

The Structure and Signals of Neutron Stars, from Birth to Death



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Symmetry energy and neutron star radii

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We introduce two sets of models with symmetry energy functionals which at high baryon densities differ in stiffness. The symmetric part of the energy per baryon is the same for all models and is based on the APR EoS. We test the behavior of the symmetry energy by using a constraint on the total baryon mass for a gravitational mass of a $1.25 M_{\odot}$ neutron star.

This constraint is the result of a study performed by Kitaura et al. on stellar explosions of stars with an O-Ne-Mg core. Since the symmetry energy is closely related to the proton fraction of neutron star matter, we discuss the role of the DUrca cooling since it can be activated above some threshold on the proton content. We conclude with showing the favored models and their corresponding effects on the neutron star radius.

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