion de Bohr.'*

[10] Ibid., pp. 391 f.: *'elle [la quantique, la non-philosophie] ne serait pas complète au sens où l'entendait Einstein, et pour une cause évidente elle aussi puisqu'il y a soustraction, justement, du langage que sous-entendait en fait Einstein. [...] L'algèbre est alors non-suffisante du point de vue ontologique classique ou procède par abstraction imaginaire, c'est comme le squelette résiduel d'un langage concret ou intuitif, elle a besoin du complément de la réalité, occasion philosophique ou chair noématique du logos.'*

By means of a 'generic transfer' of the debate that Albert Einstein and Niels Bohr pursued 'in dogmatic, positivist, idealist or realist terms and in a practically metaphysical way', Laruelle thinks it possible

> that the generic lifts the antinomy [...]. Between the predictive and realism or the descriptive there is a unilateral complementarity that makes the immediate passage from the appearance probability of the particle to the effective reality of the in-itself (an immanental decoherence, so to speak) possible. The algebra is a language but strictly operatory and only of-the-last-instance, a subtractive language. [...] Non-philosophy is not linguistic but it is a usage of-the-last-instance of the full or non-abstract language. The Logos is determined in-the-last-instance by a language-without-logos or the abstract symbolic of the algebra. It is a generic symbolic that needs the linguistic occasion or a hermeneutic help given its 'neutralization' [...].[11]

Therefore, he finally defends 'a generic realism of-the-last-instance'[12]. 'It reinforces the EPR objection [that is, the incompleteness argument] but by another realism, the realism of the generic subject insofar as it is [...] a passive operator as a virtual condition. We don't have to choose between Heisenberg or Einstein and de Broglie, but to come across a generic or non-Einsteinian real'[13]. In *The Last Humanity* Laruelle points out: 'The noetico-noematic "correlation" is unilateralized, it is a unilation without reciprocal overlapping relations, the particulate-undulatory combination is without reciprocation of the intentional arrow and of the noematic particle.'[14] Laruelle's understanding of 'unilateral duality' or 'complementarity' allows to overcome *correlationism*, that is, the philosophical standpoint, rejected by proponents of speculative realism, that we cannot directly access thinking and being, but only the correlation between them, by proposing a 'generic realism' to be distinguished from Brassier's 'anti-correlationism'[15] and from

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[11] Cf. ibid., p. 392: *'Peut-on déplacer le problème EPR [...] ? Bohr et Einstein posent le problème en termes dogmatiques, positivistes, idéalistes ou bien réalistes et de manière quasiment métaphysique. [...] Scientifiquement il faut donner raison à Bohr mais déplacer génériquement le conflit. [...] [Il] est possible que le générique lève l'antinomie [...]. Entre le prédictif et le réalisme ou le descriptif il y a une complémentari-té unilatérale qui rend possible le passsage immédiat de la probabilité de présence de la particule à la réalité effective de l'en soi (une décohérence immanentale si l'on veut). L'algèbre est une langue mais strictement opératoire et seulement de-dernière-instance, une langue soustractive. [...] La non-philosophie n'est pas langagière mais c'est un usage de-dernière-instance du langage plein ou non-abstrait. Le Logos est déterminé en-dernière-instance par une langue-sans-logos ou le symbolique abstrait de l'algèbre. C'est un symbolique générique qui a besoin de l'occasion langagière ou d'une aide herméneutique étant donné sa "neutralisation"'.*

[12] Ibid., p. 394: *'un réalisme générique de-dernière-instance'.*

[13] Cf. ibid., pp. 394 f.: *'Il renforce l'objection EPR mais par un autre réalisme, celui du sujet générique dans la mesure où il est quand même opérateur passif comme condition virtuelle. Nous n'avons pas à choisir entre Heisenberg ou bien Einstein et de Broglie, mais à retrouver un réel générique'.*

[14] Id. 2015a, p. 123: *'La "corrélation" noético-noématique est unilateralisée, c'est une unilation sans rapports réciproques se recouvrant, l'association ondulatoire-particulaire est sans réciprocation de la flèche intentionnelle et de la particule noématique.'*

[15] See Brassier 2007, pp. 118–49.

'speculative realism' in the style of Meillassoux[16]. Laruelle refuses speculation in general as a typical philosophical gesture of double transcendence[17], as he writes, for instance: 'We know from quantum theory that there is a problem of quantum tunelling in order to combine these two wings (*infra-/super*-structure) in a non-specular way.'[18] Non-philosophy thrives to think 'in *correlation with* the real', as Kolozova points out:

> The relational interconditioning of concepts is that which necessarily brings thought to the state and status of unity of (reconciled) contrarities. It totalizes it and renders it unitary (by way of performing unification into an orderly whole, a cosmos). (Even when the tension is seemingly preserved through the relation of opposition or paradox between contrarieties that participate in the 'orderly whole', what in fact takes place is their 'reconciliation' by way of transforming them into accomplices in the accomplishment of some cosmos.) [...] [T]he unity (in the sense of an accomplished whole, cosmos, structure, organism, and so on, but *not* in the sense of an affirmed oneness as singularity) is always already dualistic, synthesizing the two or leaving them *in a relation of split* (which still holds them together).[19]

In the EPR paradox showing that the thing-in-itself remains inaccessible in quantum mechanics Laruelle finds the same problem reflected as in Kant's schematism (see the schematism chapter in the *Critique of Pure Reason*) as a problem of thinking the Real as subtracted from the concept. In addition, what Laruelle says about the uncertainty of knowledge and the unrecognizable real (insinuating that the absolute secret is a necessary condition for the success of the experimentation[20]) lines up, on the one hand, with Kant speaking of faith and the *limits of reason* and, on the other hand, it is clearly positioned against Badiou's materialist conviction or belief distinguishing himself (with the words of Mao) from Kant's 'obscurantism': '"We will arrive at knowing everything what we did not know before."'[21] The schematism in Badiou regulates the unity of set theory and Being, whereas in the generic matrix it defines the combination of the algebraic or quantum givens on the one hand, and of the given philosophical lived experiences on the other hand, that is their reciprocal interpretation and their 'unity'. Laruelle offers a different solution than given by Kant's transcendental imagination (a hierarchical, empirico-rational dualism), the opposite solutions of Cohen and Heidegger, or Badiou's solution by the 'count-as-one' ('set of all sets'). As for Laruelle, assuming that

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[16] See Meillassoux, Quentin, *Après finitude: Essai sur la nécessité de la contingence.* Paris: Éditions du Seuil, 2006.

[17] See, for instance, Laruelle 2015a, pp. 70–2: 'La non-philosophie n'est pas une spéculation à la baisse'.

[18] Id. 2015a, p. 162: *'On sait par la quantique qu'il y a un problème d'effet-tunnel pour articuler ces deux volets* (infra/super-*structure*) *de manière non spéculaire.'* See also 'Discovery and non-specularity: Non-Copernican mutation within truth' in id. 2013b, pp. 265–9, and id. 1996, pp. 324–8: *'Découverte et non-spécularité. Mutation non-copernicienne dans la vérité'.*

[19] Kolozova 2014, p. 134. Cf. Laruelle 1989, pp. 12–4.

[20] Cf. Connes, Chéreau, and Dixmier 2018, p. 208: *'Le secret absolu était une condition nécessaire au succès de l'expérience* !' See also Derrida, Jacques, and Maurizio Ferrari, *Le Goût du secret. Entretiens* 1993–1995, Edited by Andrea Bellantone. Paris: Hermann, 2018.

[21] Badiou and Nancy 2017, p. 22: '"Nous parviendrons à connaître tout ce que nous ne connaissions pas auparavant."

the generic is 'a human last-instance' whose 'scientific or algebraic form' is idempotence 1 + 1 = 1, One-in-One = 1, he states as follows:

> We suspect that between idempotence and lived vectoriality, as in Kant between the concept and the intuition (between the originally synthetic unity of apperception and the formal intuition), there is a schematism problem, to which the transcendental imagination has provided Kant with the solution. In our problem we have to rise once more from the formal intuition to a generic solution which is the idempotence of the lived (experience) or the last-humanity.[22]

The generic solution is an 'immanental imagination' that combines idempotence and lived vectoriality in the idempotence of the lived experience or of the 'last-humanity'. Non-philosophy redefines, as Brassier says, 'the thing-in-itself as unobjectifiable immanence [...] which Laruelle identifies with "the real"'[23]. On the other hand, the pivileged role of 'the human' is no 're-ontologization' of the real as criticized by Brassier[24], it is rather operatory, as the following passage makes clear:

> *But we have to maintain a certain privilege of the human* or rather admit her/his... immanent duplication, her/his... intervention at the ends of the process, at first as a probable subject, then as being-of-superposition or clone indexed to the latter. But this duplication is not an ontological hierarchy, *it is simply operatory*, the possibility to think or to objectify by underdetermining her/his... initial situation in the biological circle.[25]

The real is compound by lived experiences that are operators in the immanental Hilbert space, expressed by 'oraxioms'. While in Badiou axioms express 'the ontological-formal decision of the Idea'[26] – the Platonic Idea is an operator, and the 'matheme' (Lacan) is the underlying principle[27] –, 'oraxioms' express 'the lived decisions of the generic subject'[28]. 'The world', as Laruelle says, 'hasn't been invented from Ideas or Substances,

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[22] Laruelle 2015a, p. 129: *'On se doute qu'entre l'idempotence et la vectorialité vécue, comme chez Kant entre le concept et l'intuition (entre l'unité originairement synthétique et l'aperception et l'intuition formelle), il y a un problème de schématisme dont l'imagination transcendantale a fourni à Kant la solution. Dans notre problématique il faut s'élever une nouvelle fois de l'intuition formelle à une condition générique qui est l'idempotence du vécu ou l'en-dernière-humanité.'*

[23] Cf. Brassier 2007, p. 127.

[24] See ibid., pp. 136 f.

[25] Laruelle 2015a, p. 125 (my italics): *'Mais il faut conserver un certain privilège de l'homme ou plutôt admettre sa duplication immanente, son intervention aux extrémités du processus, d'abord comme sujet probable puis comme être-de-superposition ou clone indexé à celle-ci. Mais cette duplication n'est pas une hiérarchie ontologique, elle est simplement opératoire, la possibilité de penser et d'objectiver en la sous-déterminant sa situation initiale dans le cercle biologique.'*

[26] Cf. id. 2011a, p. 32: *'L'OV [ontologie du vide] utilise des axiomes exprimant la décision ontologico-formelle de l'Idée'.*

[27] Cf. Badiou, *Manifeste pour la philosophie*. Paris: Éditions du Seuil, 1989, p. 22: *'Dans l'exemple platonicien, l'Idée est manifestement un opérateur dont le mathème est le principe "vrai" sous-jacent'.*

[28] Laruelle 2011a, p. 32: *'la NP [non-philosophie utilise] ce qu'elle appelle des "oraxiomes" exprimant les décisions vécues du sujet générique'.* For a definition of 'oraxiom' see id. 2010a, pp. 57 f.

complete waves and particles, but on the basis of the imaginary root [imaginary number] and of its process as radical origin of things.'[29]

By thinking of the EPR paradox, as a matter of fact, there is an analogy between the generic quantum random and time: in the case of this paradox and 'the philosophical measurement (position, relation, meaning, truth, value)'[30] in two causally independent conceptual points, there are not *two* aleatory generic quantum events, but a *single* one, due to correlations. In reference to the generic indexation to one of the variables in the generic matrix, either philosophy or quantum physics, Laruelle writes:

> It is a simple or unilateral duplication of the lived experience [...], there are not two lived experiences [...], but a single one in two positions or halfs [...]. The variable that will play this double game is divided in two functions, as a variable that is internal to the matrix of fusion and as an index [...]. 2 fuse in 1 for the matrix and 1 is divided in 2 for the generic. The generic is the One, always One but in two halfs, [...] in idempotence.[31]

Therefore there is a maximum *correlation* but no causality. One does not understand the chronology in this case of the process of knowledge and the 'wave packet reduction', that is, the *actualization* of some of all possible vectors or virtual observables (generic quantum potentials or potentialities) as products of knowledge (see the critical argument on the 'wave function' above in paragraph 3.1., 'The Particle Picture of Philosophy') seems to make no sense since one cannot say at which moment it happens. In case of $AB = BA$, 'the chronology is not important, does not make sense, between two observables *which commute*'[32], but if $AB \neq BA$, the chronological order of events plays a role. That is 'the emergence of time and even of space'[33] in the onto-vectorial Hilbert space. While the Laruellean Real 'in characteristic one' $(1 + 1 = 1)$[34] is atemporal, time might originate in the random of the generic quantum. In parallel with the 'commutative shadow' as the result of a 'dequantization' of the generic matrix category, on condition that the Laruelle constant tends to zero by taking *imaginary* values (see above paragraph 2.4., 'Tropical Philosophy'), a semi-classical and quasi-philosophical commutativity can reappear only on condition that A is being transformed by the *imaginary* time:

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[29] Id. 2010a, p. 395: *'Le monde n'a pas été inventé à partir d'Idées ou de Substances, d'ondes et de particules achevées mais sur la base de la racine imaginaire et de son processus comme origine radicale des choses.'*
[30] Ibid., p. 399: *'la mesure philosophique (position, relation, sens, vérité, valeur)'.*
[31] Id. 2015a, pp. 128 f.: *'C'est une duplication simple ou unilatérale du vécu [...], il n'y a pas deux vécus [...] mais un seul en deux positions ou moitiés [...]. La variable qui va jouer ce double jeu est dédoublée en deux fonctions, comme variable interne à la matrice de fusion et comme index [...]. 2 fusionne en 1 pour la matrice et 1 se divise en 2 pour le générique. Le générique c'est Un, toujours Un mais en deux moitiés [...] dans l'idempotence'.*
[32] Connes, Chéreau, and Dixmier 2013, p. 72: *'la chronologie n'a pas d'importance, pas de sens, entre deux observables* qui commutent'.
[33] Id. 2018, p. 208: *'l'emergence du temps et même de l'espace'.*
[34] Cf. Laruelle 2010a, pp. 59 f.; id. 1998, pp. 171–3; id. 2013e, pp. 125–7.

$$AB = BA_{it}.$$[35]

Non-commutative ontology of philosophical space and *real* time means to think of time as dependent on non-commutative space. Depending on the latter, time can fail to exist or disappear. The relative point of view (see paragraph 4.1., 'The Relative Point of View on Philosophy') is the view that time depends on or rises from non-commutative space, as non-commutative space rises from 'the "origenetical" point' which 'underdetermines the production of the generic lived experience'[36] (see the role of the conceptual points of a topos or of the 'punctual topos' in paragraph 4.3., 'The Homological Site'). As Laruelle writes in *The Last Humanity* on 'the collapse':

> it is the factor that 'originates', the 'origenetical' point by which the biological is lowered and opened to the future universe. It affects a radical 'decreased' or underdetermines the production of the generic lived experience, decreases before its specification according to the genre. Underdetermining means apparently causing, more profoundly originating in a collapse. The collapse is the trace of the universal presence of the imaginary number in all intentions and causalities of the representation. That is the authentic meaning of the microscopic, or of the quantum, while the particle is just a collapse of the object with which it is opened to its objectivity or its 'decoherence'. One has to think in terms of quantum and incoherence, by an undulatory collapse, before thinking coherence, the place of all illusions.[37]

The generic quantum provides a subtler point of view than standard or 'ordinary', that is, nonvariable and nonspectral, consistent 'World-thought' which constantly tries to reconstruct a plausible (coherent, classical-logical) past: only when we ask ourselves about the time that has passed, the past exists, so that we can imagine a coherent (logic, and consistent) story, since the reduction of the wave packet which happens in any philosophical measurement (interaction of generic quantum systems) is nothing else than the replacement of a virtual observable by an actual observable which is chosen among the elements in its spectrum. Thus there is an intrinsic fundamental source of variability in the generic quantum universe which is not reducible to anything classical. The results of actualizations are intrinsically variable quantities. Non-commutative ontology advocates, that the classical vision of the 'reality'[38] is just a simple

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[35] See the interview with Alain Connes at the *Collège de France* (2014) in the collection *'Entretiens du Collège de France', 'La géométrie non commutative engendre son propre temps'*, 26'01–28'19: https://www.college-de-france.fr/site/alain-connes/Entretien-avec-Alain-Connes.htm.

[36] Laruelle 2015a, p. 22: *'le point "origénétique" [...] sous-détermine la production du vécu générique".*

[37] Id. 2015a, p. 21 f.: *'Le collapsus [...], c'est le facteur qui "fait" origine, le point "origénétique" par lequel le biologique est sur-baissé et s'ouvre à l'univers futur. Il affecte d'un "décroit" radical ou sous-détermine la production du vécu générique, décroît avant sa spécification selon le genre. Sous-déterminer, c'est apparemment provoquer, plus profondément prendre son origine (comme son vol) dans un effondrement. Le collapsus est la trace de l'universelle présence du nombre imaginaire dans toutes les intentions et causalités de la représentation. C'est sans doute le sens authentique du microscopique, ou du quantique, la particule n'étant qu'un effondrement de l'objet par lequel il s'ouvre à son objectivité ou sa "décohérence". Il faut penser quantiquement, en incohérence, par effondrement ondulatoire, avant de penser cohérence, le lieu de toutes les illusions.'*

[38] Cf. id. 2011a, p. 23.

approximation of the 'Real' – 'The real is the superposition of all possible imaginaries'[39] ('"Feynman histories"' or '"Feynman paths"'[40]) –, based on John Wheeler's 'Delayed-Choice *Gedankenexperiment*'[41] in which the choice of one or the other of two complementary aspects of a quantum phenomenon is made *after* the phenomenon actually took place. What works perfectly for macroscopic phenomena (reflected by a macroscopic ontology), can no longer be applied at a microscopic, generic quantum scale, – and non-philosophical spaces are not 'macroscopic' but 'microscopic' systems of thought. This is reflected in the *Kochen-Specker Theorem* saying: if the dimension of a Hilbert space $\mathcal{H}$ is greater than 2, then there does not exist any valuation function $V: O \rightarrow \mathbb{R}$ from the set O of all bounded self-adjoint operators $\hat{A}$ of $\mathcal{H}$ to the reals $\mathbb{R}$, such that for all $\hat{A} \in O$ and all $f: \mathbb{R} \rightarrow \mathbb{R}$ the following holds $V(f(\hat{A})) = f(V(\hat{A}))$. This theorem implies that any statement regarding a 'state of affairs', formulated within the theory, acquires meaning only *a posteriori*, i.e., after 'measurement' or qualification. This implies that it is hard to avoid the Copenhagen interpretation of quantum theory, which is intrinsically *non-realist*. Quantum theory is non-realist, whereas non-philosophy cannot be described as a 'transcendental realism'[42] but as a 'generic realism' and Laruelle could also be called an 'immanental realist'. (Topos-oriented theory tries to be even more realist, see paragraph 4.4. 'Subtropical Philosophy'.) He gives implicitely a response to Meillassoux, who claims in 'Subtraction and Contradiction: Deleuze, Immanence, and Matter and Memory'[43] that Laruelle would not not contribute anything to the problem of realism, when he writes:

> For many reasons (already philosophical object, generic issues, undulatory and lived real), the question of 'realism' has no meaning here and belongs to the physicists who are condemned to epistemology. These objects are inseparable from a generic subject, because the latter is the real itself. The only question of this order of 'realism' is the attraction = *X* of the transcendence as formal or of the world but *X* is not an object. The interaction of the object and of the device [Bohr: the 'measurement problem'] brings about an invented object or a well grounded object of fiction, and which can topple over into the in-itself. There is no dilemma of observables and of the real in-itself, it is *the same* unilateral *object* [= the Real], the first time on condition of immanence and interference, a second time on condition of the attractor = *X* or as objectivity of the appearance that simulates the reality in itself.[44]

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[39] Cf. Connes, Chéreau, and Dixmier 2013, p. 50: '"Le réel est la superposition de tous les possibles imaginaires."'

[40] Laruelle 2015d, pp. 158, 176; id. 2014, pp. 231, 254; cf. id. 2015a, p. 189, and id. 2010a, p. 331.

[41] See Jacques, Vincent, E. Wu, Frédéric Grosshans, François Treussart, Philippe Grangier, Alain Aspect, and Jean-François Rochl, 'Experimental Realization of Wheeler's Delayed-Choice Gedanken Experiment' (2006), Science, Vol. 315, Issue 5814, pp. 966–8: arXiv:quant-ph/0610241v1. See also Connes, Chéreau, and Dixmier 2013, p. 136.

[42] See Laruelle 1991, p. 52; cf. Smith 2016, pp. 83 f.

[43] Meillassoux, 'Subtraction and Contradiction: Deleuze, Immanence, and Matter and Memory', in *Collapse Volume III*. Falmouth, U.K.: Urbanomic, 2007, pp 63–107.

