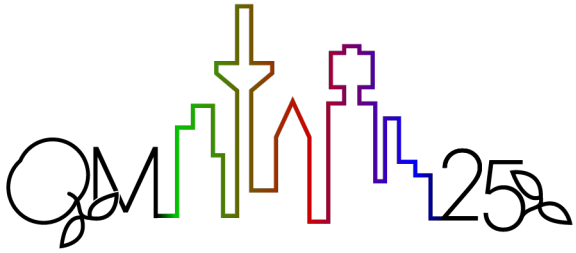

Contribution ID: **649** Type: **Poster**

Study of Heavy Quark Momentum Broadening in a Non-Abelian Plasma away from Thermal Equilibrium

Heavy quarks are formed in the earliest stages of heavy-ion collisions and hence carry comprehensive information about the entire evolution of the initial non-equilibrium glasma phase to a quark-gluon plasma phase, its subsequent hydrodynamic evolution and hadronization at later stages. One of the quantities of interest to model this evolution and to compare with experimental observations is the heavy quark momentum diffusion coefficient κ, which determines how strongly these interact with the medium. We estimate κ relevant for the pre-thermalization stage in a highly occupied state of SU(2) gauge fields inspired from the color glass condensate (CGC) effective theory. For this we implement for the the first time, relativistic evolution of heavy quarks in the mass range of charm and bottom quarks in a background of over-populated SU(2) gauge fields which are evolved using classical-statistical real-time lattice techniques. Based on a novel methodology to extract the momentum broadening for relativistic quarks, in out-of-equilibrium conditions, we find that the momentum distribution of heavy quarks exhibit interesting non-perturbative features at initial times eventually going over to a diffusive regime, where we extract the momentum diffusion coefficient [1]. We find a sizeable discrepancy between the results, calculated earlier in the static limit. We further discuss our results to provide an estimate of kinetic equilibration times for charm and bottom quarks relevant for heavy-ion experiments.

Reference:
[1] Harshit Pandey, Soeren Schlichting, and Sayantan Sharma. Heavy-Quark Momentum Broadening in a Non-Abelian Plasma away from Thermal Equilibrium. Phys. Rev. Lett., 132(22):222301, 2024.

Category

Theory

Collaboration (if applicable)

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