The gravitational potential of quantized space-time has a maximum value and is not equal to zero

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A quarter of a century ago, I found that cosmic vacuum has a maximum level of energy and it is characterized by a maximum value of the gravitational potential $\varphi_{1max} = C_o^2$. One of Newton's potential is not enough to describe the state of gravitational mass in a quantized space-time. It is necessary to take into account the maximum gravitational potential (4) in the equation of the balance of gravitational potentials inside the quantized space-time [1, 4].

The classical theory of gravity considers the cosmic vacuum as a continuum with zero energy level and zero gravitational potential. In this case, the gravitational field that creates the gravitational mass *M* is described by the Newtonian gravitational potential φ_n:

$$\varphi_n = -G\frac{M}{r} \qquad (1)$$

Where *G* is gravitational constant;
r is radius (distance).

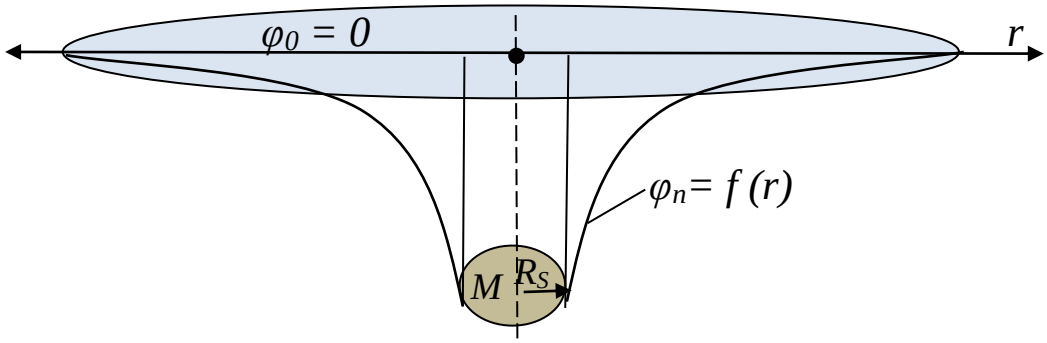

Fig. 1. An increase in the Newtonian gravitational potential φ_n as it approaches mass *M*.

Figure 1 shows the function of increasing the gravitational potential $\varphi_n = f(r)$ of mass *M* when approaching it. The module of the gravitational potential φ_{nmax} *(1)* with a minus sign reaches its maximum value on the surface of mass *M* at $r = R_S$*:*

$$\lfloor\varphi_{nmax}\rfloor = G\frac{M}{R_S} \qquad \backslash \qquad (2)$$

The radius R_S is the gravitational boundary of the medium in the theory of Superunification. But in the classical theory of gravity there is no medium and the cosmic vacuum is considered as an absolute void with zero energy and zero gravitational potential $\varphi_o = 0$ (Fig. 1). This deepest scientific error has been corrected in the theory of Superunification. It is established that the cosmic vacuum is a specific electromagnetic field of SEI with a maximum energy level and a maximum value of the gravitational potential $\varphi_{1max} = C_o^2$, where C_o is the

speed of light in vacuum. SEI is the superstrong electromagnetic interaction - the fifth fundamental force (Superforce), it is the global electromagnetic field of the universe [1, 2, 3, 4, 6].

To find the gravitational potential $\varphi_{1max} = C_o^2$ of cosmic vacuum it is necessary in field theory to use the Einstein's principle of equivalence between mass m_o and energy W:

$$W = \int_{\varphi_0=0}^{\varphi_1=C_0^2} m d\varphi = m_0 C_0^2 \qquad (3)$$

Integral (3) is a classical formula from field theory that shows that gravitational energy W is determined by the work of transferring mass from the region of the gravitational potential $\varphi_o = 0$ in the region of another gravitational potential $\varphi_{1max} = C_o^2$ (Fig. 3).

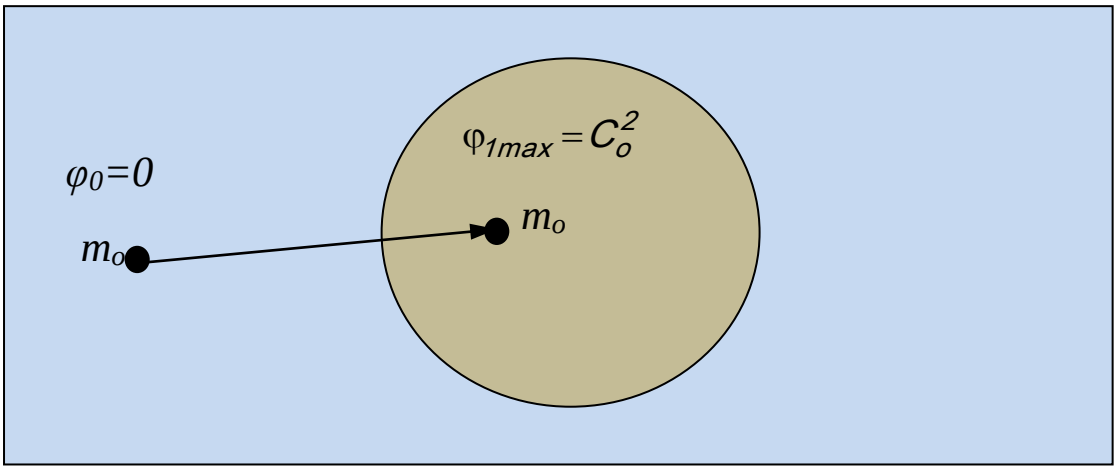

Fig. 1. Scheme for calculating gravitational energy W *(3)* for mass m_o transfer from infinity with zero potential $\varphi_o = 0$ to the region of maximum gravitational potential $\varphi_{1max} = C_o^2$

From Einstein's formula $W = m_0 C_0^2$ and the limits of integration (3) we obtain that the value of the gravitational potential of space vacuum is $\varphi_{1max} = C_o^2$:

$$\varphi_{1max} = C_o^2 \qquad (4)$$

One of Newton's potential φ_n (1) is not enough to describe the state of gravitational mass in a quantized space-time. It is necessary to take into account the maximum gravitational potential (4) in the equation of the balance of gravitational potentials inside the quantized space-time [1, 4].

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