

Constraints on Phase Transition in Neutron Stars in a Generalized Setup

We examine the constraints on a first order phase transition from hadronic matter to deconfined quark matter, based on current astrophysical constraints. In particular we hypothesize the effect a well constrained mass radius data point of a compact star would have on the allowed parameter space. To this end we employ the most likely candidates of the recently updated NICER limits of PSR J0030+0451. A parameterizable relativistic mean field equation of state in compliance with χ_{EFT} results is used, where the stiffness of the equation of state can be varied. The phase transition is modeled using a Maxwell construction. We find that astrophysical constraints have reduced the parameter space for a phase transition to such an extent that mass and radius measurements may become unreliable in providing indicators for a phase transition in the near future.

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