MICROGEON REVIVAL

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Summary. That fact, that electromagnetic energy is allocated in processes connected with changing the status of substance allows to consider the substance as a convolution of this energy and quantums of electromagnetic field as splinters of substance. In physics there are examples (geon and microgeon), which serve as evidence of this fact. The author proves the concept of strong interrelation of the fource source holding quantums of electromagnetic field in a curtailed status. Convolutions of electromagnetic field in decimeter range being considered as light-weighted leptons permit to explain all the observable properties of fireball and mechanism responsible for its formation. The ordered structures from light-weighted leptons formed by electromagnetic wave-length of 12-16 microns make it possible to describe psi-phenomena as physical ones.

The "geon"term - gravitational-electromagnetic object - was first introduced by J. Willer in 1955 to designate a clot of photons holding in their own gravitational field. Geon may be considered as a theoretical example of a heavy object, containing no usual substance [1]. Accordingly, "microgeon" is an attempt to simulate an elementary microparticle taken from one ot two photons. B. Carter succeeded in obtaining the stable solution of gravitational Einstein's equation for photon with energy of 0.51 Mev. However, due to additional conditions for photon used by him to achieve such stability, the question was arisen how to realize such model in principal. [2]. At last, in 1974 A.Ya. Burinskiy [3] employed Kerr's metric to solve gravitational equation, thus removing some restrictions for initial photon, and to simulate all the measurable properties of electron, including mass, charge, spin and to determine the value of gyromagnetic ratio.

With rare exception, microgeonic models didn't find further development in scientific literature [4]. Two reasons should be mentioned to explain this fact. The first is internal and shows that stable solutions have been obtained with regard for the boundary of gravitational collapse, where the activity of physical laws proves to be questionable. The most decisive is the second reason consisting in monopoly of kwark-gluonic models of hadrons. As a rule, physicists try to simulate properties of microparticles putting kwarks together just as bricks, whilst microgeonic model provides the possibility of continuous spectrum of mass-particles like that inherent to the energy of photons.

In the course of elaborating kwark models there were principal difficulties. At present, their number is so great that even noted physicists have every reason to speak about bling alley in this trend of science. A new alternative model is urgently required to solve the problem.

Under consideration is such model, proposed as represented by microgeon, reno

vated in theoretical sense. Having remained its former name microgeon can be applicable again, because it doesn't need any more in gravitational collapse. We found quite another reason of its stability. To hold mass (m) of photon moving

with velocity of light (C) in circular trajectory of radius (r), centripetal force (F) is required as determined by the following expression:

$$F=mc^2/r \qquad (1)$$

Kompton radius is taken

$$r=\eta/mc$$

(2)

to express (mc)

$$F=\eta c/r^2 \qquad (3)$$

Using Dirack's identity

$$\alpha=e^2/\eta c$$

(4)

for the expression (3), it is possible to obtain the following:

$$F=e^2/\alpha r^2$$

(5)

At first sight, the expression (5) is found to be similar to that of Coulomb's law, but it is quite different in physical terms. As distinct from electrostatic interaction this expression is valid only in case of strictly definite value of radius (r) in expression (2). Using this value one finds the equation:

$$F=\frac{e^2C^2}{\alpha\eta^2}m^2 = const \cdot m^2)$$

(5′)

It means that every particle to be simulated requires the force allocated in definite radius of photon gyration. As seen from expressions (5) and (5"), with increasing the mass of particle under simulation the radius of centripetal forces is declined but its value becomes increased. These forces act only within the thin spherical layer, the thickness of which is associated with the non-monochromatization degree of photon movement in the orbit.

   According to expression (5) absolute value of centripetal forces seems to be by 137 times higher than Coulomb's one. Such forces are known in nature. So, in handbooks published by B.M. Yavorskiy and A.A. Detlaf before 1980, potential of these forces was named as Fermievian one and the proper forces as nuclear ones being found out in atomic nuclei. When comparing the force values given in reference books with the results obtained by means of proton microgeonic model one should notice that Kompton radius of proton and its independently measured dimensions reveal identical values. Thus, centripetal forces providing stable movement of photon in the orbit of Kompton radius for proton seems to be similar to those characteristic of internucleonic attraction. The latter, in its turn, allow to imaginate them as qualitatively identical to cohesive forces of soap-bubbles. In both cases it is possible to observe a common boundary at the contact place, resulted in decreasing the external surface both of soap-bubbles and microgeons, but the values of bond energy is determined by dimension of the decreased external surface. In case of microgeons this energy is allocated as electromagnetic field quantum or as

"splinter" of photon. These photons holding constant radius of gyration has spiral movement in figure of eight, in case of its interaction with two neighbouring photons - in figure of trefoil, etc. The nucleon-rich atomic nucleus may be represented in the form of many photons as a clot of photons, which is moving in trajectories of compound spatial curves, their curvature is always constant.

The publications mentioned above dealt with electron modelling. What "nuclear" forces are revealed by electron? According to expression (5") absolute value of forces capable to hold photon in orbit of Kompton radius of electron proves to be by 4 million times smaller than the nuclear one. The factual dimension of electron is determined just by Kompton radius, being confirmed through measurements of photons dispersion (y-quantum) in "immovable"electrons. The dimension measurements carried out with accelerated electrons cannot be regarded as those of immovable particles. In the fact, the moving model can be represented as a line of movement, mentaly divided into two parts, in one of which photon is moving towards the particle movement, in the other part it has quite opposite direction.

