

# Quantum Cosmology and the Cosmic Microwave Background

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## ABSTRACT

*Our current understanding of the early universe rests on general relativity, and therefore it excludes the earliest stages of cosmic evolution when energy density and curvature invariants approach the Planck scale.*

*This talk provides an overview of the way a concrete approach to quantum cosmology, based on loop quantum gravity, can be used to address in a precise manner issues that have been open both for the background geometry and perturbations. These include a quantum gravity treatment of the Planck regime from which inflation arises, and a clarification of what the trans-Planckian problems are and what they are not. In addition, this approach provides examples of effects that may have observational implications, and may provide a window to test the basic principles on which this approach to quantum gravity rests.*