

# Gravitational wave signatures of “magnetised” supermassive primordial black holes

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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 vortex-like motion of the primordial plasma around them at the epoch of their formation. Interestingly enough, we find 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. We also 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 as a function of their mass, which are comparable with constraints on from large-scale structure probes; hence promoting the portal of magnetically induced GWs as a new probe to explore the enigmatic nature of supermassive PBHs.

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