Manifesto
Galactic Internet

Alexander M. Ilyanok

On the base of deterministic picture of micro and macro world I made a systematization of large number of known experimental data. I found new functional relations between fundamental physical constants. As a result we obtain new Knowledge, which changes current picture of the world. In proposed new picture the gravitation and electromagnetism are unified. The highest degree of coincidence with experiment and the simplicity of obtained equations are the main proof of obtained picture of the world.

It is demonstrated that the velocity of condensed body not exceed 1/500 speed of light, though the speed of elementary particles can reach the speed of light. Low speed of motion for condensed bodies, including astronaut and spaceship, do not allow us to reach the newly discovered extra-solar planets – super-Earths. From the other side it is demonstrated that speed of gravitation interaction is $3.5 \cdot 10^8$ times more than speed of light which give us opportunity to create new communication lines for information.

We propose to create a new type of receivers and transmitters of gravitation waves, based on macro-quantum coherent phenomena. The application of these devices gives us possibility to made a tomography of Earth as a whole object and to construct the communication system on supraluminal speed. As a result the mankind obtains the possibility in principle to join the world intellect by the galactic Internet.

New Earth model, Super-Earth, macro-quantum coherent effects, quantum astronomy, supraluminal communication channels, galactic Internet, fundamental physical constants.

Introduction

There was a new millennium, and astronomy entered a new era - the era of the discoveries of extra solar planets. In recent years it has been found a lot of planetary systems with planets on which life is possible, and the list is growing fast. These planets were called super-Earths [1]. For example, the planets Gliese581c and Gliese581d are the best candidates on the name of super-Earth because they possess the most likely conditions for the emergence of life, as they may have water. Gliese581c has a diameter 1.5 times larger than the diameter of the Earth and its distance is only 29.5 light years from Earth. It's not a great distance to a cosmic scale.

The time is now! We need a new approach to the problem of finding life on these planets, and seriously consider whether there is intelligent life on them and how to contact her? If people establish contact with extraterrestrial highly developed civilizations, it will surpass all together advances in science. The scientists are not waiting, they try to find any intelligent signals from space by optical and radio devices for long time. For example, the institution on Search for Extra Terrestrial Intelligence (SETI) is building 350 parabolic dishes – antennas which have to receive signals in wide frequency range (0.5 – 11 GHz). However, space keeps silence because this is a naïve attempt to communicate with the speed of light. For the cosmic scale the speed of light $c = 3 \cdot 10^8$ m/s is negligibly small velocity. For example, only transmission of signals to the center of our Galaxy takes 30 thousand years, and the same back. At such velocity scale it is have no sense to think about the connection with other galaxies, since their distance is measured in millions and billions of light years away. The situation on the search for other civilizations like the time before the discovery of radio waves, when the information is mainly transmitted through the sound, which velocity is almost one million times smaller than the speed of light. Clearly, what we have to look for a new kind of communication with an information transfer rate much greater than the speed of

light. As Descartes tell – to investigate the truth you have to put all in doubt, at least once in a life as far as possible.

Today the search for a new kind of communication is "banned" by the current paradigm in physics - the picture of the world. Paradigm is a pair of glasses through which theoretical physicists propose us to observe the world around us. One of the foundations of the existing picture of the world is the special theory of relativity (SRT), in its original form created by Larmor (1900), further developed by Lorenz (1904) and Poincare (1905), and then originally interpreted in 1905 by Albert Einstein (www. antidogma.ru). The latter went much further than its predecessors, and introduced the postulate (statement) that the speed of any movement of objects in the world, including the speed of their interaction with each other, does not exceed the speed of light. Such a hypothetical statement, turned into a dogma, dooms humanity to the cosmic solitude and blocking our will to explore new channels of communication with other civilizations. Is there a way out of this theoretical impasse? Let's go back to SRT origins and look for an exit.

The drama of ideas in the theory of relativity

Contemporary with Einstein scientists initially took his statement about the speed limit by speed of light for all physical interactions as absurd. They opposed his theory with not known to him a number of studies on the speed of gravitational interaction, which were based on a modified Newton's law of universal gravitation. There was a large number of different Newton's law modifications in which was introduced lagging factor. For example, in the Laplace's work the speed of gravitational interaction is estimated about $7 \cdot 10^7$ c [2,3], Lehmann and Filie evaluate it as about $5 \cdot 10^6$ c, and Heller counted it as equal to 500 c [4, p.33]. Nowadays, researches in this area are continuing. Thus, the evaluation of Pitjeva is 10^9c [5]. Tom Van Flandern gives the evaluation for speed of gravitation interaction in $2 \cdot 10^{10}$ c [6].

From the works of Laplace followed that if the speed of gravitational interaction is equal to speed of light, then solar system has to disintegrate. But, as we still feel, life on Earth continues, and the earth still revolves around the sun. Hence the gravitation paradox of STR is arises.

For many years Einstein tried to resolve the gravitation paradox of STR on the base of classical physics laws and without any success. Mathematician Grossman proposed him new idea based on the geometry of Riemann (1913). From this point into physics there was introduced a new entity - "geometrophysics". It was called the general theory of relativity (GTR). From a physical point of view the matter in general relativity creates a curved space-time, which affects the motion of matter, which in turn creates distortion. Recall that Newton's equations correspond to the superposition principle. But the equations of general relativity are nonlinear and do not comply with this principle. Simply speaking, the separate weights are summed on Newton's scale, but the same weights are multiplied with a certain ratio on Einstein's scale. In addition, in GTR curved space-time miraculously creates energy-mass. We will not go into theoretical details, comparing the theories of Newton and Einstein. We only mention the most important – in general relativity the concept of force in the Newtonian sense is excluded and the same was done with the speed of gravitational interaction. In general relativity, there are only gravitational waves, which arise when the mass is moving and travel at the speed of light. It seems like the eliminating of the gravitation paradox of special relativity. In in the sequel special relativity and general relativity began to be called the theory of relativity, which was formed in the fall of 1917 and are formed the basis for relativistic worldview. Since then, more and more physicists became to believe as a religious dogma, that all laws of physics, including gravitational interactions obey the principles of relativity, i.e. invariant under Lorentz transformations. Moreover, even the philosophers fell

into this trap and failed to show a way out of this situation. The philosophy started to base a priori on Einstein's hypothesis of the lack of superluminal velocities [7,8].

However, already in 1918 Emmy Noether proved the fundamental theorem of physics, which establishes the connection between the symmetry properties of physical systems and conservation laws. In general relativity, as in a nonlinear system, the laws of energy and momentum conservation are not satisfied. However, this result could not affect the growing popularity of Einstein, and was safely "forgotten". Further, repeated attempts to return to this theorem have not been successful. For example, in 1967 Troutman made an attempt to disprove relativity. [9]. But this gives not result. Common sense for the relativists, which essentially turned into a metaphysicists , does not work. Even Newton exclaimed: "Physics, afraid metaphysics! ...". Since, by definition, metaphysics is untestable ideas.

Looking back on the path traveled by the physics, we can detect a huge number of gaps and unresolved paradoxes, besides the theory of relativity [10]. This is due to the fact that researchers have been forgotten that the basis of science is empiricism, and the basis of mathematics is the axioms. Introduction into the physics the mathematical axiomatic ideas, such as point, infinity, etc., is fraught with very serious consequences.

Modern electrodynamics, quantum mechanics and quantum field theory, in principle, does not allow us to solve microworld problems and create tool for engineers-physicists working in applied fields. This is due to the fact that since the days of Newton and Coulomb all fields (gravitational and electromagnetic) define experimentally through the force of interaction between the object and the test mass/charge – a vector quantity which depends proportionally to $1/r^2$. With the help of the mathematical operation we were found the vector field characteristic - its potential, which is already a scalar quantity and is proportional to $1/r$. However, experimentally impossible to measure the potential, we always measure only the strength of the interaction force between two particles, then it is interpreted as the potential of a single particle. In addition, the elementary particles are characterized not only by charge but also by mass, and these characteristics are inseparable. Therefore, to determine objectively what is the proper field of the particle is still impossible.

The modern theory of the magnetic field, in particular for elementary particles, is also not complete. For example, the magnetic field is described by the vector potential, the rotor of which has no tangential component. This is contrary to the experiments on plasma acceleration - "railguns" [11, p.610 - Plasma accelerators].

Thus, Maxwell's electrodynamics is based on conceptions of the vector and scalar potentials. Therefore, to build the right electrodynamics on the old ideas still coming from Newton, Coulomb, Laplace and others, is impossible. As a result, we still cannot even describe the spatial structure of the electromagnetic field of the photon.

For the other elementary particles the problems are even worse. Thus, in the most important branch of physics - the physics of elementary particles (high energy physics), mathematics bring in the "Trojan horse" for organization of the elementary particles - the unitary group SU (n). From the concept of this group it follows that the most fundamental particles of which must consist of all hadrons should have fractional Coulomb charge and fractional baryon charge. These hypothetical particles have been called by M. Gell-Mann quarks (1964). On this basis a whole scientific field was created – quantum chromodynamics. Moreover, for this "elegant" theory and its further development has been awarded three Nobel Prizes - in 1969, in 2004, and in 2008. Because of this "recognition" quarks, as it were naturally, rooted in our lives, the theoretical estimates of the parameters were entered in the physical handbooks as the real data. Along with the hypothetical particles – quarks in physics it was introduced "virtual" particles, i.e. particles existing in the intermediate states and having short duration, which does not hold the usual relationship between energy, momentum and

mass. Theoretically, these particles could arise from a hypothetical Heisenberg's uncertainty relation for energy and time:

$$\Delta E \Delta t \geq \hbar .$$

The Heisenberg himself thought on uncertainty and probability as of something objective, and this equation considered as final limit to the knowledge in physics.

Theorists began to fill with these virtual particles at least hypothetical "physical vacuum" - the so-called Dirac's sea. Mathematicians began to wear the elementary particles in the "coat" of these "virtual" particles, to explain the experimental effects that do not fit into the classical quantum mechanics. In such a "coat" the elementary particle allegedly interacts with the "physical vacuum" without dissipation of energy! Even the father of quantum electrodynamics R. Feynman said that quantum mechanics gives a completely absurd from the standpoint of common sense description of Nature [12].

On the basis of the Heisenberg uncertainty principle and the "virtual" particles the whole direction of physics – quantum field theory was born. In one of the sections of this theory – the theory of gauge fields – Salam and Weinberg (1967-1968) was made an attempt to combine the electromagnetic and weak interactions on the basis again of "virtual" particles – $W^{\pm}, Z_0$ bosons. Mathematical imagination went so far as to assume the obvious, that the particles with masses of 80 and 90 of the proton masses are naturally found inside protons and neutrons! To proof this theory there has been constructed a special accelerator at CERN (Switzerland). Indeed, the particles with similar masses were found. For these works physicists were even awarded the Nobel Prize. But no one wants to ask that the particles were found, and how they can be packed into a proton again?

With the discovery of quarks, the situation is even worse. It has been passed almost 50 years, but the quarks have not been found experimentally. To justify the huge financial costs they even had to adjust the data to find the heaviest t-quark at the Tevatron in DZero experiment (USA). After treatment only a portion of the experimental data a Solomonic decision was made, that the experiments do not contradict the possible existence of t-quark, and therefore it exists. The experimental observation of the remaining five lighter quarks is not even a question to put it.

But the world show of theoretical physicists, followers of the Heisenberg uncertainty, continues. Thus, in the CERN a new more expensive (10 billion euros) accelerator has been built to find "God's particle" – Higgs particle, as well as to model the processes, confirming the Big Bang theory. At the same time, to give significance to their theories, they scare the public the opportunity of mini black holes in the accelerator. As for the probabilistic approach to the physics the leading philosopher K. Popper advocated that the persistent belief in the finality and completeness of quantum mechanics is one of the causes of the crisis in modern physics. [13]

So the "elegant" mathematical equations, which are attributed to some physical phenomena, often do not allow us to see the fallacy of the original physical models that are used in mathematical physics, and are essentially metaphysical.

The basis of any science is the experiment that is why the science was called natural philosophy. In mathematics the experiments are not used. It is based on axioms and theorems. So formally it should not be considered as science. It is the reason why the Nobel is not introduced the mathematical category for his award. Of course, the mathematics is very important for science as well as it allows you to see patterns and to predict new effects, i.e. it is a kind of glasses to the experimenter. So the question is – Are the glasses we choose proper?

In this connection let us analyze the experimental basis of special relativity on which refer to its supporters.

Consider the dynamics of the movement for free elementary particles such as electrons. Thus, in accordance with the special theory of relativity (STR), the force **F**, acting on the particle is:

$$\mathbf{F} = \frac{d}{dt}\left(\frac{m_e \mathbf{v}}{\sqrt{1-\beta^2}}\right), \tag{1}$$

where $\beta = v / c$, and **v** is the velocity of a particle in space (hereinafter vector quantities are depicted in bold). Equation (1) is a Lorentz transformation of Newton's second law for the force [Simonov V.G. The special theory of relativity and the electromagnetic field, Minsk, "High School", 1965, page 82]. If the force **F** acts in the direction of particle motion, the electron mass increases due to the relativistic effects and is equal to:

$$m_{//} = m_e\left(1 - \beta^2\right)^{-3/2}. \tag{2}$$

This mass is called the longitudinal mass. It is a measure of inertia of the particles in the direction of its movement.

