

Abstract Submitted
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Pre-inflationary Dynamics of the Universe in Loop Quantum Cosmology ANZHONG WANG, Baylor Univ — Loop quantum cosmology (LQC) provides an elegant resolution of the big bang singularity by a quantum bounce in the deep Planck era. In this talk, we shall first give a brief review on LQC, and then present our recent results on the investigations of the pre-inflationary dynamics of the universe from inflation down to deep Planck regime. In particular, I shall show that the evolutions of both the flat FLRW background and its linear (scalar and tensor) perturbations are universal during the pre-inflationary phase and can be given analytically, provided that the universe was initially dominated by the kinetic energy of the inflaton at the quantum bounce. We calculate the corresponding Bogoliubov coefficients at the onset of the slow-roll inflation, which are valid for any inflationary models with a single scalar field, and show that particles are generically created during the pre-inflationary period. Matching them to those in the slow-roll inflationary phase, we investigate the effects of the quantum bounce on the power spectra and find features that can be tested by current and forthcoming observations. In particular, to be consistent with the Planck 2015 data, we find the constraints of the theory.

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