

JOINT TUFTS/MIT COSMOLOGY SEMINAR

*Connecting early Universe with
Observations: from Primordial Black Holes
to Sterile Neutrinos*

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As we are entering the emerging and exciting era of multi-messenger astronomy as well as advent of many new instruments, the multifaceted field of astro-particle physics is particularly promising. I will illustrate the power of astro-particle physics in connecting early Universe with observations via two examples, primordial black holes (PBHs) and sterile neutrinos. PBHs provide an attractive non-particle dark matter (DM) candidate. Starting with motivation from fundamental physics, I will present a novel generic PBH production mechanism from scalar field fragmentation. As I will show, interactions of PBHs with compact stars could allow to gain insight into the open parameter space where PBHs can constitute the entirety of DM and also help answering some long-standing questions, such as the origin of heavy elements and Galactic Center 511-keV emission. In the case of sterile neutrinos, I will discuss how they can act as sensitive probes of early (pre-Big Bang Nucleosynthesis) cosmology and also elegantly resolve the Hubble constant tension problem, while being testable within conventional laboratories.

Tuesday, October 8, 2019, 2:30 pm
Cosman Seminar Room
Center for Theoretical Physics
Building 6C, Room 6C-442
Massachusetts Institute of Technology

Refreshments at 2:00 in the same room