SES21-2021-000084

Abstract for an Invited Paper
for the SES21 Meeting of
the American Physical Society

Cosmology constraints from CMB lensing and the large scale structure of the Universe[1]

GABRIELA A. MARQUES, Florida State University

Current and upcoming galaxy surveys will enable precision measurements of various observables of large-scale structures, such as galaxy clustering, abundance of galaxy clusters, and the weak gravitational lensing (WL). In the context of precision cosmology, cross-correlation analyses between independent tracers have become a powerful tool to infer valuable information of the Universe while providing extra safety checks on systematics affecting the datasets. As the matter density perturbations are mostly dominated by non-luminous dark matter, and consequently are not directly observable, we can probe them by cross-correlating the tracers of the same underlying matter density. One of the important tracers arises from the deflections of the Cosmic Microwave Background (CMB) photon's path caused by the WL effect. In this talk, I will discuss how the cross-correlation between the CMB lensing and the LSS data can probe different aspects of cosmic structure formation and shed light on current tensions in Cosmology. In particular, I will present the measurements of the cross-correlation between the CMB lensing from Planck and galaxy lensing from the deepest Stage-III galaxy WL survey, the Subaru Hyper Suprime-Cam (HSC). This cross-correlation signal is measured at a significance level of 3.1σ. The amplitude of our best-fit model with respect to the best-fit 2018 Planck cosmology is $A = 0.81 \pm 0.25$, consistent with A = 1. Our result is also consistent with previous CMB lensing and galaxy WL cross-correlation studies using different surveys.

[1]National Science Foundation award 1815887