



Contribution ID: 883

Type: Poster

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

Friday 8 April 2022 14:40 (4 minutes)

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 collisional 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 a 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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Session Classification: Poster Session 3 T11_5

Track Classification: Heavy flavors, quarkonia, and strangeness production