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# METAPHYSICAL FOUNDATIONS OF PHYSICS

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## Abstract

The article formulates the problem of constructing a metaphysical system, allowing passing to the rational ideas about the real world. Physics as a science about real processes answers the question ‘how?’ and does not pose the question ‘why?’. It is not a task of Physics but a task of Philosophy, which not only summarizes the achievements of culture in general and Science in particular, but also searches for the common bases of the unity of the world. All this requires a revision of the relationship between the concepts of being and non-being. In general, Philosophy does not deny the existence of non-being, but the ontology and Metaphysics define it differently. Ontology (the scientific picture of the world) assigns only a gnoseological meaning to the concept of non-being, which expresses a measure of our ignorance in the process of infinite cognition of being. Metaphysics defends the real existence of non-being, the direct cognition which is unattainable in principle on the basis of our reality. Permanently revising the boundary conditions of being, Philosophy is able to approach only asymptotically the revelation of their foundations, while never reaching them. The methodology of studying the relationship between being and non-being is based on the dialectics of the concepts of finite and infinite, discontinuous and continuous, actual and potential, and also linked to using the idea of polyonticity of virtualistics. This study allows us to claim that the level of real being includes ‘real non-being’ as its foundation. At the virtual level, non-being is organized into a ‘memory matrix’, in the space of actual infinity of which a particular universe unfolds its real existence as a potential infinity. In addition, prior to the appearance of the real level of being, the matrix already contains information, as an ideal world, about the reality, this ideal world being formed by the accumulation of reflections of past events in the memory matrix (multiple realizations of the Universe and universes). Each individual realization of being is full of randomness, but, in the process of information accumulation, summation and integration with the previous content in the matrix, it participates in the formation of formal reasons of strategic and regular development of the subsequent realizations by necessity.

*Keywords:* chaos, logos, possibility, virtuality, space-time

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## 1. Introduction

Construction of any ontology sooner or later bumps up against the need to resolve the metaphysical questions. Modern ontology is a scientific picture of the world [1]. Metaphysics, unlike ontology, also includes those aspects of

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being, which are inaccessible to rational cognition to a full extent. The object of our research is the world as a whole. The world as a whole must have a beginning, thus the study subject is the search for rational foundations, from which there would arise the possibility of explaining the reality. Humanity, being a part of the Universe, neither has a way of empirical observation of the initial processes of origination of the world in which it realizes its existence, nor is physically able to jump out of the Universe and observe it as a whole. Only armed with logic and dialectic, the person is able to come up with the projects of possible foundations of being. This work is devoted to the development of one such possible concept of the foundation of the world. In the traditional consideration it turns out that the order of things of being is based on the declaration of the foundation order. Our research rests on the assumption that the existing order of things in our world cannot be formed only on the basis of the being of a single world, just as the reflection in the mirror cannot serve as a basis of the mirror itself, but requires co-existence of many universes on various phases of their development. In the work, a construction of being is proposed that enables to clarify the formation of the necessary order in the world as the accumulation of reflections of the realizations of multiple universes, which allows considering the emergence and development of a concrete universe as a particular case in a more general structure of organization of a multidimensional world (Multiverse).

## **2. Research methodology**

The main research methodology is based on dialectic, which allows ideally constructing the world as the identity of opposites of chaos and logos, essence and phenomenon, actual and potential infinity, form and content, chance and necessity, hierarchy and non-hierarchy and others. While in the history of Philosophy and Mathematics the concept of an ‘actual infinitely large quantity’ is a known fact introduced by Nicholas of Cusa and G. Leibniz, respectively, the paper attempts to introduce the concept of an ‘actual infinitely small quantity’, which allows us to reason beyond the limits of things in one more direction. The paper also uses the general scientific methods and principles such as systematicity (sub-integrity, integrity and meta-integrity), counter-reduction and the closely related idea of polyonticity of being, virtualistics and synergetics. The paper also uses the method of idealization.

