CoCo 2o2o: Cosmology in Colombia



Contribution ID: 21

Type: not specified

Relativistic stars in the generalized Proca theory

Thursday 24 September 2020 16:21 (7 minutes)

The constant improvement of astronomical observation techniques opens up new perspectives to study various gravitational phenomena of interest at all scales. This fact, in turn, suggests testing modified theories of gravity in physical scenarios which allows us to constrain their free parameters by comparison with the observations, and that at the same time guides us to discern features that make them distinguishable from General Relativity (GR). Therefore, a study on internal solutions of relativistic stars is presented in the context of a vector-tensor theory named the generalized Proca theory. The stars correspond to spherically symmetric and static compact objects constituted by a perfect fluid governed by a polytropic equation of state (EOS). Starting from physical assumptions, analytical restrictions are found on the free parameters of the theory. Numerical solutions reveal the presence of deviations in the star's internal structure with respect to the GR predictions for the same initial conditions and EOS. Additionally, we highlight the importance of the vector field profile and the sign of the coupling chosen on important results such as mass and radius. This phenomenon is attributed to the presence of a pressure due to the vector field that modifies the evolution of the star compared to the case of GR. Hence, these results make these objects interesting targets for present and future astronomical observations.

Authors: JAIMES ESPÍNDOLA, William; RODRIGUEZ GARCIA, Yeinzon (UAN & UIS (Colombia)); GOMEZ, gabriel

Presenter: JAIMES ESPÍNDOLA, William

Session Classification: CoCo