ESTIMATING TRANSPORT COEFFICIENTS IN HOT AND DENSE QUARK MATTER

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We compute the transport coefficients– namely, the coefficients of shear and bulk viscosity as well as thermal conductivity for hot and dense quark matter. The calculations are performed within Nambu Jona Lasinio (NJL) model. The estimation of the transport coefficients is made using a quasi particle approach of solving Boltzmann kinetic equation within the relaxation time approximation. The transition rates are calculated in a manifestly covariant manner to estimate the thermal averaged cross sections for quark quark as well as quark anti-quark scattering. The calculations are performed for finite chemical potential also. Within the parameters of the model, the ratio of shear viscosity to entropy density has a minimum at the Mott transition temperature. At vanishing chemical potential, the ratio of bulk viscosity to entropy density, on the other hand, decrease with temperature with a sharp decrease near the critical temperature and vanishes beyond it. At finite chemical potential, however, it increases slowly with temperature beyond the Mott temperature. The coefficient of thermal conductivity also shows a minimum at the critical temperature.