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Unravelling the Mystery of Dark Matter with Black Holes

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Primordial black holes (PBHs), possibly formed via gravitational collapse of large density perturbations in the very early universe, are one of the earliest proposed and viable dark matter (DM) candidates. PBHs can make up a large or even entirety of DM density over a wide range of masses. Ultralight PBHs in the mass range of 10^{15} - 10^{{17}}</sup> g, emit particles via Hawking radiation, act as a decaying DM, and can be probed via observations of those emitted particles in various space as well as ground based detectors. In this talk, I will discuss how diffuse supernova neutrino background searches at the Super-Kamiokande neutrino observatory, measurement of the 511 keV gamma-ray line by INTEGRAL telescope, observations of low energy Galactic Center photons by the imminent soft gamma-ray telescope AMEGO, and EDGES measurement of the global 21-cm signal can set robust, world-leading exclusions on the fraction of DM composed of ultralight PBHs.

Author: Mr RAY, Anupam (Tata Institute of Fundamental Research, India)Presenter: Mr RAY, Anupam (Tata Institute of Fundamental Research, India)Session Classification: Dark Matter

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