Paradigm of the Part VS Paradigm of the Whole...
The Absolute Generative Structure

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Abstract

The essential analysis of changing ideas of Space and Time for the period from the beginning of "Archimedes' Second Revolution" is carried out to overcome the ontological groundlessness of the Knowledge and to expand its borders. Synthetic model of Triune (absolute) 12-dimensional Space-Time is built on the basis of Ontological construction method, Superaxiom and Superprinciple, the nature of Time is determined as a memory of material structure at a certain level of its holistic being.

Nothing has more beneficial effect on physicist's brain,
as the dose of healthy competition[1]
B.Greene

On "Reappraisal of Values", Structure of the Space and the nature of Time

More than four centuries ago, by the efforts of G. Galilei and I. Newton, the "Archimedes' Second Revolution" in physics was accomplished. This was the beginning of the Great war of a "Paradigm of the Part" with a "Paradigm of the Whole", which continues to this day. But the last few years, when the researchers themselves began to talk about the "troubles in physics" [2], the question was raised on the need to overcome such opposition. As history of the development of fundamental science shows, it is necessary to look in view of the "Paradigm of the Whole" primarily on the categories of "Space" and "Time". That is to carry out a kind of "reappraisal of values", but under the condition to reach the most remote sense distinctive depths of matter.

It is necessary to conduct a thorough essential analysis of these categories one more time and make an attempt for their maximum dialectical "extension". This expansion and "grasp" (understanding) of a new image of the Space with the ontological justification will give us access to the desired structure, a new understanding of the nature of Time. Reliance only on the experiment and formulas, i.e. *"cuts" from the whole being*, do not allow to "grasp" the structure called by U. Eco as "the absent" [3].

So, for a critical analysis of concepts of the Space and Time, let's get back to the beginning of "Archimedes' Second Revolution" the establishment of physics in Modern times. This was the beginning of the extrusion of view at the World as a whole, harmonious hierarchical Space, the beginning Time of victorious march of "Paradigm of the Part" in science. The revolution was manifested as a kind of "intellectual riot" against the complexity of Nature, its hierarchy – the era of its "conquest" began.

Founding father of the era, Galileo Galilei was the first who systematically subjected the World of hierarchical, well-ordered Cosmos of Aristotle to "shocks". The Space disappears as something complete, eternal, and materially existing according to Galileo. There is a gap between "the matter" and "the space". "Absolute rest" and world hierarchy disappears from the world view. The space of Galilee is a *closed, empty repository of the world*, a set of trajectories of the bodies. The structure of the Space is defined by uniform

circular motions [4]. The category of "Space" is mathematized, and mathematics itself ("the language of nature" – geometry) is *deontologized*. Mechanistic theory is gradually replacing the image of the world as a "Living Cosmos" (Greek-Κόσμος). A single "Logos" is divided into the "laws of the nature"; the era of experimental and mathematical natural science begins. With disappearance of the World as a whole, the "purpose" in the broadest sense disappears. But it should be noted that to "grasp" the desired structure of the Space, the idea of Galileo on "*the passage to the limit*" is extremely important, which is, albeit distantly, mathematization of the principle of "coincidence of opposites" of N. Kuzansky.

Descartes as well attacks the World as a whole. He "splits" the World into two parts: "rescogitans" ("thinking thing") and "res extensa" ("extended thing") [5]. Philosophy goes into the "concept", and science goes into geometry and mathematical formulas – "cuts" from the whole Being. But what is important, the matter continues to implement the unity of the World, despite its "split", according to Descartes. The matter is not detached from the Space; it is the space itself – *anisotropic and inhomogeneous*. *Vortex matter* determines curvilinear nature of motion of bodies. Descartes rejects the Aristotelian concept of *the absolute place* and *the absolute topos*, it is defined only relatively – through body position relative to other bodies. That is, the place is a *relative* term. Descartes excludes empty space from the world view: space of Descartes is *boundless*. But Descartes rejects the idea of plurality of the Worlds due to *continuity of the matter*. Splitting the World into "*res cogitans*" and "*res extensa*", Descartes *deontologizes* the Time: he refers *time as duration* to "*res extensa*", and time as "*unit of thought*" to "*res cogitans*".

