New Horizons in Primordial Black Hole physics (NEHOP)



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## Primordial black holes from dissipative effects during inflation

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Coupling the inflaton field to light degrees of freedom can lead to the former dissipating its energy into a thermal bath. The temperature fluctuations of this bath act as a source for inflaton perturbations. This can potentially lead to an enhancement of the primordial power spectrum  $\mathcal{P}_{\mathcal{R}}$  and the subsequent increased production of primordial black holes (PBHs). We propose a reliable method to compute the thermally-enhanced  $\mathcal{P}_{\mathcal{R}}$  based on a Fokker-Planck equation, and verify its consistency with a Monte Carlo approach and a fully analytical approximation based on the Green's function method. We observe that a strong, transient dissipative phase during inflation increases the predicted abundance of asteroid-mass PBHs, which could account for the totality of the dark matter in the Universe. The proposed method can also be applied to the calculation of CMB observables ( $A_s$ ,  $n_s$ , tensor-to-scalar ratio), allowing to probe dissipative inflation models both at small and large scales.

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