Laplace Gravitation Waves as Motive Idea of XXI Century Informational Revolution
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In the 19th century, people have mastered sound waves, electromagnetic waves in the 20th century. The 21st century should be a century of gravitational waves!

Newton opened a door to the near space, and we have mastered it. Laplace opened a window in the Grand Universe and the first experimentally estimated that the speed of gravitational interaction of eight orders of magnitude higher than the speed of light. No one has been able to refute the Laplace experiments, and we see Laplace waves on the wall of the Metagalaxy. However, Einstein theory of relativity postulates just closed this window.

It's time to have the courage to open the window to the Universe again, as Mankind is challenged by the most important task of creating a Galactic Internet.

We have shown that the gravitational field is formed by fields of each atom, thus forming together a metaatom. The total gravitational field of metaatoms has a complex spatial structure, depending on the relative speeds (temperatures) and the distance between gravitating objects. Systems of metaatom form planets, stars, galaxies, and the Metagalaxy. The simplest metaatom is a hydrogen atom, which gravitational field consists of two components: the classical Newtonian gravity acting on a distance of $2.7 \cdot 10^{20}$ m (the radius of the galaxy), and 11 orders of magnitude weaker gravitational forces of repulsion, but acting up to distances of $1.1 \cdot 10^{26}$ m (radius of the Metagalaxy).

Using obtained fundamental macroquantum laws it is possible to develop a new class of devices based on the coherent gravity waves effects for imaging gravitating objects ranging in size from man to Earth as a whole, and also to investigate the gravitational (bio) field of people.

Existing theory of gravity

What is gravity, Newton still debated. He assumed that it is a material object and exists in the form of field. At the same time, he believed that the propagation speed of gravitational interaction is much faster than the speed of light, but finite. If speed is infinite, and the energy of the gravitational field will also be infinite, then it violates the obtained laws of motion. On this occasion, he spoke: "The cause of these properties of the gravity force I still could not be deduced from the phenomena, and I do not invent hypotheses." A contemporary of Newton R. Hooke developed the hypothesis of gravitation in another embodiment. 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, are 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 cancel out each other, and the uncompensated remnant of the electromagnetic field of the order of 10^{-35} is the gravitational field.

The most important feature of the gravitational field, known in Newtonian theory and used as a basis in Einstein's one, is that gravity acts in the same way on different bodies, giving them the same acceleration regardless of their mass, chemical composition and other properties. This fact can be stated as a principle of strict proportionality of gravitational mass m_g and inertial mass m_i (kinetic). However, the principle of equivalence of gravitational and kinetic mass has been experimentally confirmed only for the condensed (cold) matter and the neutron. For the cold matter the measurement error was 10^{-9}, while for the neutron – only 10^{-2}. The equivalence principle for the radicals, excited radicals, and charged particles (protons and

electrons) was formally postulated by Einstein, which, as we have seen, is a fundamental methodological error. This led to the fantastic problems in modern physics. Briefly explain.

Newton had a deep understanding of the problem of gravitation and believed that the interaction between the bodies can go through certain ether, but with a finite speed, much faster than the speed of light. He said: "The idea that the ability to bring the attraction could be an essential, intrinsic property of matter without something such that the transfer would effect and force from one to another - seems to me so preposterous that no, I think, a man capable of thinking philosophically, to whom she would come to mind "[1]. However, in the Newton equation is not a lagging factor for force that speaks of the infinite speed of gravitational interaction (the principle of long-range) and, therefore, requires infinite energy. Numerous attempts to clarify the law of Newton's gravitation associated with the abandonment of the principle of long-range action. The first such attempt was made, apparently, by Laplace, who came to the conclusion that the addition to Newton's theory a postulate of finite speed of gravity transmission V leads to considerable difficulties in celestial mechanics. He added Newton's equation for the force F by a factor which takes into account the speed of motion of celestial bodies [2, 3]:

$$\mathbf{F} = \gamma \frac{m}{\mathbf{r}^3}\left(1 \pm \frac{v}{V}\right)\mathbf{r} \qquad (1)$$

where $\gamma = G_N M$ is the Newtonian undivided gravitational constant, G_N - Newtonian gravitational constant, M - mass of a space object with respect to which the body moves with velocity v and mass m, $\mathbf{r}$ - radius vector of a moving body.

