



## Metaphysics of Classical Space and Time

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# Metaphysics of Classical Space and Time

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## 1. INTRODUCTION

The problem of deriving classical space-time from the laws of microscopic physics now is one of the urgent problems of theoretical physics. It is closely connected with the physical essence of the cosmic medium (ether), which determines the properties and the geometry of space-time. It would be wrong to assert that the appeal to metaphysics as the first philosophy (ή πρώτη φιλοσοφία) takes as its subject the unknowable essence of the cosmic medium. On the contrary, the experimental cosmological discoveries of recent years,

including the presence of thermal background radiation of the universe of 2.7 K, its anisotropic distribution in space, the cosmological expansion of the universe to the acceleration and the rapid development of the theory of continuous superfluid medium allows to describe the universe, as the world is physically installed and clear interactions. In view of the above I would like to explain the concept of physically substantiated classical space - time, built on the basis of the laws of celestial mechanics and models of the space environment, fundamentally different from the standard cosmological model  $\Lambda$ CDM ( $\Lambda$ - Cold Dark Matter).

Professor of Moscow State University Yu. S. Vladimirov in his article [1] considered three directions of finding a solution to this problem: Penrose's twistor program, A. P. Yefremov's quaternionic program and Yu. S. Vladimirov's binary geometrophysics. But there is a fourth direction to solve this problem - it is Arthur Eddington's *Fundamental theory* [2]. The essence of this direction is described in the article *Five-dimensional world of Kepler – Newton - Eddington*, published in the book *"Cosmic Medium"* [3]. It A. Eddington in his latest work *Fundamental theory* first tried to constructively implement the idea of derivation of the classical concepts of space-time from the laws of microscopic physics. Eddington's five- dimensional world (Uranoid) contains three spatial dimensions and two - time and consists entirely of charged particles (electrons and positrons). This, with great difficulty presents the results have been amazing for Eddington himself, because considered hypothetical system was completely out of real experience. However, relying on high-precision astronomical data in recent years, obtained by the probe Wilkinson (satellite WMAP), and Planck space telescopes HST, BTA (Big Telescope azimuth) et al., Eddington's *Fundamental theory* can be extended to the real universe. The experimental results of the Military Engineering Space Academy with the clock and magnetometer installed on the artificial earth satellites, clearly confirm the reality of heterogeneous polarized dipole space environment, which has electric and magnetic perception, analog superfluid  $^3\text{He-B}$ . [4,5]. The fundamental theory allows us to give a response to said Yu.S. Vladimirov complex problems of difficulty in solving the problem [1]. Here are the problems:

1. First of all it is a theoretical justification of space having fiber bundle  $Xm(Xn)$  when geometrisation of dynamical systems. The basis of it is  $n$ -dimensional differentiable manifold  $Xn$  (a base-coordinate space), and layer -  $m$ -dimensional manifold (a layer - momentum space);

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2. Yu. S. Vladimirov asks "Why describe the physics of the microscopic physics uses complex numbers, whereas the conventional geometry and classical physics are set out on the basis of the set of real numbers?";
3. Yu. S. Vladimirov considers it necessary "to justify theoretically quadratic definition of measure in the coordinate and momentum-space, that is, to prove the existence of the Pythagorean theorem and its generalization in the form of a quadratic metric in general relativity  $ds^2 = g_{\alpha\beta} dx^\alpha dx^\beta$ ";
4. As a way geometrical properties of space and time associated with physical interactions? After all, even Kant linked the three-dimensional space with the law of decreasing strength is inversely proportional to the square of the distance. Visually, the three-dimensional space is represented and described by Euclidean geometry in Cartesian coordinates. Descartes imagined space as something absolutely unchangeable, like an empty box, inside of which occur physical processes. Kant's idea to introduce space, based on the specific physical laws. He wrote: "The three-dimensionality possible on what substances act on each other in such a way that the force of action is inversely proportional to the square of the distance.". Obviously, the geometric representation of this law is a sphere. The observer, placed in the center of the sphere, the visual space will be presented three-dimensional. The relativity of space means that it depends on the attitude and the mechanical interaction of bodies among themselves. According to Kant, and three-dimensional Euclidean space, because the forces of interaction between material bodies (the law Cavendish) and electric charge (Coulomb's law) are inversely proportional to the square of the distance. If the particles interact and charges is directly proportional to the law of  $F = k \cdot x$  (Gauss's law), the space would become Kant in straight lines radiating from the observer to infinity. This space is no longer would have the continuity, and was to be discrete.

In his article Yu.S.Vladimirov calls and a number of other important issues, which form a part of the solution of the problem of the withdrawal of the classical space-time concepts and laws of physics of the microscopic physics [1]. However, in this paper, we confine ourselves to the above listed four questions, the answers to which can be found in the three laws of J. Kepler formulated it as a result of long-term analysis of astronomical observations of Tycho Brahe in 1609 – 1619y. These laws are:

1. All planets move in elliptical orbits in one of the foci is the Sun;
2. Area of space described by the radius vector of the planet is proportional to the time;

3. The ratio of period squares of any two planets is a ratio of cubes of their large semi-axes of elliptical orbits, along which they rotate around a central body. This implies that the ratio of the cube of the orbit radius to the square of the orbit time of the planet is constant [6].

