

An Effective Cosmological Collider

Tuesday, 7 May 2024 11:40 (10 minutes)

An upcoming suite of cosmological probes of large-scale structure poses a unique opportunity to search for physics beyond the Standard Model. Particles with masses of order Hubble during inflation create a distinct, oscillatory signal in the squeezed limit of the bispectrum. Fully leveraging this property to uncover new physics, a pursuit known as the “cosmological collider”, necessitates a comprehensive understanding of contributing operators and their effects. In this talk, I’ll introduce our work that initiates a systematic study of operator redundancies in inflationary spacetime. We establish a minimal operator basis for an archetypal example, an abelian gauge-Higgs theory that couples to the inflaton. Working up to dimension 9, we show that certain lower-dimensional operators are entirely redundant and identify new non-redundant operators with potentially interesting cosmological collider signatures. We expect particular reliance on 21 cm probes to distinguish them.

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Session Classification: Session 6