For the force acting perpendicular to the motion of a particle, the electron mass is equal to:

$$m_\perp = m_e\left(1 - \beta^2\right)^{-1/2}. \tag{3}$$

This mass is called the transverse mass. It is a measure of inertia of a particle in a direction perpendicular to its motion.

The dependence of the transverse and longitudinal mass from the speed is not the same, they differ by an amount:

$$\delta\, m = m_{//} - m_\perp = m_e\beta^2\left(1 - \beta^2\right)^{-3/2}. \tag{4}$$

As follows from formula (4), the mass of the particle is anisotropic. Then there is a legitimate question - what is the anisotropy for the point?

In the experiments, when the accelerating field is applied parallel to the direction of particle motion, we must observe the dependence (2), i.e. particle must acquire energy. In fact, we are seeing the effect as if lateral force acts on it (3), i.e. it takes energy according to formula (3), which contradicts the SRT.

It is generally believed that the main experimental ground proving the special relativity is the Kaufman's experiment (W. Kaufmann, 1906) on the determination of the specific electron charge e/m_e. Kaufman has shown that a sufficiently fast (relativistic) electrons moving in a transverse field $E_\perp$ with velocity $v_{//}$, begin to move in the x, y plane according to the law:

$$x = \frac{eE_\perp}{m_\perp}\cdot\frac{l^2}{2v_{//}^2} = \frac{E_\perp l^2}{2v_{//}^2}\frac{e}{m_e}\sqrt{1 - \frac{v_{//}^2}{c^2}} \tag{5}$$

At first glance, if we take the zero charge, then this equation can be interpreted as the equation (3). But if you still looking more attentively at the equation (5) from all points of view, then you can obtain quite the opposite conclusion. Here is not the relativistic mass increase, but the decrease of the charge. However, due to the law of charge conservation, its absolute value cannot be changed. Consequently, any other parameters have to be changed, such as its spatial structure – the so-called electromagnetic mass.

Lorenz paid a lot of attention to this problem. To simplify the mathematical calculations, he has separated charge from the mass and introduced his famous Lorentz transformations for electromagnetic field of the free charge. However, from his theory you cannot calculate the energy, mass and momentum of the electron [14]. Unfortunately, the problem of electromagnetic mass has remained controversial, and – as it is defined – there is no common point of view until now. For example, Ivanenko believed that the electromagnetic

mass of an electron is only 1/137 part of its mass. Lorenz and others believed that total mass of an electron can be regarded as electromagnetic. What, at the end, we have to consider as kinetic mass of the electron? In general, there are continuous contradictions and paradoxes in the electrodynamics of free charges. So we cannot make any conclusions about the fundamental nature of the law (3). We can only add that the separation of the charge and mass in the electrodynamics produced negative impact on its theoretical basis as a whole. Really the problem has arisen before. Its source is an underestimation and misinterpretation of the charge by Coulomb. He does not take into account the weight of the charges in the experiments. And this has led to fundamental contradictions today. For example, it is known that the acceleration of free fall in a gravitational field does not depend on the mass of test bodies. At the same time, the acceleration of bodies in a constant electrostatic field is proportional to the charge of the body. This is the main reason that the electromagnetic and gravitational forces are of different nature. However, if we introduce in the Coulomb law the mass of the charge, then any sum of charge to charge mass ratio will be a constant, as well as for the gravitational field. For details you can look at [15]. The introduction of the charge mass in Coulomb's law will require further changes in all the equations of electrostatics and electrodynamics. But without this it would be impossible to introduce the concept of electromagnetic mass of the charge, which plays a crucial role in the physics of the micro world.

It is believed that the original experimental basis of the special relativity is formed by a number of optical experiments that establish the absence of effects related to the Earth's motion relative to the hypothetical ether – Michelson-Morley experiment (1887) and their followers. Their experiments showed no change in the diffraction pattern by turning the optical interferometers with respect to the orbital motion of the Earth in space. However, in future, in experiments with rotating interferometers by Sagnac (1913) it was observed a clear depends of the diffraction pattern from the speed of rotation of the interferometer [16]. At present, this effect is widely used in engineering the laser gyroscopes and accelerometers. In these devices ring laser is rotated with variable angular velocity. It was found that at the linear speed of the laser more than 0.85 m/s gyroscope effect disappears, the saturation takes place. Of course, any linear movement of optical devices at speeds above 0.85 m/s is not allow to determine the presence or absence of the "ether wind", but the orbital velocity of the Earth around the Sun is 29.8 km/s. In the next more precise measurements of the Earth's shape from satellites has been established that the Earth is deformed as a drop in the direction to its apex. That is, it is observed the effect of the presence of some field – of the "ether" – in which the Earth moves. This field can be considered as electro-gravitational. [15]. At present, our prediction was confirmed brilliantly – it is found a new form of the gravitational field, which is called the "dark energy". This field is repulsive – antigravity. For this discovery S. Perlmutter, B. P. Schmidt and A. Riess received the Nobel Prize in Physics in 2011.

In the range of large and very large energies special relativity demonstrates its failures. On the differential form of cosmic rays spectrum, such as electrons, it is possible to found three break points.
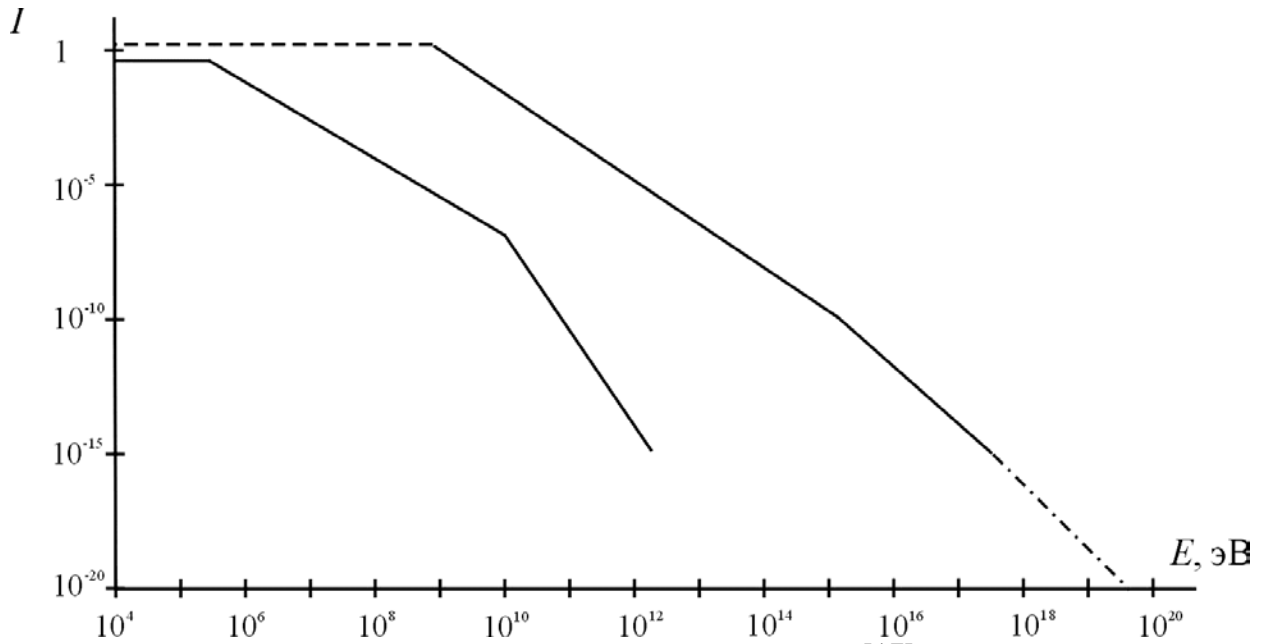
Fig.1. Cosmic rays spectrum on energy [17]

The first break starts at energy $5.1 \cdot 10^5$ eV, then follows the falling part of the spectrum with a power law -1.3÷ -1.5. This part is approximately described by equation (3), if we assume that the interaction cross section of the accelerating field and the particles decreases with increasing energy. The next break is at energy $9.5 \cdot 10^9$ eV and the slope of the incident area is increased to -2.1 ÷ -2.7. The third break occurs at energy $1.3 \cdot 10^{12}$ eV, and the spectrum is cut off. The last two sections of the spectrum did not described by special theory of relativity. Other charged particles have the similar behavior of spectra [18]. It is impossible to deduce from the SRT, in which the total energy of a particle, binding its momentum p and rest mass m_0, has the form

$$E = \pm\sqrt{p^2 c^2 + m_0^2 c^4} \; .$$

From this formula completely invisible the electromagnetic mass and, hence, one cannot see how it will be changed with increasing energy. In addition, there is an inexplicable negative energy (negative sign before the root) – another absurd from theory of relativity.

Despite such glaring contradictions of SRT to experiments and their exaggerated interpretation, there was postulated a new picture of the world. The laws for the elementary particles and mathematical point had been transformed into laws for condensed matter. We go further and find more. SRT becomes to be based not on scientific knowledge but on the "thought experiments". Based on them, it becomes possible the transformation of the scale of time and objects. Also there was the possibility of a mental space travel at a speed close to the speed of light, and the traveler almost not getting old! And the most fantastic – they have argued that at these speeds, allegedly inhibited the biological processes in the body. As a prove they began to use the experiments which show increase of the lifetime of charged elementary particle - muon at the approach of their speed to the speed of light, i.e. increasing their mass/energy. But the single particle is not a condensed matter! On the other hand, such an increase in the lifetime of muon we can attribute to the increase of internal energy or contraction of its electromagnetic mass. As an analogy, we can give the compression of the springs in clocks - the more it compress, the longer the clock runs. Compare condensed matter, i.e. living organisms, from elementary particles just another absurdity of the SRT.

It seemed that a relativistic view of the world was quite advanced at the beginning of his life, as it has helped to deal with some fundamental experimental discoveries of the early

twentieth century for the elementary particles. But as a result of its illusory success on the first phase it was formed unquestioned authority of the truth of this world picture.

Science does not stand still. And to date, we have accumulated a huge amount of experimental facts that no longer fit into the framework of this picture of the world. In the universe has not yet been found macroscopic object moving at speeds exceeding of one five hundredth the speed of light. This is a speed at which galaxies are moving relative to the background radiation. This speed also corresponds to the escape velocity at the solar surface (see also Table 1, item. 7):

$$v_2 = \frac{\alpha c}{\sqrt{4\pi}} = 617.13 km/s \,, \qquad\qquad (6)$$

where α is the electromagnetic constant – the fine structure constant.

From formula (6) we see that the surface of the sun can leave only elementary particles, but not their condensate. This is observed as the solar wind. In addition, the speed from (6) corresponds the decay of ionized liquid droplets during their acceleration in accelerators [19]. It is clear that to this speed corresponds the separation of the gravitational field from the particle.

It seems that it is easier to measure the electromagnetic mass of an electron or proton, and to determine the rate of interaction of these particles at low energies. However, under a fatal pressure of relativists this very idea was blasphemous. They agreed that even a question which put SRT in doubt would be treated as pseudoscience.

General and special theory of relativity predominated in the minds of the entire twentieth century. In the Soviet Union ban on criticism of general relativity are taken three times. In 1934 a special decree of the CPSU(b) was published, in which all opponents of Einstein proclaimed to belonged to the Right deviators and menshevistvuyuschim idealists. Then, in 1942, the Presidium of the Academy of Sciences of the USSR issued a special decree on the theory of relativity. Finally, in 1964 in the Academy of Sciences of the USSR there is a circular, forbidding "all the scientific counsels, magazines, academic departments to accept, consider, discuss and publish works criticizing the Einstein's theory" [20].

Nowadays the situation has not improved much. In the Academy of Sciences of Russia the commission on pseudoscience was created, and there are forbidden to publish in the official literature everything that contradicts the theory of relativity. The situation in science becomes so acute that began to resemble the medieval Inquisition. As Bruno said in court the inquisition: "Why resort to empty fantasies where we learn from the experience itself.". But he was still burned. This situation, though at a different level, is still in the 21st century!

Not the best situation is with the experimental base of general relativity. It is considered that the impact of gravitating mass extends to infinity. Then, accordingly, all the galaxies interact with each other. In this case, as shown by Friedman in one solution of the dynamic equations of general relativity, all Metagalaxy is not stationary – it can shrink and expand. And the shrinking may go to the point, then this point again begins to expand rapidly – this is so-called Big Bang theory. It would seem that the effect of Metagalaxy expansion confirmed by redshift of the galaxy spectra. The farther away is galaxy – the greater the redshift. Simultaneously with this interpretation Cwikky (1929) suggested a more logical explanation of the red shift that occurs due to aging of the photons in their friction with distributed in space gravitational field. [21].

In addition, as found by Finzi, the gravitational interaction is limited to the size of galaxies [22]. It follows from the fact that the galaxies in the Metagalaxy behave as a rarefied gas – without interaction. Therefore the substance of galaxies cannot be condensed into a point.

