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

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In this work, we investigate neutron stars (NS) in $f(\mathcal{R},\mathcal{T})$ gravity for the case $R+2\lambda\mathcal{T}$, $\mathcal{R}$ is the Ricci scalar and $\mathcal{T}$ the trace of the energy-momentum tensor. The hydrostatic equilibrium equations are solved considering realistic equations of state (EsoS). The NS masses and radii obtained are subject to a joint constrain from massive pulsars and the event GW170817. 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. The finding that using several relativistic and non-relativistic models the variation on the NS mass is almost the same for all the EsoS, manifests that our results are insensitive to the high density part of the EsoS. 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.

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