

Compact stars in the QCD phase diagram VI (Cosmic matter in heavy-ion collision laboratories?)

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Vector interaction enhanced bag model

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The current state-of-the-art quark matter model in astrophysics is the thermodynamic bag model (tdBAG). This model approximates the effect of quark confinement, but it lacks other important properties of Quantum Chromodynamics. The vector enhanced bag model (vBAG) improves the tdBAG approach by taking into account dynamical chiral symmetry breaking and repulsive vector interactions. The latter is of particular importance to studies of dense matter in beta-equilibrium in order to explain the 2 solar mass maximum mass constraint for neutron stars. Another important feature of this model is the assumption of simultaneous chiral symmetry breaking and confinement. The model can be derived from the QCD based framework of Dyson-Schwinger equations by assuming a simple quark-quark contact interaction. This work will focus on the resulting phase diagram and neutron star equations of state.

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