

Resolution of cosmological tensions using Unparticles

Tuesday, September 12, 2023 12:00 PM (30 minutes)

Addressing the discrepancy between the late and early time measurements of the Hubble parameter, H_0 , and the so-called S_8 parameter has been a challenge in precision cosmology. Several models are present to address these tensions, but very few of them can do so simultaneously. In the past, we have suggested Banks-Zaks/Unparticles as an emergent Dark Energy model and claimed that it can ameliorate the Hubble tension. In this work, we test this claim and perform a likelihood analysis of the model and its parameters are given current data and compare it to Λ CDM. The model offers a possible resolution of Hubble tension and softens the Large Scale Structure (LSS) tension without employing a scalar field or modifying the gravitational sector. Our analysis shows a higher value of $H_0 \sim 70 - 73$ km/sec/Mpc and a slightly lower value of S_8 for various combinations of data sets. Consideration of Planck CMB data combined with the Pantheon sample and SH0ES priors lowers the H_0 and S_8 tension to 0.96σ and 0.94σ respectively with best-fit $\Delta\chi^2 \approx -10$ restoring cosmological concordance. Significant improvement in the likelihood persists for other combinations of data sets as well. Evidence for the model is given by inferring one of its parameters to be $x_0 \simeq -4.36$.

Presenter: Prof. BEN-DAYAN, Ido (Ariel U.)