In 1982 Berg discovered the polarization anisotropy for many non-galactic radio sources. He attributed this to the rotation of the Universe at a speed of

$\Omega_M = 10^{-13} rad / year$ [23]. (See also Table 1, item 22. Note that in this equation the speed of rotation of the galaxy is associated with the first space velocity on the surface of the Sun, item 7)

All these experimental results show that our Metagalaxy is stationary rotating object. This is understandable, because until now no one can find the very point at which the explosion began. Common sense dictates that after the explosion all the pieces fly straight, but galaxies in the universe are isotropic distributed. Therefore the starting point of the explosion does not exist.

Only the isotropic microwave radiation with an equivalent temperature of 2.7 K remains unexplained – the so-called cosmic microwave background radiation. GTR is attributed the source of this radiation to the Big Bang. But for the relic radiation there is a simple explanation on the basis of new experimental data. In the new millennium with the WMAP Space Telescope, our Metagalaxy was investigated in more detail. Studies have shown that Metagalaxy is finite, i.e. has to have the wall, has to be spinning, and as well as the distribution of galaxies is isotropic then it must be spherical. In this case the wall of Metagalaxy is at a distance of 11 billion light years away from us. [24]. (See also Table 1, item 21). Then we can assume that the source of the CMB may be very Metagalaxy wall consisting of solid hydrogen with a temperature of 2.7 K. (See Table 1, item 23). Moreover, this temperature corresponds to the temperature jump in the specific heat of solid hydrogen transition from ortho to para phase .

Probably, the galaxies are born out of the Metagalaxy wall. Their chirality is determined by the hemispheres of Metagalaxy in which they were born, some kind of Coriolis effect on a galactic scale. According to the detected asymmetry [25] the number of left and right rotating galaxies we can determine where our galaxy - the Milky Way is: in meta-north or meta-south hemisphere. The energy of fluctuations in the radiation of the wall is 6 times greater than the total emission of all galaxies and explains the so-called "Roar of the Universe" [26].

All these experiments suggest the fundamental impossibility of the Big Bang. Unfortunately, these findings were not "seen" and had no effect on existing views in cosmology. This is understandable, as the world's leading physical elite (which includes a physics involved in high-energy physics) believes that the energy source of the Big Bang is the proto-matter, again consisting of quarks. That is, the mathematical imagination once again taken as physical reality. Although the "Big Bang theory is an insult to common sense", as said Nobel Laureate astrophysicist H. Alfven in far 1979 [27].

The basis of any theory of gravitation as Newton's and Einstein's is the equivalence principle which is stating the equality of gravitational (heavy) weight of its inertial mass. Since Newton's time this principle repeatedly tested for normal (cold) matter. However, Poincare asserted: "The mass – inertia coefficient – increases with speed. Should we conclude from this that the mass – the coefficient of attraction – is also increasing together with the speed and remains proportional to the inertia coefficient, or that this ratio attraction remains constant? This is an issue to decide which we have no opportunities". [28, p.507] Nowadays verification was made of the gravitational interaction of neutral particles: atoms, neutrons, photons, but the principle of equivalence for them has not been tested. For charged particles such as protons and electrons the inertia mass have been investigated, but the gravitational mass has not been measured due to the complexity of the experiments. The equivalence principle has been extended to them formally. On the other hand in the 19th century it was found that some chemical reactions occurring in hermetically sealed containers, or phase transitions of matter, such as melting, are leading to a change in weight of the substance on the value of the order of $10^{-4} \div 10^{-5}$ [4,29]. Moreover, these facts the weight change at different types of phase transitions have been repeatedly reaffirmed in the 20th century for

different substances, including biological [30]. Even an application for discovery was submitted, but all in vain, this fact is not recognized by mainstream science until now. We also decided to test the change in body weight at different phase transitions: metal-semiconductor, pyro-electric effect, the melting. We investigate a series of low-melting compounds (Table 2). As a result the experimental data confirmed studies by other authors. For example, for the melting wax we observed the change in mass at $3.00 \cdot 10^{-4}$. This value is 2 orders of magnitude greater than the accuracy with which the experiments to measure the mass defect in radiative decays was made by N. Smith (1939) [11, p. 501]. In process of melting wax in accordance with a formula $E = mc^2$ we have to obtain the energy equivalent to an average bomb explosion. But this does not occur – we are still alive! In addition, the direct measurements of the interaction of gravitational and electromagnetic fields of the capacitor in a vacuum had been made, so-called Biefeld-Brown effect. However, this effect is ignored. [31].

Thus, the ignoring of all these experimental data for the inviolability of the principle of equivalence is nothing but a falsification of science.

We now consider the experiments which are believed to confirm the general relativity theory and not described so far in the framework of the theory of Newton. These include three basic experiments: the anomalous motion of Mercury's perihelion, the deflection of starlight by the gravitational field of the Sun and the gravitational shift of the photon energy.

Rehabilitate Newton, go back to our linear world where the Noether's theorems act and describe these experiments. As Poincaré considered gravitational forces, as well as electromagnetic, should depend on the speed of the two bodies and their relative position [28, pp.453, 507, 508]. We assume the same.

Recall that the stable motion of the perihelion of planets was investigated Newton himself by rewriting the interaction force between objects in a general form:

$$F = ar^{-2} \pm br^{-3},\tag{7}$$

Newton proved that this equation is the only case describing the stable motion of satellites and stable rotation of their perihelion. [32].

Anomalous motion of the perihelion of Mercury can be easily found from (7) by the following manner. For Mercury the gravitational acceleration g on its orbit with a radius R_1 will additionally depend on the equatorial rotation velocity of the Sun surface v_Θ around its axis, i.e. from "gravimagnetic" components:

$$g = \frac{GM_\Theta}{R_1^2}\left[1 + \frac{v_\Theta}{c}\frac{2R_\Theta}{R_1}\right],\tag{8}$$

where G - the gravitational constant, M_Θ - the Sun's mass, R_Θ - radius of the Sun, c - speed of light. The secular motion of the perihelion will be $43.05^{//}$, which is found from the condition

$$\Delta\omega = 2\pi\sqrt{1 + b},$$

where $b = \frac{v_\Theta}{c}\frac{2R_\Theta}{R_1} = 1.6002\ 10^{-7}$. The experiment gives $\Delta\omega = 42{,}6^{//} \pm 0.9^{//}$.

A more exact solution for the Mercury and other planets may be obtained by taking into account the finite speed of gravitational interaction. In this case, the radius R1 is replaced by the corresponding arc of the spiral of Archimedes. Equation (8) must be written in vector form, as the dynamic and static direction of gravitational force are at an angle to each other, and this angle should also be considered.

Historically, the Newton equation (7) have used the Clairaut in the 18th century to clarify the observed motion of the moon, but without taking into account the rotation of the central mass [33]. In addition, the problem of calculation of the perihelion of Mercury is devoted an entire book [34]. Australian scientists Joseph Lense and Hans Thirring in 1918

made an attempt to justify the anomalous motion of Mercury's perihelion by gravimagnetic component of solar gravity. According to their version of the GTR, near any massive rotating body an additional deformation of the space and time. Their calculations of further shift to abnormal movement of the perihelion of Mercury gives 0.0128 $^{//}$, i.e. it is 3328 times smaller than this value. These miserable corrections to the rotation of the masses in general relativity do not stop the relativists and they try again and again to check out these effects.

Neither the Rouzver book nor elsewhere it does not pay attention to the fact that Newton's equation taking into account its dynamic part (cubic term) and physically able to describe the relative rotation of the gravitational field.

At the same time a vivid example of the presence of rotation of the gravitational field of the Sun is the spatial structure of the solar wind. Experimental data on the measurement of the solar wind indicate that the temperature of the solar wind (speed of protons, electrons, alpha particles) practically does not decrease with its distance from the sun, although its density decreases as $1/r^2$. The constancy of solar wind temperature is possible only under very intense inflow of external energy, as for the adiabatic regime the solar wind has to quickly reduce its temperature [35]. Calculations show that the density of electromagnetic fields in the solar system, which could participate in the process of heating the solar wind, at least two orders of magnitude smaller than necessary.

Similar effects of the Earth's gravitational field rotation are seen in experiments conducted by NASA using satellite Lageos-1 (1976) and Lageos-2 (1992). With the help of satellites in laser measurements of distances it was found that their orbits are displaced by 2 m per year in the direction of rotation of the Earth. These experiments do not fit in the GTR, so NASA decided to check again with very high accuracy how synchronously twist time and space around our planet. For this purpose the satellite Gravity Probe B was launched in April 2004. Results of the experiment should be available soon. Let's see ...

Our model clearly shows that the only source of constant temperature of the solar wind is the Sun's gravitational field, its gravimagnetic component. This component accelerates the solar wind to the value of the escape velocity at the surface of the sun (6). Moreover, the feature of the interaction of the gravitational field of the sun with the charged particles of solar wind has a completely different character than for neutral particles. Characteristically, that all observed this effect, but no one wants to admit it, because it is in contradiction with general relativity.

Thus, it is impossible to consider a static gravitational field without taking into account the relative motion of two masses, i.e. without taking into account the dynamic part. Usually, motion of the satellite in its orbit associated with the kinetic energy of motion or centrifugal forces. However, the centrifugal force can be interpreted as a manifestation of some kind of "dynamic antigravity". And it must be described differently in the integrals of motion. Note that neither Newton's equation with no dynamic components, or Einstein's equation does not allow us to describe the motion of stars around the galactic center as the corotational (whole) object without one more integral of motion [18, p. 564].

In our analysis we can give an analogy between the hyperfine splitting in the atom spectra due to the rotation of the nucleus (spin) and the Sun's rotation around its axis together with its gravitational field. Here and there we have the motion fields, which give rise to additional effects in the motion [36].

Another example of the dynamic part of the law of gravity is a ray of light deflection by the gravitational field of the Sun. Newton believed that light as well as any body will be involved in gravitational interactions. After 100 years Soldner (Soldner J.G., 1802) has calculated this interaction. He found that the beam of starlight passing near the Sun should deviate on the angle

$$\theta = 2GM_\Theta/R_\Theta c^2 \approx 0.83^{//}, \tag{9}$$

where G is gravitational constant, M_Θ and R_Θ are mass and radius of the Sun, respectively [37]. After 100 years it was found on experiment that a beam of light is really deflected by the Sun, but almost 2 times more. [4] With respect to this case, equation (8) can be written taking into account the speed of photons in the gravitational field of the Sun v_γ, at trace around the Sun at a distance R_γ from its center:

$$g = \frac{GM_\Theta}{R_\gamma^2}\left[1 + \frac{v_\gamma}{c}\frac{\xi 2R_\Theta}{R_\gamma}\right], \qquad (10)$$

where the coefficient ξ associated with a delay of the gravitational interaction with photons due to the large size of the Sun and is approximately equal to ½, and v_γ close to the speed of light c. As shown below, this is due to the fact that the speed of gravitational interaction for objects moving at the speed of light is finite and equal to the speed of light. As a result, the photon has no time to react with the whole mass of the Sun. You can get the same result if we use the Laplace equation, which takes into account the speed of gravitational interaction [3]. Naturally. that the gravitational interaction of photons is equal to the speed of light, i.e. the gravitational constant is doubled.

The third experiment which propose as a prove the validity of general relativity is the redshift of photons in a gravitational field. However, the magnitude of this shift is the same as described by general relativity and Newtonian theory. Therefore this experiment cannot be an objective criterion to favor one of these theories. As Newton said, nature is simple and does not use unnecessary reasons. Therefore instead of forced curving space-time we should apply to Newton ...

Comprehensive description of the general theory of relativity as one of the cornerstones of the world picture was given by Leon Brillouin: «GTR is a shining example of great mathematical theory built on sand and is a typical example of science fiction" [L. Brillouin, New view on theory of relativity. M "World", 1972]. [38]

Our will to search for the truth constrained already formed religious dogmatism in science, accompanying SRT and GRT. We are already one hundred years together with Einstein wandered in the wilderness of the theory of relativity in search the "promised world" in the Galaxy. This is due to the fact that Einstein assumed that it is possible to travel in the galaxy at velocities close to the speed of light and obtaining as a result the transformation of the time (twin paradox). However these hopes and unrealistic, as even the motion of the spacecraft at one five hundredth the speed of light, spacecraft and the astronaut simply evaporate due to the fact that the spins of the particles line up along the motion of the ship, as shown in Figure 2.
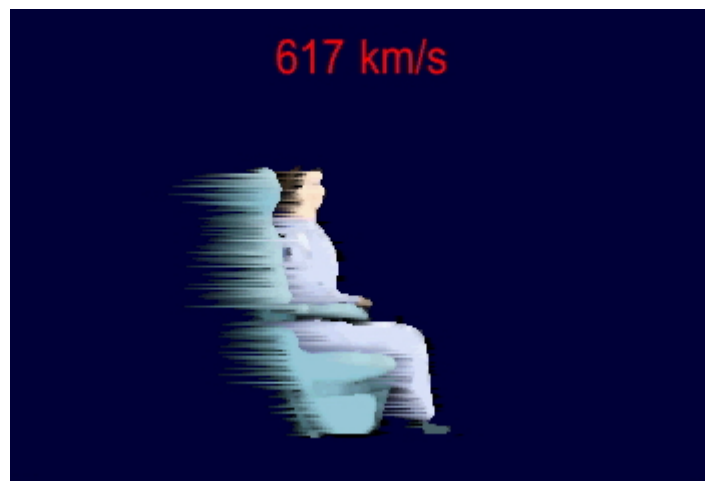
Fig. 2. Einstein's spectator at speed higher the critical speed.

