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Distinguishing cosmological models through quantum signatures of primordial perturbations

In this talk, I discuss the evolution of various measures of quantumness of the curvature perturbation by integrating out the inaccessible entropic fluctuations in the multi-field models of inflation. In particular, I discuss the following measures of quantumness, namely purity, entanglement entropy and quantum discord. The models being considered in this talk are ones that produce large scale curvature power spectra similar to those produced by single-field models of inflation. More specifically, I consider different multi-field models which generate nearly scale invariant and oscillatory curvature power spectrum and compare their quantum signatures in the perturbations with the corresponding single-field models. I will show that, even though different models of inflation may produce the same observable power spectrum on large scales, they have distinct quantum signatures arising from the perturbation modes. This may allow for a way to distinguish between different models of inflation based on their quantum signatures.

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