Contribution ID: **324** Type: **Plenary**

Hearing the Universe Humm with Pulsar timing array: Gravitational Waves and Primordial Black Holes from beyond SM

Thursday 17 October 2024 12:05 (25 minutes)

We will discuss interpretation of the nHz stochastic gravitational wave background (SGWB) seen by NANOGrav and other Pulsar Timing Array (PTA) Collaborations in the context of supermassive black hole (SMBH) binaries. The frequency spectrum of this stochastic background is predicted more precisely than its amplitude. We will discuss how Dark Matter friction can suppress the spectrum around nHz frequencies, where it is measured, allowing robust and significant bounds on the Dark Matter density, which, in turn, controls indirect detection signals from galactic centers.
Next we will discuss alternative cosmological interpretations including cosmic strings, phase transitions, domain walls, primordial fluctuations and axion-like physics. We will discuss how well these different hypotheses fit the NANOGrav data, both in isolation and in combination with SMBH binaries, and address the questions: which interpretations fit the data best, and which are disfavoured. We also discuss experimental signatures that can help discriminate between different sources of the PTA GW signals with complementary probes using CMB experiments and searches for light particles in DUNE, IceCUBE-Gen2, neutrinoless double beta decay, and forward physics facilities at the LHC like FASER nu, etc. and with Primordial Black Hole formation and its constraints.

Track type

Gravitational waves

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