Isaac Newton finishes the attack on the World as a whole. He extremely simplifies the structure of Space. It becomes simply a *repository of the World*, but Newton calls it the "*absolute space*" ("absolute" = unconditional): "Absolute space, in its own nature, without regard to anything external, remains always similar and immovable" [6]. Its main features: *stiffness, homogeneity, hollowness, isotropy*. Newton's "Absolute space" is just a repository of bodies, and *inertial system* independent of them. Time is completely *deontologized*, it "breaks away" from the "space", but Newton calls it "*absolute*": "Absolute, true and mathematical time, of itself, and from its own nature flows equably without regard to anything external, and by another name is called duration" [6].

The banner of the supporters of "Paradigm of the Part" has a slogan "Hypotheses non fingo". But "hypotheses" from the Greek ὑπό – below, under + θέσις – thesis, that is to say that something from the "base". But this doubtless "base" has had to be found, intelligently constructed, and "justified" essentially.

But Leibniz criticizes "absolutization" of the Space according to Newton, who turned it into an independent hollow entity. Leibniz's Space is *the order of co-existence of bodies*, and the time is *the order of relationships and the sequence of events*. To "grasp" the structure of the Space, the teaching of Leibniz on the analysis and synthesis is very important, as well as his "law of reasonable ground" to which he gave not only logical but also *ontological sense*. Leibniz returned to the idea of *the World as a whole*, he introduced *the principle of irreducibility of the organic to the mechanical* [7]. Let's also note the importance of the principle of least action of Maupertuis, which was then developed by Euler, Lagrange and Hamilton, for the "grasp" of the structure of space

Return to view to the world as a whole began in the XIX-th century, when scientists increasingly delved into the complex World. Philosophy delves into the complex as well. But their paths diverged more and more. Oersted addresses the ideas of philosophy, when in-depth study of the nature of electricity and magnetism began. Dialectical view of the World as a whole was required. In this regard, the philosophy of Schelling was very popular. Schelling develops the principles of *natural dialectics* as a living organism, he returns to the idea of *the hierarchy of the world* ("potency"), characterized by *polarity, dynamic unity of the opposites*, and reveals the idea of the absolute as *the identity of opposites of the finite and the infinite, the real and the ideal* [8]. Since the philosophy according to Schelling, grasps the

essence of the dialectical beginning of the Nature, it can and has the right to *construct the development of the Nature a priori*. Such constructing is checked by the data of external experience. But the experience according to Schelling is only *the accidental, and not the intrinsically necessary*. Hence the idea of the second, more in-depth, *ontological standard of the knowledge justification* and ontological constructing of the nature models. The first task of philosophy according to Schelling is *the construction of matter as a spatial phenomenon*, based on *the deepest forces of Nature*. Schelling described such constructing as *the overall deduction of the dynamic process*. The space according to Schelling is *a form of things without relationship*. The Time is *the manifestation of the uniform* as opposed to the variety of the eternal. Space and Time are *two relative but not absolute negations* of each other [8].

G.V.F. Hegel deepens and concretizes *the dialectics of Space and Time*. The Space, as Hegel thought, is inextricably linked with matter, motion and time. Hegel's Space is *the dialectical unity of discreteness and continuity*. Hegel's Space is "discrete in itself" [9]. The Space encompassing "opposites", *discrete and continuous, static formation*. Hegel makes extremely important finding about the Time for the understanding of its nature, believing that "*time is the truth of the space*". According to Hegel, "*the space becomes time... the space turns into it*". [9]

The researchers of the first half of the XIX-th century considered the problem of the structure of Space and Time primarily in relation to the concept of "*the action*" and its transmission to a distance, namely "*short range*" and "*long range*". The dialectics of "*short range*" and "*long range*" eventually led to the concept of the *field*, which is extremely important from the point of view of "*the Paradigm of the whole*". In the analysis of the foundations of physics, "grasping" the desired structure of Space and the World as a whole, "*superposition principle*" introduced by T. Young is especially important, as well as important concept "*field strength*" introduced by M. Faraday.

