

The Immanuel Kant's Living Forces

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Abstract: Today, at the beginning of the XXI century, at the time of a severe crisis in theoretical physics, when scientists seriously talk about the illusory nature of the Universe, the authors of this article turn to the legacy of Immanuel Kant and, in particular, to his Living Forces and their roles in the evolution of the Universe. We propose to revise the standard cosmological model Λ CDM (Λ - Cold Dark Matter) which is based on Einstein's General Theory of Relativity and supplement it with living forces, relying on the discovery of dark matter and dark energy, representing 95% of the mass-energy of the Universe. The participation of quantum vacuum (dark matter and dark energy) in all interactions causes a rejection of the paradigm of the evolution of a closed Universe and requires a review of all conservation laws and symmetries. Only new physics can add to our scientific knowledge an indication of the Living Forces.

Keywords: living forces; energy; dark matter; quantum vacuum; open Universe

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1. INTRODUCTION

The philosopher Dr. Stefano Veneroni from the University of East Piedmont and the physicist Dr. Stanislav Konstantinov from St. Petersburg decided to join forces and reveal the secret of the manifestation of the living forces of Immanuel Kant in the Universe, based on the works of the Dr. Stefano Veneroni and in particular "PHYSICAL AND THEORETICAL OBSERVATIONS Around FIRST CANT'S LETTER FORCE LIFE S 1746 (1749)" [1] and the latest achievements of "new physics" [2]. "Thoughts on the True Estimation of Living Forces" is Immanuel Kant's first published work [3]. Written in 1744–46 and published in 1749, it reflected Kant's position as a metaphysical dualist at the time. In it, Kant declared: "after the inventive experiments of the followers of Leibniz, it was almost impossible to overlook the existence of living forces in nature" [3]. So in Kant's view, the ideal notion of reason, is to derive conclusions on the basis of objectives, rather than subjectivity. In other words, using logic backed with empirical facts and evidence is considered superior to conclusions driven from anecdotal experiences. This is the standard way, guided by which we prepared this article. Since experimental physics has moved far ahead since Kant, we have succeeded based on the presence of "living forces" to answer many questions of the evolution of the Universe. Including: why certain systems and celestial bodies themselves keep existing despite their short relaxation time, and also the fundamental question of the resonant nature of the production of pairs of elementary particles (matter) under the influence of external radiation and monstrous electromagnetic and gravitational fields of galaxies and black holes, which form divergent flows or sinks and sources in the cosmic medium (dark matter) of the Universe [2].

2. THE N. A. KOZYREV'S FLOW OF TIME AS A SOURCE OF LIFE OR THE DARK MATTER AS A SOURCE OF BARYONIC MATTER IN AN OPEN UNIVERSE

Firstly, I want to draw your attention to the work of Professor N.A. Kozyrev at the Pulkovo Observatory. He represented the Universe as an open system, the source of updating of which is the flow of time. Professor N. A. Kozyrev described the active impact on the system from the outside, from the side of the stream of space time, as the source "of Living Forces that is not in our scientific

