Contribution ID: **444** Type: **Poster**

Transport properties of the QGP in the dynamical quasi-particle model with a CEP

Wednesday 6 April 2022 17:50 (4 minutes)

We explore the transport properties of the QGP matter in the high μ_B region, where a CEP is incorporated. To this aim we extend the effective dynamical quasi-particle model (DQPM) - constructed for the description of non-perturbative QCD phenomena of the strongly interacting quark-gluon plasma (QGP) - to large baryon chemical potentials, μ_B, including a critical end-point and a 1st order phase transition.

The DQPM is based on covariant propagators for quarks/antiquarks and gluons that have a finite width in their spectral functions (imaginary parts of the propagators). In DQPM the determination of complex selfenergies for the partonic degrees-of-freedom at zero and finite μ_B has been performed by adjusting the entropy density to the lattice QCD (lQCD) data. The temperature-dependent effective coupling (squared) $g^2(T/T_c)$, as well as the effective masses and widths or the partons are based in this adjustment.

The novel extended dynamical quasi-particle model, named "DQPM-CP", makes it possible to describe thermodynamical and transport properties of quarks and gluons in a wide range of temperature, T, and baryon chemical potential, μ_B, and reproduces the equation-of-state (EoS) of lattice QCD calculations in the crossover region of finite T, μ_B.

We apply a scaling ansatz for the strong coupling constant near the critical endpoint CEP, located at (T^{CEP}, μ_B^{CEP}) $= (0.100, 0.960)$ GeV. We show the equation-of-state as well as the speed of sound for $T > T_c$ and for a wide range of μ_B, which can be of interest for hydrodynamical simulations. Moreover, one of the advantages of the quasi-particle models is a simple implementation in transport models.

Furthermore, we consider two settings for the strange quark chemical potentials (I) $\mu_q = \mu_u = \mu_s = \mu_B/3$ and (II) $\mu_s = 0, \mu_u = \mu_d = \mu_B/3$. The isentropic trajectories of the QGP matter are compared for these two cases.

Despite that the phase diagram of the DQPM-CP is close to the PNJL calculations the transport coefficients of both approaches differ. This elucidates that the knowledge of the phase diagram alone is not sufficient to describe the dynamical evolution of strongly interacting matter.

Authors: SOLOVEVA, Olga (Goethe University Frankfurt); AICHELIN, Joerg (Subatech/CNRS); BRATKOVSKAYA, Elena (GSI, Darmstadt)

Presenter: SOLOVEVA, Olga (Goethe University Frankfurt)

Session Classification: Poster Session 1 T02 / T03

Track Classification: QCD matter at finite temperature and density