

Título/Title:

Generic Interactions in Cosmology

Orientador/Supervisor:

Nelson J. Nunes (IA-Lisbon) njnunes@fc.ul.pt

Descrição/Description:

In this project we will explore a generic coupling between a scalar field and matter fluids known as disformal couplings. These have raised great attention in the last few years as the field can be dark energy therefore accelerating the Universe today, or the inflaton driving an exponential expansion in the early Universe, but it could also be fueling a change in the value of the fine structure constant with time. The current studies focus mainly on a single scalar field with canonical kinetic terms. However, the field could in principle be of a more generic nature such as a BDI field or k-essence. These possibilities will be investigated in this project.

The work will require an analytical approach by means of a dynamical system analysis and also a numerical study in order to fully solve the equations of motion. A comparison with the current background constraints on the background evolution of the Universe will be made in order to single out the region of validity of these models.