## **3. Results**

The dialectically movable real being of things is opposed, as a foundation, by the unchangeable intelligible (conceivable) being of formal causes (*causa formalis*). This level of being a priori includes all the necessary regularities (irrespective of whether they are cognized at the given stage of development of human culture or not), which are realized in the world of things by averaging the probabilistic processes. While the world of things is dominated by chance, the

world of ideas (*causa formalis*) is by necessity. Thus, we have that an unbounded world of entities (pure forms, laws, general concepts) is realized by means of bounded things. Things appear and disappear in the being of infinitely existing (not vanishing and not emerging) virtual reality of formal causes. If the pure reality realized in things completely up to *Telos* [2, 3], then the real reality, understood by the unity of movement (*causa efficiens*) and law (*causa formalis*), would be fatally predetermined by necessity, and as a result we would arrive at Spinoza's concept of being [4] in the spirit of Laplace's absolute determinism [5], in which there would be no room for chance. Logically, in the world of continuous necessity, a reality that is always connected with movement would become impossible. This follows already from the antique ideas, Zeno's aporias, which demonstrated the impossibility of thinking about (being of) the phenomena (reality) without contradictions [6]. Therefore, starting from Democritus, the founder of atomism, it became clear that the possibility of movement requires discrete organization of things and/or space. While the existence of ideas, to dialectically connect continuity and discontinuity in a synthesis is still a topical problem of modern scientific ontology, which acts as the problem of defining the space-time continuum [7].

The philosophical study of a system (no matter how large) from inside does not yield a complete understanding of the system as a whole, but requires its speculative consideration in the structure of being of even more complex system. This approach is called the principle of counter-reduction, which was formulated by V.I. Kurashov [8]. Using the principle of counter-reduction, it is possible to come to an image of the so-called 'primary space' or conceivable ether.

The problem of determining if possible a being was formulated in his time already by G. Leibniz in 'Monadology'. The monadic structure of reality as a possible being is postulated by Leibniz in the form of ideal centres, the goal-oriented causes for real things described by the identities (monads) of various orders. According to Leibniz, the world of monads is made up by the hierarchy of conceivable differentials as 'zeros' of various degrees [9]. While in Leibniz's reasoning the real level of being exists a priori, in our case it becomes possible to speculatively construct a dynamic model of formation of an ideal reality as a result of multiple reflections in the things of reality in the 'primary space', organized in a 'memory matrix' [10]. The 'primary space' lays claim to be an absolute space for the events of our world and, in general, it may turn out to be relative. Here we can talk about the 'primary space' as a 'constant reality', which was introduced into scientific usage by the founder of modern virtualistics N.A. Nosov [11, 12]. Virtualistics a priori prescribes a multi-level nature of organization to being, where the same phenomenon of the same level may simultaneously be regarded as real, virtual and constant processes depending on the levels of being, relative to which these phenomena are considered.

As it is assumed in Physics, the real space-time was originated as a result of the so-called 'Big Bang' from a singularity [13], which requires an answer to the question: 'From where does a specific universe emerge and to where is it

expanding?' [14]. There are no isolated phenomena in the world, so always one phenomenon realizes its being in the space of another phenomenon, and such conditioning of phenomena can be extended up to actual infinity [15], which is reflected in Philosophy in the concept of substance, which allows operating with infinity as something finite and opposite to phenomena. Here there arises a question about the nature of infinity, because the concept of infinity can have different meanings. One can talk about infinity as a spatial, temporal, potential, actual, small, large, diverse quantity [16].

