

# Backreaction of the infrared modes of scalar fields on de Sitter geometry

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We study the back-reaction of the infrared modes of an  $O(N)$  theory in a classical de Sitter background. We use the nonperturbative renormalization group methods to extract the flow of the Hubble constant as we integrate the gravitationally enhanced long wavelength modes. The scalar theory flows towards an effective zero dimensional theory for the super-horizon modes, which allows to perform analytical computations. 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, due to the generation of a mass. Also, in the case of a broken symmetry, we show that the goldstone modes don't contribute to the flow.

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