

Beta equilibrated quark matter : An effective model study

We report a first case study of the phase diagram of 2+1 flavor strongly interacting matter in β -equilibrium, using the Polyakov–Nambu–Jona-Lasinio model. Physical characteristics of relevant thermodynamic observables have been discussed. A comparative analysis with the corresponding observables in the Nambu-Jona-Lasinio model is presented. We find distinct differences between the models in terms of a number of thermodynamic quantities like the speed of sound, specific heat, various number densities as well as entropy. Location of charge neutral and isentropic trajectories in the $T - \mu$ plane are studied. The present study is expected to give us a better insight into the role that the superdense matter created in heavy ion collision experiments play in our understanding of the properties of matter inside the core of supermassive stars in the Universe.

Primary author: Mrs MAJUMDER, Sarbani (Bose Institute, Kolkata.)

Co-authors: Dr BHATTACHARYYA, Abhijit (University of Calcutta, Kolkata.); Dr RAY, Rajarshi (Bose Institute, Kolkata.); Prof. GHOSH, Sanjay (Bose Institute, Kolkata.)

Presenter: Mrs MAJUMDER, Sarbani (Bose Institute, Kolkata.)

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