Emergence, Synchronization and Synchronicity
Re-approaching the Concept of Complex System from a Critical Philosophical Perspective*

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Abstract: The present study aims at re-approaching, in a critical manner, three interrelated terms differently (and independently) used or conceptualized in mono- and multi-disciplinary research today, in natural sciences and humanities: 'emergence', 'synchronization', 'synchronicity'. The comparative perspective meant to bring different contextual meanings and usages together will shed a 'renewed' light upon the general significance of the concept of 'complex system', by re-evaluating the contribution that fields like philosophy or religious studies might add in order to nuance and re-define the various understandings of the formula when used in different frameworks. The bringing together of the three terms within the framework opened by different visions and understandings of the time-space continuum highlights, in a critical manner, important aspects and features to be taken into consideration for clarifying the significance of the three concepts in their interconnectedness, for re-evaluating the conventional existing definitions, and conceptualizations of 'complex systems', for configuring more complex research methodologies, and fostering a renewed concept of 'scientificity', enriched and reshaped through dimensions which are essential for its application within the area of Humanities.

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Preliminary remarks and precautions

The present study aims at re-approaching, in a critical philosophical manner, three interrelated terms differently (and independently) used or conceptualized in mono- and multi-disciplinary research today, in natural sciences and humanities: 'emergence', 'synchronization', 'synchronicity'. The comparative perspective meant to bring different contextual meanings and usages together will shed a 'renewed' light upon the general significance of the concept of 'complex system', by re-evaluating the contribution that fields like philosophy or religious studies might add in order to nuance and re-define the various understandings of the formula when used in different frameworks.

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The need to adapt the meaning, the content and the limits of any concept to a particular context, research area, and, consequently, to a specialized language, might contradict the general assumption that, by using the same terms 'we know', a general definition, applicable in any framework, is implied.

The present approach will highlight the common features linking the three different terms under analysis ('emergence', 'synchronization', 'synchronicity'), as well as the common attributes of the different occurrences of the formula 'complex system', at the same time underlining the uniqueness and the irreducibility of every term and occurrence. Communication is thus made possible by a map of continuities and discontinuities at the level of meaning and usage, their conventional amplitude being put forward through a necessary critical and auto-reflexive gesture (as long as we use language as a means of communication).

The length of this work does not allow me to trace a general conceptual history of the terms to be approached. It will rather concentrate upon their 'functional' definitions in their common and specialized usages, instantiating, in a phenomenological manner, a variety of significances re-linked through dialogical contexts or by means of correspondences, wherever this exercise is allowed or entailed.

The three terms are investigated within the exploratory context of complex systems' behaviour. They apply to describing different states, processes or instants characterizing stochastic and/or non-stochastic 'behavioural attitudes' of complex systems.

The paper does not offer a general overview regarding the dynamics of complex systems analyzed from the perspective of the correlations existing among the three terms, but it focuses on a 'trans-particular' issue, without generalizing: the fluctuation of the 'space-time parameter' in its implicit connection with transformational processes and the need to recalibrate our discourse referring to 'parts', 'whole', 'unit'/'substance'/'subsistence', 'network'.

The study will underline the different contributions the field of Humanities might bring into discussion, by indicating towards more complex frameworks for understanding and defining science.

Emergence

The concept of 'emergence' was first introduced, in its philosophical explanatory usage, by George Henry Lewes:

> "The emergent is unlike its components insofar as these are incommensurable, and it cannot be reduced to their sum or their difference."[1]

Analyzing the meaning of emergence in relation to the 'Newtonian' space-time paradigm pushes forward the brutal and common distinction between 'parts' and 'whole', thus laying emphasis on a particular, reductive and relative, understanding of interconnectedness, from within the implicit non-critical philosophical assumption which states the existence of space and time as absolute 'substances', by virtue of their measurable attributes (visibility, extension, becoming, sequentiality, subsistence). The discussion about the 'parts' and the 'whole' when referring to a 'complex system'

[1] George Henry Lewes, *Problems of Life and Mind* (Boston: Osgood, 1875), 412.

remains tributary to the Newtonian paradigm, instantiating the 'body' or the 'matter' of space-time concatenation as a referential matrix for investigation. The direct consequence is the postulation of the *existence* of the 'complex system' in the likeness of the primary, axiomatic ground of the time-space *existence* envisaged under the absolute guide of a *substance* exhibiting measurable properties.

