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Impact of a quantum gravity bounce on cosmological perturbations

Tuesday 23 May 2023 15:15 (15 minutes)

In this talk we will explore a phenomenological avenue to connect quantum gravity to cosmological perturbations. Namely, we will discuss the impact of a modified Friedmann equation on the evolution of gauge invariant perturbation variables. Such Friedmann equations may arise from quantum gravitational theories such as Loop Quantum Cosmology (LQC) or Group Field Theory (GFT) and in these cases give a bouncing universe. To maintain generality, we employ the separate universe framework, which allows to study possible alterations independent of a description of inhomogeneities in the quantum framework. We identify two types of modifications to the Friedmann equation; one leaves the dynamics of perturbations unaltered (LQC), whereas the other can introduce a behaviour that differs from general relativity (GFT). Finally, we will examine the possibility to go beyond the separate universe framework by studying inhomogeneous quantities in GFT.

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