

Study of Neutron Star in the presence of Dark Matter

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Neutron stars (NSs), being one of the most enigmatic stellar remnants with incredibly dense core and sturdy crust, can be considered as the best laboratory in the universe to appraise many astrophysical models of the strong gravitational field regime. We analyse the effects of dark matter on the properties and curvature of the NS with the help of relativistic mean-field (RMF) formalism using NL3, G3 and IOPB-I parameter sets. We thoroughly investigate the influence of dark matter candidate on the mass-radius profile of the NS. The impact of dark matter on the moment of inertia for static and rotating NS has also been calculated and studied [1]. We calculate and examine the Riemann tensor, Kretschmann scalar, Ricci tensor and RicciScalar along with the variation of baryon density, mass and radius of the NS in the presence of the dark matter [2]. The dependence of curvature of the NS on the nature of the RMF parameter set has also been explored with the softer and stiffer equation of state.

[1] H. C. Das, A. Kumar, B. Kumar, et al., MNRAS 495, 4893 (2020).

[2] H. C. Das, A. Kumar, B. Kumar, S. Biswal, and S. Patra, Journal of Cosmology and Astroparticle Physics 2021, 007 (2021).

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