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Decoherence of Primordial Perturbations and Maldacena's Consistency Condition

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Supported by observational evidence indicating that cosmological scalar perturbations were nearly Gaussian at the beginning of the universe, it is anticipated that the origin of these perturbations is quantum fluctuations. Consequently, cosmic inflation provides a valuable setting for testing the quantum nature with/of gravity. Quantumness is characterized by features such as quantum coherence, quantum entanglement, and quantum incompatibility of measurements, all of which are sensitive to the specific setup of the observation. The quantum correlations between observable system and environment during inflation is induced by gravitational non-linearities. In this work, we provide a convenient way to calculate the decoherence using Maldacena's consistency condition. Furthermore, we discuss several consequences arising from taking into account all the interactions in the same perturbative order, such as regularization of divergences, the local observer's effect, etc.

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