[44] Laruelle 2010a, p. 400: *'Pour beaucoup de raisons (objet déjà philosophique, problématique générique, réel ondulatoire et vécu), la question du "réalisme" n'a ici aucun sens et appartient aux physiciens condamnés à l'épistémologie. Ces objets sont inséparables d'un Sujet générique parce que ce dernier est le Réel même. La seule question de cet ordre du "réalisme" est l'attraction = X de la transcendance comme formelle ou du*

Laruelle's 'thesis is that the most radical immanence (which does not take the form of a point or an ego) is the action-at-a-distance, that the immanental or the idempotence allows an indirect action, in short, that inseparability and non-locality can go together.'[45] In *Christo-Fiction* he further points out: 'It is symptomatic that the most radical immanence that the philosophy of Christ has imagined (in Michel Henry) is doubled into two equal aspects, an ego-point and an oscillatory flux of autoaffectivity that is closed up in this ego and that fills it—thus, between a conceptual atomism (the ego is semitranscendent or transcendental) and an oscillating matter, that of affective tonalities.'[46]

However, what the generic quantum entanglement shows might not be the existence of any 'action at a distance' that is faster than light, but simply *a coherence that is hidden by the random of the generic quantum.* A quasi-Hilbertian lived (experience) is about 'an internal coherence of the entanglement that is strange to the external world'[47]. The coherence governs the so-called 'reduction of the wave packets', and while quantum-oriented theory only offers probabilistic expressions, the coherence gives an actual result when there is any philosophical measurement. This random is not independently produced but follows the described rules of the onto-material formalism. Hence, the interaction is automatically synchronized, without any intervention, faster than light, at a distance. On the first sight, it seems totally aleatory, but it is a matter of appearance which hides a synchronization. Non-commutativity being an act – just as the 'force (of) thought' or 'thought power' (similar to the 'labour power' in Marx) which realizes the One-Real as determination in-the-last-instance[48], is the only formalism that permits to understand the originality of this source of harmony on the generic quantum stage with its superposed states and its operators which interact without commuting. Therefore, it might be a mistake to try to enter the spectral variability in the passage of time, since the latter could be caused by the former in the commutative 'World'. That's what is done in the 'wave package reduction' which stipulates that after a philosophical 'measurement' or 'observation' an onto-vectorial system sees its entire state reduced to the one that has been 'measured' or 'observed'. Everything becomes clearer if one manages to formulate the interventions of the 'reduction of the wave packets' without

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monde mais X n'est pas un objet. L'interaction de l'objet et du dispositif fait émerger un objet inventé ou de fiction bien fondée, et qui peut basculer sans délai dans l'en soi. Il n'y a pas de dilemme des observables et du réel en soi, c'est le même objet *unilatéral, une première fois sous immanence et interférence, une seconde fois sous l'attracteur = X ou comme objectivité de l'apparence qui simule la réalité en soi.'*

[45] Cf. ibid.: *'Notre thèse est que l'immanence la plus radicale (qui ne prend pas la forme-point ou ego) est l'action-à-distance, que l'immanental ou l'idempotence permet une action indirecte, bref que l'inséparabilité et la non-localité peuvent aller ensemble.'*

[46] Id. 2015d, p. 172; Id. 2014, p. 249: *'Il est symptomatique que l'immanence la plus radicale que la philosophie du Christ ait imaginée (chez M. Henry) se dédouble en deux aspects égaux, un point-ego et un flux oscillatoire d'auto-affectivité enfermé dans cet ego et qui le remplit, donc entre un atomisme conceptuel (l'ego est semi-transcendant ou transcendantal) et une matière oscillante, celle des tonalités affectives.'*

[47] Connes, Chéreau, and Dixmier 2018, p. 232: *'une cohérence interne étrangère au monde extérieur, de l'intrication'.*

[48] Cf. Laruelle 2011a, p. 38: *'la pensée défétichisée comme force (de) pensée (cf. "force de travail") [...] qui [...] effectue le réel-Un comme détermination-en-dernière-instance'.*

entering them in time, by avoiding the pitfall of refering everything always to time.[49] Time is *not* one of the coordinates in an onto-topological spacetime as in transcendental idealism where the *a priori* time belongs to the background framework. Deleuze gave an analysis of how time was added to the Cartesian cogito in *Kant's Critical Philosophy*[50]: 'For Kant, it is a question of the form of time in general, which distinguishes between the act of the I, and the ego to which this act is attributed: an infinite modulation, no longer a mould. Thus time moves into the subject, in order to distinguish the Ego from the I in it.'[51] Therefore, Laruelle can say: 'The One [...] is the ego rather than the subject. The One is the radical real which "is" not, [...] because it is 'without-being'; the One or the real does not "exist" but (is) in-One.'[52] In Laruelle, the generic subject does not use causal and spatiotemporal concepts for describing the 'corpuscular' thought content, whereas it places phenomena in noncausal connection in space and time, since non-philosophy is not about the causal spacetime description that constitutes the criterion of reality, but about a non-classical spacetime description that constitutes the criterion of 'the generic or immanental real'[53] foreclosed to thought.

Nancy characterizes 'the contemporary' as 'the time that became isomorphic and isochronic to itself, a time that only in a private way gets its bearing on its past and on its future, [...] a time of suspense on a narrow edge'.[54] 'In the existential-hermeneutical circle', as Caputo writes, 'the meaning of my past is always up ahead, and the meaning of my future is somehow already there.'[55] Derrida also 'argued against *closed* systems' in the 'intent on keeping the future *open* to the coming of what we cannot see coming'[56]. Language, even if we treat it as a formal system, 'is an *open-ended system*, not a closed one', continues Caputo. 'It is not, in principle, entirely formalizable. There is always something unruly about a linguistic rule, always something unpredictable about the system (the structural mutates into the post-structural).'[57] Derrida said about linguistic rules 'that they are not transcendental (strong, closed systems) but "quasi-transcendental" (weak, open systems)'.[58] His 'atheistic messianic principle', as Caputo points out, signifies 'a historical, unconditional open-endedness, an unlimited exposure to the future, a promise, which is always a risk'.[59] For Laruelle, '[i]ntroducing the

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[49] Cf. Connes, Chéreau, and Dixmier 2018, pp. 255–7.
[50] Cf. Deleuze and Guattari 1991/2005, p. 35.
[51] Deleuze, Gilles, *Kant's Critical Philosophy*, Translated by Hugh Tomlinson and Barbara Habberjam. Minneapolis: University of Minnesota Press, 1984, p. ix.
[52] Cf. Laruelle, 'A Summary of Non-Philosophy', in id. 2012a, p. 29.
[53] Cf. id. 2010a, p. 391.
[54] Cf. Badiou and Nancy 2017, pp. 63 f.: *'Le contemporain, c'est ce temps devenu isomorphe et isochrone à lui-même, un temps qui ne se repère que de façon privative sur son passé et sur son avenir, [...] un temps de suspens sur une arête étroite.'*
[55] Caputo, p. 52.
[56] Ibid., pp. 166, 167.
[57] Ibid., p. 162.
[58] Ibid.
[59] Ibid., p. 298.

indeterminate future into the cause of thought is how we are delivered from the harassment of the past and the present.'[60]

Laruelle speaks of 'One-Time': 'for such a time to be One or Real in the non-philosophical sense, that time must be unrepresentable and already manifest'[61]. 'Following the logic of unilateral duality, the past, the present, and future exist as effects of the One-time. From the perspective of One-time, there is no break between the future and the past and present. Instead there is simply a flowing thickness of a futural now. Insofar as these three aspects of time can be located at the level of the subject (which is different from the One-time), then they are present as modalities of that lived subject. Laruelle writes:

> The past re-turns [*re-vient*], the present be-comes [*de-vient*], but the virtual future under-comes [*sous-vient*]. Introducing the indeterminate future into the cause of thought is how we are delivered from the harassment of the past and the present. The nature of the futural [*futuralité*] is not one of an empty future but a [lived] void of {living} determinations, a flowing thickness, a future ceaselessly renewed as a non-cumulative and non-ecstatic wave that under-comes in the subject."[62]

Moreover, as Rovelli writes: 'Time is not oriented: the difference between the past and the future does not exist in the elementary equations of the world, it is a contingent aspect that appears when we look at things by neglecting the details'.[63] There is a fundamental source of variability in the generic quantum. That is, all thought experiments in microscopic, onto-vectorial systems are non reproducible, one can simply give probabilities (although Laruelle speaks of 'lived wave of virtuality' rather than of 'probability', and of 'immanental amplitude'). For non-commutative ontology it suffices to have a 'non-commutative algebraic logos as a complex number'[64], so that starting from a certain non-commutativity time emerges. That means that time is nothing fundamental upon which we can write thought or philosophy but, on the contrary, that time is an emergent phenomenon. That is, on the philosophical level, a very interesting result of non-philosophy's non-commutative ontology. The generic quantum calling everything into question suggests to *radicalize* freedom instead of absolutizing it (Sartre) by predicting a sort of symmetry between 'not only an uncertain future, but also an *uncertain past*'[65]. The past *is moving*, although we constantly try to fix

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[60] Laruelle 2010a, p. 437: '*Introduire le futur indéterminé dans la cause de la pensée est le moyen pour nous délivrer du harcèlement par le passé et le présent.*'

[61] Smith 2016, p. 171.

[62] Laruelle 2010a, p. 437: '*Le passé re-vient, le présent de-vient, mais le futur virtuel sous-vient. Introduire le futur indéterminé dans la cause de la pensée est le moyen pour nous délivrer du harcèlement par le passé et le présent. La futuralité n'est pas ce futur vide mais un vide de déterminations vécu, une épaisseur de flux, un futur sans cesse renouvelé comme une vague non-cumulative et non-extatique qui sous-vient au sujet.*' Slightly corrected translation by Anthony Paul Smith, cf. Smith 2016, p. 172.

[63] Cf. Rovelli 2018a, p. 109.

[64] Cf. Laruelle 2015a, p. 126: '*le logos algébrique comme nombre complexe*'.

[65] Cf. Connes, Chéreau, and Dixmier 2013, p. 51: '*il* [Einstein] *écrit un article avec deux autres physiciens dans lequel il montre, disons que "le quantique nous prédit non seulement un futur incertain, mais aussi un* passé incertain" ! [...] *C'est* [...] *ce qu'ils montrent, toujours à l'aide d'une "expérience de pensée". Ils en*

it in our vision. A coherent representation of past events depends on our standard or 'ordinary', that is, nonvariable and nonspectral, *modus operandi* of consistency-oriented 'World-thought'. That relativizes enormously the significance of the present moment and the significance of the past. It shows that the notion of time as a definite writing of the past is an inappropriate notion and how the generic quantum obliges to think things differently, in a much subtler and interesting way. The quantum or non-commutative universe has the property to generate its own time. As a consequence, the passing of time might be an emergent phenomenon rooted in quantum and generic phenomena and their specific variability or random. This is the ultimate expression of thought's orientation toward the unexpected, the unforseeable, the openness (general condition) with regard to the future as well as to the past. Therefore, what interests us is neither 'The End of Time' (see, for instance, Brassier[66]), nor 'the End Times of Philosophy'[67] but, to the contrary, the rise of time, since another beginning of the 'World' is possible.

concluent que la mécanique quantique implique une incertitude sur les événements passés entièrement analogue à l'incertitude sur le futur !". See Einstein, Albert, Richard C. Tolman, and Boris Podolsky, 'Knowledge of past and future in quantum mechanics', Physical Review **37**, pp. 780 f. DOI: doi.org/10.1103/PhysRev.37.780, 1931.

[66] Brassier 2007, Part III 'The End of Time', pp. 153–239. See also: *ORAXIOM: A Journal of Non-Philosophy*, Inaugural Issue: 'The End Times' (forthcoming), see http://oraxiom.org/index.php/OJNP.

[67] Laruelle 2012d.

4. HOMOLOGICAL ONTOLOGY IN CHARACTERISTIC ONE

4.1. The Relative Point of View on Philosophy

The notion of space, as became clear in the preceding chapter, plays a crucial role in ontology. It is traditionally conceived 'as a set of points, with a notion of neighborhood, proximity'[1] that could be called 'topo-onto-logy'[2] rather than 'Topo-Logic'[3] as by Laruelle in speaking of Deleuze's transcendental paradigm of the Möbius strip. As a transition to the topos-theoretic concept and a topos-oriented theory, I will return to the subject of variability. I will try to explain something about the topos and variability that will allow us the transition by returning to the problem of the continuous and the discrete, which was essential in the previous chapter for talking about infinitesimal variables in the context of philosophical (qualitative or conceptual, intellectual or sensuous) space. I will try to analyze a non-commutative space of non-philosophy in a different way. As we have seen, the non-commutative space is a space whose cardinality is not the same as the cardinality of the continuous but strictly bigger. Topoi are an inexhaustible source of these spaces. Thus, we have a non-commutative, non-philosophical space but we will not analyze this space by looking at it directly but by permitting it to stay behind the scene like a 'diabolic' object which will organize the spectral variability from behind the scene. As a consequence, we will do philosophy 'as usual' but on condition of a spectral variability at work. That is, all concepts, whether philosophy's 'concept-corpuscles' or non-philosophy's 'concept-particles' or 'non-conceptual symbols'[4], will be treated alike. But, for a 'good theoretician' in contrast to a 'bad theoretician'[5], there is a quasi-Cartesian 'malignant demon' behind the scene – as described by Descartes: 'I will suppose, then, not that Deity, who is sovereignly good and the fountain of truth, but that some malignant demon, who is at once exceedingly potent and deceitful, has employed all his artifice to deceive me' (*'Supponam igitur non optimum Deum, fontem veritatis, sed genium aliquem malignum, eundemque summe potentem & callidum, omnem suam industriam in eo posuisse, ut me falleret'. Meditation* I, 12[6]) –, a little devil '[h]overing in the background, like a spectre'[7] – 'Spectre, phantom or devil, I want to see what it is', as Molière (*Dom Juan*, act V, scene 5) writes – 'remains concealed, in the background, while we busy ourselves with what is going on right under our nose in the foreground'[8]. Therefore, we can do what we want, that is, philosophize as

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[1] Cf. Connes, Chéreau, and Dixmier 2018, p. 23: *'comme un ensemble de points, avec une notion de voisinage, de proximité'*.
[2] See 'Logics of Onto-logy' in Badiou 2014, pp. 11 ff.
[3] Laruelle, '"I, the Philosopher, Am Lying": A Reply to Deleuze', in id. 2012a, p. 63.
[4] Cf. id. 2002, p. 41: *'des symboles non-conceptuels'*.
[5] Cf. id. 2002, pp. 60 f.: 'Le mauvais théoricien'.
[6] Descartes, René, *Discourse on the Method & Meditations*, Translated by John Veitch. New York: Cosimo, 2008, p. 76.
[7] Caputo 2018, p. 50.
[8] Ibid., p. 36.

usual, *except* that behind the scene there is 'a *bad demiurge*'[9] who makes that everything varies – something that, according to Laruelle, has traditionally been neglected by 'the Philosopher or the Theologian, who have created a failed knowledge'[10]. The 'actors' on stage are the same as in 'ordinary', that is, nonvariable, nonparametrized and nonspectral, philosophy but now they are conceived as lived experiences ('persons'), experienced 'in person'. As Galloway points out:

> In confronting him directly, Laruelle pokes fun at Badiou's powerful triad of body-language-truth, stated perhaps most clearly in the opening pages of *Logics of Worlds*: there are only bodies and languages, except that there are truths.[...[11]] Laruelle swaps in two different terms, *lived experience* and *algebra* for Badiou's opening pair (*bodies* and *languages*). That is to say, the real lived experience of bodies, which Laruelle prefers to call 'persons', or people as they are experienced 'in person', and the mathematical language of formulae and identity known as algebra.[12]

'"God", "World", "Man", "Christ"', as Laruelle writes, 'these are such as p, q, r, or x, y, z, the cries of a transcendental formalism.'[13] They are set-theoretic concepts, provided with their familiar, standard philosophical structures, but they have a new variability by depending on a random, which characterizes the topos-concept. Hence, when we work in or think in terms of a topos, everything takes place as if we manipulate ordinary Cantorian, i.e., set-theoretic concepts, *except*, as Connes et al. write,

> that we cannot apply any longer the rule of excluded middle, which is understood as 'for any proposition one has to accept either that it is true or that its negation is true'. Since the situation depends on a random, we can no longer argue by the absurd: a statement can be true for certain values of the random without being true for all. On the other hand, all intuitionistic reasoning continues working.[14]

This spectralizing phantom makes that instead of being interested in only one particular philosophical space or intensional and qualitative manifold, there is a spectral variability. The relative point of view consists in studying only morphisms of a topos, that is, a collection of two functors, a functor of a reciprocal image and a functor of a direct image in between topoi. The relativist plurality of 'universes' or 'topoi' and the 'extrinsic' character of immanence (as in the 'Yoneda lemma' introduced above in

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[9] Laruelle 2010b, p. 41; cf. id. 2002, p. 61: '*un* mauvais démiurge'.
[10] Id. 2010b, p. 41; cf. id. 2002, p. 61: '*le Philosophe ou le Théologien, qui ont créé une connaissance ratée*'.
[11] Badiou 2009a, pp. 1, 4; cf. id. 2006a, p. 9.
[12] Galloway 2014, p. 181.
[13] Cf. Laruelle 2007, p. 109: '*"Dieu", "Monde", "Homme", "Christ" sont tels des p, q, r ou des x, y, z, les cris d'un formalisme transcendantal.*'
[14] Cf. Connes, Chéreau, and Dixmier 2018, p. 24: '[...] *lorsqu'on travaille dans un topos, tout se passe comme si on manipulait des ensembles ordinaires, sauf que l'on ne peut plus appliquer la règle du tiers exclu, qui s'etend comme "pour toute proposition on doit accepter soit qu'elle est vraie, soit que sa négation est vraie". Comme la situation dépend d'un aléa, on ne peut plus raisonner par l'absurde : un énoncé peut être vrai pour certaines valeurs de l'aléa, sans être vrai pour toutes. En revanche, tout raisonnement intuitionniste continue à marcher.*'

paragraph 2.1., 'Categorialization and Tropicalization'; as for the concept of 'sheaf'[15], see the following paragraph) means that intuitionism is the 'natural' logic of topos-oriented theory. As Badiou says: 'In category theory the relativist plurality of universes and the "extrinsic" character of immanence implies that the negation of non-being is not, in general, equivalent to the affirmation of being. This means that intuitionism is the natural logic of category theory, and that reasoning by the absurd is inadmissible in many Topoi'[16]. Therefore, the topos-concept looks like a generalization of the philosophical space whose essential properties remain valid, 'but where the notion of "true and false" becomes much subtler and qualified. We even find in there the notion of "way towards the truth", which depends on the considered topos'[17]. 'The universe of the new spaces, the "topoi" [...] is as much marvelous by its infinite richness – it contains besides the ordinary topo[-onto]logical spaces a lot of combinatorial examples – as by the totally original way a space is perceived: instead of being put in front of the stage, it remains backstage and appears only as a *deus ex machina* who introduces a variability'[18] on stage, i.e., in the philosophical space of set-theoretic concepts. In other words, the results found in commutative ontology are on equal footing for a 'homological ontology in characteristic one'. That is the link to non-philosophy. We can build a bridge to Laruelle's onto-material formalism.

The paradigm shift of 'the "theory of [relative] points of view" (Einstein)'[19] brought on the realization that there is no single perspective from which to view the 'world'. There is no background framework that we need to find. There are infinitely many different frameworks and perspectives, and the real power lies in being able to translate between them. The Kantian transcendental was already a limitation of the space as a thing-in-itself but the Laruellean immanental treats all philosophical representations as equal on the same generic plane. The 'equivalence of different kinds of philosophical decision when considered in relation to the real' is, for James, '[p]erhaps the most surprising thought which the ultra-realism of non-philosophy posits':

> For it follows from the indivisibility and absolute autonomy of the One that no single philosophy and no specific form of the philosophical decision can have any greater or lesser purchase on the real than any other (since ultimately they all have none at all). From the perspective of the vision-in-One, *all* philosophical systems and perspectives are equally contingent and their contingency is in each case equally 'in' and 'of' the real. This means, therefore, that all such systems are exactly equivalent in relation to the real

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[15] See appendix.

[16] Badiou 2014, p. 15.