In this light and within the boundaries of this contextual matrix, the distinction between 'weak' and 'strong' emergence was operated,[2] their theoretic delineation still remaining imprecise and diffuse, despite numerous efforts to provide clear and accurate definitions.

> "Again, it is helpful to distinguish between weak and strong versions. Weak reductionism recognizes that in practice the only way that the behaviour of many complex systems may be determined is by direct inspection or by simulation. In other words, one may not deduce merely from the principles that govern a class of systems how a specific individual system will in fact behave. Human behaviour, and even the behaviour of a simple organism such as a bacterium, probably falls into this category.
>
> Strong emergence is a far more contentious position, in which it is asserted that the micro-level principles are quite simply inadequate to account for the system's behaviour as a whole. Strong emergence cannot succeed in systems that are causally closed at the microscopic level, because there is no room for additional principles to operate that are not already implicit in the lower-level rules."[3]

The concept was differently reconfigured and re(de)fined when applied in particular scientific contexts, deploying novel properties or dimensions, in accordance with a specific research subject matter or methodology.[4]

Nonetheless, the concept of 'emergence' is not yet clearly and distinctly circumscribed or explained, its applicability being confined to various limited, alternative or even contradictory, scientific means of interpretation. The theorizing of 'emergence' as a process, an attribute or a mechanism remains problematic, its 'horizon' being open to further investigation:

> "The problem, as we understand it, is that terms such as 'emergence' and 'emergent property' have recently achieved a widespread currency in some

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[2] See, for example, the relevant and synthesizing works of Philip Clayton and Paul Davies, *The Re-Emergence of Emergence: The Emergentist Hypothesis from Science to Religion* (Oxford: Oxford University Press, 2006), Robert Laughlin, *A Different Universe: Reinventing Physics from the Bottom Down* (Basic Books, 2005) or Peter Corning, "The Re-Emergence of 'Emergence': A Venerable Concept in Search of a Theory", *Complexity* 7 (6) (2002): 18–30.

[3] Clayton and Davies, *The Re-Emergence of Emergence: The Emergentist Hypothesis from Science to Religion*, xii.

[4] See in this respect the innovatory approaches of P.W. Anderson, "More is Different: Broken Symmetry and the Nature of the Hierarchical Structure of Science", *Science* 177 (1972): 393–396, Arthur Koestler, *Beyond Reductionism: New Perspectives in the Life Sciences*, ed. A. Koestler and J. R. Smythies (London: Hutchinson, 1969), Jeffrey Goldstein, "Emergence as a Construct: History and Issues", *Emergence: Complexity and Organization* 1 (1999): 49–72, Corning, "The Re-Emergence of "Emergence": A Venerable Concept in Search of a Theory", 18–30.

scientific journals, while few of the authors who employ this vocabulary offer any kind of definition of what they take emergence to be, or explain why it should be important to the modern scientist. Where definitions are provided they are sometimes lacking in clarity, and sometimes conceptually inadequate."[5]

Since 'emergence' does not have a particular circumscribed correlative in the visible measurable realm, under scientific scrutiny 'in the lab', and does not name a specific well-delineated 'entity' or 'substance' (confined in terms of space and time), its generality and intrinsic lack of clarity often made scientists reluctant to applying it and to exploiting its fertile 'fluidity'.

De-fining a term, in our scientific world, still recalls the prerequisite of fixing the exact, 'finite', boundaries of the object, body, property or mechanism described by that term. This request, important whenever science claims its superiority in providing rigorous and measurable knowledge, does not apply to the 'open concept' of emergence. De-fining is 'confined', in scientific discourse, to de-limiting, in order to further investigate the 'whole' rigorously delineated and separated from other 'external' factors and influences.

