

Study of Ultracompact Stars in General Relativity

It is usually considered $2.16 M_{\odot}$ as the upper limit mass for a neutron star. Objects with masses between this value and $5 M_{\odot}$ could be weakly interacting black holes or very massive neutron stars. Motivated by this, the present paper's aim is to investigate the so-called ultracompact stars. This analysis is performed taking into consideration influences both in the metric and in the matter structure, through deformed geometries, anisotropies in the energy-momentum tensor, and adequate equations of state, with the purpose of guaranteeing the correct inspection when studying this class of atypical neutron stars. These characteristics are required since ultracompact stars almost certainly will exhibit, besides the undeniable very high density, intense magnetic fields and high rotation. To this extent, the stars are studied using non-spherical models. Accordingly, through the employment of modified Tolman-Oppenheimer-Volkoff equations and selected equations of state, significant results are achieved. Interesting prospects - like the comparison to models which possess magnetic fields or rotation in their own structures - can begin to be outlined.

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