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Electromagnetic component of physical vacuum as a basic energy containing medium the ether of the universe: Phenomenology

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Today we can talk about a crisis of the modern astrophysics. The magnitude of the cosmological constant Λ , which in accordance with Einstein's equations of general relativity (GTR) is determined by the energy density ε_v of the physical vacuum, exceeds the experimentally determined value by 120 orders of magnitude if one uses the accepted ideas about the big bang dynamics for calculation. In the talk will be shown that the physical essence of emerging problems should first be understood at the level of the transcendental phenomenology. The ground for creating the corresponding phenomenological construction is an introduction into the physical science of a basic energy-containing medium, a sort of an ether, which is identified with the electromagnetic component of the physical vacuum – EM vacuum and which is considered as the basic reference system, tied to the expanding Universe. It is believed that the universe is an open system and the source of energy that feeds the universe is the external false vacuum, which is more energy-intensive than the EM vacuum of our Universe. It is assumed that the energetic power that constantly feeds our universe across the boundary the false vacuum – EM vacuum is equal to the Planck power. In this case, the energy flow entering the universe determines, after the Hubble equation is taken into account, the equation for the dynamics of the universe expansion (an analog of the first Friedmann equation), and the rate of the Universe volume increase determines the operating pressure. It is shown that the energy density ε_v^{calc} of the EM vacuum calculated on the basis of such representations is in full correspondence with the magnitude Λ (the solution of the 120 orders problem). In accordance with the general Casimir idea, all elementary particles and atomic nuclei in the Universe are open to the EM vacuum, and the Casimir polarization of the EM vacuum in the vicinity of each elementary particle or atomic nucleus is formed. It is shown that it is within the framework of such representations the essence of the gravity phenomenon and the origin of the unique smallness of the gravitational interaction in comparison with the nuclear (strong and weak) and electromagnetic interaction can be understood. It can be assumed that it is the wave propagation of the EM vacuum perturbation was recorded in the recent LIGO observation, and this disturbance could arise in the collision of two neutron stars or by some other large-scale events.

Recent Publications

1. Timashev Serge (2017) On the gravitational shielding phenomenon Physical Science International Journal 13(1)1-6.
2. Timashev Serge (2017) Metastable non-nucleonic states of nuclear matter: Phenomenology. Physical Science International Journal 15(2):1-25.
3. Timashev Serge (2014) Planckian energy-mass source and the dynamics of the universe: phenomenology. International Journal of Astrophysics and Space Science 2(3)33-45.
4. Timashev Serge (2015) Evaluation of the average energy density of the electromagnetic component of the physical vacuum and quantum nature of gravity. International Journal of Astrophysics and Space Science 3(4)60-64.
5. P Abbott et al. (2016) Observation of Gravitational waves from a binary black hole merger. Physical Review Letters 116:061102.

Biography

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