## II. METAPHYSICS J. KEPLER

From Kepler's third law it implies that the five-dimensional world of the universe includes two-dimensional and three-dimensional space time associated constant K:

$$K = \frac{R^3}{T^2} \tag{1}$$

where

R is a distance from the centre of the planet to the centre of the Sun,

T is complex time,  $T = (t + i\tau)$ ,

t is time of planet movement around the Sun,

$\tau$  is the continuous cyclic time equal to the period of rotation of the planet around its own axis, K is Kepler's constant.

Kepler calculated K values for all planets known to him in the Solar System:

$$K = (3.33 - 3.35) 10^{24} \text{ km}^3 \cdot \text{year}^{-2}$$

At the same time, the complex time - a time during which the system makes a complete loop in its orbit, and it returns to the initial state in full accord with the first law of Kepler. It returns to the initial state is decisive in the formation of the concept of the "base" and allows you to describe the state of the system (classical and quantum oscillators) symmetric invariant equations, while the system is in a steady state of the integrable. This system corresponds to the concept of the time horizon within which we can predict the state of the system, its development path, and then the initial state of the system cannot serve as a basis for prediction. Transition system to a new level, in which the system to become non-integrable, it is dominated by irreversible processes and loses time invariance property and its state is probabilistic, vector character corresponds to the concept of "layer". The database to describe the state of the system (classical and quantum oscillators) can be used symmetrical, invariant equations, but in the layer to describe irreversible processes require a different mathematical apparatus, that is, they describe different laws that have individual character.

Contemporary physics traditionally assumes that a structure function of particles can be presented either as a time function (time representation), or as a function of an amplitude of frequencies harmonic components (spectral representation).

However, these representations are only equivalent to symmetric invariant processes, while the

time is definitely connected with the cyclic motion. There will be an error to use the time representation to describe non-invariant, irreversible processes going beyond the time horizon and connected to the probability of systems restructuring, their birth or disappearance. In this case, the adequate description of processes can be only achieved with the spectral representation. Professor at the Moscow State Automobile and Road Technical University, L.G. Sapogin, used the spectral representation of the electron structure function to describe processes of birth and disappearance of particles in his Unitary Quantum Theory (UQT) [16].

One reason for the use of complex numbers in the microcosm and the macrocosm is in the presence of two time dimensions: the real-time evolution of non-invariant systems ( $t$ ) and imaginary cyclic invariant time ( $\tau$ ). In 1955, M.Bunge introduced the complex time into the theory of electron:

$$T = (t + i\tau)$$

where

$t$  is the time of an electron live in an atom;

$\tau$  is the continuous cyclic time, equal to an electron spin period ( $\tau = \frac{h}{4\pi mc^2}$   $\tau = 10^{-21}$ s.)

Similarly, you can enter the description of the Earth's rotation around the sun complex time  $T_e = (t + i\tau)$ , where  $t$ - time of a complete revolution of the Earth around the center of gravity of the solar planetary system, and  $\tau$ - turnover time of the Earth around its own axis.

Regarding the understanding of the dual nature of the time S.Hawking wrote: "There is such a need to understand what is imaginary time – just it is different from the time that we call reality." [19]

According to Kepler's second law to each point in time is proportional to the area described by the radius vector of the system, and not the path. Toroidal vortex and the nature of micro-movements as well as macroscopic objects in the Universe determined a quadratic definition of measure. This condition is the Heisenberg uncertainty microscopic physics defines the requirement formulated by Max Bohr and consisting in the fact that the physical meaning has only the square of the absolute value of the wave function: it determines the probability density finding the particle at any point in space. From this perspective, there is no contradiction between the wave functions of the Schrödinger and de Broglie: they describe the same probability density of finding a particle at any point in space.

So, using Kepler's laws, its well-known mathematician, physicist and astronomer transsidentnoe equation ( $\mu = \epsilon - \epsilon \sin \epsilon$ ) can determine the elliptical orbit of any planet of the solar system, or satellite and all its parameters [13]. Kepler's laws of Metaphysics allow you to associate time and space for the undisturbed planetary motion without attracting and

neither Newton's law of universal gravitation, no such dynamic concepts like mass, energy, force, angular momentum, and the like. Instead of the mass of the central body Kepler used centric constant, which can be extended to both the macro and micro system. Metaphysics Kepler has been further developed in the works of I. Newton, A. Einstein, A. Eddingtona.

### III. METAPHYSICS ISAAC NEWTON, ALBERT EINSTEIN, ILYA PRIGOGINE

Half a century after Kepler, Newton introduced forces into the spatial model of the universe [7]. The space of the universe produces gravity and inertia forces acting following quadratic laws of interaction between bodies (laws by Coulomb and Cavendish). Having articulated his laws of dynamics and universal gravitation, Newton got Kepler's third law as consequence of the universal gravitation law and the second law of dynamics as follows:

$$K = GM \frac{m \text{ gr.}}{m \text{ in.}} = \frac{R^3}{T^2} \quad (2)$$

where

$m \text{ gr.}$  is the planet gravitational mass, interacting with the Sun, the  $M$  mass, produces a centripetal force of gravity;

$m \text{ in.}$  is the inertial mass of the planet. It is rotating around a circle of  $R$  radius and producing a centrifugal force of repulsion,

$G$  is the gravitational constant.