Any phenomenon manifests itself through movement, a change in the space-time, whereas the space-time itself is a phenomenon. A phenomenon is closely connected with movement. An attempt to answer the question 'how at all is it possible to move?' leads to the need to talk about the existence of 'primary space' as a possibility, over which there could be realized the real movement of things, including such thing as Metagalaxy. The need to overcome a kind of 'hermeneutic circle', where the modern physics is trapped, is indicated by the Academician V.A. Atsyukovsky [17]. In essence, according to him, to adequately reflect the phenomena of Physics, it is necessary to revise the logical foundations of Physics on the basis of the latest empirical data connected with the search for the world ether. On one hand, Physics is convinced *a priori* that the ether must exist; on the other, it is not able to find it near the Earth. In contrast to Natural sciences, Philosophy proceeds to the justification of limiting statements not by a logical-empirical way, but by a dialectical one. For the philosopher, it is important to preserve the symmetry of dialectical categories in his/her reasoning. In such way we come to the need of justification of a space 'devoid' of things, which methalogically must satisfy conflicting requirements. On one hand, the 'primary space', which we try to conceptually design as a metaphysical system, must provide the possibility of real movement of things (which requires discreteness), and, on the other, must guarantee the preservation (invariance) of the necessary regularities of being, according to which the movement is realized (which requires continuity).

There are many laws of logic and nature, according to which all the changes in the world are realized. They are effective everywhere, and in their pure form they cannot be found anywhere as a thing. In other words, it looks like the laws (identities) do not exist on the level of sensations (in reality). One can only think in reality about laws as formal causes (*causa formalis*). The existence of laws of being is associated with continuity: they cannot be screened (localized); potentially they are everywhere, but actually, nowhere. Only thanks to free energy of the inflation of the Universe [18] pure forms may acquire the possibility of appearance. In addition, things acquire real spatial and temporal characteristics. There exist numerous laws and general concepts, and they belong to the formally acting being. A phenomenon, a thing is the unity of energy and the law, according to which this or that movement is realized. Dialectically the collection of laws should constitute an integral Logos, because without unity there cannot exist interconnected plurality. Two questions arise:

‘How is the Logos formed? What is the source of energy that makes appear the real existence of things, including the Metagalaxy?’

While the laws express stability and invariance, the energy expresses variation and movement. The energy of movement of the entire Universe that defines the entire set of real processes should originate as a result of violation of the initial stability of its initial state, non-being (potential everything). The foundation of the set of emerging things can be dialectically reduced to an infinitely vanishing point. It is the common beginning that gives to all phenomena of the real world an interrelated (synchronous) character. In the real processes, large energy always tries to occupy a point volume in space. The smaller the volume, the more energy it is able to concentrate. If we mentally take the total energy of motion of the Universe and try to concentrate it at a vanishing point in space, then it can be considered as a ‘zero’ of reality with respect to things. This initial level of appearance of things can be seen as an ‘actual infinitely small quantity’, a unit of matter equal to the Planck length,  $10^{-33}$  cm [19]. However, with the attaining of zero (limiting) level for real events, being does not end. Beyond the reality we can talk about non-being only in relation to the real level of the existence of things. In its own system this ‘actual zero’ may turn out to be not zero at all and may have its own internal structure. This minimal unit acts as the actual zero only in relation to the world of things. If the real world of things constitutes an ordered whole synchronized by the beginning of its appearance, than in the foundation we have an unsynchronized set of units which form matter as the uncertainty interval of W. Heisenberg [20].

If the movement of ever-limited things requires discreteness of the ‘primary space’, than the condition of preservation of the eternal necessary laws of nature is the property of storing and this requires continuity. It is exactly thanks to memory, organized at the level of the structure of ‘primary space’, that it is possible to let the duration tend to infinity in the limit (theoretically, mentally), in the sense of eternity. The first attempt to construct a conception of the world as a unity of finite and infinite on the basis of dialectic of matter and memory was made by Henri Bergson [21]. This eternity can be imagined, according to Plato, as an image (eidos) of time [22]. Hence, it becomes possible to consider time (by itself) as a formally acting (causa formalis) foundation of the real duration, where the duration is understood as the temporariness of the existence of things. Continuity is a necessary condition for the existence of objective laws in the world. The laws of nature and logic stored in the memory matrix of the ‘primary space’ should permeate the entire real space of phenomena.

