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Backreaction effects on the luminosity-redshift relation in inhomogeneous cosmology

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I will show a general gauge invariant formalism for defining cosmological averages that are relevant for observations based on light-like signals. Such averages involve either null hypersurfaces corresponding to a family of past light-cones or compact surfaces given by their intersection with timelike hypersurfaces. Afterwards, using such formalism, together with adapted "geodesic light-cone" coordinates, I will show as back-reaction effect emerges in the evaluation of the luminosity distance-redshift relation in an inhomogeneous Universe. To conclude, considering a realistic stochastic spectrum of inhomogeneities of primordial (inflationary) origin, I will show the magnitude and behaviour of such backreaction effects.
Talk based on the following papers: M. Gasperini, G. Marozzi, F. Nugier and G. Veneziano, JCAP 1107, 008 (2011), arXiv:1104.1167 [astro-ph.CO]; I. Ben-Dayan, M. Gasperini, G. Marozzi, F. Nugier and G. Veneziano, arXiv:1202.1247 [astro-ph.CO]; I. Ben-Dayan, M. Gasperini, G. Marozzi, F. Nugier and G. Veneziano, in preparation.