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Primordial Non-Gaussianities and their imprints in the Large Scale Structure

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Measuring the level of Primordial Non-Gaussianities (PNGs) would give us some tight constraints on the inflation model landscape. The deviations from the Gaussianity are usually quantified by the fNL parameter. In the next few years, we will have available data from the Stage-IV galaxy surveys, such as DESI, EUCLID, LSST and SKA. These experiments are expected to constrain the fNL parameter to σ (fNL) ~1. This would improve the strongest current constraints from the CMB measurements and it would be particularly interesting as this could rule out some models of single/multi - field inflation. In this talk, I will discuss the imprints left by the local PNGs on the Large Scale Structure: the enhancement/suppression of the formation of heavy dark matter halos, and the scale-dependent bias. On one hand, the effect of local PNGs can be observed in the halo mass function. By using a large set of numerical simulations, I will show this effect and how to model it. On the other hand, galaxy clustering is also affected by this type of PNGs, in particular at the largest scales, where it induces a scale-dependence in the bias relation between the dark matter and galaxies. In order to study this effect, I will introduce one of the most advanced state-of-the-art N-body simulations with PNGs, the PNG-UNITSim suite, with 4096^3 DM particles. Then, I will talk about how we are using this simulation to constrain the parameters of the galaxy/halo bias induced by the PNGs. Constraining these parameters will be necessary for an accurate measurement of fNL by future galaxy surveys, which is key for understanding inflation.

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