

JOINT TUFTS/MIT COSMOLOGY SEMINAR

Neutrino Telescopes: Windows into New Physics and the Relic Universe

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Neutrino telescopes detect a variety of signals — cosmic-ray muons, astrophysical and cosmogenic neutrinos — that can be repurposed to probe new physics and cosmology. In this talk, I will discuss two independent projects along these lines. In the first, I use IceCube’s cosmic-ray muon sample to search for charged lepton flavor violation via muon-to-tau conversion; current sensitivity is background-limited, but improved background rejection or next-generation detectors such as IceCube-Gen2 and HUNT could make this channel competitive with collider searches. In the second, I show that ultrahigh-energy neutrinos — including a possible contribution from decaying superheavy dark matter — scatter off the cosmic neutrino background, allowing IceCube-Gen2 radio to probe relic-neutrino clustering far beyond current constraints. Together, these studies illustrate the versatility of neutrino telescope data for particle physics and cosmology.

Tuesday, September 15, 2026, 2:30 pm
574 Boston Ave, Room 310
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