Contribution ID: **994** Type: **Invited talk in the parallel session**

Neutron stars in f (R, T) gravity using realistic equations of state in the light of massive pulsars and GW170817

Monday, 5 July 2021 18:45 (15 minutes)

In this work we investigate neutron stars (NS) in f (R, T) gravity for the case R + 2λT , R is the Ricci scalar, and T the trace of the energy-momentum tensor. The hydrostatic equilibrium equations are solved considering realistic equations of state (EOS). The NS masses and radii obtained are subject to a joint constrain from massive pulsars and the event GW170817. The parameter λ needs to be negative as in previous NS studies, however, we found a minimum value for it due to the existence of the NS crust. The pressure in this modified theory of gravity depends on the inverse of the sound velocity. Since, this velocity is lower in the crust, |λ| needs to be very small. We found that the increment in the star mass is less than 1%, much smaller than previous ones obtained not considering the realistic stellar structure, and the star radius cannot become larger, its changes compared to GR is less than 3.6% in all cases. The finding that using several relativistic and non-relativistic models the variation on the NS mass and radius is almost the same for all the EsoS, manifests that our results are insensitive to the high-density part of the EOS. It confirms that stellar mass and radii obtained in f(R,T) depends only on the NS crust, where the EoS is essentially the same for all the models. Finally, we highlight that our results indicate that conclusions obtained from NS studies done in modified theories of gravity without using realistic EsoS that describe correctly the NS interior can be unreliable.

Primary author: MALHEIRO, Manuel (Instituto Tecnológico de Aeronáutica)

Presenter: MALHEIRO, Manuel (Instituto Tecnológico de Aeronáutica)

Session Classification: Compact Stars as Laboratories for Testing Strong Gravity

Track Classification: Neutron Stars: Compact stars as laboratories for testing strong gravity