NEUTRON AND PROTON SEPARATION IN DENSE NEUTRON STAR MATTER FOR REALISTIC NUCLEAR MODELS

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Abstract

Vanishing of the nuclear symmetry energy implies proton-neutron separation instability in dense nuclear matter. Negative values of the symmetry energy result in disappearance of protons at high densities. The neutron star matter is unstable with respect to formation of domains with high proton concentration immersed in pure neutron matter. We consider bulk separation of protons and neutrons for a number of realistic nuclear models which occurs at densities close to the density of disappearance of protons from the system. The state with separated protons and neutrons strongly influences astrophysical properties of neutron stars.