From this equation it follows that the approaching body is attracted weaker than it follows from Newton's law, and moving away is attracted stronger than it follows from Newton's law. Evaluating this formula for the orbital parameters of the Moon and Jupiter, he found that the speed of gravitational interaction V is large, but finite and must be more than $10^7 c$, where c is a speed of light. He estimated the speed of the gravitational interaction between the Earth and the Sun to be more than $10^8 c$ [2,9]. However, he does not point on the nature of the gravitational interaction. And his evaluations, as it often happens, had been forgotten, although to date no one could disprove his experiments.

Einstein decided the problem of long-range force in its own way. In general relativity the concept of the force and the speed of gravitational interaction is excluded in the Newtonian sense. Einstein wrote his famous equation of the gravitational interaction (attraction) without delay factor [4, v.2, page 475]:

$$R_{\mu\nu} - \frac{1}{2}R g_{\mu\nu} = \frac{8\pi G_N}{c^4}T_{\mu\nu} - \Lambda g_{\mu\nu}, \qquad (2)$$

where $g_{\mu\nu}$ and $R_{\mu\nu}$ are respectively the metric tensor and the curvature tensor of space-time Ricci, $T_{\mu\nu}$ - energy-momentum tensor of matter. A term with a cosmological constant Λ describes the gravitational force of attraction (if $\Lambda < 0$) or repulsion (if $\Lambda > 0$), which are additional to the gravitational forces of attraction created by ordinary matter (tensor $T_{\mu\nu}$). These additional forces are proportional to the distance between the points and they are often called vacuum gravity.

Einstein in his time threw away the Λ term out of his theory, acknowledging that it was his biggest mistake that violates the principle of equivalence. When it is $\Lambda > 0$, we even have to talk about the "anti-equivalence".

From a physical point of view the matter in general relativity creates a curved space-time (a kind of inertia-free "ether"), which affects the motion of matter, which creates distortion. In this case no need to introduce a lagging factor, as in the Laplace equation (1). In general relativity there are only gravity waves propagating at speed of light which occur when

the mass changed. At speeds much less than the speed of light Einstein's equation becomes the equation of Newton, in which, as noted above, the speed of gravitational interaction is infinite! It is amazing theoretical metamorphosis [9].

In this regard, it is not surprising that the fundamental conclusion of general relativity theory about the presence of gravitational waves moving at light speed suffered a complete fiasco - they were not found in the last 40 years. This is understandable, since as a source of the gravitational wave they took supernova explosions, separated from us by thousands of light years. As the detector they use a system of massive metal cylinders and interferometers. At the same time they a priori assumed that the velocities of the electromagnetic and gravitational waves are equal. The negative result of the experiments shows that the gravitational wave from a supernova explosion has come to us well before the light came. This is a direct confirmation of the Laplace findings about the superluminal propagation velocity of gravitational interaction, which is constantly ignored.

All other effects and conclusions of general relativity are secondary. The anomalous perihelion of Mercury, the deflection of the solar light in a gravitational field, the change of photon energy in the gravitational field is elementary derived from the Newton equations [5]. Discussions on this issue can be found in [6, 7, 8].

Recognition of the world community (Nobel Prize in Physics in 2011, S. Perlmutter, B.P. Schmidt, A.G. Riess) the existence of dark energy, which creates a repulsive force (anti-gravitation), said about the total collapse of general relativity. The most important thing that follows from these experiments is a conclusion that the galactic gravity is limited by their size. The action of the repulsive forces extends to much larger distances, which does not allow the galaxies to be compressed in a "point". Consequently, the Big Bang theory, which follows from of general relativity, in general is wrong. We present on this occasion the words of Nobel laureate astrophysicist H. Alfven: "The Big Bang Theory is an insult to common sense" [10]. Attempts to associate dark energy with $\Lambda > 0$ leads to the anti-equivalence, which again violates the basis of general relativity.

