

Neutron Star in Covariant $f(Q)$ Gravity

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In this study, we investigate the structure of neutron stars within the framework of covariant gravity, an extension of general relativity that incorporates non-metricity. By adopting a static and spherically symmetric metric with perfect fluid matter, we derive the modified Tolman-Oppenheimer-Volkoff (TOV) equations specific to three models: quadratic, exponential, and logarithmic. We analyze the structure profiles and properties of neutron stars, such as mass, radius, and compactness, by employing realistic equations of state (EoS) for nuclear matter. Our results indicate deviations in the mass-radius relationship of neutron stars when compared to predictions from general relativity, suggesting that non-metricity affects the interior profile of the star. We also demonstrate how diagrams are compatible with observational constraints from NICER and LIGO.

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