

The cosmological constant and the background reality in quantum-field theories with a cosmological constant

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Abstract

Canonical perturbative corrections in the quantum field theory with a cosmological constant are known to lead to non-perturbative effects, and there is a strong case for assuming that they are of the same order as those in the space of possible quantum-field theories. This assumption, however, is not consistent with the observation that the quantum field theory is perfectly compatible with the perturbative corrections. In this paper we show that the cosmological constant, which is the strongest perturbative term in the quantum field theory, is always of order the scaling dimension of the perturbative corrections. Moreover, by using non-perturbative corrections, we show that the real-time non-perturbative corrections are always of the order of the real-time perturbative corrections, in a non-perturbative case. This result is consistent with the observation that the quantum field theory is perfectly compatible with the perturbative corrections. This result can be unravelled at the level of the perturbative corrections.