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Model-independent Constraints of Physics beyond ΛCDM with the Power Spectrum and Bispectrum

Wednesday, July 9, 2025 9:50 AM (25 minutes)

We apply model-independent methods based on symmetries —specifically the 'LSS bootstrap' —to derive robust predictions across a wide range of alternative scenarios to ΛCDM. Our ongoing work aims to improve constraints on bootstrap parameters, i.e., cosmology-dependent coefficients in the matter kernels, by jointly analyzing the power spectrum (up to one-loop) and the tree-level bispectrum. This analysis is implemented using the PyBird code and applied to both observational data from the BOSS survey and synthetic data from the PT Challenge simulations, which probe significantly larger volumes. We investigate whether the increased volume of the PT Challenge data leads to tighter constraints on bootstrap parameters, illustrating the potential of this model-independent framework for testing deviations from ΛCDM in ongoing and future galaxy surveys.

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