According to Newton's law of universal gravitation planet moves in a stationary orbit only on condition that the centrifugal and centripetal forces acting on the planet are equal, then the equation of Newton and Kepler's law identical for fixed inertial motion systems. In the equation of Newton appears cosmological time (horizon) within which the need to fulfill two conditions:

- 1) The presence of a planet's gravitational and inertial mass;
- 2) The simultaneous impact of gravitational and inertial forces.

The criterion for inertial in real processes is the preservation of the relative energy of the interaction between matter and ether provided compensation body forces of their interaction. This means that the movement of a freely falling body in the gravitational field or motion on a circular orbit of the planet may be viewed as inertial. In case of a non-equilibrium state of the system, a speed of a body increases, its vector is constantly changing, there are vortices appearing behind the body. At the same time, an energy of vortices is actively influencing the system "from the outside" (from a side of the environment). Pressure in a vortex area formed behind the body, will be reduced, so the resultant of pressure forces will be non-zero, determining in its turn any resistance. As a result, frontal

resistance consists of frictional resistance and pressure resistance. The ratio between the frictional resistance and the pressure resistance depends on the Reynolds number (Re). The more Re is, the more a role of pressure resistance is. Hence, a transition of the system from a stable state to an unstable one, its non-equilibrium state, would be accompanied with a growth of ether's vortices. The growth would counteract a change to the state of the system, i.e. generating an additional field of inertia, which is stronger, when the greater disturbance influences the environment. Let us pay attention to a difference in a value of the Kepler constant K for terrestrial planets, such as the Venus, the Earth, the Mars, rotating along stable, seldom-perturbed orbits, for which value  $K = 3.35$ , and the Mercury, the orbit of which is subject to strong perturbations due its close location to the Sun.

For the Mercury, value K is 3.33, that is 1% less than that for planets with stable orbits. Perhaps, this results from vortex ether-dynamic forces in the space environment responding to its perturbation by the Mercury. At the same time, the inertial field increases and because a value of K depends on the ratio of masses, gravitational to inertial (2), we can conclude about a growth of the inertial mass of the Mercur. The nature of inertia is different from that of gravitation. Gravitation is determined by the charge magnitude of the body, while inertia is determined by the presence of electromagnetic cosmic medium ( $\epsilon, \mu$ ) and its source is the induced electric intensity generating force F preventing the accelerated motion of body [13]. Difference is that the inert acceleration is a vector directed in the line of force F, while gravitational acceleration has radial direction and therefore it is scalar with gradient inversely proportional to the value of squared distance. Since the inertial mass is a factor in the acceleration of Newton's second law, the expression (2) made it possible to establish a connection between gravity and electromagnetism long before all the physical theories of the 20th century.

$$F = -\min \cdot \alpha = qE \quad \min = -\frac{qE}{\alpha} \quad (3)$$

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. In Einstein's gravitational theory of the curvature of space - time determines the existence of matter-energy. More specifically, general relativity connects two mathematical objects called tensors: on the one hand, the metric tensor, which describes the curvature of space - time, on the other - stress tensor, which determines the distribution of matter in terms of the density of matter - energy and pressure. His equation of Einstein likened to a building, one wing of

which is built of precious marbles, and the other - from cheap wood. Indeed, the mathematical form of the tensor is the result of subtle geometric considerations, whereas the stress tensor that specifies the "source" of the curvature of space-time is described in terms of macroscopic concepts of pressure and energy density. Also, to obtain physical meaning of the stress tensor is necessary to introduce additional boundary condition. This condition requires that in the limit of weak gravitational field of Einstein equation reduces to Newton's equation [20]. Stephen Hawking proposed the introduction of imaginary time  $\tau = ist$  metric in general relativity. If Euclidean space metric is  $ds^2 = dx^2 + dy^2 + dz^2$ , in general relativity the metric is  $ds^2 = c^2dt^2 - (dx^2 + dy^2 + dz^2)$  and imaginary time  $c^2dt^2$  enters  $-d^2\tau$ . This eliminates the distinction between time and space in the range  $ds^2$  GRT metrics [19]. In the standard model A.Fridmana universe on a large scale can be considered homogeneous and isotropic. Then the metric takes the simple form:

$$ds^2 = c^2dt^2 - R^2(t)dl^2 \quad (4)$$

where  $dl^2$  is spatial element, which may correspond to the zero curvature, either positive or negative curvature (spherical or hyperboloid);

$R(t)$  is the radius of the universe, corresponding to the limiting distance achievable for astronomical observations.

The standard model establishes the relationship between the radius of the universe  $R(t)$  and the curvature of space on the one hand and an average density of mass - energy, which is denoted  $\sigma$ , and the pressure P.

Instead of  $R(t)$  is often administered to the Hubble function:

$$H = 1/R (dR/dt) \quad (5)$$

The ratio between P and density  $\sigma$  is given by the equation of state.

