

DE MADRID AL COSMOS

Non-linear evolution of the BAO scale in alternative theories of gravity

Miguel Zumalacárregui
ITP Heidelberg/Nordita

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Facultad de CC. Físicas, UCM

Abstract: The scale of Baryon Acoustic Oscillations (BAO) imprinted in the matter distribution is known to suffer sub-percent deviations from being a perfect standard ruler due to non-linear corrections. However, such corrections have never been computed in alternative theories of gravity. I will give an overview of historical and recent developments in alternative theories of gravity and present the first computation of the BAO shift based on perturbation theory (à la Bellini-Sawicki) and a peak-background split (à la Sherwin-Zaldarriaga), valid for any Horndeski theory. The BAO shift is modified by the enhanced growth of linear perturbations, as well as by novel, non-linear gravitational effects. The modified gravity result can range from a negligible to order-unity correction at $z=0$ depending on the model, and in some cases presents a characteristic time evolution. Although small, this effect might be within the reach of future galaxy surveys, and might have implications for BAO reconstruction in theories other than Einstein's.

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