The phenomenon of gravity in the framework of the submicroscopic approach

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Abstract

Using set theory, topology and fractal geometry Michel Bounias and the author constructed a mathematical lattice of primary topological balls, which became an actual model of the real physical space. In the lattice, the size of a ball can equal to Planck's length, 10^{-35} m. Such a mathematical lattice was named the ***tessellattice***.

A particle appears from a ball as a defect, though it should obey peculiar fractal rules. In the tessellattice, a ratio of the initial volume of a degenerate cell to the volume of the fractal contracted cell is identified with the physical notion of the particle mass. The particle moving though the lattice of cells rubs against ongoing cells, which results in the appearance of excitations around the particle. Obviously that these excitations relate to the field of inertia and that is way they named ***inertons***. In a condensed matter inerton clouds of different atoms overlap forming a common inerton cloud of the body studied. Since atoms vibrate near their equilibrium positions, the same behaviour is transmitted to the body's common inerton cloud. So, the body's inertons can be treated as an inerton gas that fills the whole object. For our case, mathematical physics gives the solution to the problem of the gas radial standing oscillations in the sphere studied in the form

$$m(r,\ t) = m_0 \frac{\text{const}}{r} \cos(\pi r/\Lambda)\cos(\pi t/T). \qquad (1)$$

For the fundamental harmonic the expression (1) is reduced to $m(r,\ t) \cong m_0\,\text{const}/r$, which describes the distribution of the deformation field around the body. In turn the expression can easily be presented as Newton's gravitational potential $U_0 = -Gm_0/r$.

Therefore, the Newton gravitation means an induction of a peculiar landscape around the mass m_0. When a small mass μ appears in the field of the potential U_0, the μ starts to move to the gravitational centre of the large mass m_0.

The Einsteinian gravity in addition takes into account a shift from the straight line on which the centres of masses m_0 and μ are located, i.e. general relativity supplements the Newtonian term with a hidden correction, such that the gravitation appears as $U = -\frac{Gm_0\,\mu}{r}(1 + v^2/c^2)$ where c is the speed of light and v is the tangential velocity of the small body with the mass μ. The shift $\delta r = r \cdot v^2/c^2$ is a declination of the moving mass μ from the mentioned straight line; r is the radius of the orbit of μ. The total gravitational energy U presented above allows the solution of four major problems difficult for Netwon's gravity, such as the motion of Mercury's perihelion, the deflection of starlight by the Sun, the gravitational redshift of spectral lines and the Shapiro time delay effect.

Introduced inertons solve the problem of dark matter. Inertons were experimentally revealed in a number of our experiments. Consequently, no general theory of relativity is needed anymore.