The formal transfer of the experimental results obtained for the elementary particles on the condensed matter such as spacecraft and astronaut is the greatest misconception of relativists. They just do not take into account a small trinket – the spin of the particles. [39,40].

As a result of our investigations [15] we concluded that, to our great regret, no interstellar travel is physically possible because of the too big time needed to move. For example, a flight to the planet Gliese 581c with current space velocities in one direction will take at least 300 thousand years. At speeds which is less than five hundred times the speed of light it takes nearly 10 thousand years. Move into deep space in real time with a superluminal speed may only information. In this case we do not need to physically travel anywhere. We can travel in space virtually and get actually new knowledge from the "Galactic Internet." We have to create it. What will it be, it is difficult to say. One can only assume that it will be formed on the basis of the laws of macroquantum mechanics. Consider possible ways to create it.

In another area of science it was found that in the Mesbauer effect and in neutron diffraction on crystals the propagation velocity of the interaction between the nuclei and the crystal should be at least 100 times higher than the speed of light. Experiments on the teleportation of photons is also require for their explanation the existence of the interaction propagation velocity of orders of magnitude greater than the speed of light [41].

More recently in experiments with colliding protons and antiprotons beams at the Tevatron CDF detector (USA) was discovered phenomenon which explanation is not a subject of the Standard Model of elementary particles based on the SRT [42]. It was found that the interaction between particles leading to the appearance of the muons and muon jets take place before to their direct impact. The particles in the experiments are flying at a speed close to the speed of light therefore their fields should not interact in special relativity.

There are many unexplained experimental facts and paradoxes that are ignored or passed by the attention by mainstream science. All attempts to theoretically describe these experiments by upgrading the existing framework of current picture of the world do not lead to success and even more confuse the situation.

The drama of ideas in quantum mechanics

Let's try to untangle the situation. After creation of quantum mechanics in the first quarter of the 20th century by Planck, Bohr, de Broglie, Schrodinger, Dirac, and several other scientists there have been repeated attempts to extend the laws of the microcosm to the macrocosm and the cosmos. [43] Unfortunately the ideas of the quantum theory of the microworld do not succeed to transfer on such macroquantum phenomena such as superconductivity and superfluidity. For example a qualitative explanation of the phenomenon of liquid helium superfluidity has been given by L.D. Landau in 1941. He used a two-phase fluid model proposed by L. Tisza in 1938 [44, pp. 357,363]. In its final form he presented the liquid in the two states – in the normal phase and superfluid phase, and in the superfluid phase the liquid can flow without friction through narrow slits and capillaries.

Landau's fundamental mistake in the description of superfluid helium has been the use of equations that do not coincide with the classical Euler equations and therefore did not follow from Newton's laws. On the other hand, used equations do not contain Planck's constant; therefore his theory was not the quantum one. [45]. Thus, his theory implied that the

critical velocity of superfluid phase He II with respect to conventional phase is $v_c \leq 60$ m/s. The experiment also gives a value 0.60 m/s. In addition, the theory could not explain the jump in thermal conductivity in three million times at the critical point $T_\lambda = 2,17$K of phase transition He I in He II. Moreover this theory did not predict the critical temperature itself. From the ever recognized physical theories in the history there never been so large discrepancies between theoretical and experimental data! However, the Nobel Prize has been given to Landau! Leading mathematician V. N. Kolmogorov cites Peter Kapitza one of the discoverers of superfluidity in this regard: "... even before the WWII Peter Kapitza conducted the experiments to test the Landau theory. These experiments gave results strongly rejecting all Landau construction. But the publication of these results was artificially delayed" [46].

Further studies of the superfluidity of liquid helium have shown that there can be produced undamped macro vortex. It was found that these vortices are strictly quantized, are determined and cannot be described by a probability wave in principle. They do not obey the Schrodinger and Dirac equations.

The stumbling block to transfer the micro world laws to the macro world is too small value of Planck's constant. On the other hand, without using the action quantum we cannot adequately described macro quantum effects not only for superfluidity, but also for the space. Thus, it is necessary to introduce the concept of a generalized action quantum related to Planck's constant.

It also failed to extend the experimental basis of a microworld quantum mechanics itself. To date the exact solution is found only for the energy spectrum of the hydrogen atom. A number of other insuperable problems are also appeared. One of the founders of quantum mechanics Dirac already in mature age at a lecture in Sydney in 1975, said: "Based on the current foundations of quantum mechanics people spent a great work to find the way for the elimination of infinity in the solutions of equations. But all these rules despite the fact that the obtained results are consistent with the experience are artificial. And I cannot agree that the modern foundations of quantum mechanics correct" [47]. Let's try to understand the origins of the doubt.

Bohr's and his followers theory [48] seemed to push far ahead of our knowledge about the atom, in particular about the patterns of spectral lines. He actually decided the classical Kepler problem for a point electron moving around the nucleus. As a result he managed to describe theoretically the regularity in the spectra of the hydrogen atom which was empirically found by Rydberg in 1890. On the other hand, the purely formal quantization rules which form the basis of this theory is not entirely clear from the physical point of view. Some problems of Bohr's theory are still without an explanation. For example, it is not known spatial structure of the electrostatic field between the nucleus and electron. From his theory a complete screening of the field of proton is not follows, although the absence of a field of proton for the hydrogen atom is observed experimentally. It does not give an answer that is a source of electromagnetic waves (what oscillate in atom with the frequency of emission), how the atom with the size of the order of several angstroms emits and absorbs electromagnetic waves with wavelengths exceeding by 3-8 orders the atom size? Although from the classical electrodynamics we know that the efficiency of such radiator-antenna is close to zero. In addition, this theory has to do with values completely eluding observation. Thus, the theory says about the orbit of an electron and its speed around the nucleus not taking into account the fact that we cannot determine the position of an electron in an atom, not destroying the entire atom. According to Bohr's theory the size of excited atom is proportional to n^2. At the same time, as shown by experiments on the diffusion of hydrogen gas and by the cross section of interaction the excited atom does not exceed its initial size. About this fact the present official science also not mentions.

Taking into account the above controversy P. Ehrenfest, O. Stern, M. Laue, J.J. Thomson, D. Raleigh were sharply against the Bohr model. The very founder of quantum mechanics Max Planck considered the main problem of the Bohr model the mismatch of the frequency of rotation of the electron around the nucleus and the frequency of emission and absorption of light [49]. The founder of wave mechanics Schrödinger considered monstrous and incomprehensible the Bohr frequency condition and his postulation of the atom stability. Schrödinger worked on this problem for over 10 years, and was also unable to resolve it to the end. Quantum mechanics was born with great difficulty, with a mass of fundamental internal contradictions.

For example consider the contradictions which arise from the Schrodinger model of the atom. For the hydrogen atom the radial wave function $u(r)$ of a particle in a spherical coordinate system (r, ϑ, φ) satisfies the "one-dimensional" Schrodinger equation on the variable r with the reduced mass for two particles $\mu = m_1 m_2 /(m_1 + m_2)$:

$$-\frac{\hbar^2}{2\mu}\frac{d^2 u}{dr^2} + \left[V(r) + \frac{\hbar^2 l(l+1)}{2\mu r^2} \right] u = Eu \qquad (11)$$

with an effective potential energy $V_{ef} = V(r) + \hbar^2 l(l+1)/2\mu r^2$ for the hydrogen-like atom $V(r) = -Ze^2/r$. The states with $l = 0,1,2,3\ldots$ are called the s-, p-, d-, f-,$\ldots$ states. The second term in V_{ef} is the centrifugal energy (a similar correction to $V(r)$ in consideration of the radial motion in classical mechanics arises due to the transversal part of the kinetic energy of the particle). In classical mechanics this law leads to the fact that any movement in the central field is in a fixed plane which perpendicular to the moment and passing through the center [50, p.288]. Note that the solution for the hydrogen atom and ion H_2^+ is the only exact solution in quantum mechanics and is a classic example of validation of quantum mechanics.

Thus the Schrödinger equation has the solutions for the wave functions, which all start at the center on the nucleus and ending fading into infinity. That is the Schrodinger equation has no classical boundary conditions. Therefore from the Born interpretation follows that there is always a nonzero probability of finding an electron in the center of the nucleus and in the neighboring galaxy [51]. This interpretation is no less a mockery to common sense than the Big Bang theory.

Perhaps the most important consequence of Schrodinger equation is that the energy spectrum of the hydrogen atom depends only on the principal quantum number n. This dependence is possible only when $l=0$. Then this solution coincides with the solution of the Bohr and the empirical formula of Rydberg:

$$E_B = \frac{m_e (Z\alpha c)^2}{2}\left(1 + \frac{m_e}{M}\right)^{-1}\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right), \qquad (12)$$

where m_e – electron mass, M – mass of nucleus; n_1, n_2 – energy levels numbers, Z – charge of nucleus, α – fine structure constant, c – speed of light.

Although the formal solution of the Schrödinger and Bohr equations are the same, they have completely different physical meaning. In the Bohr equation which was built on the principles of classical mechanics the two countervailing forces act on electron – the potential strength of the nucleus and the kinetic centrifugal force, i.e. electron moves in a classical potential well and its orbit could be elliptical. Then the reduced mass is introduced into it naturally. In the Schrödinger equation for the hydrogen atom the electron is in a potential field of the nucleus, while the centrifugal force is absent ($l=0$), i.e. the electron has zero angular momentum – it is not moving. As a result the reduced mass is introduced formally. This state

is called in a very peculiar way - "accidental degeneracy" in the hydrogen atom. The question arises - why the electron does not fall onto the nucleus, what force holds it? To mask this fundamental physical contradiction they are trying as usually by using the Heisenberg uncertainty which is not in itself the Schrödinger equation.

Dirac went ahead and wrote the equations of quantum mechanics in the relativistic form, which allow to takes into account the spin and magnetic properties of the electron. It would seem that the path has been chosen correctly as in the nonrelativistic approximation these equations are reduced to the Schrödinger and Bohr equations. However, new unphysical assumptions, such as – negative weight for antiparticles, the physical vacuum, which consists of particles and antiparticles (Dirac sea), even more confused the quantum mechanics. The weight of these contradictions forced Dirac to the end of his life to doubt the truth of the foundations of quantum mechanics. Although a number of Nobel Prizes was awarded to this theoretical direction.

Quantum astronomy – **the first step towards the Galactic Internet**

Despite the pessimism of Dirac we show that in quantum mechanics affairs are not so bad as in the theory of relativity. The theoretical basis of the wave quantum mechanics resulting from the de Broglie equation can be taken as a basis of macro quantum mechanics, however we have to change fundamentally the interpretation of these concepts. This requires a completely reject the concept of probability waves and therefore from the Schrödinger and Dirac we return to the original interpretation of the de Broglie where wave was a deterministic object. Let us explain.

De Broglie in 1924 created the theory in which he attempted to combine the wave and particle properties of matter. He attributed with each particle corresponding wave whose length λ is connected with the particle momentum p with the help of Planck's constant h by the relation:

$$\lambda = \frac{h}{p} = \frac{h}{m v} .$$

(13)

Recall that he considered the free electron as a plane wave forming a wave packet moving with group velocity v and the phase velocity u:

$$u v = c^2 ,$$

(14)

and the phase of such a wave propagates with a superluminal velocity. Since this is contrary to the SRT, the phase velocity was seen as a mathematical fiction, non-material object.

We have to mention the work of Dirac [52], where he states that if the Planck constant is not a fundamental quantity, then we lost the basic principle of quantum mechanics – the Heisenberg uncertainty principle. This statement echoes the words of Feynman in his lectures on physics: "If somewhere somebody will be able to "crush" the uncertainty principle, then quantum mechanics will gives inconsistent results and has to be excluded from the rank of right theories of natural phenomena ..." He then concludes, that "The situation in which the modern physics is should be considered as terrible. I would have conclude it with these words: outside the nucleus, we seem to know everything, inside it quantum mechanics holds, the violation of its principles was not found" [53]. However Feynman does not takes into account the fact, that the Heisenberg uncertainty principle of quantum mechanics forbids the extension of it on the macro quantum level, i.e. on the space.

In articles [36, 54,55] it was found that the laws of the microworld can be extended to the macroworld through the introduction of a generalized action quantum

$$h_\alpha = \alpha^n h = \frac{e^2 \alpha^{n-1}}{4\pi \varepsilon_0 c} ,$$

(15)

where n=0, $\pm1,\pm2\ldots$, ε_0 – permittivity of vacuum. For n = 0 we have the usual Planck's constant, for n=1 we have constant Stoney.