Therefore, in the standard model there are only two independent variables: density function  $\sigma$  and the Hubble H. To define them, you need two equations, which gives Einstein's theory. One of the equations binds Hubble function H with a density of  $\sigma$ ; the second equation expresses the adiabatic space evolution of the universe. Adiabatic means that between the environment and the elementary volume in general relativity Einstein's no heat exchange:

$$dQ = 0 \quad (6)$$

In general relativity, Einstein irreversible processes are absent, the entropy of the universe remains constant. Herewith, the true cosmic time, included into the Newton's Second Law, disappeared from consideration. In the standard cosmological model  $\Lambda$ CDM total energy of the universe is assumed to be zero. It can therefore be assumed that  $H = 0$ . Therefore,

considering the wave function of the universe, from the Schrodinger equation:

$$H\Psi = i\hbar \frac{d\Psi}{dt} \quad (7)$$

It follows that  $d\Psi / dt = 0$ ; the wave function does not depend on the time (equation  $H\Psi = 0$  equation is often called the Wheeler – DeWitt Equation). This is a paradox. The cosmological time is excluded from consideration in the flat Minkowski space. However, if we recall the presence of the fiber bundle, consisting of a base and a layer, it can be assumed that the four-dimensional world of Minkowski - Einstein describes only the "base". This is the second boundary condition, in order to GRT stress tensor have physical meaning, the limits of applicability of Einstein's equations for an adequate description of physical reality is the requirement of a stationary state of the system. This state corresponds to the imaginary part of the complex time - cyclical time. The energy of the electromagnetic field  $W$  and inertial mass  $m_{in}$  are linked Einstein's relation:

$$m_{in} = W / c^2 \quad (8)$$

Thus, the inertial mass of electromagnetic field in the "base" and "layer" describes the different ratios. In the layer in the formula (3) includes a time; and based in the formula (8) - a constant  $c^2$ . The equality of gravitational and inertial masses, as well as the value of the Reynolds number is an indicator of stability of the stationary state of the system.

To describe the evolution of the system, when the system becomes non-integrable and it is dominated by irreversible processes, that is, "Layer", you must appeal to the five-dimensional Kaluza -Eddingtona system. It Eddington was able to show that in the fifth coordinate (pseudo spatial fourth Kaluza) is the cosmological time corresponding to the real part of the complex time. This time is divided into discrete sections - time horizons. Fifth Dimension Eddington has a special status. It does not allow to enter the universe into the Procrustean bed of symmetric invariant solutions of Einstein's theory. . The discovery of the cosmological expansion of the Universe with acceleration, changes our understanding of the present stage of cosmological evolution, current state of the universe. Previously it was thought that the whole history of the cosmological expansion - is the story of its attenuation after the initial "Big Bang". This was built all the inflationary theory of the anisotropy of the universe, the provisions in the standard cosmological model  $\Lambda$ CDM. Now it turns out that just in our time, the dynamics of expansion of the Universe has moved from the stage of the deceleration to the acceleration stage.

As the field of gravity determines the spherical, continuous geometry of space and inertia field determines the linear and discrete geometry of cosmological time, and ultimately, the geometry of

space - time determined by the physical properties and the laws of the space environment. In addition, it is the space environment supports the constancy of cosmological density  $\rho_V$ , synchronizing the processes of accelerated expansion of the Universe and the birth matter.

Prigogine, winner of the Nobel Prize wondered: "Is the Universe a closed system in terms of thermodynamics?" Answering to this question, I. Prigogine came to the conclusion that the postulate of the absence of heat exchange between the environment and the volume element (adiabatic process of cosmological evolution  $dQ = 0$ ) is erroneous [14]. Einstein's universe is a closed universe with constant entropy, since in such a universe there are no irreversible processes. Prigogine 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. Herewith, the system becomes non-integrable, the time loses its invariance and its behaviour is probabilistic in nature." [14]. Active contribution of cosmic medium appears in cosmology in the maintenance of constant energy thickness under the accelerated extension of the Universe. V.Rubakov, a member of the Russian Academy of Sciences, writes in his paper « Energy - it is dark matter»: «There is no law of conservation of energy in cosmology. The universe expands, but energy thickness is constant. Volume increases and the energy in that volume increases, too. Where does it come from? Nowhere, no law of conservation of energy » [15].

For a description of the birth of matter in the Einstein's general relativity is necessary to prevent 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  $\sigma$  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  $\sigma$ , and the pressure  $P$  - vanishes, Prigogine offers a simple equation that takes into account the creation of particles:

$$\alpha H^2 = 1/R^2 (dnR^3/dt) \quad (9)$$

where  $\alpha$  - kinetic constant equal to zero or positive.

In this equation, the value of  $\alpha$  and  $H$  are positive since we are talking only about the birth (and not destruction) of the particles. In Minkowski space, where  $H = 0$ , the production of particles can not be. Furthermore, in the universe, where the total number  $nR^3$  constant irrespective  $H$  values,  $\alpha = 0$  [14]. Further,

Prigogine And 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  $P_{add}$ , 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. Turning to the second law of thermodynamics, we note that the entropy associated with the internal energy, and not with other forms of energy. Since there is a source of internal energy, and there is a source of entropy. In the standard model entropy is conserved. In our model, we have the production of entropy, proportional to the velocity of particles." [14].

