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Effects from canonical quantum gravity for slow-roll inflationary models

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The power spectrum of inflationary gauge-invariant perturbations is computed in the context of canonical quantum gravity for generic slow-roll models. A semiclassical approximation, based on an expansion on inverse powers of the Planck mass, is applied to the complete Wheeler-DeWitt equation describing a perturbed inflationary universe. This expansion leads to a hierarchy of equations at consecutive orders of the approximation and allows us to write down a corrected Schrödinger equation that encodes information about quantum-gravitational effects. The analytical dependence of the correction to the power spectrum on the wavenumber is obtained. Nonetheless, some numerical work is needed in order to obtain its precise value. Finally, it is shown that the correction turns out to be positive, which leads to an enhancement of the power spectrum especially prominent for large scales.

Summary

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