Neutron stars in f(T) models of gravity

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Abstract

There are many ways to probe alternative theories of gravity, namely, via: experimental tests at solar system scale, cosmological data and models, gravitational waves and compact objects. In the present work, we consider a model of gravity with torsion f(T) applied to compact objects such as neutron stars (NSs) for a couple of realistic equations of state (EOS). To do so we follow our previous articles, in which we show how to model compact stars in this f(T) gravity by obtaining its corresponding Tolman-Oppenheimer-Volkof equations and applying this prescription to model polytropic compact stars. In these modelling of NS in f(T), gravity presented here, we calculate, among other things, the maximum mass allowed for a given realistic EOS, which would also allow us to evaluate which models are in accordance with observations. The results already known to General Relativity must be reproduced to some extent and, eventually, we can find models that allow higher maximum masses for NSs than Relativity itself, which could explain, for example, the secondary component of the event GW190814, if this star is a massive NS.

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