In 1973, Edward Tryon suggested that our universe could have formed as a result of fluctuations of physical vacuum. In this zero-point energy of the universe is formed as the sum of two equal and non-zero values with opposite signs (energy associated with gravity and the energy associated with the mass of Einstein's famous formula  $W = mc^2$ ).

Recognized by the scientific community of Einstein's general relativity theory of gravitation and related nonlinear Limited, a closed universe. But even 23 years before Einstein's general relativity, Heaviside proposed linear equations of gravitation, like Maxwell's equations. These equations agreed well with a number of laws and principles of physics and associated with unrestricted, open universe. This leads to the fact that in theory the Heaviside, as in Newtonian theory, there is a problem of divergence of the gravitational potential, ie the problem of the gravitational paradox in the infinite space filled with matter. However, this difficulty is only in cases where the alleged existence of the substance only on the positive gravitational mass. If we proceed from the assumption of the equality of positive and negative gravitational inertial mass in the universe, the theory of gravitation Heaviside and Newton immediately removed the objections related to the gravitational paradox. In gravidynamics Heaviside appears fundamental position of equality of positive and negative mass, equivalent to

a fundamental position of equality of positive and negative electrical charges in electrodynamics [18].

The relativistic Standard Model fails to describe adequately non-integrable, irreversible processes of birth of elementary particles, stars, galaxies and the universe itself. The resonant nature of the pair of elementary particles under the influence of external radiation is a fundamental process of the universe is formed in the space environment divergent flow or drain and source. Direct experimental determination of the resonance dependence of birth  $N$  elementary particle pairs of frequency  $\nu$  is almost completely silenced by modern physics. Following the deceptive logic of the modern theory, this dependence is drawn as a monotonically increasing curve. The space environment is a global field of oscillators' super-positions with the continuum of frequencies. In contrast to the field, a particle oscillates with the same fixed frequency. In front of us, there is an example of the non-integrable Poincare system. Resonances will occur whenever the frequency of the field and the particles are the same. The evolution of dynamical systems (field-particle) up to the self-organized matter depends on available resonances between degrees of freedom. This was a conclusion by I. Prigogine and I. Stengers in their monograph the "Time, Chaos, Quantum" [14]. They revived an idea by N. Tesla on a theory of global resonance. Nevertheless, if the Tesla's resonance theory of the matter birth in the Aether had been based on an intuition of the ingenious experimenter, then in case of I. Prigogine, this theory acquired rigorous mathematical view. Proved by Poincare 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" probable, i.e. binding. With increasing communication parameters, there is an increase in likelihood of resonance outcomes. It is such LPS dynamic systems, to which systems of particle interaction with the space environment and with each other belong. Consider the features of the phenomenon that is the photoelectric effect destruction process photons structural elements of the space environment and the birth of a pair of oppositely charged microparticles (electrons and positrons). The experimental curves of the relative growth of the flow of electrons and positrons in the space environment, since the photon energy for the beginning photoelectric threshold  $W_k = 1$  MeV energy and ending with cosmic radiation 300GeV. Moreover, it has been experimentally established the presence of two photoelectric threshold and two resonant peaks, which may indicate the presence of near-Earth space of the space environment: dark energy and dark matter. The region of ultra-ray energy and, of course, frequencies (including resonant), generating electrons in

cosmic medium, (1 MeV - 200GeV) [22], has been extended recently with the energy range of ultra-rays generating positrons in cosmic medium (30 GeV - 300GeV) [23]. Using the ISS AMS detector, it was first found that the share of positrons in cosmic media grows no longer with the energy over 200GeV. Increasing contribution of electrons to total positron-electron flow, starting from 30 GeV, was demonstrated before with the PAMELA, Fermi, and some other detectors. Resonance curves birth of electrons and positrons from the virtual micro-particles forming the dipole vortices are shown in Fig.1[3]. The curves are plotted on the materials presented in [22,23].

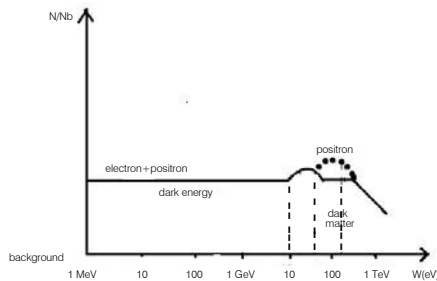


Figure 1: Resonance curves of photoelectric effect in near-Earth medium

Denying the existence of the space environment, modern science is powerless in the face of man-made disasters related to exposure to electromagnetic and gravitational effects arising from the presence of the ethereal sphere of the Earth. Location NPP in areas of tectonic faults, where there is intense electromagnetic and gravitational energy interaction between the liquid magma of the ethereal sphere Earth and to form a toroidal glowing vortex ether size of microparticles to tens of meters (rotator, torsion, yadron), can lead to reversible and irreversible effects up to their complete destruction. According geliemetrii and satellite images most of the nuclear power plant located on tectonic faults which are trace riverbeds [4]. Minor earthquake led to the disastrous consequences of the Chernobyl and Fukushima-1 nuclear power plant, as caused a huge influx of energy from the outside, from the toroidal vortex ether. At the same time plant operation and safety systems have failed because they were designed to incorrect theoretical assumptions that ignore the external electromagnetic and gravitational effects from ethereal sphere Earth. Science for the first time realized the glaring discrepancy between the views of modern physics and traditional real processes taking place in nature, requiring them to account in the design and the greatest caution in NPP. A series of accidents that followed the Chernobyl after the disaster April 26 1986: September 1989. October 1991. February 2000, was accompanied by the formation of luminous disks with a diameter of more than 11 meters (rotator). It should be noted that the risk of another catastrophe at Chernobyl

has not disappeared after stopping all the reactors in 2000 because the nuclear fuel in reactors of the station remained. Sarcophagus of the emergency unit and the containers of radioactive waste can be completely destroyed by the gravitational and electromagnetic field ether. A similar pattern is observed in Fokusima-1 nuclear power plant.