In the XIX-th attack on "the space" was carried out by mathematician as well, rising to higher and higher "levels" of abstraction. The attack essentially was carried out on "*the beginning of geometry*", Euclidean space became "tight". But mathematicians, as well as physicists, followed the way of maximum *deontologization* of mathematical abstractions, breaking away from primal world structure, dialectical in nature. Geometry developed by N. Lobachevsky, does not include the Euclidean geometry, but the Euclidean geometry may be obtained from it by *the passage to the limit* when *curvature of the space tends to zero*. Thus, Lobachevsky actualizes the idea of "*the passage to the limit*". The idea of space "*curvature*" becomes progressively stronger in mathematics. If the Euclidean geometry is implemented on the surfaces of constant *zero* Gaussian *curvature*, geometry of Lobachevsky is implemented on the surfaces of constant *negative* curvature, then the next one Riemannian geometry is implemented on the surfaces of constant *positive* Gaussian curvature. W. Clifford in 1870 developed the program of "*spatial theory of the matter*", which is based on the fact that particles are identified with regions of space where it is *curved* more strongly than in surrounding areas. Thus, the ground is being prepared for a radical revision of Newton's "absolute space" by physicists. Mathematics as physics, remaining a science that is not ontologically justified, is becoming more and more introduced into physics. With the discovery of non-Euclidean geometries, the following question becomes more and more important: which geometry is realized in nature?

The great step forward to the "Paradigm of the Whole" in the middle of the XIX-th century was carried out by James C. Maxwell. He conducts "compression" and restructuring of knowledge, concludes space-time laws of electromagnetic phenomena as a system of *vector* equations for the electromagnetic *field*. By carrying out the synthesis of optics and electricity, Maxwell creates an electromagnetic theory of light. He introduces the fundamental concept of *displacement current*. Maxwell's re-ontologization of "*Vector*" category is significantly important (Latin *Vector-"Carrier"*). In physics, the second phase of Archimedes' Second Revolution begins. An era of "electromagnetic" picture of the world

was established, Maxwell's plan was carried out more and more insistently: "The basic rule of this plan is stubbornly refuse to leave anything unexplored. Nothing should be "holy land", the sacred Unshakable Truth, whether positive or negative" [10].

The following steps from the "Paradigm of the Part" to the "Paradigm of the Whole" were made in the early XX-th century – first in the Einstein's special relativity theory (SRT), when he, like Maxwell, "squeezes" and restructures the information accumulated from science, introduces *new semantic attractors*, and then in his general relativity theory (GRT). In SRT, Space and Time are no longer considered *in isolation from each other*. Everything happens in the universe in a single four-dimensional Space of "*events*" [11]. It was another decisive step of re-ontologization of Space and Time. After creating the SRT and Minkovski works, the ideas of "*geometrization of physics*" are further developed. Geometry in it not only describes *curved Space* but *curved dynamic Space*. Physics more and more speaks the "language of geometric representations" [12]. "Mach's principle" was important for Einstein and justification of general relativity theory; this principle has yet to be analyzed more deeply, because it moves the modern researcher to comprehend the World as a Whole.

The development of geometric ideas in physics went mainly in two directions, one of which is associated with continuous geometries, the other – with discontinuous geometries. The first direction involves a variety of *metric properties* of Space while preserving topological ones; the second direction particularly suggests a variety of *topological properties* [13].

Max Planck's discovery of elementary *quantum of action* was the third step on the way to the idea of integrity in the world. Planck referred the law of energy conservation, law of conservation of momentum, law of thermodynamics, *principle of least action* to "unshaken" ones. Planck disproved the immutability of chemical atoms, mutual independence of Space and Time, continuity of all dynamic processes. Quantum mechanics is formulated as a theory describing the evolution of physical systems on the background of external space-time. W. Heisenberg, who laid the foundations of *matrix* mechanics, introduced the *uncertainty principle*, which led to refusal of the concept of trajectory; thereby Pythagoras' "Indefinite Dyad" acquired its physical being at the micro level [14]. Louis de Broglie put forward the ideas of *wave-particle duality and wave mechanics*. E. Schrodinger develops these ideas and introduces the concept of the *wave function* describing position of a quantum object in Space and Time. P.A.M. Dirac introduces the concept of "*state vector*" – a mathematical object, which introduction determines *the state of a quantum mechanical system and its evolution*. H. Weyl puts forward *calibrating concept*, developed later by W. Pauli, V.A. Fok, P.A.M. Dirac.

