Contribution ID: **57** Type: **Oral**

Transport coefficients of compressed baryonic matter at finite magnetic field

Friday 5 September 2025 16:00 (15 minutes)

The chiral model is among the effective QCD models that provide non-perturbative estimates in the intermediate density regime inaccessible to LQCD and pQCD. Within this model, increasing density or chemical potential leads to a reduction of the quark condensate and constituent quark mass, ultimately restoring chiral symmetry [1]. This work aims to provide a kinetic theory based, non-pQCD estimation of the transport coefficients –particularly shear viscosity –in presence of a finite magnetic field using the condensate dependent constituent quark mass. Strong magnetic fields lead to Landau quantization of perpendicular momenta which in turn affect the transport coefficients. This is particularly significant in the light of upcoming experimental facilities of Compressed Baryonic Matter (CBM) experiment at FAIR, Germany and Nuclotron-based Ion Collider fAcility (NICA) in Russia which are set to explore high baryon density regions of the QCD phase diagram.

References

[1] D.R.J. Marattukalam, A. Dwibedi, S. De, S. Ghosh, Possibility of quantum Hall effect in dense quark matter environments: A chiral model approach, 2024, arXiv:2410.22890.

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Session Classification: Parallel Session