

Inflationary universe from higher-derivative quantum gravity

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Abstract

© 2015 American Physical Society. We consider higher-derivative quantum gravity where the renormalization-group-improved effective action beyond the one-loop approximation is derived. Using this effective action, the quantum-corrected Friedmann-Robertson-Walker (FRW) equations are analyzed. The de Sitter universe solution is found. It is demonstrated that such a de Sitter inflationary universe is unstable. The slow-roll inflationary parameters are calculated. The contribution of the renormalization-group-improved Gauss-Bonnet term to the quantum-corrected FRW equations as well as to the instability of the de Sitter universe is estimated. It is demonstrated that in this case, the spectral index and tensor-to-scalar ratio are consistent with Planck data.

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