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Cosmology with galaxy clustering: a joint analysis of the power spectrum and bispectrum

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Future generations of galaxy redshift surveys will sample the large-scale structure of the Universe over unprecedented volumes with high-density tracers, allowing for precise measurements of the clustering statistics. In order to properly exploit the full potential of such data, a robust likelihood pipeline is required, starting with an accurate theoretical prediction of cosmological ob- servables, down to constraints on cosmological parameters. The main probe used in the context of spectroscopic galaxy surveys is the two point correlation function, or its Fourier transform, the power spectrum. However, it has been shown that the inclusion of higher order correlation func- tions in the analysis can significantly improve the accuracy with which cosmological parameters are measured. I will present a software for the joint likelihood analysis of the galaxy power spec- trum and bispectrum, and describe its validation against a large set of N-body simulations that allows to assess possible systematics in the theoretical model. Moreover, I will present forecasts for the joint analysis of power spectrum and bispectrum for future stage-IV galaxy surveys, both for the standard model and beyond-LCDM models.

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