By generalizing the ideas of Clifford and Einstein, John Archibald Wheeler develops "*geometrodynamics*", a comprehensive physical theory based on the geometry of *empty curved Space-Time*. In 1990, J. A. Wheeler expressed the revolutionary idea in the form of «It from bit» doctrine, assuming that every thing and event in the material world has its deep-based *information source*. [15]. Thus, through the "language of geometric representations", physics in its construction of the world slowly returns to *"first essence" – Form* (Aristotle).

After developing the relativity theory and development of quantum theory, the "Space" becomes more "tight" – "hidden", "*folded*" dimensions are introduced, the Space "*splits*" and "extended" objects – "*strings*" are introduced instead of "*point*". They are introduced purely mathematically, without ontological justification with semantic, essential incompleteness of both "Theory of Space" and "Theory of Measure". The number of Space *dimensions* is up to eleven in string theories. Despite its "*uncertainty*" [16], mathematics increasingly dictates physicists the directions of search for a theory or structure to be the foundation of physics and cosmology.

A brief analysis of change in views on space and time from the beginning of Archimedes' Second Revolution, gives enough information for its further contraction, extremely wide synthesis of all the concepts, substantial and relational, determinism and

indeterminism, construction of *ontologically grounded structure*, through which we can finally catch the "*Proteus of Nature*", behold its "*hidden states*" and "*hidden time*" and then unravel the "detector net" ("detector" in Latin – *"discoverer", "discloser"*) and release Proteus. Let's remember the admonition of Francis Bacon here: "In order to know the sufferings and processes of the matter, it is required to understand all things in general – both that was, and what is, and what will be, though this knowledge does not extend to separate severalities" [17]. And in this intellectual "capture" of "*Proteus of Nature*", only *Eidotheia* can be an assistant.

Superprinciple

Incompleteness of "ontological revolution" of Einstein-Planck, modern "troubles in physics", made it necessary to search for new fundamental axioms and some Super Principle, that may become *semantic attractors* for the ultimate compression and structuring of accumulated information. These axioms (or Superaxiom) and principles (or Superprinciple) must be not only *extremely expanded*, but truly "*primordial*". The language of synthesis, compression and structuring of information can only be a "*language of geometric representations*", together with *fundamental semantic attractor – the Vector*, since, based on "*Topo*s" and "*Logos*", they may bring to a deep holistic "Eidos of the World". It is "Eidos" (image), since it is impossible to disagree with A. Zenkin, that "the truth should be drawn and should be presented to "an unlimited circle" of spectators" [18].

N. Bourbaki has the fundamental idea of "*generative*" ("*mother*") *structures in mathematics* [19]. The problem of constructing "*generative structure*" is also facing physics [20]. In a broader sense, this construction is an attempt to solve the problem of knowledge justification, including the physical. It is actualized by E. Husserl: "Only to the extent, to which in case of idealization, the general content of spatio-temporal sphere is apodictically taken into account, which is invariant in all imaginable variations, *ideal formation* may arise, that will be clear in any future for all generations and in such form will be transferable by the tradition and reproducible in identical intersubjective sense" [21].

Construction of the desired "*ideal formation*" is based on the method of ontological constructing, based on meta-mathematical symbolization of Cartesian conclusion "Cogito, ergo sum" (Descartes' "formula" comprises the idea of integrity, intentionality, and *"vectorness" of consciousness*: *Consciousness is a vector quantity*) based on the ancient idea of *the trinity of the World structure* and the idea of I. Kant on *conceptual- figure synthesis*, which origins lie in the philosophy of Plato and his "*Platonic solids*".