This generalized action quantum plays a crucial role in the laws of motion of the planets in the solar system. For example, a distance of major semi-axes of the planet orbits is described by a modified first de Broglie equation:

$$R_n = \left(\frac{n+2(2m+1)}{3}\right)^2 \frac{h}{\alpha^{12} m_p c}. \tag{16}$$

where $n= 1,2,3,4,5,6,7,8,9$, $m = 0,0,0,0,1,2,3,4,5$, m_p – proton mass. For the Mercury we have $n=1$, $m=0$, $R_1=57.95\ 10^6$ km, and experimental value is $57.90\ 10^6$ km. For a cosmic scale it is an absolute coincidence. As you can see from this equation, it includes the mass of elementary particles creating a gravitational field, but not the masses themselves of the whole space objects, as in the equations of Newton and Einstein.

Thus the equation (16) can be regarded as a fundamentally new gravitational field equation, which describes the macroquantum effects in astronomy. Since the solar system is described by deterministic equations, the Heisenberg uncertainty principle in a generalized form taking into account equation (15) is transformed into the expression

$$\Delta E \Delta t \geq \alpha^n h,$$

which has no physical meaning. This is understandable because the Earth is still moving a deterministic manner and in accordance with equation (16). Consequently, as a special case for n = 0 the Heisenberg uncertainty principle itself has no physical meaning. Accordingly, the present quantum field theory is a mathematical imagination.

What is gravity, debated by Newton. He assumed that it is a material object and exists in the form field. At the same time he believed that the propagation velocity of gravitational interaction is much faster than the speed of light, but finite. If the speed is infinite, the energy of the gravitational field will also be infinite, that violates deduced by him laws of motion. On this occasion he spoke: "The cause of these properties of the gravity force I still could not deduce from the phenomena, and I do not invent hypotheses". A contemporary of Newton R. Hooke developed the hypothesis of gravitation in another variant. According to his view the oscillations of the atoms of the material body are transmitted to ether, are distributed in the latter, and reaching the other bodies causing their attraction to this body. After the discovery of electromagnetism in the 19th century Massoti (1836), followed by Zellner, Weber, Lorenz and others, began to represent gravity as a manifestation of electrostatic field. They believed that the positive and negative charges compensate each other, and the uncompensated remnant of the electromagnetic field of the order of 10^{-35} is the gravitational field. In the 20th century Einstein transformed the concept of gravitational field in curved space-time. There are a number of extravagant theories of the gravitational field [3, p.31].

However, all these theories suffer from common methodological error. It is related to the fact that since the time of Newton and Coulomb in all fields gravitational and electromagnetic experimentally determined through the force of interaction between the object and the test mass/charge, respectively. With the help of the mathematical operation the potentials of these fields are calculated. However the potentials themselves cannot be found experimentally, as there is no in the nature of such a device as "potentionalmeter". Therefore to tell objectively – what is the proper field of the particle – we still have not entitled to.

Equation (16) for the first time allows us to describe the certain structure of the gravitational field of the particles themselves. We assume, as well as Massoti that the electromagnetic mass of the proton is almost completely compensated by the electromagnetic mass of an electron, and the uncompensated remnant of the field, having a value $\alpha^8 e/m_p$, is a gravitational field. Thus, gravity is nothing but a manifestation of the electromagnetic field.

Moreover, it follows from (16), these fields have a discrete character that speaks of their wave nature. With this approach the gravitational constant can be expressed in terms of electromagnetic constants, see Table 1, item 2. However, due to the wave nature of fields, this constant will depends on the temperature, the distance between interacting objects and the total mass of objects. This is due to the fact that the proton and electron are at certain energy levels, and between them there is some relative motion. For example for the sun its surface temperature can be found from the dependence of the relative motion of the electron with respect to the proton, see Table 1, item 8.

By wave nature of the fields we can explain the dependence of the gravitational constant on the distance between objects – the so-called "fifth force". The discrepancy of 1.2% occurs in the measurement of the constants on a very small (less than 1 cm) and large (greater than 1 m) distances between objects [56].

The wave properties of proton and electron are fundamental. They form the structure of the solar system. The planets are at the nodes of the wave functions. Mercury is in the first node, determined by the wave function of the proton, see Table 1, item 4, Jupiter is in the first node, determined by the wave function of an electron, see Table 1, item 5. The wave functions of proton and electron in the core of the Galaxy describe the spectrum of star velocities around the core, see Table 1, items 18, 19. Outside of galaxies such dependency is not observed, which coincides with the findings of Finzi according to other experimental data. That is Galaxy as gravitating object is finite, as discussed above. For other planetary systems and galaxies their structure will depends on the temperature and density, but also determined by the wave properties of their constituent protons and electrons.

We also note an important fact. The temperatures of stars are in the range from 2000K (brown dwarfs) to 50000K (the Wolf-Rayet stars). In the energy equivalent the temperature does not exceed 7eV. This is a factor 2 smaller than the ionization energy of hydrogen – 13.6 eV. The stars for which the temperature exceeds 13.6 eV (white dwarfs) simply evaporate and turn into a nebula. Thus the hydrogen on the surface of stars is not the plasma; it is in the main atomic state. This state has inherent uncompensated spin. In other words, hydrogen is in a state of radicals. Because of the enormous mass of stars the density of radicals is very high. Till now on Earth the gravitational constant for this state of matter was not measured. Therefore, such a small trifle like the spin of the particle can radically change the model of star structure and the energy source of stars. Now generally accepted, that the energy source is nuclear fusion of hydrogen in the center of the star. However, there is no definitive evidence of this so far. We count this issue is very controversial.

In contrast to de Broglie we believe that the wave properties are not only particles but also the fields of the particles themselves. We will not go into a discussion about the form of fields themselves. While we need to know the critical points. Naturally, existing fields have wave moving at a certain speed. The interaction of particles can be described by an analogue with the second equation of de Broglie:

$$V_t V_l = c^2. \tag{17}$$

Here V_t – relative velocities of interacting objects, V_l – the speed of interaction between objects.

We find the marginal speed of gravitational interactions in nature. We estimate the speed of exchange interaction V_l^* between the Sun and the center of the Galaxy. From the condition of stability of the Galaxy during the movement of the Sun at a distance equal to its radius, the gravitational wave must have time to get from the Sun to the galactic center:

$$V_l^* \geq \frac{R_g \, v_\Theta}{R_\Theta c} c = 2.83 \cdot 10^8 c, \tag{18}$$

where $R_g = 2.53 \cdot 10^{17}$ km is the distance from the Sun to the galactic center, $v_\Theta = 220$ km/s - orbital velocity of the Sun around the Galactic center, $R_\Theta = 6.96 \cdot 10^5$ km – radius of the Sun.

In accordance with equation (18), for the stable motion of the Sun relative to the center of the Galaxy it requires that gravitational waves propagate in space at a speed not less than $2.83 \cdot 10^8$c.

We find in nature the lowest possible speed of relative movement for which both the conditions of equations (17) and (18) are satisfied.

Consider the motion of free electrons with respect to positive ions. The simplest case is the system of hydrogen plasma. In low-density hydrogen plasma at the time of its degeneration (cooling), it is formed stable hydrogen pseudoatom the size of which is 137 times large then size of an ordinary hydrogen atom [57]. What is this pseudoatom and how it might look like?

As a basis of our model we take the model of the atom by Nicholson (1912) [48]. He still a year before the Bohr is used the Planck constant to describe atom. In his model the atom is a system of ring electrons and located in the center proton. The diameter of the ring electron is the size of the atom. He introduced quantization of frequency by rotation of the electron rings [58]. We will expand the scope of the model by introducing the dependence of the size of the electron ring from the state of matter. So, for a degenerate plasma (supercooled) the electron in our model takes the form of a thin uniformly charged ring of radius r_0 greater than the radius of 137.036 atoms in the Bohr model $r_0 = \alpha^{-1} r_B$. This electron ring rotates with the speed $\alpha^2 c$ and defines the electron spin [59]. See Figure 3.
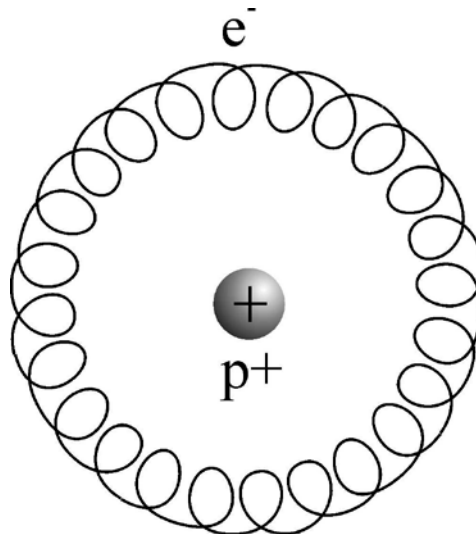

Figure 3. The hydrogen atom with the Bohr radius $r = \alpha\, r_0$, the rotational speed $v_1 = \alpha\, c$.
Ilianok model.

Under the electromagnetic field of a proton the electron will tend to adopt a new energy state, forming a neutral hydrogen atom. Consider what would happen in such a situation with a ring electron.

The only way to minimize the size of an electron orbit to an atom size is twisting it into a spiral. Spiral itself can be represented as a geodesic on the surface of a hollow torus with large radius r_B. The number of turns of the spiral can be expressed through the fine-structure constant, and it is strictly equal to the 861 turns (see Table 1, item 1). Each round of

this – the segment will correspond to its own electrostatic field in the shape of two-dimensional petal. See Figure 4.
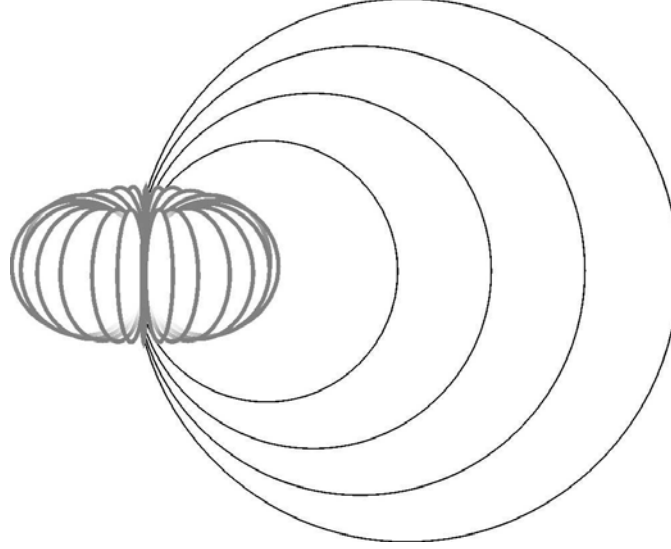
Figure 4. The model of the electron with radius $r = \alpha^2 r_0$, rotating at the speed of light c, where α - fine structure constant. It is shown the shape of one of the 861 segments of the electromagnetic field of the electron, which form his "electromagnetic mass".

We assume that the speed of folding of the ring in a spiral (the speed of its movement to the proton) is equal to $\alpha^4 c$. Then the time of formation of a hydrogen atom can be calculated by the formula:

$$\tau_0 = \frac{2\pi r_0}{\alpha^4 c} = 5{,}35961563 \cdot 10^{-8} s \quad . \tag{19}$$

This value agrees with the experimental estimates made for the supercooled plasma 10^{-8} s [57]. During the folding of the electron ring, due to the law of momentum conservation, the velocity of the toroidal electron around the proton respectively increase by 137 times and will be equal to αc. Then the kinetic energy of the motion of the toroidal electron around the nucleus is

$$E = \frac{m_e}{2} \left(\frac{Z\alpha^n c}{\eta} \right)^2 \left(1 + \frac{\alpha^{n-1} m_e}{M} \right)^{-1}, \tag{20}$$

where M – mass of the nucleus; η – a real number, Z – charge of the nucleus, n – an integer. This formula coincides with the solution of the Bohr (12) for a point electron in a hydrogen-like atom with n = 1 and η – the number of energy level. Equation (20) is a generalized Nicholson formula for the hydrogen-like atom, and it allows us to take into account the different phase states of hydrogen.

As we see from (20), to distinguish the point electron from the toroidal electron by mechanical moment is impossible. But in Bohr's model the quantization condition of angular momentum is proportional to *h*. The experiment gives a value of *h/2π*. That is why Bohr chose this value without theoretical justification. The Sommerfeld attempt to resolve this contradiction by integration over the whole orbit of the electron motion has no physical meaning [60]. And this paradox was simply forgotten.

In our model, similar to Nicholson one, this contradiction disappears automatically as a continuous ring always has the quantization step proportional to *h/2π*. In addition in our

model there is a new quality. We have a system of electron-proton which is not a dipole, and therefore does not radiate electromagnetic waves. In the minimal energy state of the atom the electron ring does not stop, but continues to rotate slowly at speed $\alpha^4 c$, at that condition the atom does not radiate electromagnetic waves and forms gravitational wave that are directly related to the atom. Note that in nature the existence of absolute zero of energy and angular momentum is impossible in principle. Always, even in the lowest energy state, there is relative motion.

