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On the evolution of inhomogenous perturbations in the ΛCDM model and f(R) modified gravity theories

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In this talk we focus on weak inhomogeneous Universe models at low redshift, described by the Lemaître-Tolman-Bondi (LTB) metric within the framework of f(R) modified gravity theories. The principal aim of this study was to compare the evolution of inhomogeneous perturbations in the ΛCDM and alternative f(R) cosmological models, assuming a flat Friedmann-Lemaître-Robertson-Walker (FLRW) metric as the background. We used the equivalent scalar-tensor formalism in the Jordan frame, for which the extra degree of freedom of the f(R) function is translated into a non-minimally coupled scalar field. The evolution of perturbations was investigated at the first order in time and space, separately. We found spherically symmetric solutions using perturbative and numerical techniques. The results appear to distinguish between the presence of a cosmological constant and the scalar field. Moreover, the results are valid for any f(R) model, since the radial profiles of perturbations do not depend on the particular choice of the f(R) function.

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