This delimitation is not functional when we turn toward the concept of 'emergence', due to the particular feature of the term to highlight a non-measurable, spontaneous, non-predictable 'transition'. Emergence underlines a discontinuity in continuity, focusing on the 'gap' and its diffuse 'margins'. It refers to the 'non-visible', discontinuous line which makes any unexpected transformation possible. The 'ultimate' explanation of emergence would be equivalent to solving and understanding each and every process in terms of being able to measure and reproduce it at will. This utopian scientific approach would assume that there might be a process without discontinuity. The discontinuous aspect is void of content; it must, by definition and by necessity, express a possibility of existence (of a measurable content), in the form of an empty 'tension' or 'inclination' *toward*.

The fertility of such a concept is huge for our understanding of the world, by its revolutionary potential: the term applies and functions in various contexts refusing a scientific jailing. It denotes an epistemological 'advancement' in uncovering the critical limits of our knowledge, at the same time indicating toward the necessary step of reconfiguring the concept of 'scientificity' which reduces science to measurable and predictable phenomena by artificially imposing the limits of 'reality' to the circumscribed domain of 'scientific' investigation.

The discussion about emergence is by far more nuanced in the field of Physics, where the paradigm shift from Newtonian understanding of space-time 'existence' to more relative, to co-relative or to non-linear apprehension of the space-time parameter brings along novel methodological frameworks. Space and time are no longer envisaged as 'substances', existing or subsisting as an absolute all-comprising matrix

[5] Angela Matthies, Andrew Stephenson and Nick Tasker, *The Concept of Emergence in Systems Biology*. *A Project Report*, 2, http://www.stats.ox.ac.uk/data/assets/pdf_file/0018/ 3906/Concept_of_Emergence.pdf (accessed December 28, 2012)

or receptacle. The Newtonian vision proved to be limited to particular segments in the spectrum of our understanding of 'reality'.

Still, the meaning of emergence was not yet correlated to the novel modes of envisaging the space-time parameter.

In the area of Humanities, the concept of emergence was borrowed accidentally, although the problematic has an outstanding tradition: the particular type of relation ambiguously supposed by the term 'emergence' was alluded or thoroughly examined in the philosophical and religious/theological discourses belonging to different geographic and linguistic areas. These theories need to be brought in correspondence with the recent theorizations of the concept of emergence: disciplines from the area of Humanities may contribute to uncovering alternative or complementary significances, methods and/or instruments meant to reshape and enrich the constellation of 'scientificity' and the apprehension of 'reality' in more complex modalities.

Emergence implies a non-linear passage, ontologically (if we credit the concept of 'strong' emergence) or epistemologically (if we favour the concept of 'weak' emergence), objectifiable in a two-step instantiations, radically (if we credit the concept of 'strong' emergence) or logically different (if we favour the concept of 'weak' emergence).

The 'weak' emergence posits the 'still unknown' continuum under the cover of the 'ignorant' discontinuity: it is a matter of time and technology until science will uncover the hidden continuum which makes us mistakenly believe in miraculous a-causal changes, temporarily labelled as 'emergent'.

The 'strong' emergence hypothesis assumes discontinuity as such, i.e., as ultimate referential level in terms of explanatory triggers. The second 'step' is not continuously derived from, contained in and presupposed by the previous step. The unpredictable shift from one step to the other is made possible by 'the gap'.

In philosophical and religious traditions of thought, the 'gap' is assumed as difference, and it cannot be reduced to a 'compact continuum'. The 'intermediaries' meant to bridge the gap do not cancel the discontinuities. This would equal to the disappearance of individuals, objects or entities, since any particular existence is defined through specific difference (as a 'part' separated from other similar or dissimilar 'parts').

The 'complete' continuum is expressed in religion as final unity or communion: there is no shape to be delineated anymore, whilst, simultaneously, all shapes *emerge* with their particular forms and faces. Emergence is thus correlated to the tight continuity-discontinuity play, in a sequential concatenation – for the ignorant, partial view of reality, and in a simultaneous move – for the ultimate view of the one having attained perfection.

Synchronization

The concept of emergence implies a specific interplay between different and nonetheless intimately correlated instantiations of the time-space parameter: a sequence in the system undergoes an unpredictable, though visible and measurable, transformational process being re-instantiated in a different 'shape', on a different 'moment' of the system. The previous 'shape' disappears, while the immediate

following ‘shape’ appears, in an unpredictable mode, objectified as a different space-time *instant*. Are these instants behaving as particles or rather as a continuous wave? The wave-particle paradox underlies, as a framework-question, the endeavour to offer a definition for emergence.

