

# Theoretical Physics Seminar

Monday, September 16, 2019 / Pupin Hall Theory Center, 8<sup>th</sup> Floor / 2:10 PM

**Soubhik Kumar - University of Maryland**

**"Primordial Non-Gaussianity as a probe of (ultra high-energy) gauge theories"**



Future measurements of primordial non-Gaussianity (NG) can reveal the mass and the spin information of cosmologically produced particles with masses of order the inflationary Hubble scale,  $H_{\text{inf}}$ , which can be as high as  $10^{13}$  GeV. In this talk, I will describe how such NG measurements can be used as an on-shell probe of, a) Grand Unified Theories and, b) low scale gauge theories that get “heavy-lifted” to  $\sim H_{\text{inf}}$  scales. I will also discuss a simple alternative to the standard inflationary paradigm, involving a curvaton field, that can allow NG signals orders of magnitude larger compared to standard inflation. This brings various motivated particle physics signatures, such as loops of heavy gauge-charged scalars and fermions, within future observational reach.