2021 Meeting of the Division of Particles and Fields of the American Physical Society (DPF21)

Contribution ID: **367** Type: **talk**

Cosmological collider physics beyond the inflationary Hubble scale

Tuesday, 13 July 2021 14:45 (15 minutes)

The cosmological collider physics program aims at probing particle physics at energies as high as the inflationary Hubble scale, $H \leq 10^{13}$ GeV, using precision measurements from CMB, large scale structure surveys, and 21-cm cosmology. Heavy particles produced during inflation can impart unique correlations in the density fluctuations across the sky, leading to non-gaussianity (NG) in the cosmological observables. This presents a unique opportunity for the "direct detection"of particles with masses as large as H. However, the strength of this signal drops exponentially due to a Boltzmann-like factor as masses exceed H. In this talk, I will discuss a mechanism that overcomes this suppression and broadens the scope of cosmological collider physics, focusing on the case of a massive complex scalar field. The mechanism allows us to harness large kinetic energy of the inflaton to produce particles with masses as large as $\sim 60H$. I will show that NG with $f_{\rm NL} \sim calO(0.01-10)$ can be obtained, and delineate a procedure to infer the mass of the heavy field from the signal.

Are you are a member of the APS Division of Particles and Fields?

No

Primary authors: BODAS, Arushi; SUNDRUM, Raman; KUMAR, Soubhik (UC Berkeley)

Presenter: BODAS, Arushi

Session Classification: Astoparticles and CMB

Track Classification: Astroparticles & CMB