In our model the size of the atom during the excitation does not change, changes only the rotational speed of the electron ring. Of course, the electron ring can be deformed into an ellipse and then atom goes in a metastable state. Under an external impact on atom the nucleus can move to the focus of the ellipse. In this case the atom is a dipole and can radiate electromagnetic wave. The radiation frequency is determined by the rotation time of an ellipse on one revolution or by the movement of its major axis - "perihelion". An electromagnetic wave of atom forms by part of its electromagnetic mass. At this time it emits only that portion of the electromagnetic mass which vector end rotates at the speed of light. After the emission of electromagnetic wave the electron returns to the ring. This model corresponds to the condition of classical electrodynamics since the efficiency of the radiator – the antenna is close to unity.

From the generalized Nicholson equation (20) we can easily find the value of the critical emission frequency of a hydrogen atom which is used for the reference clock. This is so-called 21 centimeter radiation. For example, for n=4 and $\eta = \sqrt{9/5}$ from (20) we obtain electron ring frequency, the corresponding to 21 cm emission:

$$f_{21} = \frac{1}{\eta^2} \frac{\alpha^4 c}{2\pi \, r_B} = 1.420458257 \cdot 10^9 \, Hz. \qquad (21)$$

The experimental value of the frequency is $1.420405751 \cdot 10^9$ Hz. [44]. The validity of equation (21) is very high, so the difference with experiment is observed only in the 6th digit. As can be seen from this equation the role of the reduced mass is very small and is accounted for by the factor α^{n-1}.

The physical meaning of the constant η follows from the shape of an ellipse with axes a and b:

$$\eta^{-2} = 1 - \frac{a^2}{b^2}, \qquad (22)$$

i.e. it has the sense of the reverse eccentricity of the ellipse of the electron.

By the electronic ellipse form the Lamb shift in hydrogen atom is determined in the transition $2S_{1/2} \rightarrow 2P_{1/2}$,

$$f_L = \frac{1}{\eta^3} \frac{\alpha^4 c}{2\pi \, r_B} = 1.058747047 \cdot 10^9 \, Hz. \qquad (23)$$

The experimental value of the frequency is $1.05890(6) \cdot 10^9$ Hz [44, p. 368].

Until now it was thought that Lamb shift can be described only in the framework of quantum field theory (quantum electrodynamics), as a radiative correction associated with the interaction of an electron with virtual electron-positron field of the physical vacuum. As Gordano Bruno said: "Why we have to resort to empty fantasies where we can learn from the experience itself."

We can assume the same as Hodge that the center of the Galaxy consists of a quasar, which forms a star [61]. If we go further we can assume that the quasar itself consists of a solid or liquid hydrogen. The hydrogen atoms in this case are in the ground state. The motion

of the protons relative to electrons occurs in them at a finite velocity $\alpha^4 c$. Then the gravitational wave of the atom will moves with the speed $\alpha^{-4}c = 3.526 \cdot 10^8$ c. This is consistent with our estimate of the speed of gravitational interaction in the formula (18).

Note that the speed $\alpha^4 c$ is a fundamental one. In many experiments it is critical. For example in the Sagnac effect at this speed the gyro-effect disappears, in the experiments of Fizeau (1851) at this speed the interference of light rays passing through a moving liquid begins to appear [16]. At this speed the decay of the liquid in the capillary tube moving under the influence of an electric field occurs – breaking of the electroosmosis effect [62].

In the macro world there are also fundamental effects associated with the speed $\alpha^4 c$, for example, it is the critical velocity of superfluid phase with respect to normal phase in liquid helium (^{4}He II):

$$V_{\max} = \frac{\alpha^4 c}{\sqrt{2}} = 0.6011 \text{ m/s.} \tag{24}$$

The experiment gives a value of 0.60 m/s [59]. See also Table 3, where you can find the fundamental laws of the helium superfluidity in quantum thermodynamics, whose parameters were calculated by the author.

It is possible that in addition to the gravitational interaction there are other kinds of interactions that propagate at speeds that are orders of magnitude faster than light, because to each field interaction between objects corresponds to a certain force. For example, between charges we see Coulomb force, between the masses – gravity. However, these forces differ by orders of magnitude, so we can assume that between them there is a certain set of forces that can be called the combined forces. Each force will meet its speed of interaction between objects, greatly exceeding the speed of light. In addition from equation (20) we can find the energy of the hydrogen atoms in a radical state at a given temperature and density of the star. For example for the Sun $n=1$, $\beta = \sqrt{8\pi}$ we obtain the equivalent temperature on the surface of the Sun in the center of disk 6282.1K that practically coincides with the experimental value of 6270K (see Table 1, item 8).

Receiver-transmitter of gravitational waves

For speeds of the order of $10^8 c$ data transmission using gravitational waves in the Galaxy is already a matter of hours. This raises the eternal question: "What should I do?" And the second question: "How do I do?" Over the past 40 years repeated attempts to find gravitational waves arising from general relativity does not yield any results. This is understandable, since as the source of the gravitational wave they took supernova explosions, separated from us by millions of light years. As the detector they used a system of massive metal cylinders and interferometers. At the same time they a priori assumed that the speeds of the electromagnetic and gravitational waves are equal. The negative result of experiments shows that the gravitational wave from a supernova explosion has come to us well before the light came.

We went the other way and tried to use the gravitational effects due to the phase transition of first and second kind. Our experiments on the available materials showed a low conversion efficiency of any form of energy in the mass defect and, consequently, in the gravitational field. The mass defect is of the order α^2 (see Table 2). Therefore, to increase the efficiency of gravitational effects we propose to use macroquantum effects in liquid helium. For example you can make the following experiment.

Dewar vessel in the form of a long tube (cylinder) with a capacity of 100 - 1000 kg is filled with liquid helium. The helium is cooled to a critical transition temperature for transformation in the superfluid state (lambda point) (see Table 3.)

$$T_\lambda = \frac{Mv_\lambda^2}{2k} = \frac{M(\alpha^3 c)^2}{3k}. \tag{25}$$

In this tube by rotating the tube in general there are excited undamped macroquantum vortices in the superfluid phase. The minimum quantum of circulation will be 10 nm [45, p.117]. At the same time the acoustic waves are fed into the pipe exciting in helium the first sound. By controlling the power and frequency of sound, we can get acoustic-gravitational interaction, which modulates the gravitational wave. This way we can make a receiver and transmitter. The sensitivity of this instrument will be determined by Q-factor of the "resonant circuit" on the basis of changes in the thermal conductivity at the lambda point. At this point the Q-factor changes as α^{-3}, which is about 2.6 million times. Information can be obtained by recording the scattered light on the gas bubbles that arise during the transition of HeII in HeI. In the lambda point the liquid is in a quantum coherent-bound state. For example this manifests itself in effect discovered in 1922 by Kamerling Onnes. He discovered that helium is completely runs out of the tube if the tube is lifted above the level of liquid helium. We interpret this effect as the presence of gravity-coherent connection between the helium in the tube and the main mass of helium.

If we spread the transmitter and receiver along their axis, then such a system can investigate the substance in between. For example, with such a device it is possible to investigate the structure of the Earth's core, as shown in Figure 5 as a gravitational wave passes without attenuation.
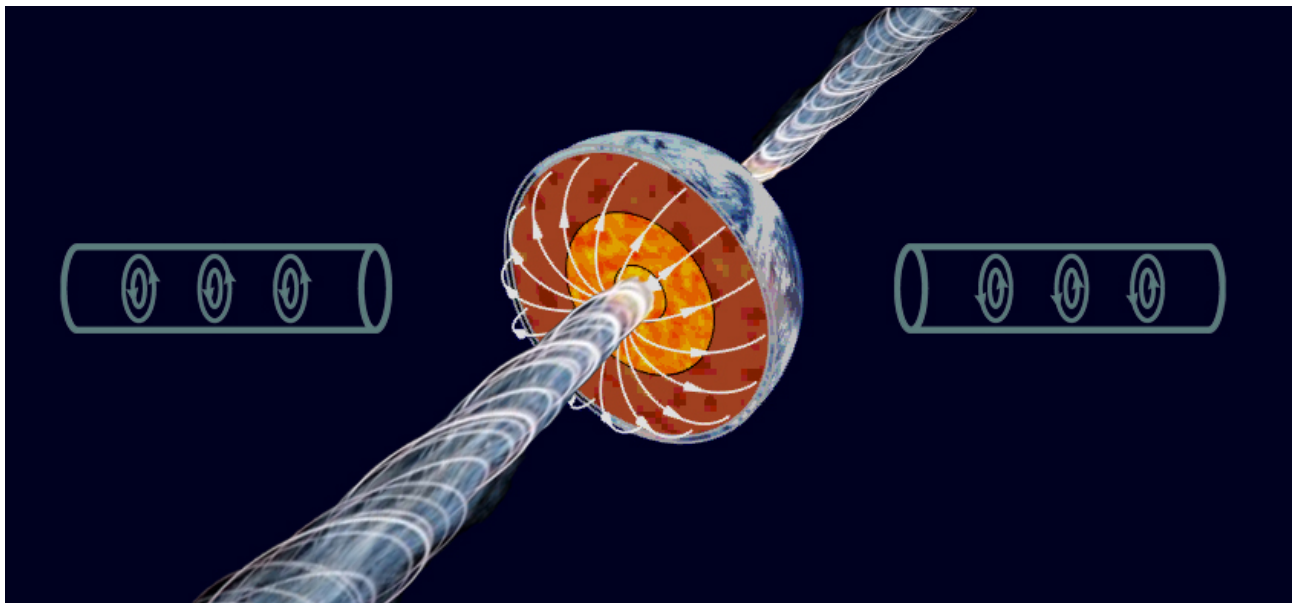
Figure 5. Tomography of the Earth by coherently-coupled transceiver-receiver on the base of superfluid helium, mounted on synchronous satellites. The arrows indicate the induction field generated by currents in the Earth's core. From the poles of the Earth are emitted gravitational waves - jets.

Note that the Landau theory and its modifications give the fantastic inaccuracy and, therefore, unsuitable for the technical realization of such a device. Therefore, as a basis for creating the device we must use the formula for the superfluid helium arising from our theory (see Table 3).

Now we give a little place for imagination. Is it possible to create such a transceiver of gravitational waves on a cosmic scale? In this regard an interesting idea proposed by John Learned on the use of cepheids as intergalactic internet sites. But he appreciates the possible data transfer rate of 180 bits per year. The speed of information transfer is equal to the light, and the information is distributed isotropically. On the other hand it is known that a large number of stars and quasars emit jets of the poles. See Figure 6. The jets propagate over distances that exceed thousands of light years away. They are clearly visible in the radio, visible and X-ray bands. However, how jets appear and from which source they obtain their power is unknown.
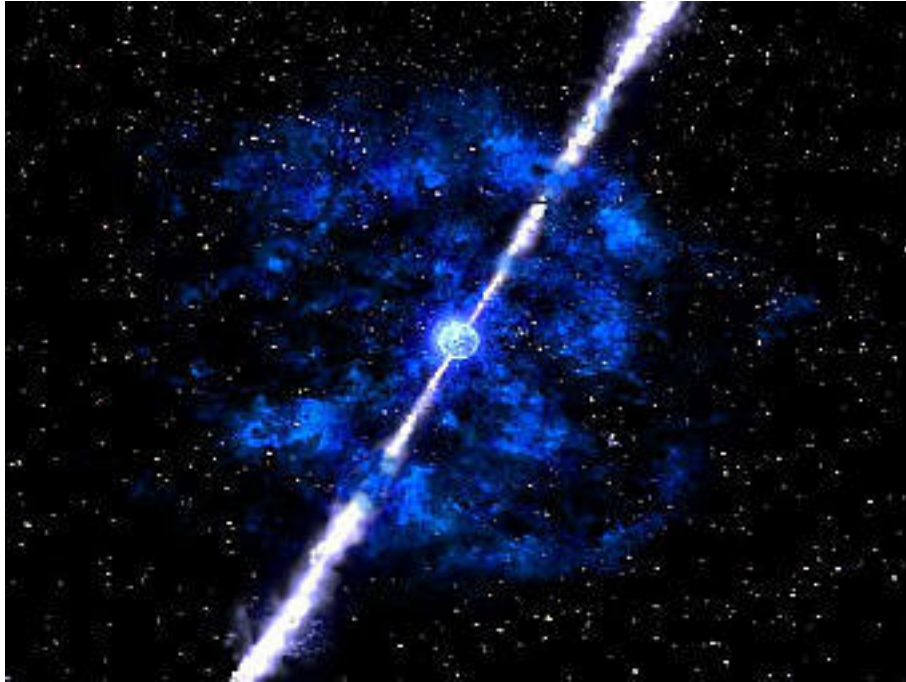

Figure 6. A view of jet.

We assume that the jet is directed gravitational wave emanating from the pole of star and forming a narrow cone. This wave captures scattered in the space elementary particles and twists them. As a result we are seeing the synchrotron emission of these particles up to the X-ray range. Jets cannot be formed if the speed of gravitational wave equals the speed of light. Otherwise we would have seen only a residual trace along the motion of a star – like the tail of a comet. *In fact the existence of jets is a direct proof of the superluminal nature of the gravitational field interaction.*

It can be assumed that the jets in one form or another do not arise only from stars, but also from rotating planets with an active nucleus such as our Earth (Figure 5). The question naturally arises whether this effect is detectable and can it be used for Galactic Internet?