[17] Cf. Connes, Chéreau, and Dixmier 2018, p. 24: *'Un topos apparaît ainsi comme une généralisation de la théorie des ensembles, dont il continue à satisfaire les propriétés essentielles, mais où la notion de "vrai ou faux" devient beaucoup plus subtile et nuancée. On y rencontre même la notion de "chemin vers la vérité", qui dépend du topos considéré.'*

[18] Cf. ibid.: *'L'univers des nouveaux espaces, les "topos", dévoilé par Grothendieck, est merveilleux autant par sa richesse infinie – il contient outre les espaces topologiques ordinaires quantité d'exemples de nature combinatoire – que par la manière totalement originale dont un espace est perçu : au lieu d'être mis au-devant de la scène, il reste dans les coulisses et ne se manifeste que comme un* deus ex machina, *qui introduit une variabilité dans la théorie des ensembles.'*

[19] Cf. Laruelle 2010a, p. 12: *'la "théorie des points de vue" (Einstein)'.*

> or, as Laruelle puts it, different terms belonging to different philosophies are *'equivalent by way of their essence in the One, but contingent. Equivalent therefore once again this time from the perspective of the One'*[20,21]

As Ó Maoilearca says, 'non-philosophy works by positing the equivalence (as regards the Real) of all philosophical positions. The autonomy of the Real leaves all philosophies relative.'[22] Therefore, it must be understood as a 'performative realism', i.e., a performance 'that sees all thoughts as equivalent, each one being as equally foreclosed to the Real as the next'[23]. Furthermore, 'non-philosophy treats *itself* equally with how it treats others – as physical. This is [...] a way of underlining how non-philosophy "equalizes," how it aspires to be egalitarian with *itself*.'[24] The relative point of view on philosophy is about the discovery of prolific points of view. A prolific point of view reveals interesting, important or essential issues like many parts of a whole that encompasses them. Such points of view are, as Grothendieck writes in *Récoltes et Semailles*, 'the most powerful discovery tools':

> the prolific point of view [...] makes us discover, and makes us recognize the unity in the multiplicity of what is discovered. And this unity [...] connects and animates these multiple things. But as the name itself suggests, one point of view in itself remains fragmented. It reveals us *one aspect* of a landscape or of a panorama, among a multiplicity of others that are equally valid, equally 'real'. Insofar as the complementary points of view of the reality are combined, as our 'eyes' are multiplied, they penetrate further the knowledge of the things. The richer and complexer the reality we wish to recognize, the more it is important, too, to have several 'eyes'[25] in order to comprehend it in its whole extent and in its whole finesse.[26]

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[20] Cf. id. 1989, p. 118.
[21] James 2012, p. 172.
[22] Mullarkey 2009, p. 205.
[23] Ó Maoilearca 2015, p. 103.
[24] Ibid., p. 101.
[25] Grothendieck notes: 'Every point of view leads to develop a language which expresses it and which is peculiar to it. Having several "eyes" our several "points of view" to comprehend a situation, means also [...] to have several different languages for defining it.' (*'Tout point de vue amène à développer un langage qui l'exprime et qui lui est propre. Avoir plusieurs "yeux" ou plusieurs "points de vue" pour appréhender une situation, revient aussi* [...] *à disposer de plusieurs langages différents pour la cerner.'*)
[26] Cf. Grothendieck, *Récoltes et Semailles. Réflexions et témoignage sur un passé de mathématicien*, § 2.6., *'Point de vue et vision'*, p. 41, matematicas.unex.es/~navarro/res/res.pdf: *'Ainsi, le point de vue fécond* [...] *nous fait* découvrir, *et nous fait* reconnaître l'unité *dans la multiplicité de ce qui est découvert. Et cette unité* [...] *relie et anime ces choses multiples. Mais comme son nom même le suggère, un "point de vue" en lui-même reste parcellaire. Il nous révèle* un des aspects *d'un paysage ou d'un panorama, parmi une multiplicité d'autres également valables, également "réels". C'est dans la mesure où se conjuguent les points de vue complémentaires d'une même réalité, où se multiplient nos "yeux", que le regard pénètre plus avant dans la connaissance des choses. Plus la réalité que nous désirons connaître est riche et complexe, et plus aussi il est important de disposer de plusieurs "yeux"* [note: see previous footnote] *pour l'appréhender dans toute son ampleur et dans toute sa finesse.'*

As for the *'unity in multiplicity'*[27] Grothendieck continues to say that 'it happens sometimes that a sheaf of converging viewpoints [...] capable to grasp *the One* across the multiple, gives substance to something new; to something which goes beyond each of the partial perspectives [...]. This new thing can be called a *vision*. The vision unites the already known points of view [...], and it reveals others that were unknown until then.[28] The relative point of view on philosophy assumes that it is possible to state everything relative to any given philosophical space that acts as a base topos. Category-oriented theory is entirely relativist by showing a plurality of possible 'Worlds'.

A prolific point of view makes us discover and comprehend a multiplicity of questions, of concepts and new statements. The 'great idea' is the point of view that not only is revealed as new and prolific, but which introduces in science a new and vast subject that embodies it. Such as the duality 'continuous' and 'discrete', 'topoi', etc. The subject that is the most vast by its range is the 'topos' which provides the idea of a 'synthesis' or 'fusion' of (i) *number*, (ii) *quantity*, and (iii) *form*. The 'topoi' present a profound metamorphosis of the notion of space. One can distinguish three types of 'quality' or 'aspect' of things of the 'universe' (Laruelle) which are the object of thought: What is fascinating is neither the number, nor the quantity, but the *form*, and in particular the structure hidden in the object. The number is suited for grasping the structure of 'discontinuous' or 'discrete' composites: the systems, often finite, formed of 'elements' or 'objects' (as we have seen above, Riemann talks about 'points' in case of a *continuous* manifold, and of 'elements' in case of a *discrete* manifold[29]), so to speak isolated the ones *vis-à-vis* the others, without any principle of 'continuous passage' from the one to the other. 'The quantity' on the other hand is the susceptible quality of *'continuous variation'*. That way it is suitable for grasping the continuous structures and phenomena. Non-commutative ontology is a 'bridge' for these two types of structure, the 'discrete' and the 'continuous'. Traditionally, the 'continuous' aspect was in the centre of the attention of philosophers which gave rise to the 'philosophical continuum'[30]. However, there were two different viewpoints in the investigation of the concept of space: the one putting the accent on 'discrete' properties, the other on 'continuous' properties (such as the position in the ambient conceptual space, or the 'quantity' measured in terms of mutual distances of its conceptual points, etc.). One can consider that the new non-commutative ontology is first and foremost a 'fusion' or 'intrication' of these two worlds: the discrete world in which there are 'spaces' without a principle of continuity, and the world of continuous quantity where there are 'spaces' in their strictest sense. In the new vision, these formerly separated worlds no longer form more than one.

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[27] Zalamea, Fernando, *Synthetic Philosophy of Contemporary Mathematics*, Translated by Zachary Luke Fraser. Falmouth, U.K., and New York: Urbanomic/Sequence Press, 2013, p. 156.

[28] Cf. Grothendieck, *Récoltes et Semailles*, § 2.6, pp. 41 f.: *'il arrive, parfois, qu'un faisceau de points de vue convergents* [...] *apte à saisir l' Un à travers le multiple, donne corps à une chose nouvelle ; à une chose qui dépasse chacune des perspectives partielles* [...]. *Cette nouvelle chose, on peut l'appeler une* vision. *La vision unit les points de vue déjà connues* [...], *et elle nous en révèle d'autres jusque là ignorés'*.

[29] Riemann 1876, p. 255: *'Punkte'* and *'Elemente'*.

[30] Laruelle 2015a, p. 150: *'continuum philosophique'*.

The relativity in the history of philosophy seen from the prolific point of view of non-philosophy is approached by Ó Maoilearca, when he describes how philosophers do not

> *stop* presupposing that *their* various modes of operation are mutually exclusive (of each other) and exhaustive (of the Real) [...] – it was always understood by each that his new position either supplants the older ones whole or incorporates them as its parts [...][.] In his *Philosophies of Difference*, Laruelle points to the Pre-Socratics as the very first philosophers to enunciate this kind of exhaustive speech act: '*Everything is* (*Water, Earth, Fire, etc.*).'[31] [...] [T]he formula 'everything is...' [...] precludes coexistence with others in virtue of its all-encompassing representation of the Real.[32]

As for non-philosophy, by contrast, Laruelle takes evidently a relative stance, when he points out:

> To the four 'truth procedures' (of which science is one) that sustain philosophy [...] [non-philosophy] opposes an open multiplicity of 'unified theories', each of which takes as object-material the relations between the fundamental and the regional (philosophy + a determinate region of experience: philosophy and politics, philosophy and psychoanalysis, philosophy and ethics, philosophy and art, philosophy and technology, etc.). Science has no exclusive privilege in non-philosophy, except for that which flows from its privileging within the philosophical material (which, precisely, is no more than a material).[33]

By seeing 'philosophy in this newly relativized way'[34], as Smith points out, 'Laruelle's non-philosophical analysis does not historize philosophy, it does relativize it and so is able to identify the elements of philosophy that must structure it prior to the philosophical act in a way parallel to Foucault's own historicizing.'[35] Moreover, '[i]n a sense what Laruelle does here is "provincialize" philosophy. [...] In making philosophical thought relative or provincial'[36] and 'thought [...] the relative productive force within philosophy'[37], Laruelle 'makes equal the varieties of human thought'[38] and 'the world [...] relative'[39].

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[31] Laruelle 2010c, p. 16.
[32] Ó Maoilearca 2015, p. 54.
[33] Laruelle 2013c, p. 12; cf. id. 2011a, p. 37: *'Aux quatres "procédures de vérité" (dont la science) qui sustentent la philosophie proprement dite (O[ntologie du]V[ide]), s'oppose dans la N[on-]P[hilosophie] la multiplicité ouverte des "théories unifiées", dont chacune prend pour objet-matériau les rapports du fondamental et du régional (philosophie + une région d'expérience déterminée : philosophie et politique, philosophie et psychanalyse, philosophie et éthique, philosophie et art, philosophie et technologie, etc.). La science n'a plus de privilège exclusif dans la non-philosophie, si ce n'est celui qui découle de son privilège dans le matériau philosophique qui, précisement, n'est plus qu'un matériau.'*
[34] Smith 2016, p. 22.
[35] Ibid.
[36] Ibid., pp. 46 f.
[37] Ibid., p. 48.
[38] Ibid., p. 47.
[39] Ibid., p. 48.

4.2. Topos-Oriented Theory and Variability

The topos as the most general concept of space is taken here to be a particular type of category-concept that attempts a generalization as to what is continuous and what is discrete. In the topos continuous and discontinuous structures embrace each other, analogous to the onto-material formalism including the generic quantum. The unifying linearity according to the generic superposition principle allows discrete spectra to co-exist with continuous spectra. The onto-material formalism, which permits us to say what variability or a variable is, and the 'universe' of topoi stand next to each other, and one should not expect that everything could be reduced to a topos, although there seems to be a topos behind any situation. The concept of topos is a special type of category-concept which generalizes the category of Cantorian concepts. It behaves very much like the category of set-theoretic concepts. In order to formalize it, one can use Grothendieck's idea of a *sheaf on a site* by generalizing the category-concept of sheaf on an onto-topological space to the *category-concept of diagrams.*[1] All properties that we need for developing a cohomological theory in the case of sheaves such as the homological ontology in characteristic one remain viable when we look at the category-concept of diagrams. This leads to the concept of topos.[2] Thus, a topos is a category-concept equivalent to the category of sheaves of set-theoretic concepts on a site, which is then called a *'defining site'* (syntactic site) for the topos-concept.[3] For example, if we have a Cantorian concept, the variability is the variability of a 'sheaf' over that concept, i.e., the 'sheaf' of set-theoretic concepts. This is the ultimate generalization of the concept of space. It allows us to go beyond the apparent difference between continuous and discrete, classical and quantum, commutative and non-commutative, standard and non-standard, etc. within an abstract space where a certain non-separation or continuity emerges. The transition from commutative ontology to non-commutative ontology can be seen as a change of topos. Classical philosophy can be located in the topos of set-theoretic concepts, in contrast to quantum-oriented theory which involves a different topos. In other words, there is a *correspondence* between the continuous and the discrete, that is, an even more intimate relation than proposed by the onto-material formalism. Laruelle attempts to quantize the philosophical space by the discretization of continuous representations as quantized *noemata*, whereas category-concepts offer a means to work with discrete versions by relating them to continuous versions. The question of quantization of the lived experience is to find a functor between 'symplectic' varieties representing the categorial concept of the philosophical matrix, and the generic matrix represented by the quasi-Hilbertian category-concept, whose objects are onto-vectorial Hilbert spaces describing 'states', and whose morphisms are bounded linear operators describing 'processes'. The term 'symplectic' just mentioned is a calque of

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[1] See Grothendieck 1957, pp. 130 f.: 'Catégories de diagrammes'.

[2] Cf. Connes, 'Geometry and the Quantum', Lecture 2/2, January 26, 2017, Collège de France, Min. 48:32–51:08, available at: https://www.college-de-france.fr/site/en-alain-connes/course-2017-01-26-15h45.htm.

[3] Cf. Illusie, Luc, 'What is... a Topos?' (2004), Notices of the AMS, Volume 51, Number 9, p. 1060, available at: https://www.ams.org/notices/200409/what-is-illusie.pdf.

'complex', introduced by Weyl as he wrote: 'The name "complex group" [...] has become more and more embarrassing through collision with the word "complex" in the connotation of complex number. I therefore propose to replace it by the corresponding Greek adjective "symplectic".'[4]

The concept of topos is intimately related to spectral variability. As a matter of fact, a topos encodes not directly a philosophical space but by considering commutative ontology as parametrized by this philosophical space. Similarly, Laruelle says in *Anti-Badiou* that non-philosophy's 'initial project was to *serialize the standard tonality of the philosophical scale* – to treat all of its pitches equally, as parameters or variables, so as to make heard a music other than the classical'[5]. In the simplest case of an ordinary topo-ontological space, or, more generally speaking, on a 'site', the objects of the topos as a category-concept are the sheaves of Cantorian concepts over this space. The concept of sheaf allows us to understand what it means to move from a global view of an object or a superstructural level to a more local view or infrastructural level, and *vice versa* from the local infrastructure to the global superstructure. The local is information of 'the bottom', while the global is information of 'the top'. The heart of categorial reasoning is continuity 'upstairs' which disappears 'downstairs'. 'Upstairs' things are more simple since they are united. Their 'cohomology', i.e., invariance, gives a lot of informations about the abstract, conceptual space by capturing its structure. By means of 'structural translations' from the bottom to the top one can construct a structure that captures the continuous (for 'the "invariant-oriented" translations realized by topos-theoretic "bridges"'[6] see paragraph 4.4., 'Subtropical Philosophy'). The cohomology of a space is also an apparent construction, but there is something more fundamental behind it, namely an 'archetype'[7] or a 'site' (see below paragraph 4.3., 'The Homological Site'), which can be projected on the cohomology, while the latter can be reconstructed from that site. As a *'uni-versal'*[8] *constant*, this open, dynamic and non-commutative archetype – given that the non-commutative is more profound than the commutative – also governs the Laruellean 'universe'. The fundamental idea of a sheaf is a space that is laminated or stratified. One has to 'go up', ramify and reconstruct an object as projection in order to include the object in an injective object (projectivity and injectivity). The general reasoning consists in the search for connections in a 'global category-concept'. In the abstract dimension of the categorial there is much more freedom, compared to the particular with its constraints. Moreover, one has to introduce relativity and the relative point of view to find the invariants, i.e., the invariants and the irreducible structures that

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[4] Weyl, *The Classical Groups: Their Invariants and Representations*. Princeton: Princeton University Press, 1939, p. 165, footnote.

[5] Laruelle 2013c, p. 125; cf. id. 2011a, p. 112: *'Le projet initial de la N[on-]P[hilosophie] était d'ailleurs de* sérialiser la tonalité standard de la gamme philosophique, *de placer par exemple toutes les hauteurs comme paramètres ou variables à égalité, de faire entendre une autre musique que la classique'*.

[6] Caramello, Olivia, *Theories, Sites, Toposes: Relating and studying mathematical theories through topos-theoretic 'bridges'*. Oxford: Oxford University Press, 2018, p. 80.

[7] Cf. Zalamea, Fernando, *Synthetic Philosophy of Contemporary Mathematics*, Translated by Zachary Luke Fraser. Falmouth, U.K., and New York: Urbanomic/Sequence Press, 2013, p. 144.

[8] Laruelle 2013b, p. 211; cf. id. 1996, p. 257: 'uni-versel'.

Laruelle systematically searches to identify to speak of philosophy *per se*[9]. Behind the relative movements, there is permanence. There is, as Desanti puts it, a '"horizon of stratification"'[10], a difference of levels in category-oriented theory. Globally, there is a ramification and locally, there is flatness. That gives a ramified homological ontology made from 'archetypes' or 'sites'.

Considering the spectral variability of set-theoretic concepts as a sheaf allows us to do all philosophical operations that we know. All actions take place like in commutative ontology, and the role of the topos remains hidden, confined to the background, simply there for governing the variability. The concepts and the 'conceptual personae'[11] are the same, so we can talk, for instance, about 'the pairs of great transcendentals (Being and Non-Being, Same and Other, Good and Evil as Non-Good, True and Non-True, etc.)'[12] or about 'the Socrates of Plato', 'the Antichrist' or 'the Dionysos of Nietzsche', 'THE capitalist', 'THE proletarian', etc.[13] in a topos and all the philosophical results remain valid. We obtain the cohomological invariants by comparing this new commutative ontology with the old one to which it is connected by the conceptual morphism of every topos toward the topos of Cantorian concepts. As a concequence, we obtain an astute, fine understanding of the space in question by looking at how it makes vary the objects, that is, by looking at commutative ontology parametrized by this space. In Chapter 3., 'Non-Commutative Ontology and Spectral Variability', we have analyzed the generic quantum in being an uncontrollable and unstoppable variability, similar to the virtual fluctuations in Leibniz, as noted by Châtelet[14]. On a philosophical level the question rises: Is there a topos that rules the variability? The topos is the easiest to handle and the most reasonable to govern the variability. Therefore, the idea is: We keep doing what we usually do, that is, philosophizing but we do it with something in the back which organizes the spectral variability.[15]

The topos shows a much more intimate symbiosis than the generic quantum between continuous and discontinuous structures. In any case, finding a 'satisfactory' model that is 'continuous', 'discrete' or 'mixed', a solution where commutative and non-commutative ontology, the 'World' of continuous structures (by 'World' Laruelle understands the correlate of philosophy; 'world-thought' means the 'identity-of-the-last-

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[9] Cf. Id. 1991, p. 17.

[10] Cf. Desanti, Jean-Toussaint, *Les idéalités mathématiques. Recherches épistémologiques sur le développement de la théorie des fonctions de variables réelles.* Paris: Éditions du Seuil, 1968, p. 112: '"*horizon de stratification*"'; see also Zalamea 2013, p. 156.

[11] See Deleuze and Guattari 1991/2005, pp. 60–81: 'Les personnages conceptuels'.

[12] Cf. Laruelle 2008, pp. 112 f.: '*les paires de grands transcendantaux (Être et Non-Être, Même et Autre, Bien et Mal comme Non-Bien, Vrai et Non-Vrai, etc.)*'.

[13] Cf. Deleuze and Guattari 1991/2005, pp. 63, 66: '*le Socrate de Platon*', '"*l'Antéchrist*"', '*le Dionysos de Nietzsche*', '*LE capitaliste, LE prolétaire*'.

[14] Châtelet 2010, 'L'enchantement du virtuel', pp. 133–55.

[15] For this 'philosophical' idea see Connes, 'Geometry and the Quantum', Lecture 1/2, January 26, 2017, Collège de France, Min. 00:58:58–01:04:34, available at: https://www.college-de-france.fr/site/en-alain-connes/course-2017-01-26-14h30.htm.

instance of philosophy and of the World (of experience)'[16]) and the 'Universe' of 'discontinuous' or 'discrete' structures will be united (by 'Universe' Laruelle understands the correlate of modern knowledges; accordingly, knowledge is for him 'the thought of the Universe'[17]). This is the subject of the topos. While the 'philosophical continuum' that we are used to is inappropriate for grasping the discrete, as we have seen above, the topos permits to combine the continuous and the discrete in the most intimate way.

A topos has an 'internal language' which is *commutative*, while its 'external language' is *non-commutative*. That is, in a topos the language of 'the algebraic logos as a complex number'[18] is commutative, whereas from an external point of view the topos is a non-commutative space. Classical philosophy is expressed in the language of Cantorian concepts. In each commutative space of philosophy there are relations and definite objects. If one takes the same objects, defined in the same way in the internal language of the topos, with the same relations, one obtains the non-commutative space of non-philosophy. In other words, non-philosophy is the same thing as philosophy, except that the one can be described in the internal language of the topos and the other in the external language of set-theoretic concepts. The 'natural' logic of the philosophical space is classical, i.e., it admits the principle of excluded middle and consequently reasoning by the absurd. The fact that the topos has an internal commutative language is important for quantum-oriented theory. In the external language of a complex algebraic logos, the topos has a spectrum, while from an internal point of view it has no spectrum; however, it has a spectrum-object. The comprehension of this construction permitting the coexistence of the discrete and the continuous is actually closely linked with the comprehension of the onto-material operator formalism which allows the coexistence of the discrete and the continuous. The interaction of these two theories – topos-oriented theory and quantum-oriented theory – permits to understand many things.