The real space, determined by the expanding Universe, in turn, as a potential infinity, is unfolding over the actually infinitely large ‘primary space’. Here the ‘primary space’ is represented as a carrier (memory matrix) of Logos. Logos (from the Greek ‘word’, ‘concept’, ‘mind’) is a universal law, the foundation of the world, its order and harmony. This term was introduced by Heraclitus, who understood it as the existing world order, inside which ‘everything flows, everything changes’, flows one into another, obeying the law

of unity and struggle of opposites. In the idealistic philosophy it is a spiritual first principle, world's mind, an absolute idea [23].

The real space cannot by itself define Logos, since in the limited things there will always prevail and be observed only that law, which actually determines the spatial form of organization of this or that particular thing. This principle was first proposed in the type theory by Bertrand Russell [24] and was developed by L. Wittgenstein in his 'Logico-Philosophical Treatise' [25, 26]. The essence of the principle consists in the fact that the language of reflection cannot speak about itself. While the language can speak about anything, for its own reflection it requires a meta-language. This principle was proven strictly logically for the language of Mathematics by K. Godel in his theorems, concerning incompleteness and non-contradiction of formal systems [27], from which it follows that a complete description of a system requires going out of the language of description of this system beyond its limits. However, A. Einstein believed that from the reasoning about the real space one can move to the definition of Logos, which determines its laws, and wanted to create the so-called 'theory of everything' [28], a mathematical synthesis into a single common equation of four fundamental interactions: the strong and weak nuclear, electromagnetic and gravitational ones. A missing link in the 'theory of everything' is the confirmation of any of the Grand Unified theories and the construction of a quantum theory of gravity based on Quantum mechanics and General relativity [29].

Logos is dialectically opposed to chaos. While Logos is associated with Unity, chaos should be associated with plurality. Each element of this 'empty set' must express the folding up of all the laws necessary for the integrity of the zero element of this set, that is, must embody everything possible that can be realized in the Universe. In other words, while the primary chaos is a set of non-manifested Logos-differentials, the actual Logos is associated with unity, an integral. Thus, chaos is represented by a set of self-sufficient internally ordered units, the collection of which defines the initial zero level of real being. In reality, to this level of being there corresponds the physical vacuum, which is understood today as the existence of virtual particles in the uncertainty interval of W. Heisenberg [30].

Theoretical studies of the processes of self-organization through chance is reflected in the concepts of so-called 'deterministic chaos', which is being successfully developed by a philosopher V.V. Afanasieva from Saratov [31, 32], and in the concepts of 'hierarchy and non-hierarchy', by the philosopher E.M. Khakimov from Kazan [33]. The essence of these similar concepts is that systems in their development rise from one level of organization (orderliness) to another through chaos or, as in the concept of E.M. Khakimov, through the state of non-hierarchy. In our case, we do not have to talk about the intermediate levels of self-organization of real systems and therefore focus our attention only on the interested to us initial level of non-hierarchy of reality in general. In other words, chaos constitutes an initial level of non-hierarchy of all things of reality, while Logos determines the order of transition of phenomena from the realm of

the possible to the reality. Moreover, in the real aspect, neither absolute Logos, nor chaos in the pure form can exist, and there will be always observed their moving unity. Their pure existence has been moved, in a way, beyond the frames of reality (things and processes) into the region of their own existence. This thinkable world bumps up against the need to determine the substantiality of being or non-being. In the traditional Western philosophy, beginning from Parmenides, non-being is what cannot be thought about [34]. Once we start to think about it, non-being is transformed into being, therefore, in the ontological aspect, being exists, whereas non-being, does not [35, 36]. Therefore, many modern philosophers assign only a gnoseological meaning to non-being, which is understood as an extent of our ignorance about the world at a given limited moment of time in the historically infinite cognition of being.

