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Dark energy due to quantum corrections to effective potential

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Inflationary expansion is one of the most promising models allowing one to describe the properties of the early Universe and its later development. In the simplest realisation of the inflationary scenario, it is generally assumed that after the Universe leaves the inflationary stage and post-inflationary reheating, it remains at minimum potential with a value of $\Lambda \sim 10^{-47}$ GeV^4 or 10^{-120} in Planck units.

In this work, we show that quantum corrections to some cosmological models [1,2] can lead to a significant modification of the behaviour of the initial potential and the appearance of a non-zero ground state energy of the Universe which can be interpreted as a cosmological constant.

We apply the formalism of the effective potential to the simplest forms of α-attractors which can be represented by the so-called T-models and E-models [3]. However, simpler models, say, such as arbitrary degree potentials, we have considered in [1].

We derived the generalised renormalisation group (RG) equations that sum up the whole sequence of leading logarithmic contributions to the effective potential. As a result, the accounting of quantum corrections leads to a change of character and a lift of the effective potential [4,5]. We interpreted this uplift as the appearance of the cosmological constant Λ for the T^2 and E^2 models.

Thus, we have found out that the cosmological constant Λ may exist as a consequence of quantum corrections to the effective potential with some value of the scale transmutation parameter μ even in non-renormalizable models of inflation. And the value of the cosmological constant Λ allows one to fix the parameter μ which is a free parameter in the non-renormalizable theory.

[1] D. I. Kazakov, R. M. Iakhibbaev, and D. M. Tolkachev. Leading all-loop quantum contribution to the effective potential in general scalar field theory. JHEP, 04:128,2023.

[2] D. I. Kazakov, R. M. Iakhibbaev, and D. M. Tolkachev. Leading all-loop quantum contribution to the effective potential in the inflationary cosmology. JCAP, 09:049,2023.

[3] Renata Kallosh, Andrei Linde, and Diederik Roest. Superconformal Inflationary α -Attractors. JHEP, 11:198, 2013.

[4] Tolkachev D. M., Kazakov D. I., Iakhibbaev R. M., and Filippov V. A. Quantum corrections to effective potentials of simplest ⊠-attractors. PoS, ICPPCRubakov2023:022,2024.

[5] D. I. Kazakov, R. M. Iakhibbaev, D. M. Tolkachev, and V. A. Filippov. Dark energy due to quantum corrections to effective potential. *In preparation.*

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