Let us consider our Earth as a giant receiver-transmitter antenna of gravitational waves. A more detailed physical model of the Earth is described in the project "Long-term forecasting of climate change and natural disasters on the basis of a new physical model of the Earth» [63]

It is known [64] that the Earth consists of an inner core, outer core, mantle and crust. The inner core has a radius $R_{\oplus 1}$= 1217.1 km. It apparently consists of a gaseous substance that does not pass the transverse seismic (acoustic) waves. The gas pressure in it is $3.6324 \cdot 10^2$ GPa. The outer core has a radius of $R_{\oplus 2}$= 3485.7 km. It consists of a liquid substance and has

the estimated temperature of 6200K, and its density is 13.0 g/cm^3 [17]. Next is the semi-liquid mantle of radius $R_{\oplus\,3} = 6031$ km, covered with a thin solid crust with $\Delta R_{\oplus\,4} = 340$ km.

We assume that the same as for the Sun [54,55,65], the Earth's outer core is composed of superdense hydrogen radicals, where the macroquantum electromagnetic laws are valid. On its inner surface waves can propagate with speed:

$$v_{\oplus\,1} = \frac{\alpha\,c}{\sqrt{8\pi}}. \tag{26}$$

The kinetic energy of such a wave corresponds to the temperature:

$$T_{\oplus} = \frac{m_e v_{\oplus I}^2}{2k} = 6282.10\,K, \tag{27}$$

where k - Boltzmann constant. This temperature (27) corresponds to the temperature at the center of the Earth [64] and coincides with a color temperature in the center of the solar disk [17].

The wave (26) has a period of revolution around the nucleus:

$$P_{\oplus 1} = \frac{2\pi\,R_{\oplus 1}}{v_{\oplus 1}} = 17.523 \text{ s.} \tag{28}$$

The wave (26) in the form of the spectral peak is well recorded by all seismic stations in the oceans in the range of Pc3 (10-45s), and on the land besides of it is visible the second harmonic with a period of 8.76 seconds in the range of Pc2 (2-10s) [66]. These peaks previously have no theoretical explanation, although the total energy of the waves in these ranges are orders of magnitude greater than the total energy of all seismic waves of the Earth.
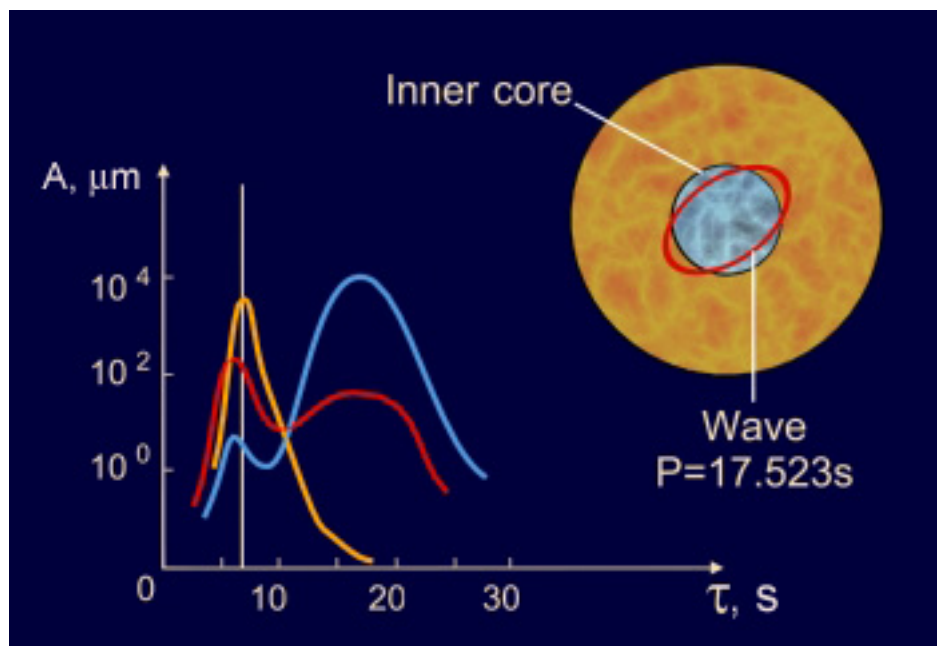
Fig. 7. An acoustic noise of the Earth.

It is important that on the same frequency of nearest range Pc3 the electromagnetic field of the Earth vibrates, which is in plasmaspheric resonance [67]. Consequently, the energy of wave motion in the outer core of the Earth must be passed to the earth's crust and the ionosphere. This wave can be detected and controlled with a gigantic electrostatic generator, which in his time had manufactured by Tesla. You can also use the existing super-power high frequency transmitters of large area used for the impact on the Earth's ionosphere. For example, a complex HAARP built in the U.S. to study the nature of the ionosphere and

the development of the anti-air and missile defense systems, which can be used for our peaceful purposes. Using a microwave generator of the HAARP, we can modulate the frequency of plasmaspheric resonance – 0.057 Hz. Then it will be possible to transmit information with a frequency of 0.0285 Hz. In an hour it will be possible to transmit 100 bits of information, whereas for the year – 0.9 Mb.

If our model is correct, the Earth's core is a macroquantum system in which gravitational waves are formed along the poles – jets. If such a wave meets on the way the Earth-like planets, it can form a coherent quantum transmitter-receiver system of gravitational waves, similar to that discussed above for our liquid helium.

Even extend the frame of our imagination. If there is a highly-developed life on the Earth-like planets, and if they set up an intergalactic communication on the principles laid down by us, we can fit into this network.

As the volume of transmitted information is not very large – 0.9 Mbit, the most valuable information for us will be in the first place to gain knowledge about still undiscovered laws of physics and biology, as well as about clean energy sources and improved communication channels for the transmission of video information. From a biological point of view, of course, the people will be primarily interested in the victory over the disease and prolong life. Perhaps it would be one way of solving the problem of eternal life.

Conclusion

Thus, despite the fact that the velocity of the particle does not exceed the speed of light, and the velocity of the condensed matter does not exceed 1/500 the speed of light, the speed of gravitational interaction made in principle possible to open up for the mankind the way to join the world mind by means of the Galactic Internet.

Now we do not know exactly how to describe these interactions. But the time has come to create a new world view based on the accumulated experience and on the ideas of Hooke and Massoti. In our proposed model of the world picture the mass and charge are inseparable characteristics of particles that naturally restore the unity of the nature of gravitation and electromagnetism. Basic points of our efforts to create a new world view are presented in a series of lectures on quantum astronomy [15].

We made a systematization of a huge amount of experimental data basing on a deterministic representation of the microcosm and gained new knowledge that changes the existing picture of the world. The bases of this knowledge are the great ideas of our predecessors – Newton, Laplace, Noether, Planck, Nicholson, de Broglie, etc. The highest degree of coincidence with the experiment and the simplicity of our equations indicate the adequacy of the used model. These equations can be called the fundamental physical laws, as they reveal new relationships between fundamental physical constants.

The tables we give the main results obtained on the basis of a new world view, and their comparison with experimental data.

Let us remember that the basic laws of physics, such as Kepler's laws of planetary motion, Newton's law of universal gravity, laws of Coulomb, Ampere, Faraday, etc. were obtained experimentally, and do not follow from any of mathematical models. To build a new picture of the world only on a mathematical basis, whatever it was attractive, is impossible. Therefore, all attempts of Lorentz, Einstein, Bohr, Born, Schrodinger, Heisenberg, Dirac, Salam, Weinberg, Gell-Mann and others, no doubt, have given impetus to the development of science in the 20th century, but now in the 21st century, science was brought to a standstill. The way out of the impasse will be found only when they stop falsifying experimental data, contrary to accepted theories, and new experiments will no longer silenced. In the words of

Galileo – in matters of science the authority of thousands is not worth the simplest reasons of the one.

It can be argued that all that have no an experimental basis can be attributed to science fiction, hidden under the "elegant" mathematical equations. And no Nobel prizes and other public forms of raising the status of scientists should not be an indulgence of errors. We must finally emerge from this dogmatic slumber, to remove his glasses relativism and to look to find the cosmic mind. The time has come to create Galactic Internet! Sign Up!

Table 1. **Fundamental laws of quantum astronomy.**

N	Name	Theoretical formula	Theoretical value	Experimental value	Ref.
		A. M. Ilyanok		*Reference value*	
		Fundamental constants			
1	Fine structure constant	$\alpha^{-1} = \sqrt{\left(\dfrac{N_\alpha}{2\pi}\right)^2 + 1}$, where $N_\alpha = 861$	137.03605472…	137.0360(2)	54,55, 17
2	Large distance gravitation constant	$G_\infty = \dfrac{e^2}{2\pi\varepsilon_0}\left(\dfrac{\alpha^8}{4\pi\, m_p}\right)^2$	$6,75334\cdot10^{-11}\cdot$ m³/kg·s²	$(6.746\pm0.0024)\cdot$ 10^{-11} m³/kg·s²	68
		Solar system			
3	Mercury average orbital velocity	$v_1 = 3\alpha^2 c$	47.89307 km/s	47.89 km/s	54,55, 17
4	Maximal value of Mercury orbit major semiaxis	$R_1 = \dfrac{h}{\alpha^{12} m_p c} = \dfrac{z_0 e^2}{2\alpha^{13} m_p c}$	$5.795\cdot10^{10}$ m	$5.791\cdot10^{10}$ m	54,55, 17
5	Maximal value of Jupiter orbit major semiaxis	$R_5 = \dfrac{h}{\alpha^{11} m_e c} = \dfrac{z_0 e^2}{2\alpha^{12} m_e c}$	$7.7647\cdot10^{11}$ m	$7.783\cdot10^{11}$ m	54,55, 17
6	Ratio of Jupiter and Mercury orbits major semiaxis	$\dfrac{R_5}{R_1} = \alpha\dfrac{m_p}{m_e}$	13.3987	13.442	54,55, 17
		Sun			
7	Sun orbital velocity	$v_{\Theta I} = \dfrac{\alpha c}{\sqrt{8\pi}}$	436.381 km/s	436,78 km/s	54,55, 17
8	Temperature on surface of the Sun in the middle of disk	$T_\Theta = \dfrac{m_e v_{\Theta I}^2}{2k} = \dfrac{m_e}{2k}\left(\dfrac{\alpha c}{\sqrt{8\pi}}\right)^2$	6282.1K	6270.0K	54,55, 17
9	Period of longitudinal helioseismological waves on Sun's surface	$t_1 = 2\pi R_\Theta\left(1 - \alpha^{\frac{2}{3}}\right)v_{\Theta I}^{-1}$	160.43 min	160.01 min	54,55, 69
10	Period of transversal helioseismological waves on Sun's surface	$t_2 = 5\alpha^{\frac{2}{3}} R_\Theta v_{\Theta I}^{-1}$	5.00 min	5.00 min	54,55, 69
11	Equatorial rotational velocity of Sun's surface	$v_\Theta = \alpha^2 c/8$	1.995525 km/s	1.9968 km/s	54,55, 17
12	Period of Sun rotation around own axis	$P_\Theta = \dfrac{2\pi R_\Theta}{v_\Theta} = \dfrac{16\pi R_\Theta}{\alpha^2 c}$	25.364 days	25.38 days	54,55, 17

Planets					
13	Equatorial rotational velocity of Earth's surface	$v_\oplus = 4\alpha^3 c$	465.981 m/s	465.10 m/s	54,55, 17
14	Jupiter radius	$r_5 = \dfrac{GM_5 N_\alpha}{4} \cdot \left(\dfrac{\alpha c}{\sqrt{4\pi}}\right)^{-2}$	$7.16326 \cdot 10^4$ km	$7.16326 \; 10^4$ km	54,55, 17
15	Equatorial rotational velocity of Jupiter's surface	$v_5 = 2\pi \dfrac{\alpha^2 c}{8}$	12.5383 km/s	12.55 km/s	54,55, 17
Galaxy					
16	Maximal velocity of stars with respect to Galaxy center	$V_1 = \dfrac{\alpha c}{8}$	273.46 km/s	273 km/s	54,55, 17
17	Maximal relative velocity of nearest stars in different galaxies	$V_2 = \alpha^2 c$	15.964 km/s	15.5 km/s	54,55, 17
18	Distance to the first maximum in the distribution of velocities of stars with respect to Galaxy center	$R_{Gp} = \dfrac{R_1}{\alpha^4} = \dfrac{h}{\alpha^{16} m_p c}$	$2.043 \cdot 10^{19}$ m $=0.6622$ kpc	0.5-0.8 kpc	54,55, 17
19	Distance to the second maximum in the distribution of velocities of stars with respect to Galaxy center	$R_{Ge} = \dfrac{R_5}{\alpha^4} = \dfrac{h}{\alpha^{15} m_e c}$	$2.738 \cdot 10^{20}$ m$=8.87$ kpc	8 –10 kpc	64
Metagalaxy					
20	Hubble constant	$H_0 = \dfrac{\alpha^{18} m_e c^2}{\hbar}$	82.489 km s^{-1} Mpc^{-1}	50÷100 km s^{-1} Mpc^{-1}	54,55, 17
21	Metagalaxy radius	$R_M = \dfrac{c}{H_0} = \dfrac{\hbar}{\alpha^{18} m_e c}$	$1.1214 \cdot 10^{23}$ km $=$ $=11,8535 \cdot 10^9$ l.y.	$11 \cdot 10^9$ l.y.	54,55, 24
22	Angular velocity of Metagalaxy rotation	$\Omega_M = \dfrac{\alpha c}{R_M \sqrt{8\pi}}$	$1.2285 \cdot 10^{-13}$ rad/y	$\sim 10^{-13}$ rad/y	23
23	Temperature of Metagalaxy wall	$T_M = \dfrac{2m_p}{2k} \left(\sqrt{\dfrac{5}{3}} \alpha^3 c\right)^2$	2,722 K	~2,7 K	64

α – fine structure constant or transversal quantum number; e – electric charge of electron; – Plank constant; c – speed of light; m_e – electron mass; m_p – proton mass;

k – Boltzmann constant (Boltsman L.), G – gravitational constant,

z_0 – vacuum wave impedance.