Changes are never singular. They produce, consequently, or are correlated, simultaneously, to ‘neighbouring’ transformational processes.

Synchronization would indicate, in this context, toward processes occurring at the same time or simultaneously, implying, in the specific case of emergent synchronization, the non-predictable, a-causal or co-dependent simultaneous origination. Synchronization brings forth the ability of the system to produce simultaneous (correlated) changes. The two moves ‘unite’ themselves or resonate at terms of time sequence, expressing similar shapes or movements, in the same rhythm, but distinguished through their different space parameter. In other words, both processes ‘observe’ the same temporal cadence or rhythm, while still preserving their own separate spatial *locus*. Metaphorically, the two synchronized processes *co*habit the same temporal *locus*, but *in*habit different spatial *loci*, whence the multiplicity of the same action, performed in two different ‘embodiments’ or spatial expressions.

In the particular case of mechanical synchronization the two actions are not only correlated through their common temporal *locus*, but rather ‘coordinated’, through the direct, external (and intrusive) intervention of man (if we have in mind an experiment, for example).

Synchronization which occurs naturally and spontaneously, without a constraining intentional guidance, is called ‘emergent synchronization’.[6]

Temporal coordination of two or more actions, through their synchronization, unites the two or more separate temporal *loci* in one ‘extended’ framework-*locus*, individualized as temporal *communion*, illustrated in physics (and music) by the phenomenon and concept of *resonance*. The *harmony* of the two performed actions derives from their *synchronization* expressing the (temporal) unity in (spatial) multiplicity.

In religious traditions, the ‘mechanical’ or ‘emergent’ communion re-instates the sense of community, through the co-habitation of the ‘sacred time’, i.e., the simultaneous observing of the holidays which delineate a common temporal *locus*, and ‘sacred place’, i.e., the act of pilgrimage or circumambulation which delineates a common spatial *locus* (referred to as the *center* or *axis mundi*).[7] The liturgical fulfilment is represented for every orthodox practitioner by the privileged act of celebrating the ‘sacred time’ (i.e., the holidays) in the ‘sacred space’ (i.e., temple) consecrated by tradition. The conjunction of the simultaneous temporal and spatial harmonies represents the climax of a communal liturgical act.

[6] For a general comprehensive overview regarding spontaneous synchronization, see Szabolcs Horvát and Zoltán Néda, “The complex parameter space of a two-mode oscillator model”, *Physica D* 256-257 (2013): 43–50, 43–44,47.

[7] See Mircea Eliade, *The Sacred and the Profane: The Nature of Religion*, trans. W.R. Trask (New York: Harvest/HBJ Publishers, 1957).

Synchronicity

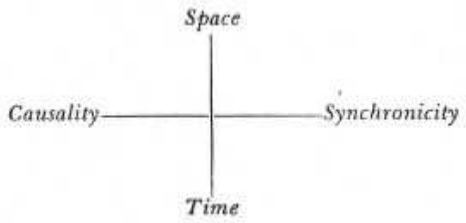
The concept of synchronicity exceeds the phenomenon of synchronization, in intensity and amplitude.

Synchronicity allows two different usages:

1. a conceptualized usage meant to emphasize and synthesize the main general features of synchronization processes; in this case, the term may be applied as a general attribute for describing, indicating and conceptualizing the defining aspects of any synchronization phenomenon;

2. a particular, non-generalized, but functional usage meant to refer to higher levels of emergent synchronization; this usage was first introduced and theorized by Carl Gustav Jung,[8] intensely supported by Wolfgang Pauli,[9] and thoroughly developed by Arthur Koestler[10]; it aims to offer an adequate description for multi-emergent processes synchronized by virtue of non-objectifiable, unpredictable causes:

