Hidden Mass of a Particle (Body). Mass Balance

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Abstract. The mass of a particle (body) inside a quantized space-time has a hidden mass and a hidden energy. When the speed of the particle is increased, the increase of the dynamic mass of the particle takes place as a result of the decrease of its imaginary component, ensuring the balance of mass. As a result, the mass of a particle (body) is the mass turning into the real mass from its hidden form inside the quantized space-time. The hidden form of mass explains to us the reasons for the growth of mass when there is an increase in the speed of a particle (body). The source of mass of a particle (body) is the spherical deformation of quantized space-time. Mass has its birth from the quantized space-time. This fact was established and mathematically described by me in the theory of Superunification [1-7].

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

The mass of a particle (body) inside a quantized space-time has a hidden mass and a hidden energy. With increasing speed of a particle (body), we observe an increase in the mass and energy of the particle. We write down the increase in mass m through the normalized relativistic factor γ_n [1]:

$$m = m_0\gamma_n \tag{1}$$

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

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_S is radius of the gravitational boundery (the interface) between the regions of tension and compression (radius of the particle, body), m;
r is distance, m;
R_g is gravitational radius (without multiplier 2), m:

$$R_g = \frac{Gm_0}{C_o^2} \tag{3}$$

where $G = 6.67 \cdot 10^{-11}$ Nm^2/kg^2 is gravitational constant;
m is mass, kg;

Next, we substitute (2) into (1) at v = Co and we obtain the maximum mass in the limit for a relativistic particle:

$$m_{max} = m_0\frac{R_S}{R_g} \tag{4}$$

In view of (3), from (4) we obtain:

$$m_{max} = \frac{C_o^2}{G} R_S \tag{5}$$

Now we can write the dynamic balance of the gravitational potentials of the particle in the external region of the quantized space-time, characterizing the state in the entire range of speeds, including the speed of light C_0, and determining the limiting parameters of the mass m_{max} (5) and on reaching the speed of light $v = C_0$ [2]:

$$C_o^2 = C^2 + \gamma_n \varphi_n = Const \tag{6}$$

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

φ_n is Newton potential of the quantized space-time, J/kg:

$$\varphi_n = \frac{Gm}{r} \tag{7}$$

Multiplying (6) by R_S /G at $r = R_S$, we obtain the balance of the dynamic mass m (1) of the particle in the entire range of speeds in the quantized space-time:

$$C_o^2 \frac{R_S}{G} = C^2 \frac{R_S}{G} + \gamma_n \varphi_n \frac{R_S}{G} = Const \tag{8}$$

From (8) we obtain the mass balance of the particle (body) in the entire speed range:

$$m_{max} = m_s + m = Const \tag{9}$$

where m_s is the hidden mass of the particle (body), kg:

$$m_s = \frac{C^2}{G} R_S \tag{10}$$

From (8) we obtain the mass m of the particle (body) in the entire speed range:

$$m = m_{max} - m_s = \gamma_n m_o \tag{11}$$

Equation (11) includes the hidden mass m_s (10) of the particle, as the imaginary component of the quantized space-time. Consequently, the dynamic mass m (11) of the particle is determined by the difference between its limiting m_{max} and hidden m_s masses. When the speed of the particle is increased, the increase of the dynamic mass of the particle takes place as a result of the decrease of its imaginary component, ensuring the balance of (11). Physically, this takes place as a result of the fact that the alternating shell of the nucleon as a field grid traps inside larger and larger quantities of the quantons, increasing the quantum density of the medium inside the quanton as a result of reducing it on the external side, as shown in the gravitational diagrams [3, 4]. This increases the spherical deformation of the medium and, correspondingly, increases the mass of the particle [1-7].

References:

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