Constraining Power Spectra of Cosmic Inflationary Scenarios by Small Scale Observations

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Abstract:

We review the power spectrum of cosmic perturbations during primordial inflation. The most remarkable common feature of various inflation models is that the power spectrum can be matched with large scale observations such as cosmic microwave background (CMB). One of the possible ways of specifying the primordial inflation is to study its predictions on small scales by the relevant observations such as CMB spectral distortions and structure formations. In this talk, we consider scenarios with having enhancement or suppression of power spectrum on small scales. Frist, we discuss thermal inflation scenario motivated by moduli problem in the context of supersymmetric cosmology. The power spectrum is suppressed on small scales, and it can be tested by CMB spectral distortions and substructure of galaxies which might be related with the missing satellite problem. Second, we consider a multiple inflation scenario with an intermediate matter-dominated phase. The power spectrum is enhanced on small scales, but is constrained severely by CMB and its spectral distortions.