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Crossover phase transition in hybrid compact stars

Lattice simulation of QCD at small net baryon densities and high temperature have revealed that the transition to hadronic phase to the deconfined quark-gluon plasma is a crossover. Recently, the structure of neutron stars have been studied with a crossover equation of state by means of a switching function to model a smooth transition from a pure neutron matter to massless quarks. The switch function parameter was constrained in order to reproduce neutron stars up to about two solar masses, with the constraint that the adiabatic sound velocity cannot exceed the speed of light. Afterwards, such a study has been extended by considering the relevance of color superconducting quarks in the cold dense matter. In this contribution, we investigate the crossover phase transition into an hybrid compact stars by means of an equation of state which incorporates hadronic matter, composed by nucleons, hyperons and Δ-isobars degrees of freedom, and a quark phase with massive strange quarks in β-stable equilibrium. In this framework, we analyze the role of the strangeness content related to the bulk properties of the compact stars.

Secondary track

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