Testing Cosmological Structure formation in Unified Dark Matter-Energy models.

Diogo Castelão[1,2], Alberto Rozas-Fernández[2], and Ismael Tereno[1,2]

[1] Departamento de Física, Faculdade de Ciências, Universidade de Lisboa, Edifício C8, Campo Grande, PT1749-016 Lisboa, Portugal
[2] Instituto de Astrofísica e Ciências do Espaço, Faculdade de Ciências, Universidade de Lisboa, Tapada da Ajuda, PT-1349-018 Lisboa, Portugal

Abstract

Unified Dark Matter-Energy models (UDM) are a class of models where dark matter and dark energy exist as a single essence and have been proposed as an alternative approach to ΛCDM. In this work we focus on a specific UDM model that contains a fast transition between dark matter-like and dark energy-like behaviours. The rapidity and redshift of the transition are important features of the model. We compute structure formation in this model, using a modified version of CLASS, and study its viability against a combination of SNe Ia, BAO, CMB and weak lensing data, performing MCMC and Nested Sampling analyses. We find that the inclusion of current weak lensing data, from the KiDS survey, allows us to strongly constrain the redshift of the transition and find a viable range of parameter values for which structure formation is similar to the one predicted by ΛCDM. (See poster).