There are a number of extravagant theories of the gravitational field on the basis of relativity [3]. These theories also have all the defects of general relativity. They suffer from a common methodological error, which is related to the fact that since the days of Newton and Coulomb all fields, gravitational and electromagnetic, experimentally determined through the strength of the interaction of the object and the test weight or test charge, respectively. With the help of mathematical operations they found the potentials of these fields. However the potentials themselves cannot be found experimentally, as there is no in the nature of such a device as "potential-meter". Till now nobody can state objectively what is the self-field of particle. But namely the fields of individual particles produce in sum the fundamental concept of body weight.

The future of the theory of gravity

In modern physics it is accepted that all interactions are of quantum nature. Accordingly, gravity must also be quantum in nature.

In compliance with the treatment of physical encyclopedia a quantum theory of gravity means a quantum-field theory of gravitational interaction. Because the gravitational interaction is universal (it equally involves all kinds of matter, regardless of their specific properties), it is considered that the construction of a full, complete quantum theory of gravity is inseparable from the construction of a unified quantum theory of all physical fields. [4, v.2, p. 295].

The problems of creation of the quantum theory of gravity are related primarily to the lack of an accurate representation of what is the spatial structure of fields for the elementary particle and atom, respectively. Without a radical review of methodological errors coming from the beginning of creation of electromagnetic theory we cannot build a complete theory

of gravity. First of all, this is due to artificial separation of the charge and mass of the particle (*e/m*). Experimentally, they cannot be divided, so that in any theoretical model they should be included in a single set. A priori gravity and electromagnetism are inseparable. This is a manifestation of the same nature!

We show the laws describing the self-field of the electron and proton, and how they are related with the gravitational fields of macro-systems in [5,11].

On the other hand we also failed to extend the experimental basis of microcosm quantum mechanics itself. To date the exact solution is found only for the energy spectrum of the hydrogen atom. It appeared a number of other invincible problems. 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 examples of rules for the elimination of infinity from solutions of the equations. But all these rules, despite the fact that the ensuing results are consistent with the experience, are artificial. And I cannot agree that the current framework of quantum mechanics is the right one"[12]. Let's try to understand the origins of the doubt.

The stumbling block for transfer of the laws of the micro-world to the macro-world is too small value of Planck's constant. On the other hand, without using the action quantum it is impossible to describe adequately the macro-quantum effects not only for superfluidity, but also for the space. So it is necessary to introduce the conception of a generalized action quantum related to the Planck's constant. For this we need to take the next logical step. The theoretical basis of wave quantum mechanics, resulting from the de Broglie equation, can be taken as the basis of macro-quantum mechanics. However, we have to change fundamentally the interpretation of these concepts. This approach requires to reject fundamentally the notion of probability waves and, therefore, get rid of the Schrödinger and Dirac equations, and return to the original interpretation of the de Broglie where wave is a deterministic object. Let us explain.

In 1924 De Broglie created the theory, which attempted to combine the wave and particle properties of matter. He ascribed to each particle the corresponding wave with wavelength λ associated with the particle momentum p by Planck's constant h by the relation:

$$\lambda = \frac{h}{p} = \frac{h}{m\text{v}} . \tag{3}$$

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:

$$u\,\text{v} = c^2 , \tag{4}$$

it being known that the phase of such a wave propagates with a superluminal velocity. Since this is contrary to the special relativity theory, the phase velocity was regarded as a mathematical fiction, not connected with the material object. We have identified in our calculations the phase velocity with the speed of gravitational interaction.

We can mention the work of Dirac [13], which 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 has something in common with the words of R. Feynman at his lectures on physics: "If there was ever able to "crush" the uncertainty principle, quantum mechanics will give inconsistent results and we have the right to exclude it from the ranks of the theories of natural phenomena ..." [14]. However, Feynman does not take into account the fact, that Heisenberg uncertainty principle of quantum mechanics forbids the extension on the macro-quantum level, i.e. on the space.

