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Cosmological parameter shifts and AdS-EDE

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The well-known Hubble tension is widely thought to be an indication of new physics beyond Λ CDM. Theoretical modification happening before recombination (early) seems to be more viable than post-recombination (late) ones since they are less constrained by observations. We propose the AdS-EDE model which solves the tension at 1σ level for the first time while remaining compatible with data. Predictions of important cosmological parameters are shifted in correlation with H_0 in the early solutions, including EDE, from their Λ CDM values. The AdS-EDE model proves to be an ideal candidate for studying parameter shifts due to its large H_0 value. EDE models show a positive correlation between the scalar primordial spectrum index n_s and H_0 , and become fully compatible with a Zeldovich-Harrison ($n_s = 1$) spectrum given the locally measured H_0 value. I will talk about the physical origin of this correlation and its profound implication on our understanding of the early Universe and inflation. The other parameter shift I will discuss is the positive $\omega_{cdm} - H_0$ correlation. The enhancement in ω_{cdm} induces a larger S_8 , exacerbating the so called S_8 problem which is sometimes employed to criticize EDE. I will explain this correlation is mainly a requirement of background CMB+BAO compatibility and seems inevitable in the simplest EDE models. However, clear knowledge of the physical origin of this correlation actually tells us how to possibly restore concordance with S_8 and LSS in the EDE models.

Authors: YE, Gen (University of Chinese Academy of Sciences); Prof. PIAO, Yun-Song (University of Chinese Academy of Sciences)

Presenter: YE, Gen (University of Chinese Academy of Sciences)

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