

Response Functions and Collective Modes of hot QCD medium

The response functions of a particular medium is a basic tool to understand the properties of the medium. In the same spirit, Chromo-electric/magnetic response functions (such as Dielectric permittivity , refractive index , etc.,) can be used to understand the medium properties of hot QCD/QGP medium. We first obtain the gluon polarisation tensor in a hot QCD medium which is described in terms of effective quasi-particle degrees of freedom with anisotropy(momentum) within transport theory approach. The effects of the collisions have been neglected since the estimations are done for very near equilibrium situations and for smaller strength of the anisotropy. The response functions (chromoelectric permittivity and chromomagnetic permeability) could be obtained by taking the static limit of the polarization tensor. The hot QCD plasma possess a collective motion due to the fluctuation or perturbation in the equilibrium state, which are termed as quasi-particle collective excitations of the plasma.

These excitations have different collective modes known as plasmons of quark-gluon plasma. These modes play an important role in the dynamical evolution of a quark-gluon plasma. The investigation are mainly focussed around such collective modes. Future extension of the work will also include an appropriate collision term in the effective transport equation that has been set-up to determine the response functions.

Reference:

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Preferred Track

Collective Dynamics

Collaboration

Not applicable

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