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Combining gravitational lensing and gravitational redshift to measure the anisotropic stress with future galaxy surveys

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Galaxy surveys provide one of the best ways to constrain the theory of gravity at cosmological scales. They can be used to constrain the two gravitational potentials encoding time, Ψ , and spatial, Φ , distortions, which are exactly equal at late time within General Relativity. Hence, any small variation leading to a non-zero anisotropic stress, i.e. a difference between these potentials, would be an indication for modified gravity. Current analyses usually consider gravitational lensing and redshift-space distortions to constrain the anisotropic stress, but these rely on certain assumptions like the validity of the weak equivalence principle, and a specific time evolution of the functions encoding deviations from General Relativity. In this talk, I will discuss a recently proposed reparametrization of the gravitational lensing observable, together with the use of the relativistic dipole of the correlation function of galaxies to directly measure the anisotropic stress with a minimum amount of assumptions.

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