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Shear Viscous coefficient of hadronic matter in presence of strong magnetic field

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A deconfined state of quarks and gluons i.e. QGP (quark gluon plasma) is created in relativistic heavy ion collisions in LHC at CERN and RHIC at BNL and a phase transition to hadronic matter is supposed to occur at around 160 MeV temperature. This extreme state of matter is also supposed to be created after the big bang. On the other hand, in recent times, non-central heavy ion collisions are taking more attention. In non-central collisions, a high magnetic field is created in the direction perpendicular to the reaction plane. Owing to this fact, in recent time, magnetohydrodynamics is also developing to study phenomenological aspects of heavy ion collisions and it involves the transport coefficients like viscosity and conductivity of RHIC/LHC matter in presence of magnetic field. The transport coefficients are used as the input parameters for the hydrodynamic simulations. In the presence of the magnetic field, the charged particles get affected, and the system becomes anisotropic. Therefore, the transport coefficients become anisotropic.

In this work, we have calculated transport coefficient of hadronic matter in presence of temperature and magnetic field using the linear sigma model (LSM). The shear viscosity over entropy density (□/□) is estimated in relaxation time approximation. Point like interaction rate of hadrons are evaluated in presence of magnetic field to calculate temperature and magnetic field dependent relaxation time. We considered only temperature dependent masses coming from mean field effects. Value of viscosity over entropy density is lower in presence of magnetic field than the value of it in only thermal medium. □/□ has a minimum in presence and as well as in absence of magnetic filed near the crossover transition.

Session

Heavy Ions and QCD

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