In articles [15-17] it was found that the laws of the micro-world can be extended to the macro-world through the introduction of a generalized action quantum

$$h_\alpha = \alpha^n h = \frac{e^2 \alpha^{n-1}}{4\pi \varepsilon_0 c} \ , \qquad (5)$$

where $n = 0, \pm 1, \pm 2\ldots$, ε_0 – permittivity of vacuum. For n = 0 we have the usual Planck's constant, for n = 1 – Stoney's constant.

For the basis of our model of the atom we take the model of Nicholson (1912) [18]. A year before the Bohr he already used the Planck constant to describe the atom. In his model the atom is a system from the ring electron and the proton located in the center. The diameter of the ring electron is the size of the atom. The quantization of frequency he introduced by rotating the electron rings [19]. We will expand the scope of his model by introducing the dependence of the size of the electron ring from the state of matter. In the radical (atom) of hydrogen the uniformly charged electron ring is curled up in the torus with a large radius r_B, which rotates on the upper energy level at maximum speed αc. This corresponds to the highest temperature of the atom 13.6 eV. Transversal rotation of the torus gives the spin to electron [20].
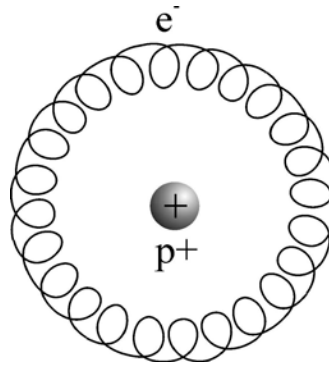
Figure 1. The hydrogen atom with the Bohr radius r_B, the rotational speed of the electronic torus $v_{\max} = \alpha c$. Ilyanok's model.

In the minimum energy state of hydrogen atom the speed of the torus is

$$v_{\min} = \alpha^4 c . \qquad (6)$$

This value corresponds to the unexcited (cold) atom.

The minimum value of the speed derived from experiments on 21 cm emission of the hydrogen atom and the Lamb shift [11]. Briefly show the main conclusions.

We generalize the equation of Nicholson and Bohr by introducing a scale factor of the electron rotational speed α^n:

$$W = \frac{m_e}{2}\left(Z \varepsilon \alpha^n c\right)^2 , \qquad (7)$$

where ε – real number, Z – charge of nucleus, n – integer number, 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 $\varepsilon = \sqrt{1 - \left(\frac{2}{3}\right)^2}$ (eccentricity of the electron's ellipse) from (5) we obtain the rotational speed of the electron ring, the corresponding to 21-cm emission:

$$f_{21} = \frac{\varepsilon^2 \alpha^4 c}{2\pi r_B} = 1.420458257 \cdot 10^9 \ Hz, \qquad (8)$$

The experimental value of frequency is $1.420405751 \cdot 10^9$ Hz [21]. The validity of equation (11) is very high, so the difference with experiment is observed only in the 6 digit.

Knowing the minimum and maximum speed of an electron in a hydrogen atom we can described the whole energy spectrum of the hydrogen atom, and consequently, the gravitational constant for different temperatures.

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, the gravitational field of an atom is formed in femto-area from 10^{-15} (nucleus) to 10^{-9} (atom). As a result, gravity is nothing but a manifestation of the electromagnetic field. With this approach the gravitational constant can be expressed in terms of electromagnetic constants [15-17],

$$G_\infty = \frac{e^2}{2\pi\varepsilon_0}\left(\frac{\alpha^8}{4\pi m_p}\right)^2 = 6,75334\cdot10^{-11}\ m^3/kg\cdot s^2 \tag{9}$$

This value is 1.19% greater than the generally accepted value of the Newtonian gravitational constant G_N=6.6739 ±0.0014 $\cdot10^{-11}$m^3/kg·s^2, which is measured at small distances [22]. At the same time, when measured at large distances between objects (more than a meter), the gravitational constant has the value (6.746±0.0024)·10^{-11} m^3/kg·s^2 [23].

