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QLBT: A linearized Boltzmann transport model for heavy quarks in a hot nuclear medium of quasi-particles

We perform a systematic study on heavy quark dynamics in relativistic heavy-ion collisions.

The dynamical evolution of heavy quarks interacting with the quark-gluon plasma (QGP) is simulated via our new QLBT model, which improves the linearized Boltzmann transport (LBT) model by treating the QGP as a collection of quasi-particles.

To account for the non-perturbative interactions among quarks and gluons of the hot QGP, the thermal masses of quasi-particles are fitted to describe the equation of state from lattice QCD simulations using the Bayesian statistical analysis method.

Combining QLBT model with our advanced hybrid fragmentation-coalescence hadronization approach, we calculate the nuclear modification factor R_{AA} and the elliptic flow v_2 of D mesons at RHIC and the LHC.

By comparing our state-of-the-art QLBT model calculation with the experimental data on D meson R_{AA} and v_2 , we extract the heavy quark diffusion coefficient D_s in the temperature range of $1 - 4 T_c$ and compare to the values from other groups.

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