

11th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions



Beitrag ID: 255

Typ: **Talk**

The heavy quark diffusion coefficient from 2+1 flavor lattice QCD

Mittwoch, 29. März 2023 09:40 (20 Minuten)

We present a novel approach to nonperturbatively estimate the heavy quark momentum diffusion coefficient, which is a key input for the theoretical description of heavy quarkonium production in heavy ion collisions, and is important for the understanding of the elliptic flow and nuclear suppression factor of heavy flavor hadrons. In the heavy quark limit, this coefficient is encoded in the spectral functions of color-electric and color-magnetic correlators that we calculate on the lattice to high precision by applying gradient flow. For the first time we apply the method to 2+1 flavor ensembles with temperatures between 200-350 MeV. Using our experience from quenched QCD, where we performed a detailed study of the lattice spacing and flow time dependence, we estimate the heavy quark diffusion coefficient using theoretically well-established model fits for the spectral reconstruction.

Experiment/Theory

Theory/Phenomenology

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Sitzung Einordnung: Parallel: Heavy Flavours & Quarkonia

Track Klassifizierung: Heavy flavor and quarkonia