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Langevin dynamics of heavy quarks in a soft-hard factorized approach

By utilizing a soft-hard factorized model, which combines a thermal perturbative description of soft scatterings and a perturbative QCD-based calculation for hard collisions, we study the energy and temperature dependence of the heavy quark diffusion coefficients in Langevin dynamics. The adjustable parameters are fixed from the comprehensive model-data comparison. We find that a small value of the spatial diffusion coefficient at transition temperature is preferred by data 2piTD(Tc)=6. With the parameter-optimized model, we can describe simultaneously the prompt D0 RAA and v2 data at pT<8GeV in Pb-Pb collisions at 2.76 and 5.02TeV. We also make predictions for non-prompt D0 meson for future experimental tests down to the low momentum region.

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