Cosmological constraints from galaxy-galaxy lensing and galaxy clustering with HSC-Y1 and BOSS data: the first application of emulator-based halo model to cosmology analysis

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Abstract

The combination of galaxy-galaxy lensing and clustering is recently emerging as a "standard" cosmological probe of structure growth, which has been used in the stage-III weak lensing surveys including DES and KiDS. In this talk, we report cosmological constraints from clustering signals of the BOSS spectroscopic galaxies and lensing signals measured using BOSS galaxies as lenses galaxies and Subaru HSC-Y1 photometric galaxies as source galaxies, exploiting the signals by pushing the scale cuts towards small scales. The challenge lies in building a robust theoretical model that can be used at the non-linear regime. For this purpose, we built a model by connecting DarkEmulator, a newly developed cosmology emulator that can compute halo statistics such as halo mass function, halo-matter correlation function, and halo-halo correlation function with a few percent accuracy, with an analytical halo-galaxy connection model. We report the robustness test of our model with mock simulations, which is dubbed as "Cosmology Challenge," and then present cosmological constraints we obtained from the HSC-Y1 and BOSS data. Videos: https://youtu.be/zmtsYwBznJc

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