Contribution ID: **126** Type: **not specified**

A Semi-analytic Approach for Curvaton Scenario

Thursday 12 December 2024 16:58 (17 minutes)

Curvaton mechanism provides an alternative way to explain the origin of the observed primordial scalar fluctuations in the Cosmic Microwave Background (CMB) radiation. In this scenario, the curvaton is a scalar field which nearly remains frozen during inflation but produces isocurvature perturbations. It starts to evolve after the end of inflation, and at the time of it's decay it converts the isocurvature perturbations to the observed scalar fluctuations. The estimation of the CMB observables i,e the scalar power spectrum and bispectrum relies on the form of curvaton potential. For a quadratic curvaton potential the observables can be estimated analytically, but for a non-trivial potential numerical methods are required. Though analytical methods are applied to deal with the non-trivial potentials, these methods often approximate that the energy density of the curvaton behaves similar to that of a quadratic potential. In this talk we will present an alternative semi-analytic method to deal with general curvaton potential, which is based on the δN formalism. Our method is more precise than the existing methods and known results can be reproduced in the quadratic limit.

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Session Classification: Parallel Session