

Stability of de Sitter spacetime against the backreaction of the infrared modes of scalar fields

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We study the back-reaction of the infrared modes of an $O(N)$ scalar theory in a classical de Sitter background. We use the nonperturbative renormalization group methods to extract analytically the flow of the Hubble constant as the gravitationally enhanced long wavelength modes are integrated out. For a massless theory, the interactions tend to renormalize negatively the Hubble constant, thus drawing energy from the classical gravitational field. This phenomenon saturates however, and unbounded loop corrections are screened by nonperturbative effects which stabilise the geometry.

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