knowledge” [3]. In his well-known work *The Causal Mechanics*, he wrote, “It is amazing that even such a specific question as why the Sun and the Stars shine, i.e. why they are in a thermal equilibrium with the surrounding space, cannot be solved within the framework of known physical laws. This conclusion follows an analysis of astronomical data. Degraded conditions of systems would have to prevail, whereas they almost never occur. A challenge is to understand why certain systems and celestial bodies themselves keep existing despite their short relaxation time?” A further research led N. Kozyrev to a conclusion that a cause for the evolution of natural space systems is an energy, inflowing “from the outside.” N. Kozyrev was the first scientist to evaluate in amount a contribution of the active impact of the environment into a progress of non-integrable, irreversible processes. Herewith, scientists did not only hold experiments on a global scale (gyroscopes, telescopes with bridges to measure currents, arising under an influence of an unknown superluminal radiation), but also recorded a change to the inertial mass in the context of an inelastic collision of two bodies or bodies heating. [3] N. Kozyrev considered those effects as especially clear evidence saying that the cosmic environment (time, according to Kozyrev) had existing active properties. Here's how he described those properties, “Our multiple laboratory experiments have shown that the environment (time, according to Kozyrev) besides passive properties, also possesses active properties, i.e. the motion directivity and the density that determine an extent of its activity. As a result, the environment (time, according to Kozyrev) does not only provide a chance for a progress of processes, but also can influence them and a state of the matter as a kind of physical reality.” However, today scientists are inclined to believe that space and time are Phantoms of the material world [4]. In his work "Critique of Pure Reason" Immanuel Kant wrote: "A simple form of intuition without substance is not itself an object, but simply a formal condition for it (as an appearance), like pure space and pure time, which, of course, are something, as forms for intuition, but in themselves are not intuitive objects” [5]. In fact, at the beginning of the 20th century, Einstein declared a geometric space of a special kind as a mathematical model of the SRT space-time. It received the name "Minkowski space". But it turned out that in the Minkowski space there can be no formation of particles (the Wheeler - DeWitt equation). In Einstein's general theory of relativity, irreversible processes are absent, including the creation of particles, since this leads to a violation of temporal symmetry. At the same time, the true cosmic time, included in Newton's Second Law, disappeared from consideration. The tests proposed by mathematicians for constructing a discrete model of the world: the Akhmavaar r-model, the geometry of the causal sets by Raphael Sorkin, the quaternionic geometry of A.P. Efremov, the Penrose twistor program for an alternative description of the Minkowski space that emphasizes the rays of light, and not points of space-time, did not find sufficient physical justification. In the relational theory of binary geometrophysics by Yu.S. Vladimirov, the axioms of systems of relations are postulated, which indicates the a priori incompleteness of the theory, and physical processes are considered from the point of view of an observer. The incompleteness of the theory may be the result of a subjective approach and the absence of experimentally substantiated physical data. Numerous versions of string theory are also at an impasse, primarily because they are based on Einstein's SRT and GRT, as well as imaginary frozen time [6]. The term "frozen time" was introduced into physics by the American theoretical physicist Lee Smolin. He wrote: “We must find a way to unfreeze time - to imagine time without turning it into space. I have no idea how to do this. I cannot imagine mathematics that cannot imagine the world as if it were frozen in eternity” [7]. Minkowski's flat space, as well as an attempt to generalize it to the case of accelerated motions, that is, Einstein's General Theory of Relativity, cannot be accepted as basic geometric models for describing the non-frozen dynamic developing world in which we live. On the basis of the mathematical apparatus of modern projective geometry, scientists come to new, more general conservation laws inherent in the physics of open systems [8]. In addition, in the five-dimensional continuum, the synchronous interdependence of changes in the state of the system (body) is provided when describing its motion in the impulse representation with the description of its motion in the coordinate representation. First of all, this is a theoretical justification of a space with bundles X_m (X_n) for geometrization of dynamical systems. The basis of the presentation of a layered space: the base is an n-dimensional differentiable manifold X_n (the space of base coordinates), and the layer is an m-dimensional manifold (the layer is the momentum space). The return of the system to its initial state is of decisive importance in the formation of the concept of "base" and allows one to describe the behavior of the system (classical and quantum oscillators) with the help of symmetric invariant equations of Einstein's general relativity. This state of the system corresponds to the concept of a time horizon, during which

we can predict the behavior of the system, the path of its development. The transition of the system to a qualitatively new level, at which the system becomes non-integrable, irreversible processes prevail in it, and time loses the property of invariance, and its behavior is probabilistic, the vector character corresponds to the concept of "layer" [2]. If we are guided by the concept of a layered space consisting of a base and a layer, then we can assume that the four-dimensional world of Minkowski - Einstein describes a "base" in which symmetric and invariant equations dominate and the system is in a stationary, integrable state. The limitations of the General Theory of Relativity do not give scientists the right to drive physical reality into the Procrustean bed of Einstein's invariant symmetric solutions. The imaginary part of complex time - cyclical time - corresponds to this state [2]. The five-dimensional continuum proposed in the article, which includes two time coordinates and three spatial coordinates, has incorporated all the advantages of the five-dimensional world of Kaluza over the flat four-dimensional Minkowski continuum. Its predecessor can be considered the five-dimensional Eddington continuum (Uranoid), which includes, in addition to the four-dimensional Minkowski continuum, the fifth time coordinate [2]. It should be noted that the geometry on which Newtonian mechanics is based is Euclidean geometry, these are Cartesian rectangular coordinates. Academician Gennady Shipov proposed to additionally take into account rotational effects in the new mechanics [9]. He managed to associate the Cartesian coordinate system with the six angular coordinates of Euler and obtain the eleven-dimensional geometry of Weizenberg. It turned out that within the framework of this geometry, one can explain a series of experiments in which the law of conservation of energy is violated. Excitation of a quantum vacuum (dark matter) caused by the accelerated motion of bodies or their rotation leads in open systems to the violation of symmetries, conservation laws and the prohibitions they cause. It is necessary to take this fact into account in classical and quantum mechanics, in the theories of quantum electrodynamics (QED) and quantum chromodynamics (QCD). The use of general relativity by physicists to describe non-invariant irreversible processes leads to gross errors, in some cases fraught with disaster. It has been experimentally noted that when the maximum rotational speed of the rotors of electric motors and turbines is reached, in some cases, spontaneous acceleration of the disks occurs and, moving vertically along the axis of rotation, they detach from the supports and fly out of the device. A similar accident occurred on August 17, 2009 at the Sayano-Shushenskaya HPP. The turbine of the second hydraulic unit suddenly began to rotate at hypersonic speed, which led to the destruction of the fastening bolts, the destruction of the room and the death of 75 people.

