

JOINT TUFTS/MIT COSMOLOGY SEMINAR

A Bumpy Start to a Smooth Ride: Onset of Inflation amid Backreaction from Inhomogeneities

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We analyze the onset of inflation for a simple single-field model when the system begins with significant inhomogeneities on length-scales shorter than the initial Hubble radius. We incorporate certain nonlinear interactions among the coupled degrees of freedom by using the nonperturbative Hartree approximation. Consistent with recent, more computationally intensive numerical-relativity studies, we find inflation to be robust for large-field models, even when the system begins with significant structure on sub-Hubble scales. We consider the space of initial conditions $(\varphi(t_0), \dot{\varphi}(t_0))$, where φ is the vacuum expectation value of the quantized field that drives inflation. Although some regions of $(\varphi(t_0), \dot{\varphi}(t_0))$ that would have yielded sufficient inflation in the absence of inhomogeneities fail to do so when backreaction from inhomogeneities is incorporated, an equal volume of such regions succeeds in producing sufficient inflation which did not do so in the absence of inhomogeneities. For large-field models, in other words, the total volume of the space of initial conditions $(\varphi(t_0), \dot{\varphi}(t_0))$ that yields sufficient inflation is *conserved* when we incorporate nonlinear backreaction from inhomogeneities, compared to the case in which inhomogeneities are neglected. (Based on arXiv:1906.08651.)

Tuesday, November 12, 2019, 2:30 pm

Cosman Seminar Room

Center for Theoretical Physics

Building 6C, Room 6C-442

Massachusetts Institute of Technology

Refreshments at 2:00 in the same room