Using Doppler formula

$$\nu = \frac{\nu_0}{1-(v/c)\cos\theta} \qquad (6)$$

where   - is photon frequency in immovable microgeon,   - is an angle between the movements of the proper model and its separate parts, one should state that splitting of photon frequency and hence of its gyration radius occurs. Thus, the orbital velocity of microgeon is that the photon frequency increases by two times in one part of model being decreased by two times in the other part (due to symmetry of Doppler formula concerning multiplication procedure). Moreover, the energy of microgeon is increasing by 25%, i.e. inside of electron with energy of 125 ev a boundary appears, the dimension of which is by two times smaller than Kompton radius of immovable electron but about 80% of electron energy and mass are concentrated within this boundary. It is easy to be convinced that the increased value of electromagnetic energy calculated by Doppler formula for the moving microgeon becomes equaled to kinetic energy of simulating particle, which moves with the same velocity. Hence, increasing the electromagnetic energy inside the moving microgeon serves as evidence of inertia in the particle to be simulated.

It is supposed that such model should indicate wave properties as well. Indeed, it is known that two frequencies being combined reveal jumping or pulse, the frequency of which is equal to half-difference of frequency components:

$$\Delta\nu = \frac{\nu_0}{2}(\frac{1}{1-v/c} - \frac{1}{1+v/c}) \approx \frac{\nu_0 v}{c};$$

The wave-length of pulse is determined in the following way:

$$\lambda = \frac{c}{\Delta\nu} = \frac{c^2}{\nu_0 v} = \frac{h}{mv} \text{ (после подстановки } \nu_0 = \frac{mc^2}{h}) \quad (7)$$

The given equation known as Broul's formula helps judging about microgeons capable to simulate both wave and corpuscular properties of elementary particles.

The model is argued to be imperfect because it doesn't deal with concrete values of mass-particles. On the contrary, we think that the microgeon model may have an advantage of simulating particle-like formations of energy emanating from photon in order to explain properties of such enigmatic natural formation as a lightning ball. Let us assume the possibility of forming the microgeons within decimeter range of electromagnetic field. Nevertheless, so large and light-weigthed formations can be a source of elementary charge, spin equaled to 1/2 and great gyromagnetic ratio. As far as these particles are much smaller in mass as compared to electron to be regarded to leptons, in the text further they will be called as light leptons (LL). A clot of such leptons is formed in sinuous forked lightning when one of sinusoids becomes shortened during lightning discharge. In plasmic contour with the current conducting simultaneously in two directions, electromagnetic field occurs including the wave-length equal to the length of plasmic contour. In this contour like as in waveguide the electromagnetic field gets curtailed and owing to expression (2) forms a clot of leptons capable to exist independently thanks to forces allocated as it has been shown in expression [5]. The quantity of leptons with opposite charges is unequal. The excessive charge of lepton clot is compensated by opposite-charged ions from plasmic contour. Hence, lightning ball proves to be a clot of light-weigthed leptons with free ions. Its evolution can be explained as based upon the proposed model. Two pathways may be presented to show the cause of lightning ball occurrence: reproducing the natural effect of discharge through conductor of omega-like form disappeared in the process of discharge formation or synthesizing electromagnetic field in vortex formation through waveguides. The proposed model of lightning ball assumes its higher stability in vacuum. This allows to consider Tunguskiy formation as a result of lightning ball outbrust happened due to Jupiterian thunderstorm or due to discharge in solar protuberance [6].

Structures resembling closed waveguide may be found in tissues of living organisms. These are cellular membranes - multilayer little bags, external and internal surface of which is electroconductive because of available ions and the middle part is a fat-like dielectric. The fact is of interest that the circumference length of these bags is within the range of 10-20 microns. On the other hand, the body with temperature about 40 C has maximum emanation in the same range of wave-lengths. It is more interesting that the range of 12 - 16 microns is located in atmospheric window of Earth [7]. It would be reasonable to consider a part of human's heat emanating from cellular membranes to be in waveguides and to form an ordered structure comprising light leptons as an independent object. Membrane potentials are known as changed by different reasons: they become declined due to stress or disappear when the death comes. In the last case the ordered structure of light-weithed leptons cannot be hold being free from the body. Dielectric air permeability is lower than that of body, that is why dimensions of every light lepton are slightly enhanced and form common boundaries, i.e. they are connected with one another. Tentative calculations show that the bond energy of leptons makes up about 10%. When comparing it

with hundredth share of energy percentage taken for the bond between nucleons in atomic charges one should notice that the ordered structures prove to be relatively more stable than atomic nuclei; it means they are capable to bear higher acceleration and higher temperatures. In view of this, it is worthy of note that the similar and rather complicated structures may take place in nature. This is confirmed by discovery of S.R. Kurdyumov and A.L. Samarskiy [8] consisting in some stable fibrous structures, which may appear and develop in plasma of tokamaks - reactors of thermonuclear synthesis. The authors of the discovery explained evolution of such structures as based upon I.P. Prigozhin's idea [9] about dissipative structures in the energy flow. However, conditions close to tokamaks are also observed near the surface of stars, being hold during milliards years. What is the level of such structures developing with velocity observed in tokamaks? If it is true, the life on Earth existing on the basis of heavy and not mobile atoms in a slow flux of energy has been most likely realized by light leptons structure formed in the Sun being constantly hold thanks to solar energy.

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