In modern domestic philosophy, one of the first experts who turned attention to the problem of non-being was A.N. Chanyshv in his ‘Treatise on non-being’ [37]. For the first time, N.M. Solodukho in the paper ‘Philosophy of non-being’ tried to apply these philosophical statements to the foundations of physics [38]. Originally, his conception is built on the recognition of a dialectic relation between being and non-being, however, in distinction from the representatives of the traditional European philosophical school, who gave the palm of supremacy to being, he adheres to the recognition of substantiality of non-being. Solodukho, building upon the thesis ‘in order that nothing exists, nothing is needed either’, has tried to look at the world from the inside. According to him, such approach allows noticing an important side of the world, which is absence (the inside), allowing moving to rational explanation of the manifoldness of existential forms by way of constructing a metaphysics [39]. In the proposed concept, we also proceed from these statements; however, the models of relation between being and non-being will be significantly different. From the positions of virtualistics, on which we build, these relations turn out to be ontologically on different levels of real existence. Here a being of one (for example, the real) level is supported by another level of being, where, as the funding level for the real being, there serves non-being having a real status at its own level of existence. These levels of being are not isolated from one another; there is a connection between them, though not real but virtual, which determines all the development laws of the lower level of being [40].

Thus, proceeding from the properties of real processes, we can go to the metaphysical foundations of reality. Things are limited in space and time; therefore, their foundation must be supported by infinity and eternity. The reality is always in motion, therefore, the foundation cannot move as a thing. So, there should be thrown on the world a certain ‘mesh’, composed of ‘zeros’ (in the real aspect), which are able to reflect in themselves (save) all possible processes. It is a kind of reflective structure (mirror) with the memory function. Moreover, the integrity of the ‘mirror’ cannot be determined by what is reflected in it, as Science is trying to imagine, extrapolating the general properties of the real level of things to the substantial foundation. For example, the movement of things is transferred to the motion of matter and becomes its attribute; or the law of

conservation of material, to the law of conservation of matter. We think that this is not entirely correct, because on the real level the origination of the levels of organization of matter is associated not only with stability but also with the violations of symmetry. Then there arises a possibility of extrapolation to the substance of not only order, but also disorder. However, if it is so, what determines the integrity of the 'mirror' itself? In other words, 'what provides the invariance of the sequence structure of zeroes of the primary space?' After all, it is exactly that they are true, indivisible metaphysical 'zero atoms', the elements of the world indecomposable within the framework of reality. All the processes of the real world appear on the surface of this multidimensional 'mirror', which permeates all the processes. It is only a collection of these centres that is able to determine matter or ether as something that has no form, but can take any form. Thus, this study allows us to claim that the level of real being contains real non-being as its foundation. Non-being is organized on the virtual level in the form of a memory matrix, in the space of actual infinity of which a particular universe unfolds its real existence as a potential infinity. Moreover, prior to the origination of the real level of being, the matrix already contains information as ideal existence of formal reasons of reality, formed by the accumulation of reflections in the memory matrix of past events of multiple realizations of many universes. Each concrete realization of being is full of chance. At the same time, informationally accumulating, summing up and integrating with the previous content in the matrix, it participates in the formation of formal possibility as a necessary regularity of strategic development for subsequent realizations.

#### **4. Conclusions**

This study did not include the substantiation of the existence of a 'memory matrix' as the sequence structures of 'zero-points', forming the discrete homogeneity of real space. Without this condition it is impossible to justify the possibility of real movement of things. This problem was formulated already by Descartes at his time, but he could not solve it. Descartes, asserting the infinite divisibility of matter, could not explain the continuity of space. In other words, he could not explain how there can exist side by side two, three, etc. segments of matter appearing in dividing the space, so that these segments simultaneously belonged to different parts and would not have separation boundaries. "Although we cannot understand the way how this infinite division takes place, we must not, however, doubt that it is done ... This truth is one of those that our finite thought cannot grasp" [41]. According to Descartes, we cannot doubt the necessity of such a division on the basis of our intuition. Since the time of Poincare it is known that two identities cannot really exist side by side [42]. Hence, the homogeneity of space-time cannot be derived from the knowledge of phenomena, but this requires other levels of existence beyond our reality. Our concept allows overcoming this difficulty by abandoning the justification of the reality foundation by reducing to phenomena as Physics is trying to do. In the future research, the proposed concept opens up the possibility



to proceed to the justification of the homogeneity of space, in which the heterogeneity of the material world is realized, by moving the concept of information to the categorical level.

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