Contribution ID: **20** Type: **not specified**

Position-dependent power spectrum: a new observable in the large-scale structure

Wednesday, August 5, 2015 2:54 PM (18 minutes)

The influence of large-scale density fluctuations on structure formation on small scales is described by the three-point correlation function (bispectrum) in the so-called ''squeezed configurations." We show that the ''position-dependent power spectrum" measures this bispectrum without employing the three-point function estimator. Specifically, we divide a survey into subvolumes, measure the position-dependent power spectrum and the mean overdensity in subvolumes, and find the correlation between these two quantities. This correlation directly measures an integral of the bispectrum dominated by the squeezed configurations. We first measure the integrated bispectrum from cosmological N-body simulations, and show that the measurements agree very well with the theoretical prediction by the ''separate universe approach," in which we consider an overdense subvolume as a positively curved universe evolving differently with respect to the background. We then use the same technique to measure the position-dependent correlation function, which measures the integrated three-point function, of BOSS DR10 CMASS sample and PTHalos mock catalogs. We show that the measurements of the mocks agree well with the standard perturbation theory prediction, and the signal sensitive to the galaxy biases and the growth rate. Combining our measurement with the anisotropic clustering and weak lensing of CMASS galaxies, we measure the nonlinear bias of CMASS galaxies.

Oral or Poster Presentation

Oral

Primary author: CHIANG, Chi-Ting (Max-Planck-Institute for Astrophysics)

Presenter: CHIANG, Chi-Ting (Max-Planck-Institute for Astrophysics)

Session Classification: AstroParticle, Cosmology, Dark Matter Searches, and CMB

Track Classification: Cosmology and Dark Energy Experiment