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 $m_a \sim 10^{-29} \text{eV}$, 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 $v_0 = 246 \text{ GeV}$ in the early universe, the $^7\text{Li}$ 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.