leading author : Sandrine Codis
co-authors : R. Gavazzi, Y. Dubois, C. Pichon, K. Benabed, V. Desjacques

How the cosmic web induces galaxy intrinsic alignments

Intrinsic alignments are believed to be the major source of systematics of the future generation of weak gravitational lensing surveys like Euclid or LSST.

Direct measurements of the alignment of the projected light distribution of galaxies in wide field imaging data seem to agree on a contamination at a level between a few per cent and ~ 10 per cent of the shear correlation functions, although the amplitude of the effect depends on the population of galaxies considered. Given this dependency, it is difficult to use dark matter-only simulations as the sole resource to predict and control intrinsic alignments. The inherently anisotropic nature of the large-scale structure and its complex imprint on the shapes and spins of galaxies may prevent isotropic approaches from making accurate predictions.

In this work, we show how the hydrodynamical simulation Horizon-AGN can be used to shed light on the level of intrinsic alignment that could possibly be a major source of systematic errors in weak gravitational lensing measurements. In particular, assuming that the spin of galaxies is a good proxy for their ellipticity, we discuss how they are spatially correlated and how they couple to the tidal field in which they are embedded.