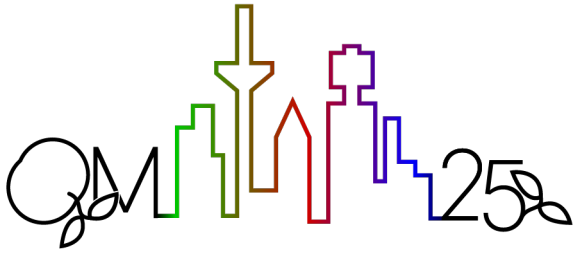

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Charm and Beauty diffusion in proton-nucleus collisions: anisotropic diffusion in the early stage in a fully consistent 3+1D framework

In this work, we simulate $SU(3)$ color fields that occur in the very early stages of high-energy nuclear collisions, using classical real-time lattice gauge theory. In particular, we model the structure of the proton and the longitudinal initial state fluctuations to simulate realistic non-boost invariant proton-nucleus collisions. We study the anisotropic momentum, and angular momentum, diffusion of heavy quarks in this stage. We find that the boost-invariant system retains a large amount of anisotropy even for values of the proper time which are quite larger than the typical timescale of the problem, namely the inverse saturation scale $\tau = 1/Q_s$. Moreover, we find that the inclusion of rapidity-dependent fluctuations leads to a partial tendency to isotropization of the system, and the amount of isotropization increases with increasing magnitudes of such fluctuations.

Category

Theory

Collaboration (if applicable)

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