The 'internal language' of a topos is called the set of properties of an invariant object called the 'subobject classifier'[19] endowed with an intuitionistic algebraic structure of Heyting that is internal to the topos (the existence of a subobject classifier was discovered by Lawvere, Heyting operations within this classifier, the possibility to speak of the 'internal logic' of a topos defined by these Heyting properties). While a 'subobject', according to Badiou, 'does not designate an object, but rather an arrow'[20], the 'subobject classifier', as Gangle puts it, 'functions in a topos as a kind of measurement apparatus or translation device'[21] for transformations called 'monomorphisms' (see above at the end of section 2.1., 'Categorialization and Tropicalization') by classifying them. The subobject classifier, says Badiou, '*makes the connection between [...] the composition of arrows (commutation), and the structure of quasi-immanence given by*

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[16] Laruelle 2013e, p. 171; cf. id. 1998, p. 153: '*l'identité-de-dernière-instance de la philosophie et du Monde (de l'expérience)*'.
[17] Cf. id. 2015a, p. 153: '*la pensée de l'Univers*'.
[18] Cf. id. 2015a, p. 126: '*le logos algébrique comme nombre complexe*'.
[19] See appendix.
[20] Badiou 2014, p. 62.
[21] Gangle 2016, p. 226.

monomorphisms'[22] (embedding). In fact, in the topos-theoretic framework we can do philosophy as we are used to doing it in the categorial framework of set-theoretic concepts, due to a general, basic principle: From the moment we think in terms of a commutative paradigm of thought, the solutions will automatically adapt to the case of a topos. All the usual properties, i.e., all predicates that we know remain true. That is, most of the properties and predicates of classical, commutative ontology remain true. In the topos-theoretic framework, the conjunctions $\wedge$, the disjunctions $\vee$, the quantifiers $\forall$ and $\exists$, the implications $\Rightarrow$ and the negations $\neg$ are arrows. 'Truth itself', as Badiou writes, 'is just an arrow of the *topos*, the truth-arrow.'[23] These arrows have the same meaning for any topos. Then the inference rules that we can apply in the reasonings depend on the properties of the subobject classifier of the topos and of the intuitionistic Heyting operations. Every topos defines a certain logic. The inherent logic of the simplest topos of commutative spaces has two truth values, true and false, while in a general topos one has an infinity of truth values, that is, a much more complex logic, which demonstrates a flexibility of logic. As Badiou points out: 'The true and the false are after all two arrows, two monomorphisms. Moreover, these elementary monomorphisms have the same source (1) and the same target (*C*). Can they not be, "these" arrows, two names for the same act? We would then have a kind of rational scepticism, where truth-values superimpose (as in the thought of Nietzsche) their nominal duality upon an identical principle of power'[24], which leads to '*the ambiguity of the One* in categorial thought'[25]. Ó Maoilearca draws a different conclusion when he writes with regard to Laruelle: 'Truth is plural because it is immanently real.'[26] And Galloway notes as follows:

> Here I side with Ray Brassier, who views Laruelle's chief innovation as that of developing a nondialectical, post-Hegelian logic of relation. See chapter 5 of Brassier, *Nihil Unbound*, 118–49. As Brassier puts it, Laruelle's innovation is 'fundamentally formal: it consists in the invention of a new kind of transcendental logic whose conceptual depth (if not extensive breadth) at once equals and challenges that of Hegel's dialectical logic' (148). Although, while Brassier characterizes Laruelle's logic primarily in terms of negation, I find it more apt to characterize the non-standard logic in terms of identity ($a = a$ or the One-in-One).[27]

Non-classical coherence (meaning *inconsistency*, *discreteness*, and *disconnectedness*) is based on an intuitionistic Heyting logic, whereas the classical coherence (implying *consistency*, *continuity*, or *connectedness*) adheres to a Boolean 'logical space' (Wittgenstein, *Tractatus Logico-Philosophicus*)[28] with binary truth values, true or false, and three key operators: the conjunction AND, the disjunction OR, and the negation NOT. 'Truth values' of the internal logic of the topos are called the sections of the

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[22] Badiou 2014, p. 72.
[23] Cf. id. 1998, p. 198: '*La vérité elle-même n'est qu'une flèche du* topos, *la flèche-vérité.*'
[24] Id. 2014, p. 79.
[25] Ibid., p. 43.
[26] Ó Maoilearca 2015, p. 128. Cf. ibid., 'Paraconsistent Fictions and Discontinuous Logic', pp. 97–140.
[27] Galloway 2014, p. 259, n. 69.
[28] Ó Maoilearca 2015, p. 117.

structure arrow of the subobject classifier toward the final object of the topos. In the case where the topos is the topos of set-theoretic concepts, the internal logic of the topos admits only two truth values, the true and the false (that is a bivalent Boolean logic). But in general, an infinity of such 'truth values' can exist. A topos has an intuitionistic logic where, for instance, the law of excluded middle, i.e., the *reductio ad absurdum*, cannot be applied. Gödel proved the equiconsistency of intuitionistic and classical theories.[29] A topos view on quantum-oriented theory and non-commutative ontology gives the logics of quantum concepts. The transition from standard philosophical to non-philosophical is a change of logics of concepts. 'Concept-particles' or 'non-conceptual symbols'[30] constitute a language that obeys no longer to classical logic - ancient logic (Aristotle), transcendental logic (Kant), dialectical logic (such as Hegel's *'Aufhebung'*), formal logic (Husserl), or Deleuze's logic of suspense (that is, the enigmatic relation between Being and Appearing, ontology and logic) - but instead to an *intuitionistic* logic. In *The Last Humanity* Laruelle says as follows: 'We refuse the Spinozist and Deleuzian model of the cause of itself, which affects itself, since the quantum decoherence or the microscopic duality does not fit into this unitary logic. The logic of the imaginary-onto-vectorial causality that we oppose to it assumes a request or a motivation in terms of its duality of micro/macrostructure'[31].

A topos is a category-concept that resembles strangely the category of set-theoretic concepts, that is, it has many properties in common with the classical philosophical space of commutative ontology. There is another crucial ingredient, that is the constants. There are variable objects which the 'little devil' makes vary but there are also constant objects. Most of the fundamental invariants (like cohomology, i.e. invariance) are obtained by comparing the variation with the constant objects (the cohomological functors). The idea of a topos, in its logical character, is the fact that there is the aforementioned subobject classifier, which has this extraordinary potential of formalization which allows to have no longer only the true and the false, but to have this idea of a *path towards the truth.* The things are much subtler than either *x* or *y* is right. We can formalize the things in a much subtler and interesting way than by the true and the false, as we are normally used to do. Equality is badly defined. Things might resemble each other without being equal. That is the generic quantum. An onto-material or onto-vectorial object has this sort of fluctuation. There is a bridge between the generic quantum and something that can be formalized by a topos, but there is more in the quantum, because there are the complex numbers, etc. An ontology of the algebraic logos as a complex number, that is, a complex algebraic ontology or non-commutative

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[29] Gödel, *Eine Interpretation des intuitionistischen Aussagenkalküls* (1933), reproduced and translated with an introductory note by A. S. Troelstra in Gödel, *Collected Works*, Vol. I, Edited by S. Feferman *et al.* Oxford: Oxford University Press, 1986: pp. 296–304.

[30] Cf. id. 2002, p. 41: *'des symboles non-conceptuels'*.

[31] Cf. id. 2015a, pp. 107 f.: *'Nous refusons le modèle spinoziste et deleuzien de la cause de soi qui s'auto-affecte, car la décohérence quantique ou la dualité microscopique n'entre pas dans cette logique unitaire. La logique de la causalité vectoriale-imaginaire que nous lui opposons suppose une sollicitation ou une motivation en fonction de sa dualité de structure micro/macro'*.

ontology ('Laruelle's ontology is an *algebra*'.[32]) is much larger than the ontology of other fields of philosophy (differential ontology, set-theoretic ontology, etc.). If we work in a topos, it is exactly as if we work in the category of set-theoretic concepts, except that one cannot apply anymore the rule of excluded middle. One cannot reason by the absurd but all intuitionistic reasoning continues to be true. Here one has a marvelous example of a concept whose range is not limited to any science. The notion of truth, for instance, is a much subtler concept in a topos.

Badiou points out that 'a categorial universe *presents a logic in an immanent way*, through actions which are *part of the universe.*[33] In addition, 'logic, semantically evaluated in a Topos, appears *as the unfolding of an algebraic structure* [...] defined entirely in terms of arrows'[34]. In general, the logic that is naturally embedded in a topos takes the structure of what can be called an 'algebraic logos of Heyting', which is the algebraic structure of logical operations that characterizes intuitionistic logic and includes classical logic as a special case.[35] The algebraic logos of Heyting is more general than the 'Boolean algebraic logos'. Every algebraic logos of Boole is Heyting, but not every algebraic logos of Heyting is Boolean.[36] For the agebraic logos of Boole it is always the case that the negation of the negation is the object itself ('involution'). In fact, this property is sufficient to define a Boolean algebraic logos as a subclass of the one of Heyting. But for an algebraic logos of Heyting that is 'not Boolean the negation of the negation is not always the object itself. The "law" of double negation fails.'[37] The logic of a Heyting logos is generally intuitionistic and not classical. 'Collapsing' functors that take the algebraic logos of Heyting to the one of Boole – corresponding to the subobject classifier in the category of set-theoretic concepts – 'are then closely connected to what Badiou calls "points" and which ground his "materialism"'[38]. In a general way, a Boolean algebraic logos is associated with set-theoretic concepts, while the algebraic logos of Heyting is associated with topoi. The structural differences between the logico-algebraic spaces of Boole and Heyting are perhaps the logical and conceptual 'expression of dyadic and triadic relational structures'[39]: the Boolean algebraic logos is dyadic, whereas the algebraic logos of Heyting is triadic[40] (see the 'spectral triple' in section 3.3.1., 'The Spectral Element of Consistency'). The topos permits at the same time an ontological, algebraic, and logical vision that is internal to the language of quantized and parametrized concepts.

We are in search of a theoretical framework wherein commutative ontology and non-commutative ontology appear as limits of a topos-oriented theory. The topos-theoretic approach allows a new description of non-commutative ontology. In this approach, a new way of thinking about the quantum-oriented theory and non-

[32] Galloway 2014, p. 238, n. 24.
[33] Badiou 2014, p. 84.
[34] Ibid., p. 114.
[35] Cf. Gangle 2016, p. 233.
[36] Cf. ibid., p. 235.
[37] Ibid., p. 236.
[38] Ibid., p. 237.
[39] Ibid., p. 239.
[40] Cf. ibid., p. 231.

commutative ontology is suggested, that is, a topos-oriented proposal for such a theory. How can a topos-theoretic approach be used as an 'extrinsic' (Desanti) theory (such as quantum-oriented theory, topo-logic-oriented theory, set-oriented theory, etc.; for the reason of the metric relations in philosophical space that has to be searched in the 'binding forces' of 'conceptual gravitation' acting on it from outside, see above Chapter 3.3., 'The Spectral Point of View on Ontology')? The key idea in this approach is that constructing a theory involves finding, in a topos, a representation of a certain formal language that is attached to the system under investigation. Thus the topos-theoretic approach consists in understanding at a fundamental level what a theory of non-commutative ontology and associated conceptual frameworks should look like. A formal language is a deductive system of reasoning made of 'atomic' variables, relations between such variables, and rules of inference. In this context it is assumed that each system has a formal language attached to it and which provides a deductive system based on an intuitionistic logos of Heyting. This alternative interpretation of quantum-oriented theory could been coined 'neo-realist' – in the wake of Laruelle's 'ultra-realism'[41] or generic realism. A more 'realist' theory means one in which the following conditions are satisfied:

(i) concepts form a Boolean algebraic logos, that plays a very important role that we do not have to consider the intuitionistic or Heyting logos; and

(ii) concepts can always be assessed to be either true or false.

In the topos-oriented approach to non-commutative ontology, both of these conditions are satisfied. A reformulation of quantum-oriented theory is achieved through the adoption of a topos-oriented theory as the conceptual framework in which to reformulate the onto-material formalism. One strategy to reformulate quantum-oriented theory in a more realist way is to re-express it in such a way that it 'looks like' classical commutative ontology.[42] This is the main idea in the proposed topos-oriented approach: we use a topos-oriented theory to redefine the conceptual structure of quantum-oriented theory in such a way that it 'looks like' commutative ontology. Furthermore, this reformulation of quantum-oriented theory has the key advantages that

(i) no fundamental role is played by the philosophical continuum; and

(ii) propositions can be given truth values without needing to invoke the concepts of 'measurement' or 'observer'.

Constructing a topos-oriented theory for a non-commutative ontology is equivalent to finding a representation in a topos of a certain language of an algebraic logos that is attached to the onto-material and onto-vectorial system or non-commutative paradigm of thought. Different presentations of a topos mean different points of view, a formalization of looking at philosophical space from different points of view, concretizing in a prezise way vague analogies and connections while wondering what is really behind all of that. By identifying a topos that captures the situation that

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[41] Ó Maoilearca 2015, p. 272. See also James 2012, p. 172.

[42] Cf. Ó Maoilearca, 'How to Act Like a Non-Philosopher', especially 'Miming Philosophy: A Game of Postures' in id. 2015, pp. 141–80, 173–6.

we want to investigate on, we will have a topos that respresents one point of view (e.g. commutative ontology) and another topos that represents another point of view (e.g. non-commutative ontology) and then we can compare these topoi to see whether they are equivalent or related in another way. If there are 'natural' relationships we might extract information from this comparison of classifying topoi which would hardly be visible by using alternative viewpoints.

By studying the topos-theoretic invariances from the point of view of different presentations by intrinsic or syntactic sites, we can reveal hidden aspects of extrinsic or semantic theories that we might have never imagined. A topos is always concretely given by the presentation of an intrinsic or syntactic site. There exists a process or construction which allows to relate to an extrinsic or semantic theory a topos, called its 'classifying topos'. If the topos is presented as a classifying topos (unifying concept, superstructure) of an extrinsic or semantic theory, that means in particular that it is defined by the intrinsic, syntactic site (infrastructure). For every topos, there exist infinite extrinsic or semantic theories (whose classifying topos is equivalent to the topos). In practice, by starting from a topos associated with a syntactic or intrinsic site, it is difficult to express or to qualify it as the classifying topos of semantic or extrinsic theories. The category is equivalent to the category of conceptual points of the topos. Each time when a topos is expressed as the classifying topos of an extrinsic, semantic theory, its invariant category of conceptual points of a topos is expressed or qualified as the category of the commutative properties of the theory.

For every topos concretely presented by a syntactic site, it is easy to deduce from this presentation many other syntactic sites which present the topos. Every presentation of a topos by a syntactic site makes of the topos a subtopos of the topos of presheaves on the underlying category-concept. The topoi of presheaves are especially important and there are extrinsic, semantic theories which are 'of presheaf type'[43] in the sense that their classifying topoi is such a topos-concept. According to Gangle, 'presheaves' are 'a type of functor', and 'functor categories' are 'presheaf categories - that are constructed from them'[44]. 'The categories of presheaves' are, as Fernando Zalamea defines, 'categories of functors to values in the category of sets'[45]. Olivia Caramello writes: 'The classifying topos of theories of presheaf type admits (at least) two quite different representations, one of semantic nature [...] and one of syntactic nature (namely, as the category of sheaves on the syntactic site of the theory)'[46], i.e., one presentation by semantic or extrinsic theories, the other by syntactic or intrinsic sites. In particular, if the topos is the topos of presheaves on a category, its subobject classifier is the presheaf. Given the topos of Cantorian concepts, its subobject classifier is the matrix of 2-elements. (Badiou: classical true/false or Boolean logic). One of the most important results in category-oriented theory shows that *any* category may be represented in this way *within* the category of set-theoretic concepts. This is the *Yoneda lemma* which

[43] See appendix.
[44] Gangle 2016, p. 139.
[45] Zalamea 2013, p. 141, n. 95 (without emphasis).
[46] Caramello 2018, p. 5.

demonstrates that every category-concept may be represented in terms of a distinct embedding (called the 'Yoneda embedding'[47]) into its own presheaf category-concept, that is, the category-concept of 'contravariant functors'[48] from it into the category of set-theoretic concepts (and 'natural', i.e. inter-functorial, transformations between these).[49] Thanks to the *Yoneda lemma* one gets directly to the heart of the 'subclass classifiers'. As Jedrzejewski says:

> The object designates now [...] the set of its representations, even if it cannot represent them all at once. It is an abstract space which gives an account of the complexity of the object. [...] Seen from the subject, the object is indexed by its viewpoints, which, in its dual category, is equals to the object seen from the viewpoint of the object. [...] All realizations of the virtual world are not actualized at the same time. [...] The knowable is then what happens or what happened, but also what will happen. An object is always a timeless object, since it incorporates all times, just like the knowledge which is associated to it. The unknowable is reduced to the non-intelligible.[50]

In category-oriented theory, *'every determination is external (by morphisms or relations)'*.[51] 'An object is identified (including what concerns its quasi-immanence, its sub-objects) only by its external relations with other objects of the universe (the arrows).'[52] Even if two theories are not the same, though in certain cases they can be said to be 'Morita equivalent' (Lawvere[53]), that is, they have the same classifying topos (up to equivalence; for further details on the concept of 'Morita equivalence', see below section 4.4.2.). All finite theories are classified presheaf topoi. Every theory admits a (unique up to equivalence) classifying topos and, conversely, every topos can be regarded as the classifying topos of some theory, and in fact of (infinitely) many such theories (variability), which can possibly be completely different from each other. Extrinsic theories of presentation are best investigated by adopting the point of view of classifying topos-concepts. Completely different (syntactic) sites can give rise to equivalent topoi. A topos can be thought of as a philosophical object which condenses in itself the semantics of a theory, representing the body of properties of the theory which do not depend on its linguistic presentation.

This raises the question of whether topoi could effectively serve as sorts of unifying 'bridges' for transferring concepts and results between theories which have a common 'semantic core' (superstructure) but a different linguistic presentation (infrastructure). The idea is to define the philosophical space by cohomological functors

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[47] Ibid., p. 80.
[48] See appendix.
[49] See Mac Lane 1998, pp. 59–62.
[50] Jedrzejewski 2007, p. 50: *'Maintenant l'objet* [...] *signifie* [...] *l'ensemble de ses représentations, même s'il est incapable de les représenter toutes à la fois. C'est un espace abstrait qui témoigne de la complexité de l'objet.* [...] *Vu du sujet, l'objet est un objet indicé par ses points de vue, qui est l'égal dans sa catégorie duale à l'objet vu du point de vue de l'objet.* [...] *Toutes les réalisations du monde virtuel ne s'actualisent pas en même temps.* [...] *Le connaissable est alors ce qui advient ou ce qui est advenu, mais aussi ce qu'il adviendra. Un objet est toujours un objet intemporel, parce qu'il incorpore tous les temps, comme d'ailleurs la connaissance qui lui est associée. L'inconnaissable se réduit au non-intelligible.'*
[51] Badiou 2014, p. 56.
[52] Ibid., p. 96.
[53] Lawvere (1963) 2004.

and then to show that these functors are representable by differently oriented theories. Each time one has a theory, one has an associated topos, that is, an associated space which links two things, the occurence of a functor and a topos that represents it, and this topos can always be represented in different ways. The profoundness of the results comes from the fact that the same object is represented in two different ways. In this formalism which is inspired by algebra one has two parallel and different theories. That is, if one wants to classify linear objects (in accordance with the generic superposition principle), one has recourse to Tannakian category-concepts or a Tannaka-oriented theory. A Tannakian category-concept is a particular kind of *monoidal* category of process interaction. If one wants to classify non-linear (that is, classical and commutative) concept-corpuscles or corpuscle-objects, one takes Galoisian category-concepts or a Galois-oriented theory. Both theories are mapped against each other. Actually, a Tannaka-oriented theory dealing with linear objects maps against a Galois-oriented theory of non-linear objects, but these two parallel theories do not merge. With the theory of 'classifying topoi' (see below: invariants of a topos) one can classify any type of extrinsic theory and require that the classifying topos and the Galoisian properties, the properties that one expects of a Galois-oriented theory, that is, technically speaking being an 'atomic' topos with two values – this property can be produced for a linear (non-classical, non-commutative) theory (generic superposition principle) as well as for a non-linear (classical, commutative) theory. With this theory of classifying topos-concepts, the philosophical dichotomy between the linear or non-commutative and the non-linear or commutative disappears. That is, one has one theory or formalism that allows one to study both. It remains the question of the specificity of the linear structure. In non-philosophy, one considers linear representations (in accordance with the generic correspondence principle). The question is: why linear? In order to respond to this question, one has to enter a framework of thought where the linear is not *a priori*, where the linear and the non-linear live together, and where one might discover the specificity of the linear.

4.3. The Homological Site

In the wake of quantum-oriented theory and the tropical analysis of the generic matrix category, the third theoretical approach to philosophy and non-philosophy is topos-oriented and consists in considering the 'homological site', i.e., the 'combinatorial skeleton' of the topos as 'a semiringed topos'[1]. The structure sheaf of the homological site is given by the semiring that plays a key role in tropical philosophy. It is a semifield of characteristic one, i.e., the 1 in the semiring fulfills the idempotent rule $1 + 1 := max(1,1) = 1$. Moreover, as mentioned above in paragraph 2.4.3., 'Semiadditive Category-Concepts and Characteristic One', this semifield is, following Connes and Consani, 'the only semifield whose multiplicative group is infinite cyclical'[2]. By construction, the homological site is a topos defined over the only finite, quasi-philosophical, tropical semifield which is not a classical philosophical, transcendental field. The homological site is 'a combinatorial object of countable nature'[3]. As we have seen in paragraph 3.3., 'The Spectral Point of View on Ontology', the conceptual gravitation is the action which counts the number of 'eigenvalues' of the consistency element or quantum of action called the 'propagator', that are bigger than the Laruelle constant. The infinite cyclical action on the quasi-philosophical semiring turns the latter into the structure sheaf of the homological site. If one takes 'characteristic one' as a name for an 'ontological status' of the real, then it is rather the 'backstage' topos which implies the possibility of the multiplicity of its onto-material manifestations 'on stage'. The homological site is 'in characteristic one' and, like Badiou's 'evental site', 'not part of the situation'[4], i.e., 'a concept analogous to Laruelle's world'[5], as Kolozova says, albeit 'on the edge of the void'[6], according to Badiou. His 'theorem of the point of excess'[7] mentioned above in paragraph 2.1., 'Categorialization and Tropicalization', states that 'there are always sub-multiples which, despite being included in a situation as compositions of multiplicities, cannot be counted in that situation as terms, and which therefore do not exist'[8]. Whereas 'Badiou speaks of the void of linguistic recognizability within the "evental site," around which a new truth, together with a new language, emerges{;}[,] Laruelle invokes the radical immanence – namely, the real – as the ultimate instance of legitimization of thought'[9]; Kolozova further explains:

> in Badiousian parlance, the voice or the clamor of the 'evental site' should become the stage of a new language. [...] On the transcendental plane, this new and singular truth will be something that does not make sense, whereas on the level of the event (of an 'unheard

[1] Connes and Consani 2018, p. 14.
[2] Ibid.
[3] Ibid.
[4] Badiou 2006b, p. 175; cf. id. 1988, p. 195.
[5] Kolozova 2014, p. 88.
[6] Badiou 2006b, p. 177; cf. id. 1988, p. 197.
[7] Id. 2006b, p. 84; cf. id. 1988, p. 98.
[8] Id. 2006b, p. 97; cf. id. 1988, p. 113.
[9] Kolozova 2014, p. 104.

