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Small free field inflation in higher curvature gravity. (English) Zbl 1459.83039


Summary: Within General Relativity, a minimally coupled scalar field governed by a quadratic potential is able to produce an accelerated expansion of the universe provided its value and excursion are larger than the Planck scale. This is an archetypical example of the so called large field inflation models. We show that by including higher curvature corrections to the gravitational action in the form of the Geometric Inflation models, it is possible to obtain accelerated expansion with a free scalar field whose values are well below the Planck scale, thereby turning a traditional large field model into a small field one. We provide the conditions the theory has to satisfy in order for this mechanism to operate, and we present two explicit models illustrating it. Finally, we present some open questions raised by this scenario in which inflation takes place completely in a higher curvature dominated regime, such as those concerning the study of perturbations.

MSC:
83D05 Relativistic gravitational theories other than Einstein’s, including asymmetric field theories
83F05 Relativistic cosmology
83C45 Quantization of the gravitational field

Keywords:
classical theories of gravity; models of quantum gravity

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References:
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