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Spurio Mancini: Testing Horndeski gravity with 3D weak lensing

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We forecast the ability of future Euclid-like experiments to constrain Horndeski theories of gravity using a fully 3D cosmic shear analysis. We use the parametrization of the Horndeski Lagrangian density first proposed by Bellini&Sawicki(2014) based on four functions of time only, to constrain them by means of a Fisher matrix analysis. The constraints imply a fixed background cosmology, purely reflecting the change in structure growth, to which 3D weak lensing is particularly sensitive.
This is due to the spherical Fourier-Bessel decomposition of the shear field that characterises the 3D formalism, which allows for inclusion and retention of the sources redshifts along the entire analysis. This has the advantage of following the evolution of structures in a non-averaged way, retaining more information on structure growth and how this is influenced by gravity.