Contribution ID: **60** Type: **Abstract**

Taming assembly bias for primordial non-Gaussianity

Friday 4 October 2024 11:20 (10 minutes)

In the standard scenario, single-field slow-roll inflation provides a mechanism to seed primordial density perturbations, distributed as a Gaussian, which evolve during the expansion history of the Universe to eventually form its observable structure. Alternative inflationary models, however, can produce amounts of primordial non-Gaussianity (PNG) which detection would rule out the standard inflationary model, giving insights on the physics of the primordial Universe.
The observations of cosmic microwave background (CMB) anisotropies and the distribution of galaxies in the large-scale structure (LSS) represent two independent ways to probe the physics of the inflationary epoch. In particular, LSS measurements from galaxy clustering are currently weaker, but are expected to improve significantly with ongoing galaxy surveys.

Local type PNG induces a strong scale-dependent bias on the clustering of dark matter halos in the late-time Universe. This effect can be exploited to constrain the value of the non-Gaussianity parameter f_{NL} from LSS observables. However, the perfect degeneracy between f_{NL} and the bias parameter b_ϕ, which drives the amplitude of the signal, prevents the ability to constrain f_{NL} in the absence of an informative prior on b_ϕ. In particular, it is well-known that assembly bias, which is due to the formation history of halos, provides a strong contribution to the value of b_ϕ.
In the talk, it is shown how assembly bias can be modeled and constrained, improving the power of galaxy surveys to competitively constrain local primordial non-Gaussianity. In particular, by reporting the results on the analysis on hydrodynamical simulations, it is shown that a proxy for the halo properties that determine assembly bias can be constructed from photometric properties of galaxies. Using a prior on the assembly bias guided by this proxy degrades the statistical errors on f_{NL} only mildly compared to an ideal case where the assembly bias is perfectly known.

Poster

No

Primary author: FONDI, Emanuele (ICCUB)

Presenter: FONDI, Emanuele (ICCUB)

Session Classification: Morning talks

Track Classification: Talks