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Phenomenological QCD equations of state for neutron star mergers

Thursday 10 August 2017 14:00 (30 minutes)

Based on phenomenological construction of QCD equations of state for the neutron structure, we extend the framework to finite temperature equations of state which have direct relevance to neutron star mergers and supernovae. Our primary target is a matter at baryon density of 5-10n0 (n0: nuclear saturation density) and temperature of ~10-100 MeV in which quark matter may be important. Using a schematic quark model which leads to the color-flavor-locked phase at high density, we study the excitation modes which contribute to the zero point energy and thermal corrections to the equations of state. Goldstone modes, soft modes, and continuum states are taken into account by the phase shift representation of the thermodynamic potential. We argue how the contributions beyond the mean field treatments affect the structure of equations of state.

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