> of reality'), it will have an explanatory power, initially recognizable perhaps only to those who inhabit the evental site.[10'11]

To contrast the evental site with the homological site which is neither a position nor a posture of the void but a posture of spectral variability and infinite cyclicity in characteristic one, I rely on Kolozova's following presentation of the 'evental site' as well as of:

> the multiple substantiation of the real and, hence, its onto-mathematical status of multiplicity. The status does not exclude the singular aspect or status of the real. Both aspects are considered unilaterally. The evental site is a position held by social groups or categories of subjectivity that are virtually nonexistent for the 'situation' (a concept analogous to Laruelle's world) whose inhabitants they are. They are on the edge of the void (the real) upon which the situation resides. And for the language that the situation disposes with, they remain unrepresentable. In fact, these groups hold the position of the void, *they are* the void for the situation they inhabit, but when they act and thereby create an entirely new truth, they do it from the position of the evental site. The evental site is still part of 'the situation', albeit on its edge and bordering with the void. [...] Therefore, the real – or the void – in terms of Badiou's philosophy of the event has many faces, many 'representatives'. In conclusion, it is *multiple*. Its instantiations as events are experienced as singularity.[12]

Thus, which semantic or extrinsic theory is needed for the unifying space of commutative ontology and non-commutative ontology? The concepts of 'topos' and of 'characteristic one', since there is a far reaching analogy between the topos in characteristic one and the category of compact operators in an onto-vectorial Hilbert space. One aspect of the real is the multiplicity of events that constitute the instance of the real. The real in characteristic one does not exclude that 'the real is always referred to in the singular', it rather includes the 'multiple eventuality of the real'[13], as Kolozova says.

4.3.1. Invariants of the Topos

In the framework of topos-oriented theory, the appropriate concept of symmetry is that of equivalence of category-concepts, so much that the predicate 'invariant' designates every object, property or process of construction that can be defined in the topos and which is invariant by categorial equivalence. The choice of homological invariants and their expression or decodification in terms of syntactic sites or extrinsic theories allow us to extract or to bring to light finite results from the infinite but inaccessible richness of the topos. As Laruelle says, from the perspective of the vision-in-One (the topos):

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[10] Cf. Hallward, *Badiou: A Subject of Truth*. Minneapolis: University of Minnesota Press, 2003a, pp. 116–22.
[11] Kolozova 2014, p. 133.
[12] Ibid., p. 88. Cf. Hallward 2003a, p. 120.
[13] Cf. Kolozova 2014, p. 88.

'There would be for each possible real point an infinite multiplicity of syntaxes or heterogeneous oppositions'[14]. James further points out:

> Each philosophical decision, syntax or structuring of the transcendence/immanence dyad would exist in a state of equality *alongside* all others and equally *alongside* the immanent real. Each would affirm its universality or totality but would do so on an (itself universal) plane of equivalence in relation to the real and would thus participate in a 'radical multiplicity of philosophical decisions'[15,16]

Moreover, as seen in paragraph 3.1., 'The Particle Picture of Philosophy', non-philosophy introduces 'equality and "democracy" into the sphere of philosophy'[17], as Laruelle 'understands all philosophies to be equivalent in relation to the real *only*, and in relation to their determination-in-the-last-instance by the real.'[18] 'If the real is the "topos"'[19], as Kolozova concludes,

> [t]he (estranged) human inevitably reflects [...] (on) the {o}u-topos of the real, which has *a priori* been left behind by the necessary and inevitable stepping into the topos of the transcendental.
> This {o}u-topos that the thinking human attempts to grasp is a non-place in the sense of the impossibility of its being inhabited without being simultaneuously *translated* by and onto the plane of the transcendental. It is a nonplace in the sense of its inaccessibility for both the (always already thinking) subject (of the estranged self) and the other to whom it is inevitably mediated by the Stranger (namely the transcendental).[20]

In this context, the topos-concept suggests a new way of thinking about philosophical space. Let us begin by giving a defintion of a conceptual topos and its morphism (based on Grothendieck, SGA 4, *exposé* IV[21]):

(i) A topos is a category-concept that is equivalent to the category of 'sheaves' of set-theoretic concepts on a 'syntactic site'.

(ii) A morphism of such a topos is a pair of adjoint functors called 'direct image' and 'reciprocal image'.

Nota bene:

(i) The topoi form a 2-category (i.e., a category-concept with morphisms between morphisms) whose 1-morphisms are conceptual topos morphisms and whose 2-morphisms are the natural transformations of such morphisms. In particular, for all topoi, the morphisms form a category-concept called the category of homeomorphisms. A conceptual point of a topos is defined as a morphism of the topos. The category of

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[14] Cf. Laruelle 1989, p. 112.
[15] Cf. ibid.
[16] James 2012, p. 173.
[17] Ibid., p. 174.
[18] Ibid.
[19] Kolozova 2014, pp. 144 f.
[20] Ibid., p. 151.
[21] See Grothendieck and Verdier 1972, pp. 299–518.

homeomorphisms between two topoi, considered up to equivalence, can be seen as an invariant of the one if the other is fixed. The invariant of the topoi defined as the category of homeomorphisms between the category of set-theoretic concepts and a topos has a special name: A conceptual point of a topos is defined as a morphism going from the category of Cantorian concepts to the topos.

(ii) For every category-concept, the category of 'presheaves' on the category, that is, of the contravariant functors toward the category of set-theoretic concepts is a topos: that is the category of 'sheaves' on the category. The contravariant functor which associates with every object of the topos the set-theoretic concept of its subobjects is representable (and be represented) by an object of the topos, well defined up to isomorphism, called the 'subobject classifier' as we have mentioned in the previous section.

In the following I am going to define three invariants of the topos that are relevant for our conceptual context. For every syntactic site we have a canonical morphism whose direct image element consists in seeing every sheaf as a presheaf; it identifies the category of sheaves of Cantorian concepts (on a syntactic site constructed of a category-concept) with a full subcategory of the category of presheaves on the category of presheaves on the category-concept. Its reciprocal image element is the functor of 'sheafification' of the presheaves; it identifies the category of sheaves of set-theoretic concepts with a quotient category of the category of presheaves on the category-concept. The category of set-theoretic concepts is a topos. In fact, it is the category of presheaves on the category-concept consisting of a unique object provided with an automorphism *Id*.

The *first invariant* is the 'punctual topos'. One of the invariants consists in the category of 'conceptual points'[22] of the topos, considered up to equivalence. The invariant of the topos defined as the category-concept of homeomorphisms between the category of set-theoretic concepts and a topos has a special name. The category of sheaves of Cantorian concepts on an onto-topological space is a topos. In particular, the category of set-theoretic concepts is a topos, for it is the category of sheaves of Cantorian concepts on the 'one point space'. This topos is called the 'punctual topos'.[23] Several unequivalent sites may give rise to the same topos, as the case of the punctual topos shows: both the one point space and the category of set-theoretic concepts are a 'defining' or syntactic site. The topos is some kind of system of generators and relations for the topos.[24] The conceptual points of the topos form a category. A conceptual point of a topos is the category-concept of homeomorphisms of the simplest topos, the topos of Cantorian or set-theoretic concepts. A conceptual point of a topos is a morphism from the category of Cantorian or set-theoretic concepts to the topos. In particular, for every topos, we can consider the invariant of the topos consisting of the category of morphisms toward the topos of Cantorian concepts ('direct image') or of the 'reciprocal image'. For every topos, there is a unique morphism from the topos toward the category

[22] Cf. Laruelle 2010a, p. 13: '*les points conceptuels*'.
[23] Cf. Illusie 2004, p. 1060.
[24] Cf. ibid., p. 1061.

of Cantorian concepts. The name conceptual 'point' comes from the following: given the topos of sheaves on a philosophical space, each element of the space defines a conceptual morphism (from the category of set-theoretic concepts to the topos of sheaves on a space) whose reciprocal image element associates with every sheaf on the space its 'fiber' at the point. The fiber is a non-commutative onto-vectorial space with parameters. (A topos admits 'fibered products'.[25]) Thus, by qualifying the concept-points of a topos we find the non-commutative space of non-philosophy. The points of a topos-concept generate non-commutative spaces of thought. The topos-theoretic interpretation of the conceptual points of the topos generating the non-commutative, non-philosophical spaces endows the topos with a clear ontological status.

There is one big difference between quantum-oriented theory and topos-oriented theory, which is a quality of the latter: One could make believe that we think in terms of the topos of set-theoretic concepts. We can tell ourselves that we work like in commutative ontology. If we have a 'fiber' we think of a Cantorian concept but one having parameters. A non-commutative space like the generic matrix is such a parameter space for a variable commutative, philosophical space. A particular, *discrete*, case is the topos of presheaves on a category-concept, i.e., contravariant functors towards Cantorian concepts. It is the strength of a topos-oriented theory that we are able to think in a particular topos as if we were in a topos of set-theoretic concepts. By taking the most simple topos, that is, the topos of Cantorian concepts, we find a category of concept-points on a non-commutative space. The reason is: As soon as we take the 'inductive limit' ('direct limit' or 'colimit'[26]) in the category of set-theoretic concepts, we have good chances to find non-philosophy's non-commutative space. For taking the 'inductive limit', we take a 'quotient space' by an equivalence relation. The corresponding space is a non-commutative, non-philosophical space and not an ordinary commutative, philosophical space. Therefore, the inductive limit in the category of Cantorian concepts gives a non-commutative space. (See further below for how non-commutative spaces spring out of the subtopos.)

The principal concepts of category-oriented theory are defined *as limits*, without aspiring to a 'philosophy of the limit'[27] as Drucilla Cornell names Derrida's theoretical legacy.[28] 'Limit' here means '*uni-versal*'[29] position, not in the sense of 'singular' as Badiou states in his 'Thesis No. 2' on the universal ('Every universal is singular, or is a singularity'[30]), but rather giving rise to a 'Universe-language'[31] in the Laruellean sense. 'Limit is one of the first names of the real,'[32] as Kolozova says in *Cut of the Real* (Chapter 3, 'On the Limit and the Limitless'):

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[25] Cf. ibid., p. 1060.
[26] See Mac Lane 1998, p. 67.
[27] Cf. Cornell, Drucilla, *The Philosophy of the Limit*. London: Routledge, 1992.
[28] Cf. Kolozova 2014, p. 101.
[29] Laruelle 2013b, p. 211; cf. id. 1996, p. 257: 'uni-versel'.
[30] Cf. Badiou 2006c, pp. 143 ff. See also Hallward 2003a, p. 250.
[31] Laruelle 2013e, pp. 160–2; cf. id. 1998, pp. 91–3: 'Langage-univers'.
[32] Kolozova 2014, p. 90.

> The real is not only an 'out there' that we encounter (in Greek *τυγχάνομεν*, hence *τύχη* or *tuché*) as a limit. The human-in-human, radical, and prelingual humanity is an experience that precedes any decision, any postulate of the thetic thought or of philosophy—it is an instance of the real. Also, the real under its first names of the lived (*le vécu* or *le joui-sans-jouissance*) is 'an immanence that takes pleasure only (from) itself and solely (from) itself without outdoing itself, embarking upon or transcending itself.'[33] The real is 'an identity that is nothing-but-singular', and not 'singular and universal' (which is to say 'mixed', that is, in relation with an imagined, philosophically produced world).[34]

'The mixed' in the Laruellean sense, as Kolozova puts it, is 'the mixed' established by the real and the thought 'but without philosophical amphiboly: the theorizing subject affirms the difference in status between the object of thought (correlating with the real) and the real of the object in such a a way that the former is recognized as transcendental and the latter as immanent'[35]. Furthermore, she points out:

> Thinking in terms of the real and the one as the point of departure and as a point of gravitation implies universalistic gestures of thought. However, [...] they are not gestures of a universalizing unity of differences but rather concurrently contingent ones. They are universal in the sense of their creation of unique language-universes (as in Laruelle) and truths embodying the desire to be valid for everyone (that is, universally).[36]

For Kolozova, limit 'is one of the first names of the real', in the Laruellean sense, instead of 'a vision of the world where the real intervenes only as the 'uncanny' external.[37] 'Every thought is immanently universalistic since the pretension to universality is constitutively inbuilt in the desire of thought'[38], as she concludes, or more precisely:

> According to each of them [Badiou and Laruelle], the act of theoretical work is always already a universalistic gesture. It is a radically individualistic (solitary), nontotalitarian, and nonuniversal(izing) (as nongeneralizing) gesture of thought. The central concern of this sort of 'particularistic universalism' is to claim that the act of theorizing is always already an act of producing a 'universe', one never witnessed by any other universe before. Laruelle speaks of a 'language-universe', while Badiou clearly claims, 'Everything universal is singularity.'[39] Laruelle's 'universe' is nonthetic, and it is 'a dimension which is not total, but a sheer nondecisional totality.'[40] In his 'Thesis No. 2' on the universal, in addition to his statement that 'everything universal is singularity', Badiou says: 'The

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[33] Cf. Laruelle 1989, p. 40; see also id. 2013d, p. 36: 'an immanence that enjoys (of) self and solely (of) self without surpassing itself, breaching itself, transcending itself'.
[34] Kolozova 2014, p. 94.
[35] Ibid., p. 114.
[36] Ibid., p. 112.
[37] Ibid., pp. 90 f.
[38] Ibid., p. 125.
[39] Hallward 2003a, p. 250.
[40] Cf. Laruelle 1989, p. 168.

universal cannot be directly articulated with any recognizable particularity, grouping, or identity.'[41]

Non-commutative ontology allows 'to encode' spaces, that is to say, 'quotient spaces'. A large source of examples of non-commutative spaces is given by such quotients of equivalence relations. 'Quotient' means, as said in paragraph 2.1., 'Categorialization and Tropicalization', that we keep the same language of the algebraic logos as a complex number and we add axioms. That is an equivalence. We start by a non-commutative space X. Suppose then that we are interested in taking a quotient $Z = X/Y$ (read 'X mod Y or X by Y') of X with respect to an equivalence relation. The quotient by equivalence relations of a non-commutative space X by a commutative subspace Y is a non-commutative space obtained by 'collapsing' subspace Y to zero (in paragraph 2.4., 'Tropical Philosophy', the imaginary generic quantum was considered to tend to zero giving the tropical semifield as the commutative shadow of the complex 'generic plane'). Since, as soon as we understand what is called an 'inductive limit', we get that kind of space because it is defined as a quotient space. The fundamental idea is: when we take a quotient ('generic plane mod or by tropical semifield'), we do not have to consider it as a commutative, philosophical space but as non-philosophy's *non-commutative* space. The non-commutativity comes from the fact that we will identify distinct concept-points and we will have arrows, i.e., morphisms, etc., and that makes the quotient non-commutative. In general the elements in the complex algebraic logos act as bounded operators on the onto-vectorial quasi-Hilbert space of the equivalence class. This is the link between the construction of the complex lift of tropical philosophy and quantization, although '[i]t is still unclear in which precise sense the comlex lift [...] can be used to "quantize"'[42] the Homological Site. In any case, the punctual topos helps to go beyond the all too simple dialectics of point/arrow that is continued by Badiou, when he writes: 'Every radical transformational action originates *in a point*, which, inside a situation, is an evental site'[43]. Expressing or qualifying the category of concept-points of a topos is often a difficult question. However, we have a general process which permits to interpret a large class of category-concepts as categories of conceptual points of a topos. The topos of the 'homological site' can be interpreted as a classifying topos of a certain extrinsic theory.

The *second invariant* is the subtopos of a topos. We need to generalize the concept of a subspace in a space. Now, we can consider a subtopos in the topos. This subtopos-concept has an algebraic structure called the co-algebraic logos of Heyting. If we have an extrinsic theory, we can always associate with it a classifying topos. That is, every topos can be written as a classifying topos of a theory. An extrinsic theory is always a language of an algebraic logos as a number (Gödel) and axioms like the Laruellean 'axiomatics of the One'[44]. To give oneself a subtopos in a topos, associated

[41] Hallward 2003a, p. 250. Kolozova 2014, p. 104.
[42] Connes and Consani 2018, p. 65.
[43] Badiou 2006b, p. 176; cf. id. 1988, p. 197.
[44] Smith 2016, p. 47.

with a certain extrinsic theory, is equivalent to consider the quotient by equivalence relations of the theory written in the same language with more axioms. 'A crucial aspect of the duality between quotients and subtoposes is', as Caramello writes, 'that the notion of subtopos of a given topos is a topos-theoretic invariant which behaves naturally with respect to sites.'[45]

The *third invariant* is the 'property of Boole'. From the logical point of view the property of Boole ('booleanity') corresponds to the law of excluded middle. An extrinsic theory does verify the excluded middle if and only if its classifying topos verifies the 'Boole property' in this sense. If we have a philosophical space, we have an associated topos, that is, the *continuous*. But if we are in a non-philosophical space, we have also an associated topos of a *discrete* 'presheaf' type that relates to non-philosophical category-concepts. Both the discrete and the continuous plunge into the universe of topos, we have at the same time the discrete and the continuous, and everything which is intermediary. One does no longer have the non-philosophical 'Universe' of the discrete on the one hand, and the philosophical 'World' of the continuous on the other hand. If we have a 'presheaf' topos associated with an extrinsic theory, what does it mean for that theory to be of a 'presheaf' type? It means that if we start thinking in terms of a topos, we can have an associated topos that has no points. If a topos is presented as the 'subclass classifier' of an extrinsic theory, the set of subtopos-classifiers of the topos is identified with the set of quotients of the theory (that is, written in the same language of the algebraic logos but with more axioms), considered up to syntactic equivalence.

The non-commutative quotient space is the collection or '"*ensemblage*"'[46] of conceptual points of the homological site over the 'subtropical' semifield of the algebraic logos as a tropical number. What was still missing until now was the definition of a semiclassical space whose conceptual points would coincide with the aforementioned quotient space. The primary intent is to provide a solution to this search by introducing the 'homological site' as an object of algebraic ontology involving two elaborate concepts: the topos and the structure of characteristic one. For homological ontology in characteristic one we put two things together: we consider (i) the topos of set-theoretic concepts provided with a certain information or action, and (ii) characteristic one or the tropical (Boolean) semifield, which plays a crucical role in the tropical analysis of the generic matrix category (see section 2.4., 'Tropical Philosophy'). This conceptual framework of algebraic ontology unites non-commutative ontology, topos and tropical philosophy. The non-commutative spaces of non-philosophy give a strong motivation to develop an algebraic ontology in the 'universe' of characteristic one.

The non-commutative approach to philosophy has a topos-theoretic counterpart embodied by the 'homological site'. This site involves a 'subtropical' semifield viewed as a structure sheaf on the topos. The 'structure sheaf' of the 'homological site' is a sheaf of semifields of 'characteristic one' (i.e., of semifields in which $1 + 1 = 1$), it is given globally by the fundamental, subtropical semifield of characteristic one. The conceptual points of the homological site over the subtropical semifield, i.e., the subfield of the

[45] Caramello 2018, p. 3.
[46] Laruelle 2010a, p. 440.

tropical semifield, are the non-commutative space quotient. This note provides the space underlying the non-commutative approach. The underlying space of the homological site is the topos of Cantorian concepts or, more precisely, the topos of functors from the homological site to the category of set-theoretic concepts. Its structure arises from the homological site by extension from the homological site to the tropical semifield, which plays a central role in the tropical analysis of the generic matrix category. The homological site is a topos deeply related to the non-commutative approach to philosophy. The topos is the presheaf topos of functors from the homological site to the category of set-theoretic concepts. The structure sheaf is a sheaf of semifields of characteristic one and as an object of the topos it is the subtropical semifield. The homological site is defined over the *subtropical* semifield of characteristic one. To define the extension from the homological site to the tropical semifield we consider its subfield as a subtropical semifield. The 'homological site' is constructed as the 'commutative shadow' of the non-commutative space of philosophy. The homological site is defined as the topos provided with a 'structure sheaf' seen as a subtropical semifield in the topos. It is the simplest possible thing in this topos, simply the immanental, subtropical semifield (structure sheaf) of characteristic one. The 'homological site' is intimately related to the structure of the conceptual point in non-commutative ontology, which is rather radical than absolute. The 'conceptual point' in non-commutative matrix ontology is represented by the algebraic system of compact operators. 'The imaginary number is not the point of absolute transcendence'[47], says Laruelle in *The Last Humanity*:

> There lies the difference between the scientific radicality and the philosophical circularity which are symmetrical but the first one is 'radical' and the second 'absolute'. The scientific radicality does not return to the real which it apparently just left, it is not a divided macroscopical transcending but a unique ascending without mixture or circle of two opposite directions (for instance, Husserl).[48]

One of the most astonishing things is: the non-commutative space of non-philosophy is in this topos, given by the 'inductive limit'. We are in the topos, there we have simply the subtropical semifield. The object that one obtains is no longer a semifield, but *it has a spectrum*, i.e., it is immanently quantum. We look at the points of the topos. That gives the structure sheaf. For the (envisaged) 'tropicalization', we need an algebraic system of characteristic one. Homological ontology in characteristic one is the attempt to exploit the formal analogy between the cohomology (invariance) of a philosophical space with coefficients in a sheaf and the theory of functors in order to find a common frame which permits to encompass these theories. How does the commutative space of philosophy emerge from the non-commutative space of non-philosophy? This is abstract, we are no

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[47] Cf. id. 2015a, p. 161: *'Le nombre imaginaire n'est pas la pointe de la transcendance absolue'.*

[48] Cf. id. 2015a, p. 162: *'C'est là la différence entre la radicalité scientifique et la circularité philosophique qui sont symétriques mais dont la première est "radicale" et la seconde "absolue". La radicalité scientifique ne retourne pas au réel qu'elle n'a qu'apparemment quitté, ce n'est pas un transcender macroscopique dédoublé mais un ascender unique sans mélange ou cercle des deux directions opposées (par exemple Husserl).'*

longer in a classical, commutative frame but in an operatory, quantum frame. The continuous (the philosophical continuum) comes out of the discrete (stratum). We always work 'up to Morita equivalence'. The collection of points of the homological site over the subtropical semifield is the non-commutative space quotient by equivalence or congruence relations. This provides the space underlying the non-standard, non-commutative approach. A point of the syntactic (homological) site defined over the tropical semifield is given by a pair of a point of the topos and of a local morphism of a semifield of the 'fiber' in the point of the structure sheaf toward the tropical semifield. If we have a 'fiber' we think of a non-commutative space with parameters.

