Hypothesis about the natural reasons of stationary orbits of atom of hydrogen

A.V. Rykov [1]

In the world there is plenty of reviewed and not reviewed publications about a nature of gravitation. The nature of gravitation remains a secret for physicists. There was a situation when detection of this nature will be the key achievement of a science, which will present many sides of the physical phenomena in a new aspect. A. Einstein's theory is attempt of modeling of gravitation and inertia as the geometrical mechanism. In comparison with I.N'jutona's theory the step in the necessary direction is made. However there is a break between independent concepts of space — time and the substance having spatial and time characteristics. This break is stimulus for continuous searches of true nature of gravitation and inertia. The hypothesis stated by the author about a nature of gravitation [Rykov A.V., 2001] appeared so fruitful, that has allowed to consider from new point of view the device of electronic orbits of atoms on an example of the elementary atom - hydrogen.

Substantive provisions of the theory of gravitation and inertia

The theory is based on the well-known fact of "transformation" of a photon with energy $1\ MeV$ in a pair electron - a positron. It is necessary to warn, that there is a remarkable concurrence: energy of a photon almost precisely corresponds to existing definition of classical electron radius $R_e = \xi \dfrac{e_0^2}{m_e c^2} = 2{,}81794334 \cdot 10^{-15}\ [m]$, And energy

$m_e c^2 \approx 0{,}5\ MeV$. Concurrence derives natural suspicion on use by the author of the tautology, which are not having physical sense. But it not so by virtue of the skilled fact of transformation of a photon in a pair electron - a positron.. In paper [Rykov A.V., 2001] is received electric massles structure of physical vacuum with dipole distance

$$r_e = 1{,}3987632 \cdot 10^{-15}\ [m]$$

and extreme possible deformation of a dipole $\Delta r_{rb} = 1{,}02072687 \cdot 10^{-17}\ [m]$, double sum of which is precisely equal to classical electron radius. The reason that energy of a photon of " red border " for vacuum in 2 times is more than energy of electron and positron mass.

Other important circumstance of a hypothesis about a nature of gravitation is that the reason of an attraction of all bodies to each other is the weak difference of elementary charges (+) and (-) in a dipole. Under laws of Faraday induction and Coulomb forces all bodies are drawn to each other by a polarized charge of dipole structures of environment, and the inertia consists in property of environment to resist to any acceleration material body.

This extremely important environment of existence of substance in the Nature has allowed to publish the paper [Rykov A.V., 2003] which can be accepted as the partial program of development of physical knowledge of the device of the Nature.

Model of atom of hydrogen on N. Bohr

Let's address to sources of the beginnings of the Quantum Mechanics, put by N. Bohr (1885-1962) in the form of model of atom of hydrogen which has received brilliant confirmation in spectral researches of radiation of hydrogen. Briefly we shall remind substantive provisions of work of N. Bohr.

Electron Energy E in atom, proceeding from **classical** physics, develops from kinetic energy *T* and potential electric energy *U: E = T + U*. We shall note, that the classical physics by which the set of "sins" now is attributed has intruded area of a microcosm. Potential energy

$U = (-e_0)V$; A charge of a nucleus Ze_0 ; For circular movement:

$$\frac{mv^2}{r} = \frac{Ze_0^2}{r^2};\ \ E = T + U = \frac{mv^2}{2} - \frac{Ze_0^2}{r};\ \ \ mv^2 = \frac{Ze_0^2}{r};\ \ mv^2 = 2T = \frac{Ze_0^2}{r} = -U;\ \ T = -\frac{1}{2}U = -E$$

Full energy is negative. The allowed radiuses:

$$r = \frac{r^2 mv^2}{Ze_0^2}\frac{m}{m} = \frac{M^2}{Ze_0^2 m} = n^2\frac{h^2}{2\pi Ze_0^2 m}\ ;$$

Let's note interesting circumstance of occurrence of negative electron energy in atoms. This concept has arisen exclusively because of a negative sign of a electron charge which has the conditional character determined by the human. The specified formulas are written in system SGS. Translation of formulas in less confusing system of SI gives the following spelling:

$$U = \xi(-e_0)V [kg \cdot m^2 s^{-2}]; \quad mv^2 = \xi \frac{Ze_0^2}{r}[kg \cdot m^2 \cdot s^{-2}]; \quad r = \xi \frac{Ze_0^2}{mv^2}[m]; \quad r = \frac{M^2}{\xi Ze_0^2 m}[m];$$

$$r = n^2 \frac{h^2}{4\pi^2 \xi Ze_0^2 m_e}[m]; \quad r_1 = \frac{h^2}{4\pi^2 \xi e_0^2 m_e} = 5,29177245 \cdot 10^{-11}[m] \text{ - Radius of the first orbit in atom of}$$

hydrogen, $n = 1, 2, 3, \ldots$ - the quantum numbers appropriate to numbers of stationary orbits at hydrogen.
Everywhere in formulas there was an electric constant,

$\xi = 8,98755179 \cdot 10^9 [m^3 kg \cdot a^{-2} s^{-4}]$, which is return size of habitual electric permeability of vacuum.

So, the model of atom has come in the contradiction with existing then classical physics.
1. According to classics, electron, moving with centripetal acceleration, is obliged to radiate electromagnetic energy.
2. In atom there are stationary circular orbits on which there is no electron radiation, and they do not fall on a nucleus as a result of power consumption.

