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Applications of the QCD Sum Rules (QCDSR) Method to Hybrid Stars

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The study of matter at extreme densities has been a major focus in theoretical physics in the last half-century. The wide spectrum of the information provides an insight into the world around us. The models and concepts put forward by the study of nuclear matter help to solve mystery of the interaction in the universe. Through the study of neutron stars we are able to investigate the process involves all four known fundamental forces of nature.

In this study we first use a relativistic model within the mean-field approximation to refine our knowledge of the workings of the strong interaction in neutron stars with the presence of hyperons and then we use Baryon-Meson coupling constants from QCD sum rules method to describe the stellar matter. Using both methods for the coupling constants, the particle fraction in beta equilibrium is investigated and the neutron star mass-radius profile is obtained in the presence of hyperons.

Keywords: neutron strar, hyperon, coupling constants

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