The range of this Newtonian gravitational force is given by:

$$R_{G_\infty} = \frac{2\pi r_B}{\alpha^{14}} = 2.738\cdot10^{20}\ m \tag{10}$$

From equation (4) taking into account equation (6) we can find the speed of propagation of gravitational waves. It will be equal to

$$v_g = \alpha^{-4}c = 3,53\cdot10^8 c\ . \tag{11}$$

This value is between the estimate found by Laplace - $10^8 c$ [2], and evaluation of Pitievoi – $10^9 c$ [24] and Tom Van Flandern – $2\cdot10^{10} c$ [9].

Due to the wave nature of fields the value of speed of gravitational waves will depend on temperature, relative velocity, 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.

It is shown in [11] that the Metagalaxy is a rotating thin-walled sphere with a wall of solid hydrogen at a temperature 2.7 K (Fig. 2a). Newtonian attraction forces described by (14) are acting on this wall. Inside the sphere there are repulsive forces (dark energy), which describes by the gravitational constant of antigravitation in metagalactical scale G_M :

$$G_M = -\frac{e^2}{2\pi\varepsilon_0}\left(\frac{\alpha^{11}}{2 m_p}\right)^2 = -4,0215868\cdot10^{-22}\ m^3/kg\cdot s^2. \tag{12}$$

The range of the repulsive force is associated with the Hubble constant and defined as:

$$R_M = \frac{c}{H_0} = \frac{\hbar}{\alpha^{18} m_e c} = \frac{r_B}{\alpha^{17}} = 1.1214\cdot10^{26} m, \tag{13}$$

which is equal to 11,8535·10^9 light year. This value agrees with the calculations [25].

As can be seen, metagalaxy repulsive force in $\left(2\pi\alpha^3\right)^{-2} = 1.677\cdot10^{11}$ times less than attractive force acting in our Galaxy.

Thus, for formation of communication channels within galactic communications one can use only the forces of attraction (9) for a while. Apparently repulsive forces are unlikely to be used for intergalactic communication in this century!

Laplace's gravitational waves displays on the wall of the Metagalaxy as "diffraction Newton rings". They were fixed in space observatory WMAP while studying microwave radiation in the form of concentric circles of differential intensity [26].

a)   б)
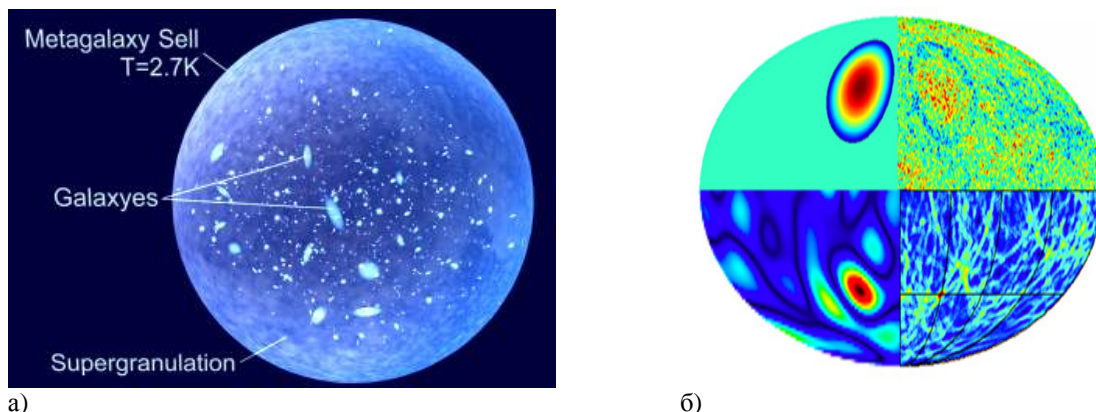
Figure 2. a) Our model of the Metagalaxy (1999). Wall of the Metagalaxy is transparent in the super-long radio waves. b) The most significant concentric circles of differential intensity of microwave radiation, obtained   by   processing   of   the   image   when   projected   onto   the   sphere http://modcos.com/images/articles/den/2011/12/1011.3706.pdf. The appearance of the diffraction circles due to the interaction with neighboring metagalaxies http://vixra.org/abs/1306.0014

