# JOINT TUFTS/MIT COSMOLOGY SEMINAR

# *Axi-Higgs Cosmology*


## Hoang Nhan Luu

Hong Kong University of Science and Technology (HKUST)



Non-canonical cosmology with an uplifted Higgs vacuum expectation value (VEV) is believed to provide the solution for multiple existing tensions within the ΛCDM regime. We recently proposed a theoretical model called axi-Higgs to explore this framework. The axi-Higgs model features an ultralight axion with mass $m_a \sim 10^{-29}$ eV, which couples to the Higgs field such that the Higgs VEV is driven by the axion background evolution. If the Higgs-VEV is roughly 1% higher than its present value $v_0 = 246$ GeV in the early universe, the $^7$Li puzzle in BBN and the Hubble tension with late-universe measurements are mitigated. The presence of this axion together with its coupling with photon also help explain the isotropic cosmic birefringence signal and alleviate the $S_8$ tension. The model leaves observational imprints that may be detected by the spectral measurements of quasars or in the atomic clock measurements.


## Tuesday, October 26, 2021, 2:30 pm

## 574 Boston Ave, Room 310

## Tufts University

Refreshments at 2:00 outside the building, at the corner of Harvard St. and Boston Ave.