

The structure of vacuum solves problems of Astrophysics and Physics

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The summary *The structure of vacuum is open at research of the fact of formation of masses for electron and a positron by energy 1,022 MeV. A birth an electron and for the first time observed in 1933 in Wilson's camera placed in a magnetic field for division of tracks of electron and positron, and also Patrick Blekett who has received in 1948 for it and other opening the Nobel Prize on physics. It is now established [1,2], that the structure of vacuum is a source of gravitation, inertia, a source of a birth of all masses micro particles, a source of the electromagnetism known in a science and in practice. Our universe cannot exist and is normal function without this structure.*

1). Astrophysics has confirmed after 1998, that the universe possesses latent (without radiation) "dark" energy and a matter. Opening of structure of vacuum enables understanding specified "dark" energy and a matter of the universe. The basis for such statement is indissoluble connection of gravitation and the antigravitation responsible for "dark" energy [3]. The structure of vacuum has electromagnetic character and is formed by a crystal lattice with elementary charges in its units in value (+.-) **1,602176462e-19** Colombo and streams of a magnetic induction between charges in value $\Phi=4,8032042e-18$ Weber [1,2]. The lattice with the size of an element **1,3987631e-15** m carries out function of "dark" energy, the stream of a magnetic induction carries out function of a "dark" matter.

The size of a stream of a magnetic induction has connection with a known stream of a magnetic induction for copper pairs of electron and positron in the phenomenon of superconductivity:

$$\Phi = \Phi_q / \alpha^{-1} \pi = 4,8032042 \cdot 10^{-18} \text{ Weber (1)}$$

This fact is resulted only for an illustration of not casual connection of superconductivity with structure of vacuum.

The problem "dark" energy and a matter of the universe are solved.

2). A step of structure of vacuum in **37832** less radius of atom of hydrogen that explains impossibility of shielding of gravitation and other similar actions (use of electric intensity from charges of structure). It is rigidly connected to vacuum of the universe in which light is propagated and all micro particles move. Movement micro particles submit to the device of vacuum. Electron, negative muon, an antiproton move "under" charges (-), a positron, positive muon, a proton move "under" charges (+). As a result of a trajectory of movement of particles have the spiral form with

step of wave: $\lambda = \frac{h}{mV}$. Such movement is in the consent with thin splitting lines of radiation of atom of the hydrogen, investigated by Lamb. This splitting speaks certain fluctuations of vacuum. Actually the spiral trajectory along orbital movement of electron, creating small deviations of electron from an existing orbit, forms a physical basis for degradation of lines in a spectrum of radiation of atom. The length of electron is defined by structure of vacuum:

$$L(k) = 4\pi \cdot 1,3987631e-15 (1+1/137.03998) = 2.4261764e-12 \text{ m.}$$

Thin splitting of lines of radiation of atom of hydrogen is solved.

3). The neutron has two masses: a proton and electron, each of which moves "under" the charges. Thus instability of a neutron is created, and its "dumbbell" is stretched out under action of a proton in nucleus of substance, forming forces **gluon** like a stretching of rubber or a spring. **The problem of gluon in theoretical nuclear physics is solved.**

4). Any mass of particles is formed at entering necessary quantity of energy into structure by any form, including the colliders. Entering of energy into magnetic stream Φ causes a birth of any mass, known and not yet known particles:

$$m_i^\pm = \sqrt{\frac{\eta}{G}} \Delta_i \Phi^\pm. \quad (2)$$

The formula specifies that masses of particles and анти particles have different signs. And this circumstance very important: annihilation occurs not by charges of structure of vacuum, and but the masses which have been given birth from structure under opposite signs. The structure from charges remains firm and provides with one charge on absolute size all masses of particles. It is possible to assume, that mass which is formed of a part of a stream of a magnetic induction, has character of a rotor with opposite signs:

$$m^\pm = \xi \frac{e_o}{2\pi v r} rot^\pm \Phi$$

As a rule, all masses are formed by pairs: electron - positron, (+) muon - (-) muon, a proton - an antiproton. In physics there is an imagination about the reasons of absence of antistubstance in the universe. The structure of vacuum allows doing without such imagination. The neutron is formed of a antiproton, leaving a proton to exist for substance, and from a positron, leaving electron for substance. The neutron is necessary for formation of all nucleus of substance, it is more complex some hydrogen. In nucleus the neutron, being basically a source of electric forces **глюона**, fastens protons in complex nucleus. In a free condition in a neutron there is "transformation" of mass of an antiproton into mass of electron, and mass of a positron - into mass of a proton. The neutron breaks up to a proton, electron and antineutrino. Under such circuit there is a transformation of particles of antistubstance in particles of substance by replacement of mass of an antiproton by mass of electron and mass of a positron on mass of a proton, keeping thus a place of position in a charging lattice. It is necessary to recognize property of structure in formation and transformations of masses by unique property of the nature. **The problem of antistubstance is solved.**

5). One act of entering of huge energy $1.6712e+8$ joules is capable to create the maximal mass minimal on the size of a "black" hole [1]:

$$m_{\max} = \sqrt{\frac{\eta}{G}} \Phi = \sqrt{\alpha} m_{pl} = 1.859429541 \cdot 10^{-9} \text{ kg}. \quad (3)$$

Where m_{pl} - Planck's mass, $\alpha = 1/137.035998$ - a constant of thin structure.

