Contribution ID: **342** Type: **Oral Presentation**

Improving Constraints on Fundamental Physics Parameters with the Clustering of Sunyaev-Zeldovich Selected Galaxy Clusters

Wednesday, 31 July 2019 17:40 (20 minutes)

Next-generation probes of the cosmic microwave background will detect tens-to-hundreds of thousands of galaxy clusters through the Sunyaez-Zeldovich effect, providing a measurement of large-scale structure which offers new constraints on cosmology and fundamental physics. An often-used statistic for Sunyaev-Zeldovich cluster constraints is their abundance as a function of redshift, but as the number of clusters increases to 10^4–10^5, higher order statistics such as the cluster power spectrum become viable probes. Using the Fisher formalism, we forecasted the cosmological constraints that can be obtained from the cluster power spectrum for two next-generation microwave background experiments, the Simons Observatory, and CMB Stage-4. We found that the inclusion of the power spectrum with cluster abundances will improve constraints by around 10–30%. In this talk I will overview the forecasting methodology, discuss the resulting constraints, and the implications they have on using the cluster power spectrum as a probe of cosmology and fundamental physics.

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Session Classification: Astroparticles & CMB

Track Classification: Astroparticles & CMB