The resonant theory of particle creation in the Universe implies that the Universe is filled with quantum vacuum (dark matter) [2]. Really, according to the results of Planck's astronomical telescope the Universe is composed of:

- Dark energy (68.3%);
- Dark matter (26.8%);
- "Ordinary" (baryonic) matter (4.9%) [10].

The quantum vacuum (dark matter) is a global field of oscillators' super-positions with the continuum of frequencies. When the quantum vacuum of the Universe is excited by cosmic radiation or relativistic particles, the resonances accompanying the birth of new particles will occur whenever the frequency of external cosmic radiation and particle coincide. The evolution of dynamical systems (particles) to self-organizing matter depends on the resonances between the degrees of freedom in a quantum vacuum. I. Prigogine wrote, "If the systems are independent, then for coherence and self-actualization, there would be simply no place as all dynamic movements would essentially be isomorphic movements of free (non-interacting) particles." [11]. Proved by Poincare, the non-integrable dynamical systems and the theory of resonant trajectories by Kolmogorov-Arnold-Moser allowed Prigogine to conclude that the mechanism of resonance interaction of particles in large-scale Poincare systems (LPS) was "essentially" mandatory (the probabilistic outcome is 1) so the particle and the Universe are always interconnected by resonances [11].

On set by professor N.A. Kozyrev question: "why certain systems and celestial bodies themselves keep existing despite their short relaxation time?" the answer was found, after the publication of the Professor F. Shakirzyanov, the head of the department of the National Research University of MPEI, article "On Photon Domains" and, in particular, the mechanism for transferring some of the energy of stars to the electromagnetic phase using photonic domains [12]. In the article, Professor F.

Shakirzyanov considers the features of a new substance discovered by him - photon space. In a detailed examination of the phenomenon associated with solar flares and spots, he came to the conclusion that solar spots and chromospheric flares are regions with photon space of quantum vacuum that are in the process of its transition into the baryonic matter. It becomes clear why thermonuclear reactions occur on relatively cold stars and why the fusion reaction that has begun does not cover the entire star, but proceeds in local regions. The locality of stellar matter heating and the locality of the thermonuclear reaction zones explains the long life of stars [12]. However, the role of photon domains is more suited to quantum vacuum (dark matter), which can accumulate electromagnetic energy to a certain critical value and then, when extreme values are reached, splash it into the baryon world in the form of pulses of radiation of giant supernova energies and monstrous black gravity holes. A natural example of the existence of quantum vacuum domains (dark matter) in terrestrial conditions can be ball lightning which is a spherical vacuum cavity resonator with plasma walls.

The region of quantum vacuum (dark matter) in which energy is accumulated will be called the domain. The hypothesis of the existence of an inhomogeneous quantum vacuum (dark matter) in the form of vacuum domains allowed Dr. Vyacheslav Dyatlov, Professor of the Siberian Branch of the Russian Academy of Sciences, to combine F. Shakirzyanov's theory of Photon Domains with Maxwell's electrodynamics and Heaviside's gravodynamics [13]. It allowed defines the energy of the quantum vacuum domain (VD) in electric, gravitational, magnetic and spin fields [10]. Based on this, Dr. Vyacheslav Dyatlov suggests calculating the energy of a vacuum dipole (VD) as a four-dipole in four fields (E - electric, M- magnetic, G - gravitational, S - spin) in the following form [13]:

$$W = W_E + W_G + W_M + W_S \quad (1)$$

Where

$$\begin{aligned} W_E &= -\mathbf{d}\mathbf{E}_0; & W_G &= -\mathbf{d}_G\mathbf{E}_{0G}; \\ W_M &= -\mu_0 \mathbf{l}_M \mathbf{H}_0; & W_S &= -\mu_{0G} \mathbf{l}_S \mathbf{H}_{0S}. \end{aligned}$$

