

Equation of state at finite chemical potential, based on the PNJL Lagrangian

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The NJL and PNJL approach had problems to describe the lattice equation of state for zero chemical potential. This made this Lagrangian, despite of its great merits, less attractive to study what happens for a finite baryon chemical potential. A finite baryon chemical potential is expected for the experiments at FAIR/Germany and NICA, Russia but also during the merger of two neutron stars which has been observed recently by gravitational waves. Using a systematic expansion of the Lagrangian in next to leading order in N_c and modifying slightly the interaction between the quarks and the Polyakov loop potential we obtained now results which are in the error bars of the present lattice calculations for zero chemical potential. For the PNJL Lagrangian the extension to finite chemical potential is straight forward. We present these results and discuss what kind of phase transition is expected at low temperature and finite chemical potential and hope to give also preliminary results for the thermodynamical properties of merging neutron stars.

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