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How does canonical quantum gravity affect scalar and tensor perturbations during inflation?

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We calculate corrections originating from canonical quantum gravity to the power spectra of gauge-invariant scalar and tensor perturbations during inflation. This is done by performing a semiclassical Born–Oppenheimer type of approximation to the Wheeler–DeWitt equation, from which we obtain a Schrödinger equation with a quantum-gravitational correction term. We perform our calculation both for a de Sitter universe as well as for a generic slow-roll model. The quantum-gravitational correction term leads to a modification of the power spectra on the largest scales, which is too small to be measurable, and we find a correction to the tensor-to-scalar ratio at the second order in the slow-roll parameters. We also compare these findings with results that were obtained in this context using just scalar-field perturbations in a non-gauge-invariant way.

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