Contribution ID : **69** Type : **not specified**

Scalar-tensor cosmology in a minisuperspace formulation with Chaplygin Gas

Friday, 23 September 2022 15:40 (20)

Scalar tensor theories (STT) of gravity are one of the most fundamental types of modified theories of gravity. By introducing a non-minimally coupled dynamical scalar field, they make it possible to describe gravitational interaction to the extent that the purely tensor general theory of relativity fails, or does not give sufficiently accurate predictions. One of the ideas strongly developed in recent years regarding the attempt to describe the dark sector of the universe is the so-called dark fluid. In its concept, it aims to unify in one physical phenomenon the influence of dark energy and dark matter on the evolution of the universe. One example of such a fluid is the family of models of the so-called Chaplygin gas (CG) [1], which is characterized by a specific equation of state: $p(\rho) = - A /\rho^\alpha$. By considering particular CG models as sources of matter in the Universe, specific FLRW cosmological models in the minisuperspace (MSS) formalism can be obtained, which can be presented in specific conformal frames, such as the best known Einstein and Jordan frame. Classical mechanical systems in cosmology in the MSS formulation are proved to be extremely effective in studying ST cosmological models [2]. During the talk I will present an analysis on the conservation laws of the energy-momentum tensor in the case of minimal and non-minimal coupling for metric and metric-hybrid STT, as well as a numerical analysis to verify whether the obtained cosmological models can be an extension of the Λ-CDM model. References [1] M. C. Bento, O. Bertolami, and A. A. Sen, Generalized Chaplygin gas, accelerated expansion, and dark-energy-matter unification, Phys. Rev. D 66, 043507 (2002). [2] A. Borowiec, A. Kozak, Scalar-tensor cosmologies in a minisuperspace formu- lation: A case study, Phys. Rev. D 105, 4 (2022).

Presenter(s) : POSTOLAK, Marcin (University of Wrocław)