

New Horizons in Primordial Black Hole physics (NEHOP)



Contribution ID: 6

Type: **Talk**

Gravitational wave signatures from magnetised supermassive primordial black holes

Wednesday, 21 June 2023 15:20 (20 minutes)

Primordial black holes (PBH) can account for a wide variety of cosmic conundra, among which the origin of primordial magnetic fields. In this talk, we consider supermassive PBHs furnished with a disk due to the vortexlike motion of the primordial plasma around them at the epoch of their formation, proposing at the end a novel natural ab initio mechanism for the generation of a battery induced seed magnetic field (MF) which can be later amplified by various dynamo/instability processes and provide the seed for the present day MF on intergalactic scales. Then, we derive the gravitational-wave (GW) signal induced by the magnetic anisotropic stress of such a population of magnetised PBHs, checking its detectability by future GW detectors. Finally, by avoiding GW overproduction we set upper bound constraints on the abundances of supermassive PBHs Ω_{PBH} as a function of their mass, which are comparable with constraints on Ω_{PBH} from large-scale structure probes; hence promoting the portal of GWs induced by magnetised PBHs as a new probe to explore the enigmatic nature of supermassive PBHs.

Primary author: Dr PAPANIKOLAOU, Theodoros (National Observatory of Athens)

Presenter: Dr PAPANIKOLAOU, Theodoros (National Observatory of Athens)

Session Classification: Session 11