Contribution ID: **826** Type: **Invited talk in the parallel session**

Testing Gravity on Cosmic Scales: A Case Study of Jordan-Brans-Dicke Theory

Thursday, 8 July 2021 16:30 (22 minutes)

I will present an end-to-end exploration of the simplest modified gravitational theory in Jordan-Brans-Dicke (JBD) gravity, from an analytical and numerical description of the background expansion and linear perturbations, to the nonlinear regime captured with a hybrid suite of N-body simulations, to the parameter constraints from existing cosmological probes. In the analysis, the nonlinear corrections to the matter power spectrum due to baryons, massive neutrinos, and modified gravity are simultaneously modeled and propagated in the cosmological analysis for the first time. I will show how the uncertainty in the gravitational theory alleviates the S_8 tension between the joint (3×2pt) dataset of weak gravitational lensing tomography and overlapping redshift-space galaxy clustering from the Kilo Degree Survey × 2-degree Field Lensing Survey and the cosmic microwave background (CMB) dataset of Planck, and the extent to which it alleviates the tension between the local measurement of the Hubble constant and that inferred by Planck. Despite the alleviation of S_8 and H_0 tensions, I will show that there is no substantial model selection preference for JBD gravity relative to ΛCDM. I will further discuss how the uncertainty in the underlying gravitational theory complicates future inferences of small-scale physics from the CMB.

Primary author: JOUDAKI, Shahab

Presenter: JOUDAKI, Shahab

Session Classification: Status of the H_0 and Sigma_8 Tensions: Theoretical Models and Model-Independent Constraints

Track Classification: Cosmic Microwave Background: Status of the H_0 and sigma_8 tensions: theoretical models and model-independent constraints