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Neutron stars with dark matter - the dark siblings of hybrid stars

Neutron stars offer a unique possibility to study matter under extreme conditions. The core of such an object can reach densities up to several n_0 which enables the possibility for a transition to quark matter. However the properties of such hybrid stars could be mimicked by dark matter and thus one needs a clear understanding of the properties for each object. To do so we study dark matter-admixed neutron stars and try to classify the differences and similarities. We are including bosonic, self-interacting dark matter with a sufficiently stiff self-interaction potential in the form of $V \propto \phi^n$ and find that these neutron stars become ultra-compact ($C \geq 1/3$). We furthermore study the stability of these configurations by investigating the onset of unstable radial modes. With their unique properties they could account for unusual mass-radius measurements, however the same is valid for quark stars, i.e. stars made off entirely quark matter. The discussion about the nature of these objects will be addressed in this talk.

Category

Theory

Collaboration (if applicable)

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