Rosi Braidotti[49] claims, according to Kolozova, 'that the coexistence of unity and non-unity is made possible by the simple fact that the existence of each of the two rests on a different ontological level and represents a different, distinct epistemological moment'.[50] Given that science rather than philosophy has methodological access to the Real, our approach consists rather in thinking alongside science in an analytic prolongation of non-philosophy. 'Analytic' in the sense that we focus on certain, crucial details of quantum- and generic-oriented theory, to reach further conclusions answering to our initial conceptual problem of a unified theory of the continous and the discrete, characteristic one and spectral variability. We will see that both concepts do not mutually exclude each other. In the internal language of the topos (without excludded middle), characteristic one is variability and variability is characteristic one. We do assume neither that variability is the 'truth' of characteristic one, nor do we refuse to acknowledge the converse. In search of the conceptual tools required for such a semi-philosophical debate on an algebraic ontology of the homological site, we use categorialization or category-concepts, tropical analysis and tropicalization or dequantization, characteristic one, non-commutative ontology, spectral variability, the topos-concept, etc. Thinking 'in characteristic one' with the topos-concept might prevent us, in the wake of Laruelle's argument, from falling into 'the trap of the "gréco-judaïque" obsession with the unitary thought of organizing differences in a unified and unifying whole as the central constituent of metaphysics'[51], as Kolozova says being, for her part, in search of a 'peaceful coexistence'[52]:

> Let us thus allow the possibility that there might be a 'good one', a 'good unity', namely, one that does not necessarily have to exclude the multiplicity. In total, let us assume the possibility that both instances (of unity and of nonunity) can be part of the subject's constitution and simultaneously operative without being mutually exclusive. Let us assume that this 'coexistence' is made possible by the very potentiality of the two instances to be operative on different levels within different structural subconstructs of the subject.[53]

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[49] Braidotti, Rosi, *Metamorphoses: Towards a Materialist Theory of Becoming*. Cambridge: Polity Press, 2002.
[50] Kolozova 2014, p. 25.
[51] Ibid., p. 64; cf. Laruelle 1989, pp. 7–10, 20–22.
[52] Derrida 1981, p. 41.
[53] Kolozova 2014, p. 30.

Characteristic one does not exclude variability. Corresponding to the quasi-Riemann hypothesis (in Chapter 3.3., 'The Spectral Point of View on Ontology') that the reason of the metric relations of the philosophical space, in case of a continuous subjacent 'Real', have to be searched in the 'binding forces' of the 'conceptual gravitation'[54] which act on it from outside, the imaginary homological site in characteristic one is the 'backstage' 'topos' or the 'location' of 're-volt' wherefrom the spectral variability 'on stage' is governed. As Kolozova puts it:

> the 'location' of revolt has to be looked for elsewhere and outside of what is strictly known as 'the subject'. Furthermore, this 'location' has to be the site of resistance for or within a certain self or an 'I'. Since the revolt or resistance is that which enables the subject's self-critique and self-transformation, one is obliged to assume that there is a certain *continuity* of an 'I' behind these transformations. [...] Moreover, in the context of Butler's (Foucauldian) theory, this instance of continuity is to be presumed to be the location of resistance, because it is from the standpoint of only that instance that one can introduce, undergo, and endure subjectivity transformations.[55]

Of course, we have to avoid a 'Nietzschean solution [...] of "an escape in advance into the fiction" [*une "fuite en avant" dans la fiction*], says Laruelle, of solving the problem by rendering the real "engulfed" by the fiction. The first is effaced by the latter – everything is but fiction.'[56] 'The act of "imaginarization in advance" of the real implies the following', as Kolozova points out: 'fiction = reality; reality = fiction; these equations are situated in a vicious circle.'[57] With regard to the fact that 'Oneness and radicalness in the sense of non-relatedness and immanence are the defining constituents of non-philosophical, that is, of nondichotomous, thinking'[58], as Kolozova writes, the semi-philosophical unifying point of view on philosophy and non-philosophy might look too philosophical: 'Unitary thought (*unitaire*, in the sense critized by Laruelle) is *relational*. It is a posture of thought that establishes relations between different concepts by way of organizing them into a construct, an organic whole that is a unity of multiplicity of concepts. [...] Unitary (*unitaire*) thought is always already dualistic (*dualitaire*).'[59] However, the vision of 'subtropical philosophy' and its 'commutative shadow', that is, 'tropical philosophy', is far beyond developing any 'dualistic picture of the real and its shadow, or, in different words, to claim the reality of [...] "fiction".'[60] According to Laruelle's Vision-in-One, as Kolozova adds, 'fiction and the real are not opposed. They are not even placed into a relation that would condition their respective meanings.'[61] The homological site is 'the limit' or 'the site of resistance', as we could say. 'It is the conditioning necessity of our

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[54] Cf. Laruelle 2010a, p. 12: 'gravitation conceptuelle'.
[55] Kolozova 2014, pp. 46 f.
[56] Cf. ibid., pp. 163, 69. See Laruelle 1989, p. 231.
[57] Kolozova 2014, pp. 68 f. See Laruelle 1989, p. 231.
[58] Kolozova 2014, p. 64.
[59] Ibid.
[60] Ibid., p. 69.
[61] Ibid.

lives [spectral variability] and also the topos of resistance.'[62] Given that 'vision-in-One' means not to think 'from' being but 'from' the One[63] – it does not mean that the One is thought or theoretically determined, in particular not affirmed in its 'status as unthinkable and undeterminable'[64], but simply 'to think in characteristic one'.

[62] Ibid., p. 72.
[63] Cf. Laruelle 1989, pp. 53 f.
[64] James 2012, p. 167.

4.4. Subtropical Philosophy

Despite Laruelle's scepticism about philosophical conceptions of 'the man-animal as a "bridge", as becoming continuous, the becoming-animal of man and the becoming-human of the animal'[1] or as the 'Nietzschean bridge of the man-animal toward the superman'[2], he nevertheless constructs '[t]his duality that the probable subject forms with the universe and which is resolved in the-last-instance, as the new "imaginary" bridge [...]. This new type of bridge would require, according to its utopic architecture new engineers [...]'[3]. The function of this 'new "imaginary" bridge' is here fulfilled by the topos. The 'bridge-building technique', as it is described by Caramello[4], is a *'theory of "structural translations"'* [5] that allows us to construct topos-theoretic 'bridges' connecting distinct extrinsic theories with each other. Specifically, if two theories are two Morita-equivalent theories (that is, extrinsic theories classified by the same topos) then their common classifying topos can be used as a 'bridge' for transferring informaton or action between them. The transfer between the two theories takes place by expressing topos-theoretic invariants defined on their common classifying topos directly in terms of the theories. This is done by associating with each of the two theories a syntactic site for its classifying topos and then considering invariants on the common classifying topos from the points of view of these two sites. The 'bridge' technique makes it possible to effectively compare distinct extrinsic theories with each other and transfer knowledge between them.[6] As 'a few methodological remarks' Caramello adds:

> The view underlying the 'bridge' technique consists in regarding a topos as an object which, together with all its different representations, embodies a great amount of relationships existing between the different theories classified by it. Any topos-theoretic invariant behaves in this context like a 'pair of glasses' which allows us to discern information which is 'hidden' in a given Morita equivalence. Toposes can thus act as 'universal translators' across different [...] theories which have the same 'semantic content'. [...] [T]opos-theoretic invariants usually manifest themselves in significantly different ways in the context of different sites [...]. Unlike the traditional, 'dictionary-oriented' method of translation based on a 'renaming', according to a given 'dictionary', of the primitive constituents of the information as expressed in a given language, the 'invariant-oriented' translations realized by topos-theoretic 'bridges' consist of

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[1] Laruelle, *Théorie des Étrangers. Science des hommes, démocratie, non-psychoanalyse.* Paris: Kimé, 1995, p. 40: *'l'animal-homme comme "pont", comme devenir continu, devenir-animal de l'homme et devenir-humain de l'animal'.*

[2] Cf. id. 2015a, p. 185: *'Le pont nietzschéen de l'animal-homme vers le surhumain'.*

[3] Cf. id. 2015a, pp. 196 f.: *'Cette dualité que le sujet probable fait avec l'univers et qui se résout en la-dernière-instance, nous la construisons comme le nouveau pont "imaginaire" [...]. Ce nouveau type de pont exigerait en fonction de son architecture utopique de nouveaux ingénieurs'.*

[4] The most recently in Caramello 2018, pp. 53–81.

[5] Ibid., p. 80.

[6] Cf. ibid., pp. 69 f.

'structural unravelings' of invariants across different representations of the relevant toposes.[7]

This way of practicing theory is, as Caramello says, 'inherently "upside down": instead of starting with simple ingredients and combining them to build more complicated structures, one assumes as primitive ingredients rich and sophisticated [...] entitities, namely Morita equivalences and topos-theoretic invariants, and proceeds to extract from them "concrete" information'[8] or action relevant for quasi-classical thought.

The subject of the topos is the concept where the world of the continuous and the world of 'discontinuous' or 'discrete' structures fusion. The unifying power of the topos allows us to embrace both the *continuous* and the *discrete*, and to unify both commutative and non-commutative systems of thought. In particular the notion of classifying topos, as we have seen above in section 4.2., 'Topos-Oriented Theory and Variability', is suitable for formalizing this idea of unification, the phenomenon that two differently looking systems of thought might have the same conceptual content. The classifying topos permits us to go from an extrinsic theory to its semantic content with the possibility that two different theories and contents are connected or equivalent. The fact that two extrinsic theories tell the same story thanks to the classifying topos is conceptually embodied in a homological object, the topos, with all its intuitions associated with ontology. Different syntactic, infrastructural sites can define equivalent topoi. Two extrinsic theories can have the same conceptual content thanks to the theory of classifying topoi.

4.4.1. Principles of Topos-Oriented Theory

These are the principles that make topos-oriented theory as an imaginary bridge possible and prolific:

1) With each 'extrinsic' theory a topos, well defined up to equivalence, is associated, called its classifying topos which embodies the conceptual content of this theory. The required condition of theories being 'extrinsic' is extremely large. The language and the axioms of each such theory, especially all algebraic theories, define a site called the 'syntactic site' of the theory, and the passage of this site to its associated topos embodies conceptually the passage from the infrastructural definition of a theory to its philosophical content, that is, from its intrinsic syntax to its extrinsic semantics. The syntactic presentation of the topoi by the sites and the semantic presentation of the classifying topoi by the theories seem radically different and nonetheless they define exactly the same objects: up to equivalence, each topos is associated with many sites and, at the same time, it is the classifying topos (superstructure) of a lot of theories.

2) A *second principle* is that the duality between topoi and their presentations by syntactic sites and semantic theories is even more important than the considered topoi

[7] Ibid.
[8] Ibid., p. 81.

in themselves: All topoi share remarkable properties with the most elementary category-concept, the category of set-theoretic concepts which make it possible to realize inside of any topos nearly all philosophical constructions and manipulations that we are used to realize in the Cantorian framework of ontology. The topoi are too big as category-concepts for being able to be described and perceived directly. The topoi are therefore always concretely given in an indirect way by syntactic sites and by semantic theories that they classify or eventually by other presentations. And it is due to such presentations that they are associated and thus combined with concrete philosophical contents: syntactic in the case of sites, semantic in the case of extrinsic theories. The topos is also too abstract to produce concrete results, which is why we have to find invariants. Just like the One in Laruelle, however much it may be an immanental cause or determinant-in-the-last-instance of all thought, it is simply too indivisible and autonomous to generate specific terms or content for any particular form of thought, in this case non-philosophy. As Hughues Choplin points out: 'a philosophical *occasion* is necessary to bring forth the emergence and the existence of the non-philosophical universe (since the One is too autonomous to generate by itself – directly – anything else than itself).'[9]

3) A *third principle* is that we have to consider the topoi up to equivalence (of category-concepts) and that the essential ambiguity of the theory of the presentations of the topoi – which consists in the fact that any topos is associated with an infinity of different syntactic sites as well as with an infinity of different semantic theories – is no problem but a fundamental structure that orientates topos-oriented theory. The fact that two sites have equivalent associated classifying topoi means that they have the same theoretical content. The fact that two extrinsic theories are 'equivalent in the sense of Morita' by having equivalent classifying topoi means that they have the same semantic content (superstructure). The fact that the topos which is associated with a site is equivalent to the classifying topos of a theory means that the conceptual content of this site is equivalent to the semantic content of this theory. The ambiguity of the presentations of the topoi is not only a theoretical fact but also a practical and operatory one. In fact, several very general and quite simple results allow to elaborate dynamically from one single presentation of a topos by a site or a theory infinite other presentations of this topos by sites or theories. One can even say that the notion of topos perfects the notion of 'group': in concrete philosophical questions, groups are not studied for themselves but for their actions, that is, for their classifying topos. Therefore, the concept of topos can be seen as a generalization of the notion of group large enough to embrace the onto-topological spaces but also, by the same token, all kinds of philosophical spaces as well as any semantics of extrinsic theories, especially the semantics of the algebraic logos as a complex number. 'Morita equivalence' and thus the possibility of bridges between or the unification of different semantic theories is

[9] Cf. Choplin, Hugues, *L'espace de la pensée française contemporaine. À partir de Levinas et Laruelle.* Paris: L'Harmattan, 2007, pp. 115 f., n. 38: '*une* occasion *philosophique est nécessaire pour susciter l'émergence et l'existence de l'univers non-philosophique (l'Un étant trop autonome pour générer de lui-même – directement – quoique que ce soit d'autre que lui-même).*'

realized by the topoi. The theory of classifying topoi permits to structure the philosophical content in a maximum way: the classifying topos of a semantic theory is an object that embodies the whole conceptual content of meaning of the theory. From the point of view of classifying topoi, the distinction between linear (according to the generic superposition principle) and non-linear (standard, classical, pre-quantum) seems less fundamental. Moreover, linear theories (like the quantum-and-generic-oriented theory) admit just like non-linear (classical, commutative) theories classifying topoi which are in themselves no linear (non-standard or quantum) objects. The fact that the topos that is associated with a site is equivalent to the classifying topos of a theory means that the conceptual content of this site is equivalent to the semantic content of this theory. The ambiguity (that is, the variability) of the presentations of the topoi is not only a theoretical but also a practical and operatory fact. One can dynamically elaborate from one single presentation of a topos by a syntactic site or a semantic theory infinite other presentations of this topos by sites or theories.

4) The *fourth principle*, which is a consequence of the two previous ones, consists in thinking that one should use the topoi and the duality between syntactic sites and topoi by considering invariants of the topoi and by expressing or qualifying these invariants in terms of divers types of presentations of these topoi. We understand here by 'invariants' objects, properties or constructions that are associated with the topoi and which are invariant by topos equivalence. To decode such an invariant means to express it in concrete terms of a syntactic site or semantic theory of presentation (such as quantum-oriented theory, set-oriented theory, topo-logic-oriented theory or category-oriented theory) by making disappear any reference to the topos in relation to which it was at first defined. That way, two syntactic sites and semantic theories put in relation by an equivalence of their associated topoi see a same invariant of their common topos be expressed in totally different terms in one and in the other, although two properties or two constructions are found in equivalence that one would have never imagined to bring together without this expression or decodification of descent from the 'imaginary' world of the abstract topoi toward the 'real' world of concrete philosophies (classical, non-classical and semi-classical philosophical spaces) that are embodied in syntactic sites or the defintions of semantic theories.

Examples of invariant properties of topoi: The 'atomicity' and the bivalence (the two most important properties of the Galoisian topoi; Galoisian category-concepts: non-linear), the property of Boole (which corresponds to the law of excluded middle in logic), the property of De Morgan (which is a weakened form of this law) and finally the property of being 'presheaf-like', particularly important since every presentation of a topos by a defining, syntactic site makes of it a sub-topos of the topos of presheaves over the underlying category-concept of the syntactic site. Two examples of invariant constructions, consisting in associating every topos with two sub-topoi characterized by certain properties, its 'Booleanization' and its 'Demorganization'. The wide-ranging subject of topoi delivers the idea of a fusion of a discrete, i.e., algebraic ontology in characteristic one (Laruelle), on the one hand, and of a continuous, i.e., arithmetical ontology (e.g. Badiou's One-of-count), one the other.

We succeeded here (thanks to the crucial idea of a 'sheaf') to express a certain concept of 'space' in terms of another concept (first, the concept of 'category', see the categorification of the philosophical and generic matrices; then, the concept of 'topos'). Each time, the discovery of such a translation of a concept (expressing, qualifying, decodifying; encoding: syntactic; decodifying: semantic) in terms of another one (corresponding to another kind of 'situation', as Badiou says), enriches our comprehension of both concepts. This way, a 'transcendental' (topo-onto-logical) situation (embodied, represented by a given intensive or conceptual, philosophical space) can be translated into an algebraic situation (embodied or represented by a category-concept); or, if one wants, the 'continuous' represented by a space, to wit: the 'philosophical continuum', is 'translated', 'expressed' or qualified by the categorial structure (and till then perceived as being essentially 'discontinuous' or 'discrete'). The emphasis here lies on the fact itself of the translation – in this case on the realization of a passage or transition from a philosophical world to the categorial world – which gives even more importance to the presentations of the topoi by syntactic sites considered in themselves as categories of a particular type. By exploring the relation of the conceptual world of philosophical spaces, or more generally of syntactic sites, and of the abstract world corresponding to the topoi, it turns out that the concept of space cannot be extended, while the topos is plunged by definition in the much bigger world of category-concepts, within which it is characterized by the exceptional structural properties that the topoi have in common with the category of Cantorian concepts. The concept of philosophical space is in a way a maximum notion – a notion that is so general that we cannot imagine how to find an extension that remains 'reasonable'. On the other side, these category-concepts that we get coming from philosophical spaces are very particular. They have a set of properties which make them similar to what one gets when they come from a space that is reduced to a single conceptual point. The concept of topos is both 'not too large' (as shown by the very particular character of the topoi from the categorial side) and 'large enough' (as illustrated by the character of 'maximum' generality of the concept of site from the conceptual side): The concept of topos is an extension or a metamorphosis of the concept of space.

The expressive, qualifying character of the topoi: The passage from a syntactic site to its associated topos sends the 'real' world of the site 'on stage' toward the 'imaginary' world of the topos 'backstage' which constitutes an appropriate environment for the expression or qualification. The 'arches' of topos-theoretic 'bridges' should be provided by site characterizations for topos-theoretic invariants, that is results connecting invariant properties of topoi and constructions on their sites (written in their respective languages). It thus becomes crucial to investigate the behaviour of topos-theoretic invariants with respect to sites.[10]

[10] Cf. Caramello 2018, p. 74.

