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Elastic and radiative heavy quark energy loss within a transport model

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The full space-time evolution of heavy quarks and light partons in ultra-relativistic heavy-ion collisions is studied within the partonic transport model Boltzmann Approach to MultiParton Scatterings (BAMPS). We discuss in detail for all flavors the influence of elastic and radiative energy loss with a running coupling. Radiative processes, in particular, are implemented through an improved version of the Gunion-Bertsch matrix element, which is derived from comparisons to the exact result. In this calculation the finite heavy quark masses are explicitly taken into account, leading to the dead cone effect. Consequently, we present results of this updated version of BAMPS and compare them to experimental data at RHIC and LHC. In detail, the nuclear modification factor and elliptic flow of charged hadrons, heavy flavor electrons as well as muons, D mesons, and non-prompt J/ψ are discussed. The latter two are especially sensitive to the mass difference of charm and bottom quarks. Furthermore, we make predictions where no data is available yet.

On behalf of collaboration:

None

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