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# Mr. ROMANO, Antonio Enea (National Taiwan University): Dark energy or large scale inhomogeneities?

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As an alternative to dark energy it has been suggested that we may be at the
center of an inhomogeneous isotropic universe described by a Lemaitre-Tolman-Bondi (LTB) solution of Einstein's field equations. In order to test this hypothesis we calculate the general analytical formula to fifth order for the redshift spherical shell mass. Using the same analytical method we write the metric in the light-cone by introducing a gauge invariant quantity G(z) which together with the luminosity distance DL(z) completely determine the light-cone geometry of a LTB model.
Finally we combine these results with the luminosity distance formulae and
show how
$LambdaCDM$ models cannot be mimicked by smooth large scale inhomogeneities, independently of the value of the
cosmological constant.

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