

Contribution ID: 105

Type: Poster

Improving Cluster Shape Measurements for IA Studies

We aim to study the intrinsic alignment (IA) properties of galaxy clusters within the large-scale structure (LSS) of the Universe. This task was usually carried out by using an optically selected sample of galaxy clusters, whose member galaxies are identified by optical cluster finders that can be directly used to estimate the projected shapes of the halos. However, optically selected clusters are prone to the effect of line-of-sight projection, leading to a result that is challenging to model. In this study, we develop a statistical method to estimate the projected shape of galaxy clusters selected based on their intracluster medium (ICM), nearly free from the projection effect. We apply this method to the cluster sample selected in the South Pole Telescope (SPT) survey in a combination with the optical galaxy catalogs from the Dark Energy Survey (DES). We will present the preliminary results and their validations in this meeting.

Section

Cosmology

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Session Classification: Poster-EA