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Going beyond the power spectrum: an analysis of BOSS & DESI galaxy clustering using the wavelet scattering transform.

Thursday 17 July 2025 11:00 (30 minutes)

Optimal extraction of the non-Gaussian information encoded in the Large-Scale Structure (LSS) of the universe lies at the forefront of modern precision cosmology. In this talk, I plan to discuss recent efforts to achieve this task using the Wavelet Scattering Transform (WST), which subjects an input field to a layer of non-linear transformations that are sensitive to non-Gaussianity through a generated set of WST coefficients. In order to assess its applicability in the context of LSS surveys, I will present recent progress towards the application of this technique to DESI galaxy clustering observations, moving beyond a past analysis of the precursory BOSS dataset. I will summarize the latest efforts to assess the robustness of this estimator through an emulator mock challenge within the DESI collaboration, before discussing a series of improvements for its application to the anisotropic redshift-space clustering traced by DESI Year 1/Year 3 spectroscopic observations. Finally, I will show first proof-of-concept results from the application of this novel technique to another key cosmological probe, the Lyman-alpha forest.

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