\mathbf{d} and \mathbf{d}_G is two VD dipoles - electric \mathbf{d} , gravitational \mathbf{d}_G

\mathbf{l}_M and \mathbf{l}_S is two moments of VD - magnetic \mathbf{l}_M and spin \mathbf{l}_S .

μ_0, μ_{0G} is magnetic and magnetospin permeability;

$$\mu_0 = 1.257 \cdot 10^{-6} \text{ m} \cdot \text{kg} \cdot \text{c}^{-2} \cdot \text{A}^{-2} \quad \mu_{0G} = 0.9329 \cdot 10^{-26} \text{ m} \cdot \text{kg}^{-1}$$

Generally speaking, the fields $\mathbf{E}_0, \mathbf{E}_{0G}, \mathbf{H}_0, \mathbf{H}_{0S}$ depend on spatial coordinates, but they can be approximately considered constants within the domain. Therefore, the dipole forces acting on the quantum vacuum domain, guided by the work of Academician Tamm [14], can be determined as follows:

$$\mathbf{F}_{DE} = -\nabla W_E; \quad (2)$$

$$\mathbf{F}_{DG} = -\nabla W_G; \quad (3)$$

$$\mathbf{F}_{DM} = -\nabla W_M; \quad (4)$$

$$\mathbf{F}_{DS} = -\nabla W_S; \quad (5)$$

Where

\mathbf{F}_{DE} is force acting on the VD as an electric dipole;

\mathbf{F}_{DG} is force acting on the VD as a gravitational dipole;

\mathbf{F}_{DM} is force acting on the VD as a magnetic dipole (magnetic moment);

\mathbf{F}_{DS} is force acting on the VD as a spin dipole (spin moment);

∇ is gradient operator [10].

These forces are involved in the fifth fundamental interaction between quantum vacuum and baryonic matter and play the role of "Living Forces" in Latent energy of the Universe [15]. Dr. Jonathan Feng of the University of California, Irvine, in a 2017 press release, said: "For decades, we have known

about four fundamental forces: gravity, electromagnetism, and strong and weak nuclear forces. The discovery of a possible fifth force acting between baryonic and dark matter will completely change our understanding of the universe, which will entail the unification of the fifth force and dark matter ” [16].

3. THE ILYA PRIGOGINE'S OPEN UNIVERSE AND THE ALBERT EINSTEIN'S CLOSED UNIVERSE

Nobel Prize winner I. Prigogine, exploring the dynamics of systems development and in particular the growth of entropy, established inconsistency in the Clausius statement on the “heat death of the Universe.” [11]. He wondered: “Is the Universe a closed system in terms of thermodynamics?” Answering this question, I. Prigogine came to the conclusion that Einstein's assumption about the adiabaticity of cosmic evolution, that is, about the absence of heat transfer between the environment and the elementary volume, is wrong:

$$dQ=0, \tag{6}$$

Albert Einstein put that assumption as the basis for the standard model of the closed Universe. In general relativity, Einstein irreversible processes are absent, the entropy of the universe remains constant. The cosmological time is excluded from consideration in the flat Minkowski space. With the General Relativity Theory (GRT), Einstein proposed a new interpretation for acceleration. The acceleration, explained by Newtonian physics in terms of the gravitational interaction, is considered within the GRT as a result of the curved space-time, whereas the inertial motion meets a case of the "flat" space-time. Herewith, the true cosmic time, included into the Newton's Second Law, disappeared from consideration. To remove this paradox, I. Prigogine proposed corrections to the Einstein's equation, inserting an additional term, the entropy. He wrote, “Proposed by us modification to the Einstein's equation that takes into account the matter birth, represents non-equivalence of the matter and the space-time. In our expression, the Einstein's equation does not only establish a relationship between the space-time and matter, but also the entropy.” [11]. Einstein's universe is a closed universe with constant entropy since in such a universe there are no irreversible processes. For a description of the birth of matter in Einstein's general relativity is necessary to be considered variations in the density of matter due to the production of particles. This leads to disruption in time symmetry. Prigogine proposed to add the number of variables included in the standard model (the pressure P , the mass-energy density σ and the radius of the universe $R(t)$) an additional variable n - the density of the particles and an additional equation, which would tie the Hubble function of radius of the universe $R(t)$ and the birth of particles n . In the case of the universe, consisting of particles of the same type of mass M , when the mass-energy density is simply equal to σ , and the pressure P - vanishes, Prigogine offers a simple equation that takes into account the creation of particles:

$$\alpha H^2 = \frac{1}{R^2} \frac{\partial n R^3}{\partial t} \tag{7}$$

where α - kinetic constant equal to zero or positive.

