

Abstract

Abstract(of the original paper): We propose a novel cosmological scenario, in which standard inflation is replaced by an expanding phase with a drastic violation of the Null Energy Condition (NEC): $\dot{H} \gg H^2$. The model is based on the recently introduced Galileon theories, that allow NEC violating solutions without instabilities. The unperturbed solution describes a Universe that is asymptotically Minkowski in the past, expands with increasing energy density until it exits the regime of validity of the effective field theory and reheats. This solution is a dynamical attractor and the Universe is driven to it, even if it is initially contracting. The study of perturbations of the Galileon field reveals some subtleties, related to the gross violation of the NEC and it shows that adiabatic perturbations are cosmologically irrelevant. The model, however, suggests a new way to produce a scale invariant spectrum of isocurvature perturbations, which can later be converted to adiabatic: the Galileon is forced by symmetry to couple to the other fields as a dilaton; the effective metric it yields on the NEC violating solution is that of de Sitter space, so that all light scalars will automatically acquire a nearly scale-invariant spectrum of perturbations.