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Correlations of Neutron Star Observables with Properties of Nucleonic and Hyperonic Interactions

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A wide range of extreme states of the nuclear matter that cannot be studied in terrestrial conditions is realized in neutron stars, making them a source of information on the properties of baryonic interactions and nuclear matter under conditions different from those in the most stable nuclei. Under such conditions, additional sensitivity to certain properties of baryonic interactions may arise. At densities several times higher than the normal nuclear density, hyperons may appear in the neutron star matter.

In this paper, we study the dependence of the observables of neutron stars, such as the maximum mass, the corresponding minimum radius, the tidal deformability coefficient for stars with a mass of $1.4M_{\odot}$ and their radius on the properties of hyperon-nucleon and nucleon-nucleon interactions.

In particular, a strong interplay was established between the parameters of neutron stars and the density at which hyperons appear, as well as the contracting power of YN interactions.

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