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Beyond Early Dark Energy: an EFT-based approach to cosmological tensions

Monday, 8 July 2024 16:00 (30 minutes)

The Transitional Planck Mass (TPM) model is a useful application of the Effective Field Theory of Dark Energy and Modified Gravity, characterized by a step-like transition in the Planck Mass at cosmological scales. This transition, occurring during the radiation era, has shown efficacy in mitigating the Hubble tension. It achieves this by decreasing the sound horizon as detected by Cosmic Microwave Background (CMB) probes, offering a compelling alternative to Early Dark Energy (EDE) models.In this presentation, I will explore constraints on the TPM model derived from a comprehensive dataset encompassing Cosmic Microwave Background, Baryon Acoustic Oscillations, Large Scale Structure, and Type Ia supernovae observations. These datasets indicate a preference for approximately a 5% shift in the effective Planck mass (less than 10% at a 2σ level) when incorporating a prior based on local H0 measurements. I will discuss the goodness of fit to each dataset and the limiting factors to the performances of the model.
The TPM model exhibits unique characteristics that distinguish it from classic EDE. The transition in the Planck mass is not constrained to happen at a very specific time, avoiding the coincidence problem found in EDE.
There is also an interesting anti-correlation between the values of the S8 and H0 parameters, which could be exploited to relieve different cosmological tension at the same time.
Additionally, I will present recent advancements, including new constraints derived from the latest Type Ia supernovae catalogs.

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Session Classification: Current status of the H_0 and growth tensions: theoretical models and model-independent constraints

Track Classification: Cosmic Microwave Background, Cosmological Tensions (CM): Current Status of the H_0 and growth tensions: theoretical models and model-independent constraints