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Toward a Complete Description of Heavy Flavor Transport in Medium

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We evaluate heavy-flavor (HF) transport in relativistic heavy ion collisions within a nonperturbative (strong-coupling) framework. In the Quark-Gluon Plasma, heavy-quark diffusion coefficients are obtained from a potential-based T-matrix approach, which builds up resonance correlations toward the phase transition region. Those resonance correlations are also utilized for hadronizing heavy quarks via resonance recombination with light quarks from the medium. In the hadron-resonance gas, the diffusion coefficients of HF mesons are calculated in terms of empirical scattering amplitudes obtained from effective hadronic theory. A carefully constrained hydrodynamic model is used for the evolution of the background medium to implement the diffusion and hadronization components via relativistic Langevin simulations. Our calculations thus represent a conceptually self-consistent strongly-coupled framework for HF probes at both micro- and macroscopic levels. Pertinent HF observables (electron and D-meson spectra andv2) are computed and show good agreement with available RHIC and LHC data.

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