This mass surpasses on many orders any mass particles, including hypothetical boson Higgs. Inertia anyone particles will inherit inertia of a part of a stream of a magnetic induction from which there was its formation. Inertia all magnetic phenomena it is well-known in physics. The structure of vacuum solves a problem of a birth of all masses of microparticles and inertia. There is no necessity for experiences on collision of microparticles. **The problem of a birth of masses of substance and inertia is solved.**

6). The structure of vacuum determines all phenomena of electromagnetism, starting from currents and finishing by all magnetic phenomena. Without structure of vacuum the electromagnetism, known to people, is impossible. The limit of a stretching of structure under external influence is

determined as **1,020726744e-17 m**. The relation of an element of structure to a limit of a stretching is precisely equal **137.035998 [1]**. **The law of the Nature is those.**

7). One of the main functions of structure is gravitation. It is generated by infringement of symmetry of charges (+) and (-) at which the size of a charge (+) is more on size a charge (-) on **7.8490194e-41 C**. [1]. Presence of any mass in structure makes its polarization which draws all masses to each other. Absence of masses or their big remoteness creates the "negative" pressure [3] known as the phenomenon of expansion by the universe's "dark" energy. The formula of Newton for force of gravitation gets a view:

$$F = G \frac{m_1 m_2}{R^2} = \xi (4\pi R)^2 \sigma_{12} \sigma_{21}, \quad (4)$$

Where polarization of structure of vacuum from one mass will be:

$$\sigma = \sqrt{\frac{G}{\xi}} \frac{m}{4\pi R^2} \quad \text{C./m}^2. \quad (5)$$

This polarization creates acceleration from force of gravitation:

$$g = 4\pi \sqrt{G\xi} \sigma \quad \text{M/c}^2 \quad (6), \quad \text{where} \quad \xi = \frac{1}{\epsilon_0} = 8.98755179 \cdot 10^9 \quad \text{- an electric constant of vacuum, return size of its electric permeability.}$$

The problem of gravitation and expansion of the universe is solved.

8). Planck's constant has a new spelling:

$$h = 2\pi e_0 \Phi \alpha^{-1} = 6.6260687652 \cdot 10^{-34} \quad \text{J*s.}$$

The new spelling precisely coincides with the found basic components of structure of vacuum: an electric charge, a stream of a magnetic induction and a constant of thin structure 137,035996. It means not only quantum radiation of a "black" body with growth of temperature, but also a new sight at Quantum Mechanics in which h plays a key role.

Specification of sense of a constant of Max Planck has taken place.

Conclusions

- Speed of gravitation in **3576,055 times more** speeds of light.
- Physical fields in the Nature are not present, they are thought up by physicists for an explanation of the natural phenomena which reason is unknown. All force interactions along with light are translated by material structure of the environment of vacuum.
- As the environment of vacuum has an electromagnetic structure light has electromagnetic character with **E** and **H** vectors connected through currents of displacement of charges of the environment of vacuum and answers representations by Maxwell. Gravitation, being propagated in structure of vacuum, has also an electric basis by a principle of polarization of structure by any mass.
- In this sense all world of the universe has an electromagnetic structure, beginning from structure of vacuum through the nature of gravitation and inertia up to electric structure of atoms and their component.

- A source of gravitation is electric a component of the environment of vacuum, a source of inertia is magnetic a component of the environment of the vacuum, inheriting well-known in physics inertia of the magnetic phenomena.
- Electric a component of structure of vacuum it is found out in the form of "dark" energy, magnetic a component concerns to a "dark" matter of the universe.
- Electric a component of structure of vacuum provides absolutely all masses of microparticles in size with a electrical charge (+.-) $1,602176462e-19$ C. This fact remains in physics without any interpretation. **It is the conclusive proof of a reality of the environment of structure of vacuum.**
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The literature

1. A.V. Rykov. Vacuum and substance of the universe // Restart, M.; 2007, 160 pp. (in Russian)
2. A.V. Rykov. Nature of Gravitation, arXiv.org> Physics> General Physics (Submitted on 18 Dec 2001), 7 p.
3. Davis Poll. Super force // "World", M., 1989, 271 pp.