Contribution ID: **43** Type: **not specified**

Inflationary and Gravitational Wave Signatures of Small Primordial Black Holes as Dark Matter

Wednesday 21 May 2025 16:50 (20 minutes)

Mounting evidence suggests that the semi-classical description of a black hole breaks down at the latest after losing an $\tilde{}O(1)$ fraction of its mass. As a result, effects such as memory burden can slow down evaporation so that small primordial black holes (PBHs), in particular those in the mass range $\tilde{}10^6$ g to $\tilde{}10^9$ g, become viable dark matter candidates. I will present our investigation into the production of PBHs from a prototype model of polynomial inflation with a non-minimal coupling to gravity and demonstrate that a sufficiently small PBH mass alleviates any tension with CMB observations. Furthermore, I will present bounds on the scalar-induced stochastic gravitational wave (GW) background generated by small PBH formation. Whilst we identify some prospects for observation with future GW detectors, I will highlight the need to develop new experiments for high-frequency GW detection in the $\sim$kHz to $\sim$MHz range.

Based on:
Inflationary and Gravitational Wave Signatures of Small Primordial Black Holes as Dark Matter. W. Barker, B. Gladwyn and S. Zell, https://arxiv.org/abs/2410.11948, accepted for publication in Phys. Rev. D

Authors: GLADWYN, Benjamin (University of Oxford (GB)); ZELL, Sebastian (LMU Munich); BARKER, Will (Institute of Physics of the Czech Academy of Science)

Presenter: GLADWYN, Benjamin (University of Oxford (GB))

Session Classification: PBHs and GWs