Further, Prigogine considering, how the birth of the particles leads to a modification of Einstein's equations of general relativity in terms of the first and second laws of thermodynamics. The first expresses the beginning of the conservation of energy. But energy can take many different forms. For example, when we abruptly stop the engine, part of the kinetic energy is converted into heat energy inside. In cosmology, so it is necessary to distinguish between the two types of energy: gravity (it is negative) and "internal" associated with mass energy (it is positive). The internal energy can be created at the expense of gravitational energy. Prigogine writes: “This approach leads to a modification of Einstein's equations. In this equation, the term appears, which we, in comparison with Newtonian physics, we identify with the pressure. By normal pressure P , we add additional pressure $P(\text{add})$. Due to the birth of the particles. Pressure is the sum of two terms, one of which corresponds to the usual thermodynamic equation of state, and the other has no analogue in ordinary physics, as relates to the conversion of gravitational energy into matter. In the standard model entropy is conserved. In our model, we have the production of entropy, proportional to the velocity of particles.”[11]. The author of the evolutionary paradigm of the universe, Nobel laureate I.R. Prigogine found that “isolated closed systems turn into chaos, and open systems evolve into ever higher forms of complexity.” [11]. Thus, the closed of Einstein's Universe dooms the Universe to degradation. In an open universe, an exchange of energy is allowed between quantum vacuum (dark matter) and baryonic matter. Professor I. Prigogine called this effect “an active influence on the system from the

outside, with the transition of the system in a non equilibrium state.” I. Prigogine clarifying Mach’s Principle and came to the conclusion that in a steady condition, an active influence from the outside on the system is negligible, but it can become of major importance when the system goes into a non-equilibrium condition [11]. In the work “Time, Chaos, Quantum”, he writes: “In a stable steady condition, an active influence from the outside on the system is negligible, but it can become of major importance when the system goes into a non-equilibrium condition.” [11].

4. CONCLUSION

Skepticism and relativism have played a positive role in science by calling into question everything that has no rational justification. Doubt and criticism were aimed at overcoming dogmatism, absolutization of truths. However, extreme skepticism that prevails today in theoretical physics is connected with agnosticism. The reason for this is the crisis of the scientific paradigm that prevails today in physics. In order to overcome the crisis in theoretical physics, which was pointed out as far back as 2014 in his article by physicists of the Large Hadron Collider Joseph Likken and Maria Spiropula “Supersymmetry and the crisis in physics”, a new physics is needed [17]. It should be noted that recognition of the polarization of quantum vacuum (dark matter) in theories of quantum electrodynamics (QED) and quantum chromodynamics (QCD) leads to the violation of symmetries, conservation laws, and prohibitions in the Standard Model. Each symmetry in the SM corresponds to its own conservation law (the famous Noether's theorem and its subsequent generalizations). For example, symmetries with respect to time shifts (that is, the fact that the laws of physics are the same at every moment of time) corresponds to the law of conservation of energy, symmetries relative to shifts in space correspond to the law of conservation of momentum, and symmetries about rotations in it (all directions in space are equal) - the law of conservation of angular momentum. Conservation laws can also be interpreted as prohibitions: symmetries prohibit changes in the energy, momentum, and angular momentum of a closed system during its evolution. The participation of quantum vacuum (dark matter) in all interactions causes a rejection of the paradigm of the evolution of a closed system and requires a review of all conservation laws and symmetries. Only new physics can add to our scientific knowledge indication of the “Living Forces” that provides the evolution of the Universe. Unfortunately, today, guided by the catchphrase of Academician Landau: “Where philosophy begins, physics ends”, philosophy was expelled from physical theories, it was replaced by an abstract mathematical apparatus and binary software algorithm, which led to the rejection of the real Universe and its recognition as an illusion [18].

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