> "Synchronicity is not a philosophical view but an empirical concept which postulates an intellectually necessary principle. This cannot be called either materialism or metaphysics. No serious investigator would assert that the nature of what is observed to exist, and of that which observes, namely the psyche, are known and recognized quantities. […] The result, in that case, would be a unity of being which would have to be expressed in terms of a new conceptual language – a "neutral language," as W. Pauli once called it. Space, time, and causality, the triad of classical physics, would then be supplemented by the synchronicity factor and become a tetrad, a quaternion which makes a whole judgment possible:



> […] Just as the introduction of time as the fourth dimension in modern physics postulates an irrepresentable space-time continuum, so the idea of synchronicity with its inherent quality of meaning produces a picture of the world so irrepresentable as to be completely baffling."[11]

Synchronicity does not only refer to particular processes of emergent synchronization, but it also depicts the privileged *state* of a complex system whose parts harmoniously synchronize in their act(ion) and expression, the level of synchronicity being indicative of and correlated with the a-causal unity, harmony, and

[8] Carl Gustav Jung, *Synchronicity: An Acausal Connecting Principle* (Bollingen, Switzerland: Bollingen Foundation, 1993 [1952]).

[9] See Wolfgang Pauli and Carl Gustav Jung, *Atom and archetype: The Pauli/Jung letters, 1932–1958*, ed. C. A. Meier and D. Roscoe (New York: Princeton University Press, 2001).

[10] Arthur Koestler, *The Roots of Coincidence* (New York: Vintage, 1973).

[11] Jung, *Synchronicity: An Acausal Connecting Principle*, 106–107.

perfection of any (complex) system. Higher levels of synchronicity indicates a propensity towards higher levels of space-time synchronization culminating, in the religious discourse, with the 'extinction" or 're-absorption' or 'transmutation' of matter, and the abolition of the space-time continuum in the form of multiple fragments perceived as parts in sequential order.

The absorption of the space-time dimension, i.e. the world as we perceive it through our bodily senses, is made possible by the meta-synchronization of the temporal and spatial synchronization: the temporal communion is simultaneously complemented by the spatial communion (i.e., cancellation of any individuation mark or limit), at the same time preserving the space-time sequentiality (i.e., the multiplicity of forms in their temporal deployment). The state is eluded in religious texts through terms describing unitive (mystical) experiences. The ultimate referential point for meta-synchronization is represented by the ultimate principle or the divine, envisaged under different names according to each and every tradition. The principle is not an entity, nor is it 'located' somewhere or 'somewhere in time," but enacts and is enacted within each and every manifestation, without being fragmented or limited to any form of existence.

If the temporal *locus* represents the reference point for temporal synchronization, and the spatial *locus* represents the reference point for spatial synchronization, the meta-conjunction of the temporal and spatial *loci* is performed by virtue of the ultimate principle, deprived of the duality of space-time concatenation, freed from any limitative distinction, without form, but making all forms possible. Emergence is re-configured in the religious discourse as privileged process of simultaneously giving birth to all forms, which thus continuously (from the space-time perspective) and discontinuously (from the perspective of apprehending the *radically different* ground of the ultimate principle) *emerge*.

Re-approaching the concept of 'complex system'

When examining the formula of 'complex system' in relation with the concept of emergence or synchronization, the main question to be raised refers to causality.

I. In the ***Newtonian paradigm*** of understanding space and time, the definition of a complex system ultimately brings into discussion the existence of such a 'system' as a 'body' or 'entity' in tight relation with the concept of 'locality' metaphorically (and conventionally) transposed, for the sake of communication, in the (graphic) image of a 'network', a 'surface', a multidimensional 'body' etc. The terms used to designate complex systems vary according to the most pregnant feature or aspect the researcher intends to favour in order to convey a particular understanding regarding the (cor)relations within the system, the attributes, the internal mechanisms etc.

