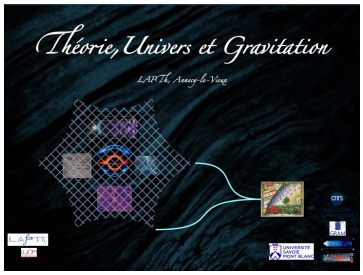

ID de Contribution: **1**

Type: **Talk**

Optimal constraints on Primordial non-Gaussianity with the eBOSS DR16 quasars in Fourier space

jeudi 7 novembre 2024 10:00 (20 minutes)

The statistical properties of the primordial curvature perturbations are a key ingredient of the success of the LCDM model in explaining the Universe as we observe it today. In simplest models of inflation initial fluctuations are Gaussian for all practical purposes, and measurements of the CMB bispectrum by the Planck satellite constrain any deviation from the Gaussian regime in a part in ten thousand. On the other hand, the theoretical target for the amplitude of Primordial Non-Gaussianities (PNG) in the initial perturbations is roughly an order of magnitude smaller than what Planck has measured. We have almost saturated the information content in the CMB, and any further improvement will likely come from the late-time distribution of galaxies or any other tracers of the Large Scale Structure (LSS) of the Universe.
I will present constraints on the amplitude of local PNG, $f_{\rm NL}$, using the quasar sample in the Sloan Digital Sky Survey IV extended Baryon Oscillation Spectroscopic Survey (eBOSS) Data Release 16 (DR16) from https://arxiv.org/abs/2309.15814. We analyze the power spectrum monopole, testing for the presence of scale-dependent galaxy bias induced by local PNG. Our analysis makes use of optimal redshift weights that maximize the response of the quasar sample to the possible presence of non-zero PNG. We find $-4 < f_{\rm NL} < 27$ at 68% confidence level, which is among the strongest bounds with LSS data. The optimal analysis reduces the error bar by about 10% compared to the standard one, but this improvement is lower than the one expected from previous forecasts. In addition, the larger volume of this dataset, when compared to previous releases of the eBOSS quasar catalog, does not always correspond to a reduction of the final uncertainty on local PNG. This could suggest the presence of still unknown systematic effects in the data. If the quasars have a lower response to local PNG, our optimal constraint becomes $-23 < f_{\rm NL} < 21$ at 68%, with an improvement of 30% over standard analyses. We also show how to use the optimal weights to put data-driven priors on the sample's response to local PNG.

Author: CAGLIARI, Marina (LAPTh)

Co-auteurs: CASTORINA, Emanuele (UniMi); BONICI, Marco (University of Waterloo); BIANCHI, Davide (UniMi)

Orateur: CAGLIARI, Marina (LAPTh)