

Updated Constraints on Infrared Cutoff Models and Implications for CMB-BAO Tension

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The nearly scale-invariant primordial power spectrum provides the standard initial conditions for cosmological perturbations. However, the largest observable scales remain only weakly constrained by current CMB measurements, leaving open the possibility of deviations from scale invariance, such as an infrared (IR) cutoff in the primordial spectrum. This possibility is further motivated by the persistence of large-scale CMB anomalies, most notably the low quadrupole power. Recently, IR cutoff scenarios have attracted renewed attention due to their potential interplay with reionisation features, which can partially alleviate the emerging CMB-BAO discrepancy within the Λ CDM framework following recent DESI observations. In this talk, I will discuss our recent work where we revisited several broad classes of phenomenologically motivated IR cutoff models using parametrised forms of the primordial power spectrum. I will present updated constraints on IR cutoff scenarios from recent CMB observations, discuss their implications for the CMB-BAO discrepancy, and comment on the status of large-scale CMB anomalies from a Bayesian perspective of anomaly statistics.

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