

Modelling the distribution of galaxy multi-tracers through cosmic time

Tuesday 15 July 2025 11:00 (30 minutes)

The latest generation of spectroscopic surveys, such as DESI, Euclid or Subaru-PFS, aims to map the large-scale structure of the Universe with unprecedented accuracy by targeting diverse galaxy populations: luminous red galaxies (LRGs), emission-line galaxies (ELGs), and quasars (QSOs). These sources serve as biased multi-tracers of the underlying dark matter field, and their clustering properties provide crucial constraints on the expansion history and growth of cosmic structure.

In this talk, I will present our latest results on modeling the DESI ELG and LRG clustering and its connection to dark matter halos using the AbacusSummit simulation, coupled with a novel halo occupation framework for galaxy multi-tracers. Our approach incorporates intra-halo dynamics and quenching to reproduce the anisotropic clustering down to 0.1 Mpc/h scales with unprecedented accuracy. By leveraging DESI data and reaching 20 times better resolution than current abundance matching studies, our model provides a robust benchmark for future cosmological analyses. These findings not only refine our understanding of galaxy bias and systematics but also offer new insights into the nature of dark matter and gravity on sub-megaparsec scales.

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