Contribution ID: **157** Type: **not specified**

Effect of Trans-Planckian Environment on Primordial Spectra and Non-Gaussianity

Tuesday, September 12, 2023 5:10 PM (20 minutes)

We investigate the impact of stochastic quantum noise due to trans–Planckian effects on the primordial power spectrum for gravity waves during inflation. Given an energy scale Lambda, expected to be close to the Planck scale m_Pl and larger than the Hubble scale H, this noise is described in terms of a source term in the evolution equation for comoving modes k which changes its amplitude growth from early times as long as the mode physical wavelength is smaller than Λ^{-1}. We model the source term as due to a gas of black holes in the trans–Planckian regime and the corresponding Hawking radiation. In fact, for energy scales larger than, or of the order of Lambda, it is expected that trapped surfaces may form due to large energy densities. At later times the evolution then follows the standard sourceless evolution. We find that this mechanism still leads to a scale-invariant power spectrum of tensor perturbations, with an amplitude that depends upon the ratio Λ/m_{Pl}. This result is compatible with recent observations and can allow the slow-roll parameter space to scan a new range of values. Finally, we also discuss, for a more general model, the forecast on the primordial tensor non-gaussianity in the presence of stochastic sources.

Primary authors: Prof. MANGANO, Gianpiero (Università di Napoli Federico II & INFN Sezione di Napoli); Dr FASIELLO, Matteo (IFT - Madrid); CIELO, Mattia (Istituto Nazionale di Fisica Nucleare); Prof. PISANTI, Ofelia (Università di Napoli Federico II & INFN Sezione di Napoli)

Presenter: CIELO, Mattia (Istituto Nazionale di Fisica Nucleare)

Session Classification: COS: Cosmology

Track Classification: Cosmology