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Charm and Bottom quarks dynamics in Heavy-Ion Collisions: anisotropic flows v_n and their correlations with Event-Shape Engineering technique.

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We describe the propagation of heavy quarks (HQs), namely charm and bottom, in the quark-gluon plasma by means of a full Boltzmann transport approach including event-by-event initial state fluctuations. The non-perturbative dynamics of the interaction between plasma particles and HQs have been taken into account through a Quasi-Particle Model(QPM) while the hadronization process is described by hybrid coalescence plus fragmentation approach. We show the D-mesons R_{AA} and v_2 at RHIC and LHC energies. Furthermore, we discuss the extension to high-order anisotropic flows ($v_n(p_T)$) also evaluated within the Event-Shape Engineering technique which consists in selecting events in the same centrality class but characterized by different geometry in the initial state. In this context, we show event-shape selected D-meson spectra and v_n but also predictions for correlations between different D-meson flow harmonics at LHC energies in different range of centrality selections. Within this approach we extract a space-diffusion coefficient D_s for charm quark which is in a agreement with lattice QCD results within the systematic uncertainties. In the same scheme, we extend our approach to study bottom quark dynamics: we find that QPM approach is able to correctly predict the first available data on R_{AA} and v_2 of single-electron from B decays. We show also predictions for centralities where data for both v_2 and v_3 are not yet available .

- [1] M.L.Sambataro, Y.Sun, V.Minissale, S.Plumari and V.Greco, Eur.Phys.J.C 82 (2022) 9, 833.
- [2] M.L.Sambataro, V. Minissale, S.Plumari and V.Greco. Submitted to Phys. Lett. B. e-Print: 2304.02953.
- [3] S.Plumari, G.Coci, V.Minissale, S.K.Das, Y.Sun and V.Greco, Phys. Lett. B 805 (2020), 135460.
- [4] M.L.Sambataro, S.Plumari and V.Greco, Eur. Phys. J. C 80, no.12, 1140 (2020).

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