B.Rauschenbach noted that the "trinity literally permeates all the nature" [22]. He introduces "mathematical model of the trinity" – *a vector* with its origin in the orthogonal system of Cartesian coordinates. But B.Rauschenbach, unfortunately, did not link mathematical "*vector*" to the fundamental concepts of physics – "*state*" and "*state vector*", and in its ontological limit understanding, with *the absolute forms of existence of matter (absolute states)*: *absolute rest, absolute formation, absolute motion.*

It is known that I. Newton, in accordance with his theological doctrine, did not accept the idea and logic of the trinity, and has developed his own version of metaphysics and physics in support of his Unitarian theological views. In the end, he laid only one metaphysical hypostasis in the foundation of physics – *linear*. "Absolute rest of the matter" was thrown out of the picture of the World. Therefore Newton's "absolute space" is only a "slice" of the sought-for Absolute space, two other "hypostasis" – *wave* and *vortex*, became evident only in the 19-20th century, when physics began to go into the matter.

Solving "the cipher, fixing the dimensions of the whole being", G.V.F. Hegel did not succeed. The reason is that while revealing the mystery of the absolute method of being, he "hammered" the world in the abstract "concept" and, ultimately did not synthesize it with the "figure" in a particular mathematical way, which would become a representant of sought-for

generating structure, that should "lay", as Hegel claimed, upon only one "concept". In the end, "Absolute Idea" crucified on the "tripod" in the form of "transitional triad", has not become the key to profound dialectics of "being-nothing" as a *Process and its Measure*.

What is this unique "Concept"? This "Concept" is *the Logos of Heraclitus*, the founder of *the dialectics of Space*, or the Law of Cosmos, understood as the coexistence and antagonism of the "opposites".

But why didn't Logos become a firm and unified foundation? The fact that philosophy mainly "driven" Logos in "verbal concept", physics "crushed" it into particular "laws of nature" and "driven" it into formulas. But to understand the World as a Whole, you do not need "the science of formulas and formalization", but "Science of Forms". Here's what Francis Bacon said in his theory of forms "The discovery of forms is followed by true contemplation and free action"... "Thus, the study of forms, which (within their meaning and in their law) are eternal and immovable, composes metaphysics, and the study of the active principle and the matter, latent process and latent schematism (all this concerns the ordinary course of nature and not fundamental and eternal laws) composes physics".

For it *Logos-Law* should be given its rightful "place" or, according Kant – to define a "transcendental place of the concept". But to determine it and to comply with the "measure" – is nothing more than to "grasp" *a priori structure of the Space*, which can consistently accommodate all the fundamental ideas and concepts of Space and Time.

In ancient Egypt, the Law was designated in the form of *equilateral triangle* apex upward. The motion of thought ("*the ontology of mind*") is at the heart of its construction, in a straight line, wave and circle. The idea of proportionality and symmetry is deeply laid within an equilaterality. According to E. Wigner, the principle of symmetry applies to the "laws of nature" as the "laws of nature" refer to phenomena, i.e. the symmetry "manages" the "laws of nature" and the "laws of nature" are phenomena in turn [23].

Thus, the necessary and sufficient principles for the construction of extended synthetic model of the Space include Superprinciple – the trinity of absolute forms of existence of matter (absolute states) or "hypostasis" – linear (absolute rest), wave (absolute formation) and vortex (absolute motion) and the First Principle, flowing from the first – the Principle of symmetry.

Superaxiom. Topology of Being

First of all, science is Logic. But Logic is now is fragmented as well as Science. To overcome the fragmentation of Knowledge and Logos (the Law), we find the point of divergence of scientific knowledge (Empiric) and traditional metaphysical knowledge (Empyrean). This "point" is the first conclusion of the Tradition or *Super Axiom*: *"In The Beginning Was Logos..."*

So, we have Superprinciple and Superaxiom, "the language of geometric representations", Method of ontological construction and the matter as a trinity of its absolute forms of existence (absolute, fundamental states). On this basis, we construct a model of *Proto Process*, which will be the representant of the sought-for *structure of Space-Ttime*.

Plato defined the triangle (the "*celestial triangle*") as a "*measure of sensible things*". For Aristotle, the triangle was the "*representant of the things in general*". In its deep essence it was a schematic embodiment of his dialectics: "... there is something that always moves the movable, and the first motive is motionless itself" [24].

"Celestial Triangle" of three vectors ("Delta"- Δ) is a scheme of conclusion or "*the elementary thinking act*" – *Quantum of Mind-Action (Qualitative Quantum, Quantum-Prototektonx*). This symbol is a proto matrix of *limiting field of absolute states of the matter*: *absolute rest, absolute formation, absolute motion*. Nodes of "delta" are points – places

(Greek *topoi*) of *coincidence of maximum and minimum of fundamental states of matter*: (“fundamental extremums”, “existencials-extremumus”), which are symmetric to «Generating Center» – “*Source of Absolute States*”.

