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Gravastar Model in $f(\mathcal{T}, \mathcal{T})$ Gravity with Vaidya–Tikekar Geometry

In this study, we construct a gravastar model based on the Mazur–Mottola proposal within the framework of $f(\mathcal{T}, \mathcal{T})$ gravity. Gravastars are considered promising alternatives to black holes, as they provide compact, horizon-free objects that eliminate the occurrence of spacetime singularities. The proposed model consists of three distinct regions: an interior core, a thin shell, and an exterior vacuum region. The interior is characterized by a constant negative energy density that produces an outward repulsive pressure. This repulsive force is counterbalanced by the thin shell, which is filled with ultra-relativistic stiff matter obeying the Zel’dovich equation of state, thereby ensuring the equilibrium and stability of the configuration. The exterior region is described by the Schwarzschild vacuum solution. Within this framework, we obtain a physically viable and singularity-free gravastar solution, where the gravitational dynamics are governed by the combined effects of the torsion scalar and the trace of the energy–momentum tensor.

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