Abstract Submitted
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nEoS: neutron star equations of state specifically tailored to modified gravity studies[1] EVA LOPE-OTER, FELIPE J. LLANES-ESTRADA, Univ. Complutense de Madrid — Full testing of General Relativity and its extensions requires a dense medium as found only in neutron stars and their mergers, where the field equations have a significant matter source. The Equation of State of neutron star matter for these studies needs to avoid inducing contradictory reasoning, as can happen because many if not all modern EoS sets have been constrained to some extent by astrophysical observables (whose calculation assumes standard GR) or by model assumptions on the nuclear side. Our nEoS sets, available at http://teorica.fis.ucm.es/nEoS/, provide an alternative where only first principles of hadron physics have been used (Chiral Perturbation Theory at low density, perturbative Quantum Chromodynamics at asymptotically high density, and in the intermediate nonperturbative region, only causality and monotony). Thus, they are ideally suited to test gravity with neutron star matter without logical pitfalls. They span a band in the $P(\rho)$ plane that incorporates all solid knowledge from hadron physics to date. We also newly discuss finite-temperature modifications of the nEoS sets and a bound on the maximum latent heat that, unlike the Seidov limit of GR, follows from hadron physics alone, thus being valid in modified theories of gravity.

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Felipe J Llanes-Estrada
Univ. Complutense de Madrid

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