Realization way

Namely hydrogen atoms (hydrogen radicals) are the main component of the solar surface. The gravitational fields of a proton and an electron form Laplace gravitational waves. With that, these waves are formed not only by hydrogen but also by all the atoms of other substances. The study of these waves in macro-quantum systems such as superfluid helium has shown that it is possible to obtain coherent-gravitational interaction of the undamped vortices. On the basis of this interaction we can create the transmitters/receivers of gravitational waves. This is the gravitational analogue of the laser. Of course, the gravitational field cannot be screened, therefore any gravitating object is "semitransparent" depending on the weight for such waves [5].

Found macro-quantum fundamental laws allow you to create a new class of unique instruments – coherent-gravity scanners – for research of any gravitating objects of any size – from a man to the planets. To increase the efficiency of gravitational effects we propose to use macro-quantum effects in liquid helium

Conclusion

Let us remember that the basic laws of physics, such as Kepler's laws of planetary motion, Newton's law of universal gravitation, laws of Coulomb, Ampere, Faraday, etc., were obtained experimentally, and to this day they do not follow from any of mathematical models. Construct a new picture of the world only on a mathematical basis, whatever it was attractive, is impossible. The way out of deadlock in the theory of gravity will be found only when they stop falsifying experimental data, contrary to accepted theories, and no longer silenced new experiments. In the words of Galileo - in matters of science the authority of thousands is not worth the simplest reasons than one.

Our reasons are simple:
- experimentally has not been confirmed so far the hypothesis about the equivalence principle for radicals and charged particles;
- movement of condensed matter at a speed exceeding 1/500 the speed of light is impossible [15]. And all the conclusions of special relativity and general relativity are based on experiments on elementary particles, rather than condensed matter;

- impossible to divide the Newtonian gravitational constant $\gamma = G_N M$ for the stars, as there are no experiments of Cavendish type for the stellar matter. It follows that all models of the stars and "black holes" are based on hypotheses;
- change in the sign of γ for Metagalaxy is impossible, because then the anti-gravitation occurs on a scale of Metagalaxy, therefore the force of gravity (attraction) between the galaxies are limited to a radius of galaxies. Hence the Big Bang is the impossible.
- Change of the sign of the gravitational constant leads to a violation of the equivalence principle both in the theory of Newton and in general relativity. Consequently, these theories are not legitimate in metagalactical scale.

These conclusions are fundamentally contradicting current models of stars and galaxies and completely refute the Big Bang theory.

Einstein's hypothesis about the extension of the relativity principles, and causality on all kinds of matter, for which *the speed of interaction* are limited to the speed of light, proved to be untenable. They are fundamentally contrary to the experimental data on space objects received more than 200 years ago by Laplace and his followers in our time, which show that the speed of gravitational interaction is many orders of magnitude greater than the speed of light. It was spend in vain enormous labor and resources to confirm general relativity. It can be argued that all that has no an experimental basis can be attributed to science fiction, hidden under the "elegant" mathematical equations. And no Nobel prizes and no other public forms of raising the status of scientists should not be an indulgence of errors. Comprehensive description of the general theory of relativity as one of the cornerstones of the world picture, gave Leon Brillouin: «General theory of relativity is a shining example of great mathematical theory built on sand and is a typical example of science fiction" [27].

We are going by the other way, based on the known experimental basis. As a result, we have been able to find the fundamental laws of quantum astronomy [5], which describes gravitation and electromagnetism as a unified manifestation of the properties of matter.

Of course, it is necessary to carry out further experimental studies of our findings. This can be done first in the systems of superfluid helium, and then move to study the effects of superfluidity macro-quantum radicals on the surface of the stars, and to study macroquantum effects in living organisms as well...

Only information can move into deep space in real time with a superluminal speed. In this case we do not need to travel physically anywhere. We can travel in space virtually and get actually new knowledge from the "Galactic Internet." We have to create it. What will it occur, it is difficult to say. One can only assume that it will be formed on the basis of the laws of macroquantum mechanics.

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