Table 2. **The results of weighing the samples at the initial and final temperatures**

substance	Temperature of the phase transition ° C	P_{init}, g σ_{init} t_{init}, °C	P_{fin}, g σ_{fin} t_{fin}, °C	Δt, °C	$-\Delta P/P_{init}$	β, K^{-1}
1	2	3	4	5	6	7
V_2O_4	72	16,32230 $3,06\cdot10^{-6}$ 20	16,81450 $0,59\cdot10^{-4}$ 72	52	$4,60\cdot10^{-4}$	$8,84\cdot10^{-6}$
Se	221	45,64835 $1,10\cdot10^{-6}$ 20	45,6387 $1,10\cdot10^{-5}$ 100	80	$2,10\cdot10^{-4}$	$2,64\cdot10^{-6}$
Bi	271,3	32,48930 $1,54\cdot10^{-6}$ 20	32,4783 $1,54\cdot10^{-5}$ 170	150	$3,40\cdot10^{-4}$	$2,26\cdot10^{-6}$
$BaTiO_3$	120	42,5996 $1,17\cdot10^{-6}$ 20	42,5937 $1,88\cdot10^{-5}$ 120	100	$1,40\cdot10^{-4}$	$1,38\cdot10^{-6}$
wax	60	11,79895 $4,24\cdot10^{-6}$ 20	11,79535 $0,59\cdot10^{-4}$ 60	40	$3,00\cdot10^{-4}$	$7,63\cdot10^{-6}$

σ – relative error (relative precision).

Table 3. **The fundamental laws of the superfluidity of helium in quantum thermodynamics**

N	Name	Theoretical formula	Theoretical value	Experimental value	Ref.
		__Author__		**An independent experiment**	
		Superfluidity			
1.	The critical velocity of superfluid phase motion relative to normal phase in liquid helium (^{4}He II)	$v_{max} = \dfrac{\alpha^4 c}{\sqrt{2}}$	0.6011 m/s	0.60 m/s	70
2.	The limiting velocity of first sound in liquid helium	$v_1 = \alpha^3 c\sqrt{\dfrac{4\pi}{3}}$	238,4303 m/s	$238,3 \pm 0,1$ m/s (saturated vapor pressure at T = 0.1 K)	70
3.	The limiting velocity of second sound in liquid helium	$v_2 = \dfrac{v_1}{\sqrt{3}} = \alpha^3 c\dfrac{\sqrt{4\pi}}{3}$	137.58 m/s	137.58 m/s (saturated vapor pressure at T = 0.1 K)	70
4.	The critical speed of sound at the phase transition	$v_\lambda = \dfrac{v_1}{\sqrt{2\pi}}$	95,12 m/s	At T_λ	

5.	The critical transition temperature of liquid helium in the superfluid state	$T_\lambda = \dfrac{M v_\lambda^2}{2k} = \dfrac{M(\alpha^3 c)^2}{3k}$	2.1780 K	2,1720 K	70

$N_\alpha = 861$ – transverse quantum number;

α – fine structure constant or longitudinal quantum number ($\alpha^{-1} = \sqrt{\left(\dfrac{N_\alpha}{2\pi}\right)^2 + 1}$) ;

e – electron charge; – Plank constant; c – speed of light; M – mass of atom ^{4}He;
m_e – electron mass; m_p – proton mass;
k – Boltsman constant.

Citation

1. Super-Earths named the best homes for life http://www.membrana.ru/particle/838 , http://en.wikipedia.org/wiki/Super-Earth
2. Laplace, P., Mechanique Celeste, volumes published from 1799-1825, English translation reprinted by Chelsea Publ., New York. 1966.
3. Bogorodsky A.F., Universal gravitation, Kiev, Navukova Dumka, 1971. 351 p.
4. Vizgin V.P., The relativistic theory of gravitation. The origins and development 1900-1915. Moscow: Nauka. 1981.
5. Pitjeva E.V., "Experimental testing of relativity effects, variability of the gravitational constant and topography of Mercury surface from radar observations 1964-1989", Cel.Mech.&Dyn.Astron. 1993. 55:313-321.
6. Tom Van Flandern, Meta Research, The Speed of Gravity What the Experiments Say. www.metaresearch.org/cosmology/speed_of_gravity.asp; Physics Letters A 1998. 250:1-11.
7. Philosophical problems of the hypothesis of superluminal velocities / Molchanov J.B. in Proc. Institute of Philosophy AN USSR, M. "Nauka". 1986.
8. Popper K., Logic and the growth of scientific knowledge, ed. V.N. Sadovsky. M. "Progress". 1983.
9. Trautmann A., Conservation laws in general relativity, Einstein Collection 1967, M. "Science", 1967. 308 p.
10. Peierls R., Surprises in theoretical physics, M. "Science". 1988.
11. Encyclopedia of Physics. V.3 of "Great Russian Encyclopedia" 1992. P. 610. Plasma accelerators.
12. Feynman R., QED - the strange theory of light and matter, M. "Science". 1988. P.144.
13. Popper K.R., Quantum theory and the schism in physics, M. "Logos". 1998.
14. Ivanenko D.D., The classical field theory, M. 1951. Pp.181, 223.
15. Ilyanok A.M. Quantum Astronomy. http://metagalactic.net/astron/00_e.htm, http://www.ivanov-portal.ru/astron/00_e.htm
16. Lukyanov D.P., Principles of Quantum gyroscope. Leningrad, 1987.
17. Allen C.W. Astrophysical quantities. The Athlone Press. 1973.
18. Physics of space. Little Encyclopedia., M. "Sov. Encyclopedia". 1986.
19. Manzon B.M. Acceleration of macroparticles for controlled thermonuclear fusion, UFN, **134**. 1981. N 4.
20. Askochensky A., Black holes are out of fashion, "Ogonek" **48**. 2004. www.antidogma.ru
21. Troitsky V.S., Experimental evidence against the Big Bang cosmology, UFN, **155.** 1995. N6. Pp.703-707.
22. Finzi F., Mouth Not. Roy Astron Soc. **21**. 1963. N1.

23. Birch R., Is the Universe rotating? Nature, **298**. 1982. P. 451.
24. Jean-Pierre L., Weeks J. at.al. Dodecahedral space topology. Nature. **425**. 2003. P.593;
    http://www.newscientist.com/news/news.jsp?id=ns99994250
25. Project NASA "Galaxy Zoo"
    http://rnd.cnews.ru/natur_science/news/top/index_science.shtml?2008/12/23/332964
    "Axis of Evil: The Return of geocentrism" 23/12/2008;
    http://modcos.com/articles.php?id=172
26. Project NASA ARCADE
    http://www.nasa.gov/centers/goddard/news/topstory/2009/arcade_balloon.html
27. Alfven. H. The future of science. M. "Science". 1979. P.64.
28. Poincare A., Selected Works Vol.3, Moscow: "Nauka". 1974.
29. Arzelie A., Historical and bibliographical notes. The general theory of relativity, the
    principle of equivalence // Einstein Collection. 1973. Pp. 267 – 270.
30. Miroshnikov M.R., Lunichev N.L., Miroshnikov R.M., Application for discovery of
    "Gravitational dynamic properties of matter and living organisms". "Technics of
    Youth". 1988. N 1.
31. En.wikipedia.org/.../Biefeld-Brown_effect.
32. Theorem XIV, Proposition XLIV, Problem XXXI. Isaac Newton, "Mathematical
    Principles of Natural Philosophy." Translated from Latin, Krylov A.N. M. "Science",
    1989. P.195.
33. Balk M.B., Demin V.G., Kunitsyn A.D., Collection of problems in celestial mechanics
    and cosmodynamics. M. "Science". 1972. 336 p. Pp. 100, 250.
34. Rouzver N.T., Perihelion of Mercury from Leverrier to Einstein. "Mir". 1985.
35. Chertkov A.D., The solar wind and the internal structure of the sun. M: "Science".
    1985. P.15.
36. Ilyanok A.M., Macroquantum Effects in Astronomy, **arXiv:physics/0111183**
37. Von Soldner J.G. Berlines Astron. Jahrh., 1804. P.161.
38. Bjerknes C.J.. Albert Einstein: The incorrigible plagiarist. Downers Grove, Illinois,
    U.S.A. 2002.
39. Georgi H.A., Unified Theory of Elementary Particles and Forces, Scientific American,
    April. **244**, 1981. P.40-55.
40. Kessler I., The polarized electrons, M:"Mir", 1988. Pp. 92, 211.
41. Nature **454.** 2008. Pp. 861-864.
42. CDF Collaboration., Study of multi-muon events produced in p-pbar collision at sqrt
    (s) = 1.96 TeV . 2008. arXiv:08105357.
43. Dirac P.A., The Cosmological Constants, Nature. **139.** 1937. p.323.
44. Physics of the Microworld. Little Encyclopedia. Moscow: "Soviet Encyclopedia".
    1980.
45. Patterman S., Hydrodynamics of a superfluid, M. "Mir". 1978. Pp. 109, 338.
46. Kolmogorov V.N., The jubilee edition in 3 books, M. "Fizmatgiz", 2003. Book 2. P.
    594.
47. Dirac P.A., Memories of an unusual era. Collection of articles., M."Nauka". 1990. P.
    139.
48. Bohr N., Collected Scientific Works. In 2 volumes, ed. I.E. Tamm, v.1, M. "Science".
49. Dynich V.I., El'yashevich M.A., Tomil'chik L.M. To the history of creation and
    development of Bohr's theory. Preprint № 615, Minsk, 1988, IF AN BSSR.
50. Encyclopedia of Physics, V. 2. M. "Soviet Encyclopedia". 1990.
51. Max Born, Atomic physics, Moscow "World". 1965. P. 166.
52. Dirac P.A., The evolution of the physical picture of nature, in the book "What do
    physics think of." Issue 3. M. "Science". 1965. P.131.

53. Feynman R., Feynman Lectures on Physics. ed. R. Feynman, R. Leighton, 3rd ed., M. "Mir". 1977.

54. Ilyanok A.M. Energy of Stars (non-thermonuclear approach) Part II. Journal of New Energy, 2001, V. 6, N1.P. 55-79.

55. Ilyanok A.M. "Quantum Astronomy", Part II **arXiv:astro-ph/0001059**.

56. Thomas J., Vogel P., Testing the Inverse-Square Law of Gravity in Boreholes at the Nevada Test Site, Phys. Rev. Lett. **65**, N10. 1990. P.1173.

57. Manykin Z.A., Ozhovan M.I., Poluektov P.P., "On the possibility of metallization of gas in an excited state", Pisma v JETP, v. 6, B4. 1980. P. 218.

58. Physics of the Twentieth Century: Development and Prospects, M. "Science". 1984. P.57.

59. Ilyanok A.M., Quantum-size electronic devices and operating conditions thereof, Eurasian patent N 003164.

60. Sommerfeld A., Atomic Structure and Spectra., v.1. "GITLL", Moscow, 1956.

61. Hodge P., A revolution in astronomy. M: "Mir". 1972. P.33.

62. Tikhomolova K.P., Elektroosmos, 1989. P. 65.

63. Ilyanok A.M., "Long-term forecasting of climate change and natural disasters on the basis of a new physical model of the Earth» http://metagalactic.net/climat/index_en.html .

64. "Physical Quantities: A Handbook", F.P. Babichev and others, Moscow: "Energoatomizdat". 1991. 1232 p.

65. Ilyanok A.M. "Quantum Astronomy", Part I. **arXiv:astro-ph/9912537**

66. Monakhov F.I., Low-frequency seismic noise of the earth, Moscow: "Nauka", 1977. P.96.

67. Jacobs J.A., Geomaghetic micropulsations, "Springer-Verlag", Berlin. 1970.

68. Thomas J., Vogel P., Testing the Inverse-Square Law of Gravity in Boreholes at the Nevada Test Site, Phys. Rev. Lett., **65**, No.10. 1990. P.1173.

69. Severny A.B., Some of the problems of solar physics, Moscow: "Nauka". 1988. P.126.

70. Putterman S.N., Superfluid Hydrodynamics, North-Holland Publishing Company, Amsterdam-London, American Elsevier Publishing Company, Inc – New York. 1974.