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Heavy-flavor anisotropic flow at RHIC and LHC energies within a full transport approach

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The propagation of heavy quarks (HQs), charm and bottom, in the quark-gluon plasma (QGP) is described by means of a full Boltzmann transport approach. The non-perturbative dynamics and the interaction between HQs and the bulk is taken into account by means of a Quasi-Particle Model. Including the description of the intense electromagnetic and vortical fields, we discuss their impact on the directed flow of neutral D mesons at RHIC and LHC energy, clarifying the powerful role of this observable in giving information on the transport properties of the hot QCD matter generated in ultra-relativistic collisions. Indeed, the v_1 magnitude is associated with the HQ diffusion coefficient while the v_1 splitting is connected to the electric conductivity of the QGP medium.

We also show our results for the D-meson R_{AA} and v_n at RHIC and LHC energies within a coalescence plus fragmentation hadronization scheme and including event-by-event initial state fluctuations. We highlight the role of the latter on the development of $v_3(p_T)$ and $v_4(p_T)$. We discuss event-shape selected D-meson spectra and v_n as well as correlations between different D-meson flow coefficients at LHC energies in different centrality classes. The centrality selection is performed according to the magnitude of the second-order harmonic reduced flow vector q_2. The extracted temperature dependence of the spatial diffusion coefficient D_s is consistent with lattice QCD results within the systematic uncertainties. Furthermore, we present predictions for R_{AA}, v_2 and v_3 of B mesons and electrons from semi-leptonic B-meson decays at top LHC energies. We find a remarkable suppression al low p_T, leading to a determination of D_s that is in agreement with the lattice QCD calculations.

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Primary authors: OLIVA, Lucia (Università di Catania, INFN Catania); PLUMARI, Salvatore; GRECO, Vincenzo; MINISSALE, Vincenzo; SAMBATARO, Maria Lucia (Università degli Studi di Catania)

Presenter: OLIVA, Lucia (Università di Catania, INFN Catania)

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