“Celestial Triangle” or the Absolute transcendental figure, is both eidos (limiting image), gnosis (sum of the limiting transitions), measure (qualitative quantitative), matrix (limiting frame of the process) and law (“fundamental cycle”). It has three *Absolute Invariants*.

The first Absolute Invariant is Eidos of the first absolute form of existence of the matter, *Space of linear state of the matter* (“continuous”, “continuum” field), the Space of pure potentiality (“absolute rest”, “invariant rest”, “planckeon air”, “calibrating field”). Its representant objects are: “Cartesian box”, “absolute Newton’s space”, “absolute calibration block”.

The second absolute invariant is Eidos of the second absolute form of existence of the matter, *Space of vortex states of the matter* (“discrete”, “vortex field”), *Absolute Vortex space*. Representant objects are: “sphere”, “ball”, “corpuscle”, “dine-atom”, “diskretum atom”.

The third absolute invariant is Eidos of the third absolute form of existence of matter, *Space of wave states of the matter* (“wave field”), the space of pure becoming, *Absolute Wave space*. Representant objects are: “cylinder”, “tunnel”, “waveguide”, “pipe”, “string”.

Each Absolute Invariant has its own *direction or inner path of “thing-in-itself”*. Grouped symmetrically around the center – source, through the Symbol, they set undivided, consubstantial *Triune way – as a way of Absolute Eidos (“Absolute Idea”) in its self-propulsion or Super Algorithm*.

Trinity of absolute states of matter – *Absolute Generating Structure* or *Ontological Framework of the World*, which “transcendental buckles” manifest themselves as *“fundamental constants*”. Its “transcendental scheme” is represented as a form of *natural coordinate system* – Cartesian rectangular, cylindrical and spherical. They are ontologically equivalent (each has its own way), inseparable (comprehend one, we rely on the other two), and consubstantial (in absolute Form).

Three symmetrically centered Proto Eidos are represented in the simplest geometric object – the Enneagram. Enneagram as a basic cultural symbol is a representant of the ancient Chinese “magic matrix of Lo-Shu”, “3x3 Matrix”. Plato called the Space just “a place for all nascent” – “Matrix”.

Memory is the nature of Time. This is its ontological relationship with Space. Time is the unity of manifold in a pure visual representation. The moment of transition to a new level of Being, which ontological structure is identical to the previous level, but differs in terms of memory – is the present Time.

Future Time is the memory of the structure at a new level of Being, Time as Burden, due and possible, the “purpose”. Hence the birth of the “*arrow of Time*” and the hierarchy of the World. Thus, the extended synthetic *Absolute (“Fundamental”) Space – Time is Triune (Absolute) 12-dimensional Space – Time*. The Space in which three linear measurements (pure potentiality), three vortex (pure actuality) and three wave (pure formation), plus three temporal (*structural memory* through the levels of existence) – Past, Present and Future. *Absolute generating structure (Absolute, Fundamental Field)* as a Symbol is the desired ontological image of the Universe – “model of self-aware Universe”, the foundation and construct of the Common Knowledge.

Absolute generating structure creates “House of Being” – a *linear-wave-vortex language* in which Being speaks to us. Our task is to understand it. At that, it is important to remember the “covenant of M. Planck” – “Permanent whole picture of the World is that unshakable purpose, that natural science seeks in the course of its development” [25].

Conclusions

1. It is necessary to additionally introduce the Ontological standard for justification of knowledge in fundamental physics.
2. Geometry is only the “language of Nature”. So instead of “curved space” – “quasi-curved”.
3. The idea of tensity of *Absolute (triune) field* at all levels of being of the Whole is central when ranking interactions.
4. “Theory of Everything”, which includes the entire hierarchy of the World, can only be represented in *vector form*. Consciousness (“vector quantity”) through Logos and Eidos of the Whole is necessarily included in the full picture of the World: “The true physics is that can include a comprehensive man in the whole view of the World” [26].

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