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Cosmic Shear Nulling as a geometrical cosmological probe: methodology and sensitivity to cosmological parameters and systematics

jeudi 10 avril 2025 10:30 (15 minutes)

The Weak Lensing Shear is a powerful probe of cosmology. Along with Galaxy Clustering and the cross-correlation of those two probes, it gives the most effective set of Data, used by cosmological observations, to constrain cosmological parameters and study the large-scale structure of the universe. Yet, the nature of the Dark Energy, representing around 68% of the energy content of our current universe, is still unknown. Thus, any additional cosmological feature, data or probe that would give new constraints or information on cosmological parameters is of interest. One of those features could be the BNT (Bernardeau, Nishimichi, Taruya) transform as it provides a mostly geometrical property of Weak Lensing: The Nulling of the galaxy-galaxy lensing Cross-Spectra. This feature does not depend on the Galaxy Power Spectrum but only on background geometry of space time and brings few additional systematics to the current analysis on Weak Lensing and Galaxy Clustering. As part of the Euclid consortium, we wish to exploit the Nulling property of the BNT transform to reduce theoretical uncertainties on Dark Energy parameters derived by the Euclid Mission.

We present this idea in the context of the Euclid mission in the following paper: https://arxiv.org/abs/2502.02246 and in a more general context for future survey in the following letter: https://arxiv.org/abs/2502.02243

Astrophysics Field

Cosmology LSS DarkEnergy

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