Of particular note is a significant interaction of vortices with rotors of electric motors and turbines at the coincidence of their axes of rotation. Experimentally established that, sometimes spontaneously turbine is accelerated and rises along the vertical axis of rotation. This is observed in crustal fault zones. A similar accident occurred August 17, 2009 at the Sayano-Shushenskaya HPP. The turbines of the second hydraulic unit suddenly began to rotate at hypersonic speeds, leading to rupture of the mounting bolts, the destruction of buildings and the death of 75 people.

The land has an electric charge, which, due to the Coulomb repulsion tends to the spherical surface of the planet. The process of electrification of the near-Earth environment can be described as a state of flow of an incompressible fluid. The energy is transmitted primarily along the curve - the shortest path between the source and the receiver on the Earth's surface. current distribution of "electric fluid" on the Earth's surface can be represented analytically, as the theory of a stationary, two-dimensional ideal incompressible fluid on the Riemann surface.

#### IV. METAPHYSICS ARTHUR EDDINGTON

In the 20th century, many scientists including Albert Einstein undertook repeated unsuccessful efforts to unite gravitation and electromagnetism geometrically in the framework of four dimensions of Minkowski continuum, and only T.Kaluza has managed to do it, but in the five-dimensional formal world of four spatial dimensions and one time dimension. Eddington's statement that «a matter particle understood as a population of events is a system the linear extent of which has a time character» allowed him to pass on to the five-dimensional Kaluza theory. Here absolutely implicit physical meaning of the Kaluza fifth coordinate (hidden dimensions) becomes the real pseudo-spatial x5-coordinate. Eddington five-dimensional world absorbed all the advantages of the Kaluza five-dimensional world over the planar four-dimensional Minkowski continuum, allowed to reveal the connection between macrocosm, including space-time vision, and microcosm with the charge and mass of elementary particles, with presence of cosmic environment (uranoid), with the existence of electromagnetic vector and scalar fields. Eddington's uranoid includes electrically neutral environment and equality of particles with opposite charges and the left and right polarization [2]. This fifth component of the velocity of the particle has the physical meaning of the ratio of electric charge



q to the mass m of the particle, which is included in the dimensional coefficient G - Newton's gravitational constant. The fifth equation of a geodesic is constant ratio q / m for the current state of the planets in the solar system (the current time horizon). Justice is even a statement that the momentum of the particles of the fifth coordinate is meaningful electric charge (up to a dimensional constant c / 2√G) [7].

Spatial and temporal diversity of different dimensions different properties introduced into these discrete transformations P-space conversion, the conversion time T and C charge conjugation. Eddington found equality in Uranoid particle systems with different properties.

The 5-dimensional manifold instead of the square of the 4-dimensional interval  $ds^2 = g_{\alpha\beta} dx^\alpha dx^\beta$  should take  $dl^2 = GAB dx^A dx^B$ , where the indices A and B have the meanings: 0, 1, 2, 3, 5. GAB values are components of the five-dimensional metric tensor. They form a square matrix having a generally 15 independent components:

$$\begin{matrix} G00 & G01 & G02 & G03 & G05 \\ G10 & G11 & G12 & G13 & G15 \\ GAB = & G20 & G21 & G22 & G23 & G25 \\ G30 & G31 & G32 & G33 & G35 \\ G50 & G51 & G52 & G53 & G55 \end{matrix} \quad (10)$$

In the curved Riemannian space-time, operating with the components of five-dimensional metric tensor, one can obtain ten components of metric tensor of the Einstein's general theory of relativity, four components of electromagnetic vector potential A of the Maxwell theory, and one component which theoretically can describe any new scalar field [7].

Tomsk physicist G.Nikolaev, using the single-valued magnitude of physical property of vector potential A and moving charge e, at (v « c) [8]

$$A = ev/cr, \quad (11)$$

ascertained existence of two types of magnetic fields in the space around it:

$$\text{vector field } H^\perp = \text{rot}A \quad (12)$$

$$\text{scalar field } H^\parallel = -\text{div}A \quad (13)$$

It is generally accepted that if the magnetic field H is known, there is no need to refer to "formal" vector potential A. However, the mere fact that the Schrödinger wave equation appears only vector potential was obvious since the inception of this equation. Unsuccessful attempts to replace the vector potential A in the equations of quantum mechanics "physical" magnetic field H is said that the wave function of any moving charge in the field of the vector potential A, should reflect the existence of a quite tangible

interaction between a moving charge with this field. This interaction can be characterized by the magnitude of potential change and the wave function. Experimental observation of the phenomenon of power interaction effect of moving along the axis of the current toroida electrons with the field of the vector potential A in the experiments of the Aharonov-Bohm (1956) [9], has been confirmed in later experiments by Japanese scientists (1984) [10]. During the experiments it was found change in the phase of the wave function of a moving charge in the absence and presence in the study area of the field of the vector potential A, in the absence of space in the magnetic field H. The positive results of the experiments corresponded to only single digits of the vector potential A, is compared with the same parameters unambiguous elemental current. Changing the phase of the wave function of the vector potential A is given by:

$$\Delta\phi = q / \hbar \int A ds, \quad (14)$$

where the integral is taken along the particle's trajectory.

