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Transport properties from Charm to Bottom: p_T suppression, anisotropic flow v_n and their correlations to the bulk dynamics

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We study the propagation of charm and bottom quarks in the quark-gluon plasma (QGP) by means of a relativistic Boltzmann transport approach that in the large M/T limit recovers the standard Langevin dynamics. The non-perturbative interaction between heavy quarks and light quarks is described by means of a quasi-particle approach in which light partons are dressed with thermal masses. The last tuned to lattice QCD thermodynamics naturally induce a non-perturbative interaction that entails only a weak dependence on the temperature especially around the critical temperature T_c, which plays a fundamental role to describe simultaneously the experimental data for the nuclear suppression factor R_{AA} and the elliptic flow $v_2(p_T)$ of D mesons from RHIC to LHC energies. In the same scheme we present predictions for B mesons at 5.02 ATeV that shows a quite significant suppression and allow a determination of the space-diffusion coefficient that is practically independent on the transport scheme for HQ (Boltzmann vs Langevin). The last is seem to largely deviate from from pQCD estimate but also to be still somewhat larger than AdS/CFT and quite close to lattice QCD calculations. Finally it will be discussed the relevance of initial state fluctuations that allows to extend the analysis to high order anisotropic flows $v_3(p_T)$ and $v_4(p_T)$ as well as to investigate the role of QCD interaction in developing correlations between the light and the heavy flavor anisotropic flows. These will provide novel and powerful constraints for the transport coefficients.

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