Contributed Talk

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Title: Relativistic vs. loop quantum effects in the primordial power spectrum

Abstract: We present an analytical study of the main imprints that a fast-roll pre-inflationary regime in General Relativity and in Loop Quantum Cosmology can leave on the primordial power spectrum of scalar and tensor perturbations. In particular, effective regimes of Loop Quantum Cosmology of phenomenological interest display a classical epoch of decelerated expansion prior to a short-lived period of slow-roll inflation. The equations that evolve this cosmology backwards in time eventually depart from Friedmann equations and describe a bounce of quantum origin. In order to extract robust predictions from these epochs when quantum cosmology effects may have been important, it is of the utmost importance to disentangle their imprints on the evolution from those coming from the fast-roll regime. The possibility of clearly understanding these differences depends strongly on the choice of initial conditions (i.e., the vacuum state) of the perturbations. We consider the same physical motivation for the choice of state in both types of cosmological backgrounds (relativistic and of loop quantum origin). Then, after performing a series of analytic approximations, we extract the main differences between the resulting power spectra and explain their fundamental origin.