The formula *complex system* iterates the idea of 'unity in multiplicity':

1. *Complexity* supposes multiplicity: more (points, dimensions, aspects, bodies, entities objects etc.) are (inter)related thus creating a 'context' imagined and transmitted by means of terms designed to suggest the idea of a dynamic 'configuration', i.e. a space-time 'entity' endowed with its own 'behaviour'. This scientific explanatory 'vision' separates a 'part' or a 'fragment' from what we call 'world' or 'reality' in order to thoroughly

investigate its functioning as an independent 'body' or 'mechanism'. The attitude of the nowadays researcher follow the same 'traditional' explanatory traps: the scientific vision will use animistic images, in its endeavour to create the impression that a complex system behaves a 'living entity', anthropomorphic images, in the endeavour to 'personalize' the 'embodied' system, by creating a particular profile in connection with ideas such as organicity, free will, intention etc., or mechanical images, in the endeavour to offer a mathematical, perfectly measurable and predictable description of a system functioning, more or less, in the likeness of a machine;

2. The second term, *system*, represents the 'unifying principle' of the interconnected multiplicity introduced by the term *complex*. It suggests the image of unity and completeness, integrity, wholeness. It also creates the false impression that *this* complex system under examination does exist as a separate or separable entity. The relevance of any scientific endeavour of this kind cannot be but 'local', 'circumstantial', according to the artificially and mechanically 'cut' fragment or part of 'reality' withdrawn from its 'context' and conceptualized in the form of an 'object', i.e. the *complex system* under analysis. This is why the more traditional philosophical and religious lines of thought critically reject the possibility to ever find or offer the ultimate explanation, given the fact that such a conceptualized answer would be the key to understand only the abstract configuration of a 'complex system' as the fade simulacrum of a fragment or part detached from the fluidity of life in order to investigate it in our epistemological labs – as if, by using a perfectly 'animistic' metaphor, one could cut a leaf or take a picture of it and then examine it in the lab in order to provide knowledge about how the leaf or even the whole tree with its surroundings are functioning.

Scientific experiments may offer circumstantial results, relative to the *locus* 'detached' in order to be examined. Once detached and brought under scrutiny the objectified 'complex system' may be relevant for similar circumstantial cases, but may never offer the absolute key for an ultimate knowledge of a part or the whole of what we call 'reality'. The attitude of contemporary researchers is efficient and productive, but idolatrous in its way of approaching reality through 'hand made' objects and projections cut in the fabricated form of 'complex systems'.

II. In the ***post-Newtonian paradigm*** of understanding physical reality at macro- and microscopic levels, the perception regarding space and time significantly changed. There still remains a gap to be bridged and its margins are at the interface between objectivity (i.e., the objective and objectifiable realm of perception through bodily senses or technological devices) and subjectivity (i.e., the transcendental structures of human knowledge, in Kantian terms, the soul, the mind and/or the intellect, in philosophical and religious terms, the consciousness in recent scientific approaches developed by cognitive sciences, neuroscience, contemplative and consciousness studies etc.). The contribution of Humanities in this respect could be significant if

researchers turned their attention from particular (con)textual research issues (usually approached in a mono- and overspecialized manner, relevant exclusively for the limited subject area of 'specialization') toward joining their efforts and knowledge, in a common effort, with scientists from natural sciences or newly born interface studies, in order to refocus their attention on understanding man (structures of knowing and perception, generation mechanisms of the mind, mind and body interaction, etc.) and reality (structure and mechanisms of the universe, object-subject relationship, levels of perception, apprehension and interpretation, etc.).

In this light, a renewed discourse with regard to 'complex systems' should be expected.

Weak emergence, successfully applicable in the Newtonian paradigm, concentrated on objectified, measurable and predictable 'reference points', manifested as 'intermediaries' meant to chain together, in a localizable continuum, the 'visible' or 'experimented' margins of the 'mergent' and 'emergent' poles.

The post-Newtonian paradigm makes more and more room for the strong concept of emergence, by emphasizing the *non-locality* aspect, and by concentrating on transition processes, without neglecting the subjective factor or the relativity of any contextual approach.

The cause-effect causality experimented and overestimated in the Newtonian paradigm privileging the investigation of space-time 'fragments' cut as 'objects' and constituting the 'objective' world favours the vision of complex systems imagined as existing configurations developed around a space-time axis which implies a particular inter-relational mechanism embedded in a sequential generation structure. Emergence is used in this context in order to label the unexpected, non-predictable phenomena and concatenations supervening within the 'system'. How the system itself *emerges* or is generated remains a secondary question which might set the stage for further scientific development.