4.4.2. The Concept of Morita Equivalence

Two extrinsic theories are said to be Morita-equivalent if they have equivalent classifying topoi. 'To be Morita-equivalent to each other' defines an equivalence relation on the collection of extrinsic theories.[11] Such theories can be equivalent in the sense of Morita without being 'bi-interpretable', in other words, without a 'dictionary' allowing to pass from one to the other. We can speak of Morita equivalence each time when two topoi presented by intrinsic, syntactic sites and extrinsic, semantic theories are equivalent. Each topos that is presented in a certain way generates an unlimited quantity of other extrinsic theories and thus of Morita equivalences. Therefore, different ways of looking at quantum-oriented theory could be formalized as Morita equivalences. In this sense, Morita equivalent algebraic systems 'are regarded as "the same" (or better isomorphic) spaces'[12] in non-commutative ontology. As Caramello writes: 'The notion of Morita equivalences materializes in many situations the intuitive feeling of "looking at the same thing in different ways", meaning, for instance, describing the same structure(s) in different languages or constructing a given object in different ways.'[13] Interestingly, for the transfer of 'global' properties of toposes, it is only the *existence* of a Morita equivalence that matters, rather than its explicit description, since, by its very definition, a topos-theoretic invariant is stable under *any* categorial equivalence.[14]

How can we exploit a Morita equivalence? — By the choice of invariants and their double expression or qualification. Suppose that we are lead to consider a Morita equivalence, that is, an equivalence of category-concepts between two topoi and associated with different syntactic sites or semantic theories. Then the considered Morita equivalence can be exploited by choosing the invariants of the topoi and by expressing or qualifying these invariants in terms of syntactic sites or semantic theories of presentation of the topoi. In this characterization of the considered invariants in terms of sites or theories, more often than in the Morita equivalence itself, resides in general the part of the conceptually most difficult and most profound, subtil and creative work in the sense that it leads us to introduce new concepts and to find results most of whom are completely unexpected and would have been impossible to imagine otherwise. These results or these new concepts are concrete and real. They are 'on stage', where 'all thought is equalized when regarded as raw material for non-philosophy, that is, as part of the Real [...] rather than as "representations" of it'[15], as Ó Maoilearca says. 'Non-philosophy is unconditioned thought – it is self-standing knowing or "gnosis". As *Philosophie non-standard* puts it, such a gnosticism denotes the "equality in principle" of all knowledges, and its vision thereby strives to replace the "struggle" between thoughts with an "equalising" (*égaliser*).'[16] Moreover: 'The anarchy of Laruelle's

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[11] Cf. ibid., p. 71.
[12] Connes and Marcolli 2006, p. 10.
[13] Caramello 2018, p. 73.
[14] Cf. ibid., p. 80.
[15] Ó Maoilearca 2015, p. 9.
[16] Ó Maoilearca 2015, pp. 97 f. Cf. Laruelle 2010a, p. 500: *'la gnose générique* [...] *doit utiliser tous les moyens à églité* [...] *une égalité de principe de tous les savoirs'*. See also ibid., p. 502.

Real [...] is an *immanent* democracy that equalizes all thoughts as Real.'[17] The concepts are philosophical and pre-quantum or non-philosophical, quantized and parametrized, or nonvariable and dequantized, in the sense that they are written in the natural languages of syntactic sites or semantic theories of presentation (i.e., the real infrastructure) and that the topoi (i.e., the imaginary superstructure) which have served to combine these sites or theories do no longer appear in their formulation but in the new, commutative and homological one. Let us give some examples of such results (i.e., concepts) which are immediate, that is, necessary consequences of certain contingent characterizations of invariants of the topoi. Whereas the topos is abstract and imaginary, 'backstage' or 'swampland', as string theorists nowadays say: Cumrun Vafa, for instance, was rising at the conference 'Strings 2018' the interesting question, if it is possible that our universe does not exist for real.[18]

4.4.3. The Duality Between the Real and the Imaginary

In theoretical practice, the construction of 'topoi as bridges' is operated in the following way:

1. We start from an equivalence, or of a duality, or of a relatively elementary correspondence in the 'real' world of concrete theories ('The matrix is here the only concrete and real thing'[19], as Laruelle says).
2. We lift this equivalence or duality in the 'imaginary' world of the topoi in a Morita equivalence, which means in general that the equivalence is deduced from a categorial equivalence by a contingent choice of a certain invariant, here, for example, the one defined by the category of conceptual points of the topoi.
3. We consider other invariants of topoi and we express or qualify them in terms of syntactic sites or semantic theories of the topoi, thus we obtain other concrete equivalences, dualities or correspondences. It turns out that those are often unexpected and, in general, cannot be deduced directly from the concrete equivalence.

Thus, we can schematize this conceptual way of realizing the technique of the topoi as bridges in the form of an ascent followed by a redescent between two levels, the 'real' level of concrete or virtual philosophy and non-philosophy and the 'imaginary' level of the topoi (see figure below).

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[17] Ó Maoilearca 2015, p. 123.

[18] Harvard University, Center for the Fundamental Laws of Nature High Energy Theory Group, News, August 21, 2018: 'Cosmological Implications of the String Swampland': https://hetg.physics.harvard.edu/news/cosmological-implications-string-swampland.

[19] Cf. Laruelle 2015a, p. 83: *'La matrice est ici le seul concret ou réel'*.

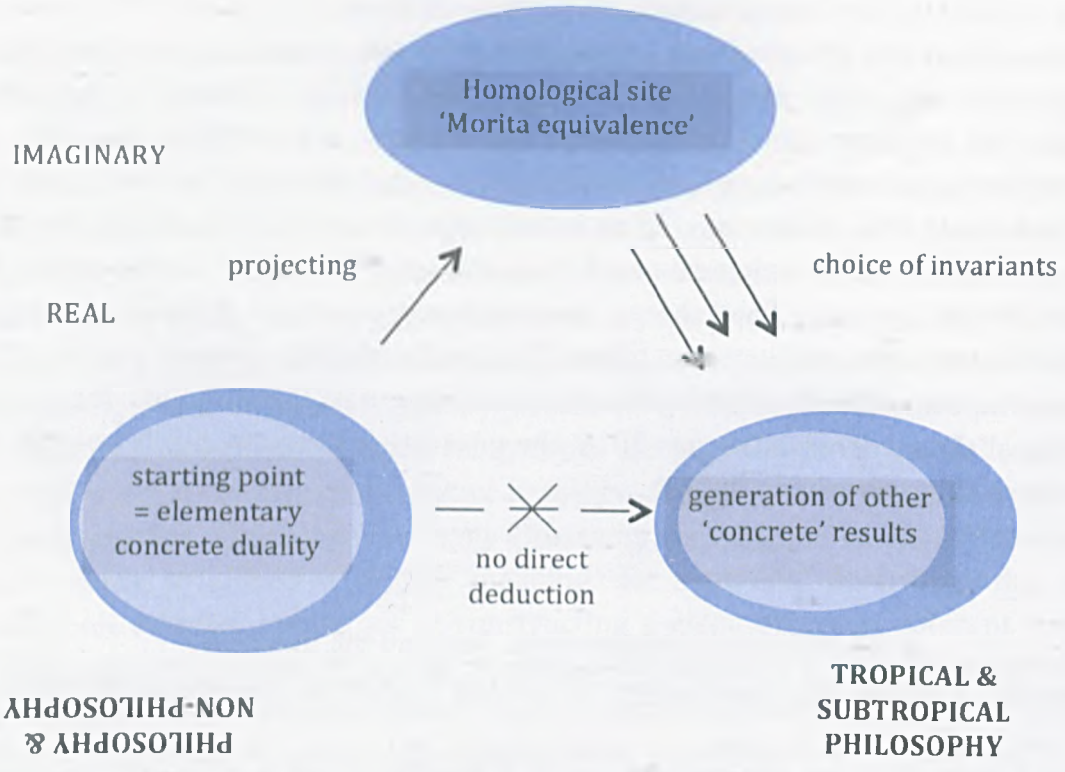

FIGURE. Topos as a bridge between philosophy and non-philosophy, on the one hand, and tropical and subtropical philosophy, on the other.[20]

'Above' or 'behind' the *real* concrete 'World' or virtual 'Universe' of commutative and non-commutative ontology there is an abstract *imaginary* world, which is embodied in a topos and described by homological ontology in characteristic one. Let us consider the invariants in this imaginary universe, these invariants can be expressed in a new concrete or generic way (the virtual is tantamount to the generic in Laruelle[21]), that is, to climb down in the concrete World, representing the dequantized, non-parametrized philosophical space, or in the virtual Universe as the quantized, variable space of non-philosophy. Starting from a topos or a Morita equivalence, the expression, qualification or characterization in terms of intrinsic, syntactic sites (e.g. the transcendental field, the plane of immanence, the generic quantum plane, the tropical semifield, etc.) or extrinsic, semantic theories of any invariant (set-oriented theory, topo-logic-oriented theory, quantum-oriented theory, category-oriented theory, etc.) is conceptually difficult but faisible. On the other hand, to climb back up in the other direction from a philosophical result to a Morita equivalence which could generate it is generally unrealizable in a direct way. For instance, one cannot transfer the problems and means of non-philosophy directly and continuously to philosophy. There is no direct and continuous transfer but there is an indirect and complex or imaginary transfer via the homological bridge of a

[20] Cf. Caramello, Olivia, and Laurent Lafforgue, *'Sur la dualité des topos et de leurs présentations et ses applications : une introduction'* (2016), Institut des Hautes Études Scientifiques, p. 52, available at: http://preprints.ihes.fr/2016/M/M-16-26.pdf.

[21] Cf. Laruelle 2010a, p. 60. *'Le virtuel ne se confond pas avec l'imaginaire* [...] *qui n'est que l'un de ses moyens, mais avec le générique.'*

topos. That means if we want to tackle these problems with the theory of 'topos as a bridge', we do not have to search to attack them directly 'on stage' but to define a 'good' topos sitting 'backstage' that could embody or represent the essential parts of the conceptual content of the extrinsic theory. Homological ontology in characteristic one proceeds from the concrete or virtual real toward the abstract imaginary and back to the real. The variability on stage is governed by the imaginary backstage topos. (See figure below.)

One might criticise that I offer nothing more than that: 'Philosophical universes, concepts organized in coherent unities establishing a (philosophical) reality in its own right'[22]. But in fact, their 'conceptual content' is reduced to mere 'immanental material' or '*chôra*', as Laruelle says. The immanental material 'at hand can be used', according to Kolozova, 'without the obligation to follow the rules of its use dictated by a doctrine, a system of thought, or a school of thought'[23]. Tropical philosophy is the semiclassical shadow of the generic quantum plane or non-philosophy, and the immanental is no longer the real/imaginary itself but rather that semispace of thought. Subtropical philosophy is the complex lift of the homological site or tropical philosophy.

[22] Kolozova 2014, p. 155.
[23] Ibid.

CONCLUSION

The philosophical problem of treating continuous and discrete variables of a philosophical space X in a unified manner can be approached from different angles: quantum-oriented theory with its spectral variability provides one solution to the coexistence of the discrete and the continuous. The concept of topos, which requires a tropical analysis of the generic matrix category as a result of dequantization of space X, offers another intimate symbiosis between continuous and discontinuous structures by interweaving even more closely the conventional idea of a philosophical continuum and that of a discrete space than Laruelle's generic quantum. We started from the concern of the instructive value of the fundamental non-concepts initiating us to the non-philosophical gesturality. Subsequently, we considered non-philosophy not as a *form* of philosophy or as a formalism in the sense of structuralism but as a quantum and generic *category* of philosophy ('category' in the sense of a generalized space) in accordance with Laruelle's *generic correspondence principle*. The *tropical correspondence principle* is a heuristic tool to use analogies and ideas borrowed from traditional philosophy by transforming the transcendental field treated as a quantum object in an immanental semifield considering it as a semi-classical object. Onto-material and onto-vectorial properties or constructions are linear according to Laruelle's *generic superposition principle*, while conventional knowledges and methods are non-linear. However, they are linear over immanental semifields according to the *tropical superposition principle*. A systematic application of this principle allows to provide linear solutions of a commutative subalgebraic logos to non-linear problems of the non-commutative algebraic logos by means of semi-philosophical methods. *Tropical analysis* is related to a quasi-classical subcategory of the quantum generic matrix category which extends the quantum-oriented theory, as its commutative shadow, beyond its language and its axioms and offers, in an attempt of unification, a new quasi-philosophical perspective on non-philosophy toward *tropical philosophy*. Non-philosophical properties or constructions can manifest themselves in several different forms as a part of extrinsic theories having a semantic 'core' or superstructure in common, which serves as a sort of bridge for the transfer between various syntactic infrastructures, whether they are real or ordinary (i.e., nonvariable, nonparametrized and nonspectral), complex (i.e., quantized) or tropical (i.e., dequantized).

Non-philosophical methodology is based on both the transfer and the dynamic, nonset-theoretic (that is, not object-oriented - phenomenological - but relational) modeling of knowledges and methods. The categorial language is especially well-suited to characterize with an appropriate degree of generality as well as of intuition the functioning of the 'non' which models a theory, etc. by various (non-Gödelian, non-Cohenian, non-Einsteinian, non-Schrödingerian, etc.) morphisms. Non-standard thought is closely linked to the concept of duality. The onto-material formalism is written in a 'low-level language', which means that it hardly appeals to intuition. On the other hand, the categorial axiomatization or categorialization of the quantum-oriented theory

provides the passage to a sketchable language, drawing inspiration from diagrammatic reasoning, which allows intuitive reasoning about the interaction of generic quantum systems without being a pictorial thought according to the representation. A categorialization of the generic matrix uses high-level *gestalt*-concepts. One has to change one's perspective by being more attentive to *morphisms*, and less to *objects*. This brings about the shift of emphasis from objects to processes. Analyzing the onto-material formalism from a category-oriented viewpoint requires a change of viewpoint, which downplays objects (contrary to contemporary 'object-oriented philosophy') and emphasizes morphisms. A categorial approach proceeds by an examination of the gestures of thought at work, it does not aim at justifying them, but at simply describing their *functionality*. In these gestures, one has the effacement of the objects for *relations* and *morphisms*, even the disappearance of the objects. The categorial understanding of non-philosophical activities leads us to their cohomology (i.e., their invariance) which supplies what remains invariant. In the abstraction of categorial concepts a certain non-separation of the couple *continuous* and *discrete* emerges. The two approaches converge by the use of category-concepts which offer a means to work with discrete versions by relating them to continuous versions. For operatory reasons category-concepts play an important role in fields where *processes* play a crucial role, like in Laruelle's non-Cantorian matrix ontology with its onto-material and onto-vectorial systems and operations. The category-concept gives a conceptual structure of practicing non-commutative ontology. This explains many of the puzzling features of non-philosophy such as the generic failure of local realism. For instance, the entanglement, non-locality or non-separability of the lived '*HAP* system' are essential features of ethical acts in an immanent ecological context. These features only seem puzzling as long as one tries to treat the category of non-commutative ontology as analogous to the category of Cantorian ('modern') ontology rather than analogous to the category of differential ('postmodern') ontology, so that non-commutative ('contemporary') ontology will make more sense when regarded (from a semiclassical point of view) as modeled after a topo-logic-oriented theory. All this suggests that both non-commutative ontology and commutative differential ontology will be best understood in terms of categories quite different from the set-theoretic matrix category. It is necessary to rethink basic concepts by approaching non-philosophy from a category-oriented perspective. Non-commutative ontology and differential ontology are best understood in terms of categories, which are quite different from the one of set theory ontology. The categories of non-commutative ontology and differential ontology resemble each other more than either resembles the category of ontology of the void. The structural homology between topo-logic-oriented theory and quantum-oriented theory can be expressed by treating a homological theory as a functor from the category of differential ontology (philosophiy of difference) to the category of non-commutative ontology (non-philosophy).

Quantum-oriented theory means first of all non-commutative, onto-vectorial space. Non-commutativity entails many advantages. Laruelle has discovered a philosophical analogue of the Heisenberg commutation relations $[p, q] = i\hbar$. In 'ordinary', i.e., nonvariable, nonparametrized and nonspectral ontology of 'dualistic

philosophies'[1] from Parmenides (*Being = Thought*) and Descartes ('*Cogito ergo sum*') to Badiou (*Set Theory = Ontology*), the commutativity assumption appears as a welcome simplification which makes certain logical identifications easier. But in fact our use of the written language makes us perfectly familiar with non-commutativity, if we consider anagrams, i.e., writings which become equal when 'abelianized' but nevertheless have quite different meanings as long as the order of letters is respected. In the philosophical 'World', we can only switch to the 'commutative shadow' at the expense of a 'loss of meaning'[2] which is encoded by non-commutativity. Another key feature of the non-philosophical 'Universe' is that *the non-commuting discrete variables of the simplest kind generate the commuting continuous variables.* In other words, the 'reality' arises out of the 'Real' of the quasi-Hilbertian space.[3] Classical, commutative ontology emerges from Laruelle's non-commutative space (such as the 'Non-Parmenidean Equation': 'Practice = Thought' or the '(non-)relation of theory and practice'[4].

We always think of variables by their representation as operators in an onto-vectorial space. Since the product of two self-adjoint operators is not self-adjoint unless they commute, we deal with an algebraic logos as a complex number endowed with an 'antilinear involution'. The simplest non-commutative system of this kind is the algebraic logos of the generic 2×2 matrices and the antilinear involution is given by using the complex conjugation. This complex algebraic system of generic matrices only represents *discrete* variables taking at most two values such as 'productive forces' and 'relations of production'[5], 'man' and 'animal'[6], 'Logos' and 'Torah'[7], 'immanence' and 'transcendence'[8], etc. but as soon as one adjoins another non-commuting bivalent variable *Y*, one generates all *continuous* functions in a 'connected space', that is the simplest example of a philosophical continuum constituting a two-dimensional sphere that can be called 'two-sphere'. The involutive logos generated in such a way contains plenty of 'continuous variables'. The sphere itself is recovered as the *spectrum* of the algebraic logos, and the 'points' of the sphere are the 'actors' or, as one says in the 'categorial' jargon, the 'arrows' or the 'morphisms' of the involutive logos to the complex numbers. This is a prototype example of how the connected space or the two-sphere of philosophy can emerge from the discrete, that is, from the algebraic logos as a complex number and the second variable, due to non-commutativity. What happens is that the connected space of the philosophical two-sphere emerges from the characters of the quantum and generic universe in a spectral manner. There is another great advantage of non-commutativity: the 'natural' logos which springs out of the non-commuting logos

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[1] Smith 2016, p. 45.
[2] Cf. Connes, Chéreau, and Dixmier 2013, p. 77: '*passer au commutatif est une perte de sens*'.
[3] Cf. id. 2018, p. 122: '*la réalité ultime naît de l'espace hilbertien*'.
[4] Laruelle 2012d, p. 149. Cf. id. 2004, p. 126: 'le (non-) rapport de la théorie et de la pratique'. See also Ó Maoilearca 2015, p. 244.
[5] Gangle and Greve 2017, pp. 160 f.
[6] Cf. Laruelle 2015a, p. 126.
[7] See id. 2015d, p. 142, and id. 2014, p. 210.
[8] Cf. id. 2010a, p. 327.

and the other variable contains the first one but is larger and gives the philosophical logos with *continuous* values on the two-sphere (i.e., the philosophical continuum).[9]

The non-commutative nature of this system is *inevitable* in the sense that the classical techniques for analysing the philosophical space are inoperative. A distinct feature of the non-commutative space is already present at the level of the underlying set-theoretic concept, since a non-commutative space has the cardinality of the continuum and, at the same time, it is not possible to put this space in bijection with the philosophical continuum. More precisely, any map of such a set to the real line fails to be injective. By these considerations, we notice immediately a major obstacle if one tries to understand intensive or conceptual spaces by using a classical commutative logos. The reason why these spaces are called 'non-commutative' is that if one accepts to use non-commuting coordinates to encode them, and one extends the traditional tools of commutative ontology to this larger non-commutative framework, everything is put correctly in place. The basic principle that we adopt is to take advantage of the *presentation* of the space as a quotient of an ordinary space by an equivalence relation but then, instead of effecting the quotient, we replace the equivalence relation by its convolution over the complex numbers.[10]

The new paradigm of spectral triples: Non-commutative ontology is given by a tripartite structure or a 'spectral triple' as a new 'ontological plane'[11] or paradigm which consists, in the first place, of an 'involutive logos' concretely represented as an operator logos (operator system) in a non-commutative space and, in the second place, in a 'self-adjoint operator' called 'propagator' acting on the same space. Thus they are both represented, in the last place, in an 'onto-vectorial Hilbert space'. The involutive logos encodes the non-commutative space upon which it acts. The self-adjoint operator represents the 'spectral consistency element'. In general, the algebraic logos generated by the involutive algebraic system and the propagator are irreducible. This operator formalism called 'immanental' allows to give this paradigm a 'natural' appearence on a macroscopic scale by encoding the philosophical space with invariants.

Non-commutativity can help instead of being a disadvantage. Non-commutativity permits to generate the *continuous* variables from *discrete* ones on a qualitative or intensional plane. The idea is that the onto-vectorial Hilbert space is not a continuous space but we try to *approximate* it with a continuous space. This is a new paradigm for philosophical spaces. It is based on the 'spectral' formalism of non-commutative ontology. The 'spectral action' is the only 'natural' additive invariant of a non-commutative ontology. It allows to treat the continuous and the discrete intensity or intension on the same footing. The new tool is the spectral paradigm and the new outcome is that commutative ontology does emerge from non-commutative ontology, that is, from the onto-vectorial space and linear operators. The 'onto-material' formalism of operators in the non-commutative space encompasses the parametrized

[9] Cf. Connes 2017, pp. 16 f.
[10] Cf. Connes and Consani 2018, p. 8.
[11] Caputo 2018, p. 34.

variables of philosophy. That is the '*Leitmotiv*' of this approach which permits to develop further a 'particle picture' of ontology.

What Laruelle suggests is that the variables obey the rules of the *generic matrix* and this leads to formalize non-philosophy in terms of operators in onto-vectorial Hilbert spaces. It is essential for a 'nonset-theoretic and matricial ontology' to understand subtler, that is, *non-commutative* spaces of thought as suggested by Laruelle. We could think that 'non-commutative ontology' consists simply in a rational generalization of classical ontology by assuming that the philosophical coordinates no longer commute. However, what can be deduced from Laruelle's assumption of a generic quantum is that non-commutative ontology, by simple non-commutativity, generates its own time, that is, changes over time. That is, classial commutative ontology is *static*, it does not change, since there is no immanental variability, unpredictability, while non-commutative ontology actually changes over time, that is, it is *processual*. Simply from non-commutativity, the non-commutative algebraic logos as a complex number as such – no other, supplementary structure is needed – time can arise.

