JOINT TUFTS/MIT COSMOLOGY SEMINAR

Whispers from the dark: primordial black holes and gravitational waves

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Primordial black holes are a fascinating family of black holes born in the early universe and represent a candidate for the dark matter, particularly in the asteroidal mass range. After reviewing their formation mechanism, based on the collapse of large overdensities generated during an inflationary epoch, we discuss their evolution across the cosmic history, which includes phases of baryonic accretion, early structure formation and their assembly into binary systems. We then investigate the detectability of these cosmic relics through gravitational waves, focusing on signals emitted both at their formation epoch, due to the gravitational collapse of inflationary perturbations, and from the coalescence of primordial binary systems. Finally, we highlight smoking gun signatures to claim for their discovery at future gravitational wave experiments, such as Einstein Telescope and LISA. In particular, we emphasise the importance of tidal Love numbers in the search for subsolar black holes as a tool to distinguish them from other astrophysical objects.

Tuesday, November 26, 2024, 2:30 pm

Cosman Seminar Room

Center for Theoretical Physics

Building 6C, Room 6C-442

Massachusetts Institute of Technology