The conclusion is made that the beginnings of Quantum Mechanics contradict classical physics in micro world. There was a strange situation as a result of which the barrier in the physics studying a uniform and indivisible Nature has appeared. The quantum Mechanics finds rules of the device of a microcosm and does not answer such questions, - what do prevents radiation by electron, taking place on stationary orbits? Radiation or absorption of electromagnetic waves by electrons by electron in atoms occurs only at their transitions between stationary orbits.

Let's look that the environment of existence of substance gives classical physics and the Quantum Mechanics as the physical vacuum having electric structure, shipped in a magnetic (mass) continuum. In the main features, this environment answers the mechanical model used ingenious Maxwell at a conclusion of the formulas, trouble-free working till this moment. The important element of understanding of essence of inertia is its occurrence as resistance of dipole environments to the

accelerated movement $f = b\Delta r_a \sim ma$, where $b = \xi \frac{e_0^2}{\Delta r_{rb} r_e^2} = 1,155406 \cdot 10^{19}[kg \cdot s^{-2}]$ - electric elasticity of a

dipole of structure of vacuum,

Δr_a - deformation of a dipole of structure under action of force of inertia of a body of mass m and acceleration. The mark of proportionality ~ is used from understanding of that the body cooperates not with one dipole of structure, and with some of the domain of structure of vacuum. To remove apparent contradiction between classical physics and QM, the logic conclusion is necessary: electrons move in stationary orbits **without inertia**. Is not present centrifugal and there are no centripetal the forces creating classical acceleration. There are such orbits or ways of movement of particles (electrons) in structure of vacuum, which have no resistance to the accelerated movement. In this respect circular movement of electrons, having a charge (electric intensity) and the own magnetic moment, and also the magnetic moment of rotary movement, similarly to rotation of generator Roshchin - Godin [Roshchin V.V., Godin S.M., 2000] in which all specified elements exist. On experience of the generator there was a reduction of inertia and weight of a rotor.

Let's proceed to parameters of vacuum. The most important is that a Plank constant is completely defined by key parameters of structure of environment:

$$h = 2\pi e_0^2 \alpha^{-1} \sqrt{\xi/\eta} \ [J \cdot s].$$

The magnetic constant of vacuum here has appeared $\eta = 1 \cdot 10^7 [m^{-1} kg \cdot a^2 s^2]$ as return size of magnetic permeability and a constant of thin structure $\alpha^{-1} = 137,035999$. Substitution h in the formula for the first orbit of hydrogen gives

$$r_1 = \frac{1}{\eta} \frac{e_0^2 \alpha^{-2}}{m_e}.$$

The orbit depends on an elementary charge of structure of environment, its magnetic constant and the most fundamental value of our Universe - constant thin structure. It is possible to replace mass with other parameters of environment

$$m_e = \frac{1}{\eta} \frac{e_0^2}{2(r_e + \Delta r_{rb})};$$

2

In result we shall receive, that $r_1 = 2\alpha^{-2}(r_e + \Delta r_{rb}) = 5{,}29177245 \cdot 10^{-11}\,[m]$. The radius of the first orbit is defined only by size of constant thin structure and the basic metric characteristics of environment. Obviously, concurrence $R_e = 2(r_e + \Delta r_{rb})$, however there can be deviations of value

Δr from Δr_{rb}, because their full identity is not established. The remark on concurrence of classical radius with conclusions from equality energy of photon and a electron-positron was above given.

Under what conditions resistance of environment to acceleration is equal to zero? Probably only one: in a condition of inertia $f = b\Delta r_a \sim ma$ there is no acceleration and $\Delta r_a = 0$. It means, that movement of particles in general and electron in particular can occur so, that the particle does not cooperate with a lattice of vacuum, moving strictly on an existing exact circle or sphere of charges of one sign (for electron "-"). Thus there is neither gravitation, nor inertia. Gravitation and inertia arise only at movement of particles and macro bodies with crossing electronic structure of vacuum. For the particles moving from a charge to a charge of an identical sign, the curvilinear trajectory is generally characteristic as against movement of particles on the elected circular trajectories. Circular trajectories settle down on the sphere, which is taking place through charges of dipoles of one sign. A problem of a finding of spheres in a lattice of vacuum may be resolved on the basis of usual geometry in space. Curvilinear ways of particles associate with waves De Brogle $\lambda = h/mV$.

The simplest form of a trajectory will be spiral movement with small amplitude.

Conclusions

1. Is not present and should not be contradictions in classical physics and in its modern kind. The nature is uniform for all sections of a science. This unity is based on an inhabitancy of substance.
2. The structure of vacuum satisfies to conditions of KM in its very sources. It gives the decision of such problems as mechanisms of gravitation and inertia.

The literature

A.V. Rykov Hypotheses about a nature of gravitation // Letters in " the Physical idea of Russia ", the Moscow State University, MSU.; 2001, # 1, page 59-63.

Rykov A.V. The inhabitancy of substance in the Nature // New power, Open Company " Laboratory of New Faraday Technologies ", Saint Petersburg; 2003, # 3, page 12-14.

Rykov A.V. Medium For Existing of Matter in Nature // New Energy Technologies, Faraday Lab LTD, St-Ptb, 2003, #3 (12), p.12-14.

Roshchin V.V., Godin S.M. The experimental research of physical effects in dynamic magnetic system // *Letters in JTP*, 2000. V .26, # .24