Hidden Energy of a Particle (Body). Balance Energy

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Abstract. The energy of a particle (body) inside a quantized space-time has a hidden energy. When the speed of the particle is increased, the increase of the dynamic energy of the particle takes place as a result of the decrease of its hidden component, ensuring the balance of energy. As a result, the energy of a particle (body) is the energy turning into the real energy from its hidden form inside the quantized space-time. The hidden form of energy explains to us the reasons for the growth of energy when there is an increase in the speed of a particle (body). The source of energy of a particle (body) is the spherical deformation of quantized space-time which provides us with the equivalence of mass and energy. Mass has its birth from the quantized space-time. Mass is a bunch of energy of a spherically deformed quantized space-time. Mass is the energy of spherical deformation of the quantum density of the medium inside the quantized space-time. This fact was established and mathematically described by me in the theory of Superunification [1-8].

Keywords: hidden mass, hidden energy, spherical deformation, quantized space-time, equivalence of mass and energy, theory of Superunification.

In [1] we gave the formula of mass m balance for a particle (body) in the entire speed v range:

$$m = m_{max} - m_s = \gamma_n m_o \tag{1}$$

Formula (1) of the mass balance is including the following parameters of the particle (body):

Where m_{max} is the limit mass of a relativistic particle when it reaches the speed of light, kg:

$$m_{max} = m_0 \frac{R_S}{R_g} = \frac{C_o^2}{G} R_s \tag{2}$$

where m_0 is rest mass, kg;

R_S is radius of the gravitational boundery (the interface) between the regions of tension and compression (radius of the particle, body), m;

γ_n is normalized relativistic factor [2]:

$$\gamma_n = \frac{1}{\sqrt{1 - \left(1 - \frac{R_g^2}{R_S^2}\right)\frac{v^2}{C_o^2}}} \tag{3}$$

where $C_o^2 = 9 \cdot 10^{16}$ J/kg is gravitational potential of undeformed quantized space-time;

v is particle speed, m/s;

R_g is gravitational radius (without multiplier 2), m:

$$R_g = \frac{Gm_0}{C_o^2} \qquad (4)$$

where $G = 6.67 \cdot 10^{-11}$ Nm^2/kg^2 is gravitational constant.
Where m_s are hidden mass of the particle (body), kg:

$$m_s = \frac{C^2}{G} R_S \qquad (5)$$

where $\varphi_1 = C^2$ is gravitational action potential of deformed quantized space-time outside of the particle (body), J/kg.

Multiplying the mass balance (1) by C_o^2, we obtain the dynamic balance of the energy W of the particle in the entire range of speeds, including the speed of light:

$$mC_o^2 = m_{max}C_o^2 - m_sC_o^2 = \gamma_n m_o C_o^2 \qquad (6)$$

Or: $$W = W_{max} - W_s = \gamma_n W_o \qquad (7)$$

where W_0 is rest energy, J;

W_{max} is the limit energy of a relativistic particle when it reaches the speed of light, J:

$$W_{max} = W_0 \frac{R_S}{R_g} = \frac{C_o^4}{G} R_s \qquad (8)$$

where W_s is hidden energy, J:

$$W_s = \frac{C^2 C_o^2}{G} R_S \qquad (9)$$

Equation (7) includes the hidden energy W_s (9) of the particle as the imaginary component of quantized space-time. Consequently, the dynamic energy W (7) of the particle is determined by the difference between the limiting W_{max} (8) and hidden W_s (9) energies of this mass. With the increase of the speed v of the particle, the increase of the dynamic energy W (7) of the particle takes place as a result of the decrease of the hidden component W_s (9) of the particle, ensuring the balance (7) [1-8]:

$$W_{max} = W + W_s = \frac{C_o^4}{G} R_s = Const \qquad (10)$$

In the range of low speeds $v << C_0$, the normalized relativistic factor γ_n (3) changes to factor γ:

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{C_o^2}}} \qquad (11)$$

Formula (11) we can expandcan be expanded into a series and, rejecting the terms of higher orders, the balance (7) can be reduced to the well-known form:

$$W = W_{max} - W_s = \gamma_n W_o = m_o C_o^2 + \frac{m_o v^2}{2} \qquad (12)$$

As indicated by (12), the increase of the kinetic energy of the particle with the increase of the speed of the particle is equivalent to the increase of the dynamic mass of the particle, $m = W/C_o^2$.

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