

The Modern Physics of Compact Stars and Relativistic Gravity

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Protons in High Density Neutron Matter

Based on the recent observation of the strong dominance of proton-neutron short range correlations (SRCs) as compared to proton-proton and neutron-neutron SRCs the new properties are predicted for the beyond Fermi-shell momentum distribution of nucleons in asymmetric nuclei. The first property is that there is a approximate scaling relation between high momentum distributions of proton and neutron weighted by their relative fractions and the second property is that the high momentum distributions are inverse proportional to their relative fractions. We then discuss the implication of these new properties in high density asymmetric matter and demonstrate that it explains the several recent experimental anomalies observed for neutron rich heavy nuclei. We further discuss the possible implications for neutron stars, one of them being the strong modification of the protons in the core of a neutron star.

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