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Impact of the MIT bag model parameters values on the maximum mass of neutron star with a quark core

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The effect of model parameters of quark matter equation of state on the magnitude of the maximum mass of a hybrid star is investigated. The quark matter is described within the framework of the extended MIT bag model with one-gluon exchange corrections taken into account. For nucleon matter within the density region, corresponding to a phase transition, the relativistic equation of state is used and calculated with consideration of two-particle correlations, based on the Bonn meson-exchange potential. Using Maxwell's construction, the characteristics of a first-order phase transition are calculated, and it is shown that for a fixed value of the strong interaction constant α_s, the baryon concentrations of the coexisting phases grow monotonically with increasing bag constant B. It is shown that for a fixed value of the strong interaction constant α_s, the maximum mass of a hybrid star increases with decreasing bag constant B. For a given value of the bag parameter B, the maximum mass increases with increasing strong interaction constant α_s. It is shown that the hybrid star configurations, with maximal mass equal to or exceeding the mass of the currently known most massive pulsar, are possible for the values of the strong interaction constant $\alpha_s > 0.6$, also for sufficiently small values of the bag constant B.

Type of contribution

Talk

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