Experimental discovery of the phenomenon of longitudinal force effect of interaction along the axis of current toroid of electrons with the field of vector potential A in the experiments of Aharonov-Bohm make one revise the well-established view about the transverse magnetic Lorentz forces alone and accept the presence of longitudinal forces of magnetic interaction. The presence of scalar magnetic field generates forces acting on the charge in the line of the velocity of its motion. The presented approach to the problem of improving the Maxwell's electrodynamics is used by many authors. For example, the author of [21] proposes to abandon the Lorentz calibration, and replace it with a new expression for the electromagnetic energy flux density:

$$S = -\text{div}A - \lambda \epsilon_0 \mu_0 d\phi/dt \quad (15)$$

Obviously, potentials imposed thus allow great flexibility in the use of Maxwell's equations. In the classical case relies  $S = 0$ . When using the calibration (15) at  $\lambda = 0$  we obtain the Coulomb gauge, and at  $\lambda = 1$  we have the Lorentz calibration. If S is not equal to zero, then for  $\lambda = 0$  the scalar field acquires the meaning of a longitudinal magnetic field in Nikolaev theory. Further transformations are carried out in a standard way. As a result, we obtain the following system of equations:

$$\begin{aligned} dE/dt - \text{rot}H - \text{grad}S &= 0, \\ dH/dt + \text{rot}E &= 0, \\ \text{div}E - dS/dt &= 0, \\ \text{div}H &= 0 \end{aligned} \quad (16)$$

For ease of reference the equations (16), the case of absence of currents and charges and accepted  $\epsilon_0 = \mu_0 = 1$  [21].

Under the new theory of electrodynamics, many phenomena have found their explanations, such as motion of U-shaped conductor, an issue of railgun engine (railgun gun) and results of Aronov-Bohm experiments, for which, going from transverse Lorentz forces, there has been no correct explanation found. Thus, we can conclude that inherent in Maxwell's electrodynamics original idea of a vector magnetic field  $H \perp = \text{rot}A$ , in the apparent disregard of another scalar magnetic field  $H \parallel = -\text{div}A$  erroneous [8]. As for not invariant equations of electrodynamics, it is due not so much the existence of scalar magnetic field as an assumption reality of the environment and taking into account the effects of delayed potentials and deformation of the electric field of moving charges. Full invariance of the equations of electrodynamics is valid only in a completely empty space Einstein's SRT. This leads to the conclusion that in principle not possible to create a fusion reactor based on tokamak. Particles of hot plasma in tokamak trapped rush by the magnetic field lines of arbitrary topology to the walls of the tokamak and destroy it.

In the 21st century, analyzing the anisotropy of the thermal background radiation of the universe, it was found that in addition to the forces of gravity and inertia in the cosmos operates more longitudinal force causes the movement of our solar system to the point of "Apex of the Sun", located in the constellation of Leo [11] or Hercules [12]. Staff at the Pulkovo Observatory AA Shpitalnaya A.A.Efimov and found that the anisotropy of time-dependent processes of flare activity of the Sun, earthquakes with magnitude  $M > 7$ , the coordinates perihelions comets with parabolic orbits relative to the "fixed" space around the sun is caused by the three mutually orthogonal forces. On the basis of a large number of observations of phenomena of different nature in the solar space they were able to build a triaxial ellipsoid anisotropy orthogonal forces which are directed respectively in the center of the Galaxy, at the apex of the sun and the axis of rotation of the Sun (this direction is almost perpendicular to the direction of the center of the galaxy). It should be noted that the results are quite reliable. Statistical evaluation of the significance of the results is  $8\sigma$ , where  $\sigma$  - standard random variable [11]. If the nature of the first two forces due to gravity and inertia of Newton, the nature of the longitudinal force directed along the axis of rotation of the Sun can be explained by the existence of a scalar magnetic field, along with the well-known vector magnetic field. Taking into account all the properties of the magnetic field immediately reveals the existence of another and the longitudinal forces of magnetic interaction, greatly differs from the known Lorentz force. Availability scalar magnetic field generates forces on the charge in the direction of its velocity. [8]

Based on the fact of the real existence of bias currents ( $j_b$ ) in the physical environment around a

moving charge  $j_b = 1/4\pi \partial E / \partial t$ , Nikolaev established a functional relationship of these currents induced by them on the basis of short-range magnetic fields:

$$\begin{aligned} H \perp &= 1/c \int j_b \perp / r_0 = 1/c \int ev/r^2 \sin\phi, \\ H \parallel &= 1/c \int j_b \perp / x_0 = 1/c \int ev/r^2 \cos\phi, \end{aligned} \quad (17)$$

where:

$$\begin{aligned} j_b \parallel &= \int \sigma j_b \perp dS, \\ j_b \perp &= \int \sigma j_b \perp dS, \end{aligned} \quad (18)$$

$(j_b = j_b \parallel + j_b \perp)$

The surface  $SO$  restrict axial flow of the bias current  $j_b \parallel$ . On its outer surface is determined by the intensity of the magnetic field vector  $H \perp$ . Surface  $S\sigma$  restricts radial flux bias current  $j_b \perp$ . On its outer surface is defined by the inner strength of the magnetic field  $H \parallel$  [8].

