

The halo model with beyond-linear halo bias: unbiasing cosmological constraints from galaxy–galaxy lensing and clustering

The halo model is a phenomenological model often used to interpret the large-scale structure of the Universe. In this model all dark matter exists within dark matter halos, which trace the underlying matter fluctuations. In its most generic form it includes a number of approximations such as dark matter halos are spherical and can be completely described by their mass, and that the halos trace the underlying matter fluctuations in a linearly biased way –linear halo bias. These assumptions have provided a useful description of large-scale structure observables until now, but with ever improving datasets need to be revisited. In this talk I will present the error introduced in a joint halo model analysis of galaxy-galaxy lensing and galaxy clustering observables when adopting the standard approximation of linear halo bias. I will discuss how we include beyond-linear halo bias, compare to an alternative approach, and show that the direction of the sizable offsets depends on the freedom afforded to the halo model through other nuisance parameters. Finally, I will conclude that beyond-linear halo bias must be included in future cosmological halo model analyses of large-scale structure observables on non-linear scales.

Orateur: MAHONY, Constance