ID de Contribution: **2** Type: **TWG talk**

Weak gravitational lensing as a (3D) probe of gravity

Cosmic shear, the weak gravitational lensing caused by the large-scale structure, is one of the primary probes to test gravity on cosmological scales with current and future surveys such as Euclid. In particular, cosmic shear is sensitive to both standard GR cosmological parameters and those that describe modified theories of gravity, such as those belonging to the Horndeski class. These models include the majority of universally coupled extensions to ΛCDM with one scalar degree of freedom in addition to the metric, which are still in agreement with current observations.

There are two main techniques to analyse a cosmic shear survey; a tomographic method, where correlations between the lensing signal in different redshift bins are used to recover redshift information, and a 3D approach, where the full redshift information is carried through the entire analysis.

In this talk, I will start presenting the first constraints on Horndeski gravity obtained from the analysis of tomographic cosmic shear data from the KiDS survey, in cross-correlation with galaxy-galaxy lensing and angular clustering data from the GAMA survey. I will show in particular how this analysis could be repeated and improved with future data coming from Euclid.

I will then compare the constraining power of the tomographic and the 3D approach on Horndeski gravity and on standard cosmological parameters, presenting Fisher matrix forecasts for Euclid. Due to its increased amount of redshift information, a future 3D analysis has the power to constrain both standard gravity and Horndeski theories better than a tomographic one, producing in particular a decrease in the errors on the Horndeski parameters of the order of 20 - 30% and an error on the sum of the neutrino masses three times smaller than in tomography. This makes the 3D approach particularly appealing in view of future applications to the Euclid satellite.

Summary

Author: SPURIO MANCINI, Alessio (University of Heidelberg)

Co-auteur: PETTORINO, Valeria (CEA Paris-Saclay, Departement of Astrophysics, CosmoStat Lab)

Orateur: SPURIO MANCINI, Alessio (University of Heidelberg)