By thinking about the Einstein-Podolsky-Rosen paradox (Laruelle's 'immanental realism' according to which the Real or the 'in itself' remains inaccessible[12]) we understood that there is, as a matter of fact, an analogy between the generic quantum random and time: in the case of this paradox and the measurements which are made in two causally independent points, there are not two quantum hazards, but a single one, due to correlations. There is a maximum correlation but no causality. One does not understand the chronology in this case and the wave packet reduction seems to make no sense since one cannot say at which moment it happens. The chronology is not important and does not make sense between two observables *which commute*. If $AB = BA$, the chronology of events is not important, but as soon as $AB \neq BA$, the chronological order of events plays a role. Non-commutative ontology is not only a matter of generalization but also a matter of opening to completely new things which have no analogue in the classical world of thought; the classical world is static, but the quantum or non-commutative world has this property to generate its own time. Time as we perceive it appears from the generic quantum random.

The concept of topos is related to the immanental variability. A topos encodes not directly a non-commutative space but by considering commutative spaces that are parametrized by this non-commutative space. Every action takes place like in classical, commutative ontology, and the role of the topos remains hidden, confined to the background, simply there for governing the variability. The concepts are the same, so we can talk about the 'cogito' of Descartes, the 'transcendental' of Kant, etc. in a topos and all the philosophical solutions remain valid. We obtain an astute, fine understanding of the non-commutative space in question by looking at how it makes vary the objects, that is, by looking at commutative, philosophical spaces parametrized by this new non-commutative space. We found a complex algebraic and ontological object, a discrete homological site, i.e., a universal topos that rules the immanental variability and makes

[12] See Laruelle 2010a, Chapter XII, 'Le réel non-einsteinien', pp. 387 ff.

intervene the fundamental concepts of characteristic one and topos. We keep doing what we usually do, that is, philosophizing but we do it with something in the background which organizes the variability. While the commutative, philosophical continuum that we are used to is inappropriate for grasping the discrete, the concept of topos shows an even more intimate symbiosis than the generic quantum between continuous and discontinuous structures.

Classical ontology is expressed in the language of Cantorian concepts, we have relations and definite objects, we take the same objects and define them in the same way in the internal language of the topos, with the same relations, and we obtain non-commutative ontology. In other words, non-commutative ontology is the same thing as commutative ontology, except that the one is described in the internal language of the topos and the other in the language of set-theoretic concepts constituting the commutative spaces of philosophy. The internal language of a category can be used for reasoning about the category in a set-theoretic fashion, that is by using 'elements'. In a topos we can interpret all the common 'formulae' that we use in commutative ontology. The logic of a topos is intuitionistic. The existence of the internal language of a topos justifies the use of the standard set-theoretic intuition when working 'inside' a topos provided that one avoids invoking the law of excludded middle or any other non-constructive principles.[13]

For the unifying space of commutative and non-commutative ontology the quasi-concepts of *topos* and of *characteristic one* are needed. There is an analogy between the *topos in characteristic one* and the *category of compact operators* in an onto-vectorial Hilbert space. *Homological ontology in characteristic one* describes that topos, which embodies an *imaginary* abstract world 'above' or 'behind' the *real* concrete world of philosophy and non-philosophy. The problems and methods of non-philosophy cannot continuously and directly be transferred to philosophy, but there is an indirect way over the homological bridge of a topos. Homological ontology in characteristic one builds a complex bridge between commutative, continuous ontology and Laruelle's non-commutative, discrete non-ontology. There is a balance between the spectral variability of the generic quantum (as the most elementary concept, the rational core and the essence of Laruelle's onto-material or immanental formalism), which allows the continuous and the discrete to coexist in a generic space and the topos as another, even more intimate link between discrete and continuous structures. Homological ontology in characteristic one proceeds from the concrete real toward the abstract imaginary and back to the concrete real. The real and concrete variability 'on stage' is controlled by the imaginary 'backstage' topos as a kind of reincarnation of the Cartesian 'malignant demon'. The key idea was to replace the ordinary philosophical space X by its role as a parameter space. Instead of focussing on space X, we rather concentrate on their ability to define a variable set-theoretic concept with a parameter. The category of Cantorian concepts depending on parameters fulfills almost all classical rational properties, except the axiom of the excluded middle, and encodes a philosophical space through the

[13] Cf. Caramello 2018, p. 43.

category of sheaves of set-theoretic concepts on that space. From this point of view, we understand space *X* not by directly looking at it. The parameter space remains rather hidden by governing the variability of every onto-material object. The nonvariable, nonparametrized spaces of thought form part of a new commutative, homological ontology in characteristic one.

After all, I am by far more optimistic, just like Smith and others, than Brassier when he stated in 2003[14] that non-philosophy would not provide any concrete examples, but also about the possibilities to escape from 'the pitfalls of philosophy' than Ó Maoilearca when he wrote in 2009 (he ought to be less pessimistic by now though): 'I do not think it is possible to immunize non-philosophy from becoming philosophy *over time* – any avant-garde is inevitably naturalized when replaced by a new non-philosophy.'[15] Tropical philosophy and subtropical philosophy are meant to be both an analytic prolongation of quantum-oriented theory offering a non-philosophical solution to the coexistence problem of continuous and discrete variables and one more answer to the initial and final question: 'What is to be done with non-philosophy?'.

[14] See Brassier 2003, p. 24.
[15] Mullarkey 2009, pp. 256 f.

GLOSSARY

Abelian category: '*An abelian category A is an Ab-category satisfying the following conditions*

(i) *A has a null object,*

(ii) *A has binary biproducts,*

(iii) *Every arrow in A has a kernel and a cokernel,*

(iv) *Every monic arrow is a kernel, and every epi* [i.e., epimorphism] *a cokernel.*'[1]

'Formally, define an *Ab-category* (also called a *preadditive* category) to be a category A in which each hom-set $A(a, b)$ is an additive abelian group and for which composition is biliear: For arrows $f, f' : a \longrightarrow b$ and $g, g' : b \longrightarrow c$,

$$(g + g') \circ (f + f') = g \circ f + g \circ f' + g'f + g'f'.$$

[...] Thus an *Ab*-category is given by the data

(i) A set of objects $a, b, c, \ldots$;

(ii) A function which assigns to each ordered pair of objects $\langle b, c \rangle$ an abelian group $A(b, c)$;

(iii) For each ordered triple of objects $\langle a, b, c \rangle$ a morphism

$$A(b, c) \otimes A(a, b) \longrightarrow A(a, c)$$

of abelian groups called composition, and written $g \otimes f \longmapsto g \circ f$;

(iv) For each object, a morphism $\mathbf{Z} \longrightarrow A(a, a)$. [...]

The definition of *Ab*-category is just like the definition of category by hom-sets: **Set** is replaced by **Ab**, cartesian product $\times$ of sets by tensor product in **Ab**, and the one-point set $*$ is replaced by $\mathbf{Z}$.'[2]

Adjoint: 'The word "adjoint" seems to have arisen first (and long ago) to describe certain linear differential operators. About 1930 the concept was carried over to a Hilbert space H, where the adjoint T^* of a given linear transformation T on H is defined by equality of the inner products

$$(T^*x, y) = (x, Ty)$$

for all vectors $x, y \in H$.'[3]

Category and **Topos**: '1. *Objects and arrows.* A category consists of objects $a, b, c, \ldots$ and arrows f, g, h. Sets form a category with sets as the objects and functions as the arrows.

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[1] Mac Lane 1998, p. 198.

[2] Ibid., pp. 28 f.

[3] Ibid., p. 107.

2. *Domain.* Each arrow f has an object a as its "domain" and an object b as its "codomain"; we then write $f: a \longrightarrow b$.
3. *Composition.* Given $f: a \longrightarrow b$ and $g: b \longrightarrow c$, their composite is an arrow $g \circ f: a \longrightarrow c$.
4. *Associativity.* If also $h: c \longrightarrow d$, then the triple composition is associative:

$$h \circ (g \circ f) = (h \circ g) \circ f: a \longrightarrow d.$$

5. *Identities.* Each object b has an identity arrow $1_b: b \longrightarrow b$. If also $f: a \longrightarrow b$, then $1_b \circ f = f$. If also $g: b \longrightarrow c$, then $g \circ 1_b = g$.

An elementary topos is a category with a certain additional structure: terminal object, pullbacks, truth, a subobject classifier, and power objects (sets of subsets). The axioms for this addtional structure are as follows:

6. *Terminal object.* There is a terminal object 1 such that every object a has exactly one arrow $a \longrightarrow 1$.
7. *Pullbacks.* Every pair of arrows $f: a \longrightarrow b \longleftarrow c: g$ with a common codomain b has a pullback [...]:

$$\begin{array}{ccc} p & \longrightarrow & c \\ \downarrow & & \downarrow g \\ a & \xrightarrow[f]{} & b. \end{array} \qquad (1)$$

In particular, (take $b = 1$), any two objects a and c have a product $a \times c$.
8. *Truth.* There is an object Ω (the object of truth values) and a monomorphism $t: 1 \longrightarrow \Omega$ called truth; to any monomorphism $m: a \longrightarrow b$, there is a unique arrow $\psi: b \longrightarrow \Omega$ such that the following square is a pullback:

$$\begin{array}{ccc} a & \longrightarrow & 1 \\ {\scriptstyle m}\downarrow & & \downarrow{\scriptstyle t} \\ b & \xrightarrow[\psi]{} & \Omega. \end{array} \qquad (2)$$

9. *Power objects.* To each object b, there is an associated object $P\,b$ and an arrow $\varepsilon_b: b \times P\,b \longrightarrow \Omega$ such that for every arrow $f: b \times a \longrightarrow \Omega$ there is a unique arrow $g: a \longrightarrow P\,b$ for which the following diagram commutes:

$$\begin{array}{ccc} b \times a & \xrightarrow{f} & \Omega \\ {\scriptstyle 1 \times g}\downarrow & & \| \\ b \times Pb & \xrightarrow[\varepsilon_b]{} & \Omega. \end{array} \qquad (3)$$

[4]

[4] Ibid., pp. 289 f.

Contravariant functor: 'Consider a functor $S: C^{op} \longrightarrow B$. By the definition of a functor, it assigns to each object $c \in C^{op}$ an object Sc of B and to each arrow $f^{op}: b \longrightarrow a$ of C^{op} an arrow $Sf^{op}: Sb \longrightarrow Sa$ of B, with $S(f^{op}g^{op}) = (Sf^{op})(Sg^{op})$ whenever $f^{op}g^{op}$ is defined. The functor S so described may be expressed directly in terms of the original category C if we write $\bar{S}f$ for Sf^{op}; then $\bar{S}$ is a *contravariant functor* on C to B, which assigns to each object $c \in C$ an object $\bar{S}c \in B$ and to each arrow $f: a \longrightarrow b$ an arrow $\bar{S}f: \bar{S}b \longrightarrow \bar{S}a$ (in the *opposite* direction), all in such a way that

$$\bar{S}(1_c) = 1_{\bar{S}c}, \quad \bar{S}(f\,g) = (\bar{S}g)(\bar{S}f\,), \qquad [...]$$

the latter whenever the composite $f\,g$ is defined in C.'[5]

Duality, dual: 'Categorical duality is the process "Reverse all arrows". [...] The *elementary theory* of an *abstract category* (ETAC) consists of certain statements Σ which involve letters $a, b, c, ...$ for objects and letters $f, g, h, ...$ for arrows. [...] The *dual* of any statement Σ of ETAC is formed by making the following replacements throughout in Σ: "domain" by "codomain", "codomain" by "domain", and "h is the composite of g with f" by "h is the composite of f with g"; arrows and composites are reversed. Logic (and, or, ...) is unchanged.'[6]

Functor: 'A *functor* is a morphism of categories. In detail, for categories C and B a functor $T: C \longrightarrow B$ with domain C and codomain B consists of two suitably related functions: The *object function* T, which assigns to each object c of C an object Tc of B and the *arrow function* (also written T) which assigns to each arrow $f: c \longrightarrow c'$ of C an arrow $Tf: Tc \longrightarrow Tc'$ of B, in such a way that

$$T(1_c) = 1_{Tc}, \qquad T(g \circ f) = Tg \circ Tf, \qquad [...]$$

the latter whenever the composite $g \circ f$ is defined in C. A functor, like a category, can be described in the "arrows-only" fashion: It is a function T from arrows f of C to arrows Tf of B, carrying each identity of C to an identity of B and each composable pair $\langle g, f \rangle$ in C to a composable pair $\langle Tg, Tf \rangle$ in B, with $Tg \circ Tf = T(g \circ f)$.'[7]

Functor category: 'Given categories C and B, we consider all functors $R, S, T, ...: C \longrightarrow B$. If $\sigma: R \stackrel{\bullet}{\longrightarrow} S$ and $\tau: S \stackrel{\bullet}{\longrightarrow} T$ are two natural transformations, their components for each $c \in C$ define composite arrows $(\tau \bullet \sigma)c = \tau c \circ \sigma c$ which are the components of a transformation $\tau \bullet \sigma: R \stackrel{\bullet}{\longrightarrow} T$. [...] This composition of transformation is associative; moreover it has for each functor T an identity, the natural transformation $1_T: T \longrightarrow T$ with components $1_T c = 1_{Tc}$. Hence, given the categories B and C, we may construct

[5] Ibid., p. 33.
[6] Ibid., p. 31.
[7] Ibid., p. 13.

formally a functor category $B^C = \mathrm{Funct}(C, B)$ with objects the functors $T: C \longrightarrow B$ and morphisms the natural transformations between two such functors.'[8]

Hilbert space: 'The mathematical concept of Hilbert space generalizes that of Euclidean space by allowing the vectorial space to be of infinite dimension. The application to quantum mechanics uses the complex Hilbert space.'[9]

Idempotent: 'Generally, an arrow $f: b \longrightarrow b$ is called *idempotent* when $f^2 = f$; an idempotent is said to *split* when there exist arrows g and h such that $f = hg$ and $gh = 1$.'[10]

Monoidal categories. — 'A category is monoidal when it comes equipped with a "product" like the direct product ×, the direct sum ⊕, or the tensor product ⊗.'[11]
'A monoidal category M is a category with a bifunctor, ⊗ or □ ,

$$\square : M \times M \longrightarrow M$$

written for objects a, b of M variously as a "product"

$(a, b) \longrightarrow a \square b, a \otimes b$, or $a\, b$

which is associative up to a natural isomorphism

$$\alpha : a(b\, c) \cong (a\, b)c \qquad (1)$$

and is equipped with an element e, which is unit up to natural isomorphisms

$$\lambda : e\, a \cong a, \rho : a\, e \cong e. \qquad (2)'[12]$$

Observable: 'An observable quantity in quantum mechanics is mathematically formalized by an operator acting on the vectors of a Hilbert space.'[13]

Opposite category: 'To each category C we also associate the *opposite* category C^{op}. The objects of C^{op} are the objects of C, the arrows of C^{op} are arrows f^{op}, in one-one correspondence $f \longmapsto f^{\mathrm{op}}$ with the arrows f of C. For each arrow $f: a \longrightarrow b$ of C, the domain and codomain of the corresponding f^{op} are as in $f^{\mathrm{op}}: b \longrightarrow a$ (the direction is

[8] Ibid., p. 40.
[9] Cf. Connes, Chéreau, and Dixmier 2013, p. 199: *'Le concept mathématique d'espace de Hilbert généralise celui d'espace euclidien en autorisant l'espace vectoriel à être de dimension infinie. L'application à la mécanique quantique utilise l'espace de Hilbert complexe.'*
[10] Mac Lane 1998, p. 20.
[11] Ibid., p. 161.
[12] Ibid., pp. 251 f.
[13] Cf. Connes, Chéreau, and Dixmier 2013, p. 204: *'Une quantité observable en mécanique quantique est formalisée mathématiquement par un opérateur agissant sur les vecteurs d'un espace de Hilbert.'*

reversed). The composite $f^{op}g^{op} = (g\,f)^{op}$ is defined in C^{op} exactly when the composite $g\,f$ is defined in C. This clearly makes C^{op} a category.'[14]

Phase space: 'In the model of classical mechanics it is necessary, in order to determine the subsequent trajectory of a particle, to know at once its initial position and velocity. Thus, the initial givens form a set of six parameters which are the three coordinates of the position and the three coordinates of the velocity, or rather of the momentum $p = mv$. If we are interested in a number of n particles, we have to know for each of them its position and its momentum. We are therefore dealing with a set of $6\,n$ parameters called the phase space of the mechanical system under consideration. Classical mechanics determines, from a function on this space called Hamiltonian and which measures the energy, differential equations determining the trajectory from the initial givens. The natural structure of the phase space is that of a symplectic manifold whose points are the "states" of the system. The Hamiltonian H is a function on X which intervenes in order to specify the evolution of any observable physical quantity, that is to say of any function f on X, by the equation:

$$\dot{f} = \{H, f\}$$

where { } designates the Poisson bracket, and $\dot{f} = \frac{\mathrm{d}}{\mathrm{d}t} f$.'[15]

Presheaf: 'For C a small category, a contravariant functor F: $C^{op} \longrightarrow$ **Sets** is often called a presheaf. [...] The functor category $\mathbf{Sets}^{C^{op}}$ of all these functors (presheaves) is often written $\hat{C}$. Certain of these functors (with a "matching" property) are called sheaves'.[16]

Sheaf: See 'Presheaf'.

Small category: 'We call a category small if the class of its objects is a set.'[17]

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[14] Mac Lane 1998, p. 33.

[15] Cf. Connes 2005, pp. 12 f.: *'Dans le modèle de la mécanique classique, il est nécessaire, pour déterminer la trajéctoire ultérieure d'une particule, de connaître à la fois sa position et sa vitesse initiales. Les données initiales forment donc un ensemble à six paramètres qui sont les trois coordonnées de la position et les trois coordonnées de la vitesse, ou mieux du moment* p = mv. *Si l'on s'intéresse à un nombre* n *de particules, il faut connaître pour chacune d'entre elles sa position et son moment. On a donc affaire à un ensemble à* 6 n *paramètres, que l'on appelle l'espace des phases du système mécanique que l'on considère. La mécanique classique détermine, à partir d'une fonction sur cet espace, que l'on appelle l'hamiltonien et qui mesure l'énergie, des équations différentielles qui déterminent la trajectoire à partir des données initiales. La structure naturelle de l'espace des phases est celle de variété symplectique dont les points sont les "états" du système. L'hamiltonien* H *est une fonction sur* X *qui intervient pour spécifier l'évolution de toute quantité physique observable, c'est-à-dire de toute fonction* f *sur* X, *par l'équation* :

$$\dot{f} = \{H, f\}$$

où { } *désigne le crochet de Poisson, et* $\dot{f} = \frac{d}{dt} f$.'

[16] Mac Lane 1998, p. 77.

[17] Mac Lane 1995, p. 26.

Subcategory: 'A *subcategory* S of a category C is a collection of some of the objects and some of the arrows of C, which includes with each arrow f both the object dom f and the object cod f, with each object s its identity arrow 1_s and with each pair of composable arrows $s \longrightarrow s' \longrightarrow s''$ their composite. These conditions ensure that these collections of objects and arrows themselves constitute a category S.'[18]

Subobject classifier: 'The characteristic function of a subset $S \subset X$ is the two-valued function $\psi_S: X \longrightarrow \{0,1\}$ on X with the values

$$\psi_S x = 0 \quad \text{if } x \in S; \quad \psi_S x = 1 \quad \text{if } x \in X \text{ but } x \notin S. \qquad (1)$$

Put differently, $\{0\} \subset \{0,1\}$ represents the simplest non-trivial subset. An arbitrary subset $S \subset X$ can be mapped into this simple subset by ψ_S, as defined. This map produces a pullback square

$$\begin{array}{ccc} S & \longrightarrow & \{0\} \\ \downarrow & & \downarrow \\ X & \xrightarrow{\psi_S} & \{0,1\}. \end{array} \qquad (2)$$

Such characteristic functions are often used in probability theory; in logic, $\{0,1\}$ is the set of two "truth values" with 0 the value "truth". One says that the monomorphism (the typical subset) $t: \{0\} \longrightarrow \{0,1\}$ is a "subobject classifier" for the category of sets.

It turns out that there are similar classifiers for subobjects in other categories. In general, a **subobject classifier** for a category C with a terminal object 1 is defined to be a monomorphism $t: 1 \rightarrowtail \Omega$ such that every monomorphism m in C is a pullback of t in an unique way. In other words, for each m there exists a unique pullback square

$$\begin{array}{ccc} S & \longrightarrow & 1 \\ {\scriptstyle m}\downarrow & & \downarrow{\scriptstyle t} \\ X & \xrightarrow{\psi} & \Omega. \end{array} \qquad (3)$$

In the resulting pullback square (3), the top horizontal arrow is the unique map to the terminal object 1, the lower horizontal arrow acts as the "characteristic function" of the given subobject S, while the "universal" monomorphism $t: 1 \longrightarrow \Omega$ may be called "truth".'[19]

[18] Mac Lane 1998, p. 15.
[19] Ibid., p. 105.

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