Considering that on the surface of the Sun is concentrated electric charge  $Q \approx 1,7 \cdot 10^{29} \text{ Kl}$ . and the outer sphere flowing currents, creating a magnetic field  $H \approx 80 \alpha / \text{m}$  (stained  $H \approx 10^5 \alpha / \text{m}$ ), you can imagine the magnitude of the longitudinal forces, forces to move the sun along with the planets of the solar system to its apex at a speed of  $330 \text{ km} / \text{s}$ . The result of the new longitudinal force is a collision of galaxies. This process is accompanied by the absorption of smaller galaxies, large galaxies and the formation of powerful gravitational waves. Instead of fading gravitational waves left in the universe after the mythical "Big Bang", the scientists found quite noticeable gravitational waves, born in the collision of galaxies and black holes. Here I would like to point out that even in 1994, when the July 16, 1994. great nucleus of the comet Shoemaker-Levy collided with Jupiter gas sphere, radial oscillations gave rise to the surface gravity waves, instantly resulted in fluctuations in several geodetic satellite command-measuring complex of Russia. Usually geodetic satellites orbit are located inside the tube of about 1 km in diameter. The collision between the diameter of the path of the tube increased by 5 - 8 times. Speed, formed by the collision of a comet with Jupiter, gravitational waves significantly exceeded the velocity of electromagnetic waves (light from Jupiter to Earth is about 1 hour). Thus, the Russian military ahead of American scientists with the discovery of gravitational waves (LIGO project) for 22 years and were even able to roughly estimate their speed of propagation in space.

## V. RESULTS AND DISCUSSION

In recent years, many studies are recommended to refuse the Minkowski space as a geometric space-time model. At the same time, it is obvious that the Minkowski space, as well as its attempt to generalize to the case of the accelerated movement - Einstein's general theory of relativity can not be regarded as a basic model for describing the universe. Fifth

Dimensional World A.Eddingtona includes all the advantages of a flat Minkowski four-dimensional continuum. He showed the connection of the macrocosm, including spatiotemporal representations, with the microcosm, with the charge and the mass of elementary particles, the presence of the space environment (ether), the existence of vector and scalar fields. Why Eddington theory did not become a working tool for physicists? The reasons for this are subjective in many ways. The scientific elite does not accept such notions as "space environment" (in the sense of ether) and the "arrow of time" (in the sense of the evolution of systems). Of course, the decisive factor in this was that Eddington has not had time to finish his book and his attempt to display the classical concepts of space-time physics microcosm remained unfinished. But he built a bridge between metaphysics and modern physics. To create a cosmological model of the universe, which adequately reflects the physical reality, science must recognize the existence of the space environment (ether), defining a continuous space of spherical geometry and discrete geometry of complex time.

## VI. CONCLUSION

In conclusion, I should note that condescending, patronizing tone of our scholars to address the heritage of J. Kepler speaks only about how little we appreciate the scientific heritage left to us by the geniuses of the past, and how we relate to surface it. Mathematical abstraction of modern twistor theory and R. Penrose quaternion theory A.Efimova, although it allows to remove a large number of mathematical models that make it possible to build a physical theory based on fundamental relationships, can not replace the physical reality, to comprehend the phenomena of nature and experiments. Metaphysical, mystical relationship of mathematics and physics is manifested in the fact that formally derived mathematical conclusions can find the real proof in the real physical world and it gives researchers a subjective ability to detect new types of interactions. In a relational theory of binary geometrophysics Yu. S. Vladimirov postulated axiom systems of relations, indicating that the a priori theory of incompleteness and physical processes are considered from the position of the observer. The incompleteness of the theory may be the result of it is a subjective approach. This is facilitated by the methodology of physics, based on the postulation of relations between the undefined concept, which is in the words of Academician O. A. Osipov "clearly speculative in nature, setting the level of science." In the book "Physics Philosophy" M. Bunge stated: "In physics, philosophy operationalism established. It is considered that character as well as the equation has the physical meaning only to the extent that it relates to some possible operations person. This leads to the assertion that physics as a whole – is the science of operations,

mainly measuring and computing, not the science of nature. That is to say, physics is related precisely to the subjective experience rather than objective reality"[17]. Relativistic invariance, which has at its core the subjective space -time presentation is not consistent with the quantum-mechanical nonlocality, has an objective character. This reflects a deep internal contradiction of quantum-relativistic field theory, leads to insurmountable difficulties in solving the problems of the quantum theory of gravity unified theories and output space-time representations of the physics of the microscopic physics.

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