Contribution ID: **1323** Type: **Cosmology**

Classical Cosmological Collider Physics

Monday 24 May 2021 14:15 (15 minutes)

Massive field excitations during the inflationary era, imprinted on cosmological correlation functions, have been studied as a unique opportunity to probe heavy degrees of freedom beyond the terrestrial colliders. In the simplest inflationary models, any such *cosmological collider signal* is exponentially suppressed for fields much heavier than the inflationary Hubble scale, limiting the potential reach of such new physics searches. We show that existence of high-frequency classical oscillations can resonantly enhance heavy field signals. In particular, we study two concrete examples of such classical oscillations: (i) coherent oscillation of another massive field, classically excited due to a sharp feature in a generic multi-field scenario, and (ii) sub-dominant oscillations of the inflaton itself, as a result of periodic features on the inflationary potential.

Summary

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Session Classification: Cosmology I