



Contribution ID: 60

Type: **Highlight talk**

## Effect of Trans-Planckian Black Holes on primordial spectra

*Tuesday, 20 June 2023 18:00 (10 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  $m_{\text{Pl}}$  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  $\Lambda^{-1}$ . 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  $\Lambda/m_{\text{Pl}}$ . 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

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**Session Classification:** Session 8