

## Transport properties of the hot and dense QGP

*четверг, 12 ноября 2020 г. 18:30 (30)*

We study the influence of the baryon chemical potential  $\mu_B$  on the dynamical properties of the Quark–Gluon–Plasma (QGP) in and out-of equilibrium. The description of the QGP in equilibrium is based on the effective propagators and couplings from the Dynamical QuasiParticle Model (DQPM) that is matched to reproduce the equation-of-state of the partonic system above the deconfinement temperature  $T_c$  from lattice Quantum Chromodynamics (QCD).

We study the transport coefficients such as the ratio of the shear and bulk viscosities to the entropy density, i.e.  $\eta/s$  and  $\zeta/s$ , the electric conductivity  $\sigma_0/T$  as well as the baryon diffusion coefficient  $\kappa_B$  and compare to related approaches from the literature (non-conformal holographic model, lattice QCD, NJL). We find that the ratios  $\eta/s$  and  $\zeta/s$  as well as  $\sigma_0/T$  are in accord with the results from lattice QCD at  $\mu_B=0$ . Furthermore, we have considered the shear viscosity and the electric conductivity of strongly interacting quark matter within the extended  $N_f=3$  Polyakov Nambu–Jona-Lasinio (PNJL) model along with the crossover transition line for moderate values of baryon chemical potential  $0 \leq \mu_B \leq 0.9$  GeV as well as in the vicinity of the critical end point (CEP) and at large baryon chemical potential  $\mu_B = 1.2$  GeV, where the first-order phase transition takes place.

We explore how the nature of the degrees-of-freedom affects the transport properties of the QGP. Moreover, we study the possible influence of the presence of a CEP and of a 1st order phase transition at high baryon chemical potential.

The out-of equilibrium study of the QGP is performed within the Parton–Hadron–String Dynamics (PHSD) transport approach extended in the partonic sector by explicitly calculating the total and differential partonic scattering cross sections based on the DQPM and the evaluated at actual temperature  $T$  and baryon chemical potential  $\mu_B$  in each individual space-time cell where partonic scattering takes place. The traces of their  $\mu_B$  dependencies are investigated in different observables for symmetric Au + Au and asymmetric Cu + Au collisions such as rapidity and  $m_T$ -distributions and directed and elliptic flow coefficients  $v_1, v_2$  in the energy range  $(s_{NN})^{1/2}$  from 7.7 GeV to 200 GeV.

**Primary author(s) :** Dr SOLOVEVA, Olga (Goethe University Frankfurt); Prof. BRATKOVSKAYA, Elena (GSI & Goethe University Frankfurt); Dr MOREAU, Pierre (Duke University); Dr OLIVA, Lucia (Goethe University Frankfurt); Dr SONG, Taesoo (GSI & Goethe University Frankfurt); Prof. AICHELIN, Joerg (SUBATECH, University of Nantes)

**Presenter(s) :** Dr SOLOVEVA, Olga (Goethe University Frankfurt)

**Session Classification :** Session 9: Phase diagram in the context of heavy-ion collisions

**Track Classification :** Phase diagram in the context of heavy-ion collisions