Religious type of discourse addresses the topic of causality in both aspects: the cause-effect causality stressing the spatial and temporal sequence and concatenation, and the emergent 'a-causal causality', laying emphasis on instantaneity, momentariness, spontaneity, non-locality. Strong emergence refers, in this last case, to the coming into *being* of a-causal multiplicity understood as synchronization of multiple 'units' or 'individuals', in terms of their essence: they *emerge* together, sharing simultaneously, in different shapes and forms, the verb 'to be', which becomes the privileged *locus* and *source* of resonance. This type of emergence conceptualized as dynamic of 'unity in multiplicity' or continuous nascence/ creation/ renewal of the world represents the highest expression of synchronicity, i.e., the perfect interconnectedness resonating by virtue of the ultimate unifying principle.

In many different religious and/or theological texts the ideas of synchronization and synchronicity are emblematic for high practitioners or spiritually accomplished leaders.

Magic and science

I have shown in the previous section that scientific approach, as we envisage and practice it today is, in many of its aspects, *idolatrous*. This is the 'implicit' mistake of any theoretical configuration which is not auto-reflexive and critical enough as to

evaluate, in each and every moment, its intention, its applicability and goal, and, the most important thing: its inherent limits and relativity.

Science needs, by definition, particular contextual approaches to fulfil its *desiderata* knowledge. This type of knowledge, obtained through experiments claiming their rigor and legitimacy by virtue of their repeatability and measurable aspects, remains tributary to a specific, circumstantial framework exploited in its cause-effect layer. I would call this intrinsic dimension of nowadays science, touching to the displacement of a fragment, part or context in order to investigate it and by means of 'similarity' to apply it in different correspondent frameworks, the *magic* dimension of science.

Magic is built on efficient or productive interventions for the sake of particular or individual(istic) goals. It acts on the basis of similarity or contagion,[12] exchanging the natural spontaneous experience with the experiment as 'mechanical' influence meant to turn away the natural expected course of events in order to impose a different 'will' and to give rise to contrived artificial developments.

Following this line of thought, emergence, through its unpredictable appearance, escapes the *magical* mechanisms and experiments of science. The same could be said about synchronicity, whereas synchronization can be experimented and produced mechanically.

It is difficult for a scientist to approach naturally emergent phenomena because of their usually unrepeatable character. The cause-effect law cannot be invoked, and any experiment in this respect is consequently hard or even impossible to manage.

New experimental methodologies need to be configured using more complex and diverse instruments able to adequately integrate the subjective, experiential parameter amply theorized and approached within the research area of Humanities.

Conclusion

The phenomena of emergence, synchronization and synchronicity reveal significant features and dimensions when analyzed in the light of recent scientific developments regarding space-time relationship as reflected in our perception and theorization of the physical world in conjunction with the investigation of our subjective structures of knowledge and perception.

[12] See, in this respect, the classical work of Sir James George Frazer, *The Golden Bough. A Study in Magic and Religion* (New York: Oxford University Press, 1994), 37: "Thus far we have been considering chiefly that branch of sympathetic magic which may be called homoeopathic or imitative. Its leading principle, as we have seen, is that like produces like, or, in other words, that an effect resembles its cause. The other great branch of sympathetic magic, which I have called Contagious Magic, proceeds upon the notion that things which have once been conjoined must remain ever afterwards, even when quite dissevered from each other, in such a sympathetic relation that whatever is done to the one must similarly affect the other. Thus the logical basis of Contagious Magic, like that of Homoeopathic Magic, is a mistaken association of ideas; its physical basis, if we may speak of such a thing, like the physical basis of Homoeopathic Magic, is a material medium of some sort which, like the ether of modern physics, is assumed to unite distant objects and to convey impressions from one to the other."

The *critical* gesture to always indicate the limits of our experiments, theories and knowledge is requisite.

The general description of complex systems is to be re-appraised and refined according to novel integrative methodologies, combining instruments belonging to various disciplines, including the area of Humanities.

'Scientificity' needs to be re-formulated through integrating the critical methods and the different perspectives (regarding concepts such as time, space, causality, life, matter, subject-object relation, etc.) encountered in the disciplines pertaining to the field of Humanities.