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Open Charm and Bottom production in Heavy-Ion Collisions: R_{AA} and $v_n - v_m$ correlations within event-shape selection

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We discuss the dynamical evolution of charm quark elastic energy loss in a bulk medium at fixed temperature T extending the Boltzmann (BM) collision integral to include off-shell dynamics. We show the results on the transport coefficients and the time evolution of charm quark making a comparison among the Langevin dynamics, the BM collisional integral within a Quasi-Particle Model (QPM) approximation with on-shell QGP medium and the BM collision integral extended to a dynamical quasi-particles model with off-shell bulk particles. We also study the propagation of both charm and bottom quarks in the QGP by means of a full on-shell Boltzmann transport approach within an hybrid coalescence plus fragmentation hadronization model. We show the D-mesons R_{AA} and v_2 at RHIC and LHC energies also discussing the role of the initial state fluctuations on the development of high-order heavy-flavor flow harmonics ($v_n(p_T)$, $n = 3, 4$). The results presented include event-shape selected D-meson spectra and v_n , correlations between different D-meson flow harmonics at LHC energies in different range of centrality selections. The events in centrality class are divided according to magnitude of the second-order harmonic reduced flow vector q_2 . In the same scheme we show predictions for R_{AA} , v_2 and v_3 of B-mesons and both electrons and muons from semileptonic B-meson decays at top LHC energies. Within this approach the extracted T-dependence of the space-diffusion coefficient D_s of both charm and bottom quarks is in an agreement with lattice QCD data within the systematic uncertainties. Lately, we have extended QPM approach to partonic propagators that explicitly depend on three-momentum of particles, furthermore we discuss the impact of momentum-dependent partonic masses on the D_s coefficient providing novel and powerful constraints for heavy-flavour transport coefficients.

[1] M.L.Sambataro, S.Plumari and V.Greco, Eur. Phys. J. C 80, no.12, 1140 (2020).

[2] S.Plumari et al., Phys.Lett.B 805 (2020) 135460.

[2] M.L.Sambataro, S.Plumari, Y. Sun, V. Minissale and V.Greco, in preparation.

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