

# Physical vacuum as a system manifesting itself on various scales - from nuclear physics to cosmology

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Suggested here is an attempt to resolve on a phenomenological basis the most keenly discussed enigma of the Universe, namely, the essence of its base medium, "dark energy", which is usually associated with the physical vacuum and accounts for 73% of the energy content of the Universe. To what extent are this vacuum of the standard model of the dynamics of the Universe and the vacuum introduced to describe the phenomena of the microworld; i.e., the vacuum in chromodynamics and quantum electrodynamics, one and the same vacuum? And what is the reason for the catastrophic difference, "discrepancy of many orders of magnitude", between the cosmological constant values evaluated on the basis of the vacuum of the microworld and that of the macroworld? It has been demonstrated that a key point in the solution of the variety of the above problems should be the rejection of the standard model associated with a single-stage matter-generation process that had taken its course during the Big Bang. It turned out that the principal dynamics specificities of the expanding Universe could be due to the constant action of an energy-mass source of the Planck power, developed at the instant of the Big Bang. In that case, the well-known problems of the standard model of the dynamics of the Universe, associated with the introduction of such hypothetical entities as dark energy and dark matter, can be solved in a non-contradictory fashion on a phenomenological basis, and the paradox of the "discrepancy of many orders of magnitude" between cosmological constant values can be resolved.

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