

U07a Galaxy Intrinsic Alignment: novel challenges and opportunities in weak lensing cosmology

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The intrinsic shape of galaxies align with the large scale matter field, known as the intrinsic alignment (IA). Galaxy intrinsic alignment has been known as a major contamination systematic for weak lensing cosmology. Theoretical models such as non-linear alignment or tidal alignment tidal torque have been developed to model the IA signal in weak lensing cosmological inference. We discovered a novel environmental dependence of the IA signal in cosmological simulations, which has not been accounted in the current IA models. This phenomenon likely puts new challenges for the cosmic shear analysis, especially for statistics that are beyond two-point statistics. I will discuss this finding and the possible implications in my talk. Meanwhile, galaxy IA has been proved to be a novel cosmological probe that is complementary to galaxy clustering. However, to fully exploit the potential of IA, high signal to noise ratio IA measurement is required, which is challenging to obtain with the standard galaxy shape measurement. I will briefly discuss our recent progress in exploring novel shape measurement that provides high signal to noise ratio IA signal.