QCD constraints on the equation of state for compact stars

Eduardo Souza Fraga - Instituto de Física, UFRJ

Abstract:

In recent years, there have been several successful attempts to constrain the equation of state of neutron star matter using input from low-energy nuclear physics and observational data. We demonstrate that significant further restrictions can be placed by additionally requiring the pressure to approach that of deconfined quark matter at high densities. Remarkably, the new constraints turn out to be highly insensitive to the amount - or even presence - of quark matter inside the stars. In this framework, we also present a simple effective equation of state for cold quark matter that consistently incorporates the effects of interactions and furthermore includes a built-in estimate of the inherent systematic uncertainties. This goes beyond the MIT bag model description in a crucial way, yet leads to an equation of state that is equally straightforward to use.