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Hadron gas with repulsive mean field

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We study the thermodynamics of hadronic matter using the hadron resonance gas model where the repulsive interactions between baryons are modeled using the mean field approach.

We have shown [1] that repulsive interactions are especially important when considering the higher order fluctuations. We now extend the treatment of [1] to cover not only ground state baryons but heavier resonances too, include the resonance states predicted by lattice calculations and relativistic quark models. We evaluate both the equation of state and the higher order fluctuations and correlations of baryon number and strangenss, and compare the results with the most recent lattice results. After fixing the magnitude of nucleon-nucleon repulsion from the nucleon-nucleon scattering phase shift, we study how different repulsion between ground state baryons and resonances on one hand, and between strange and non-strange baryons on the other, affect the EoS and fluctuations.

In fluid dynamical and hydrid calculations such a a constrained extension of conventional hadron resonace gas model is important for consistent matching of fluid with lattice QCD EoS to hadronic ensembles.

[1] Huovinen and Petreczky, arXiv:1708.00879

Content type

Theory

Collaboration

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