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Heavy-flavor dynamics in nucleus-nucleus collisions: from RHIC to LHC

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The understanding of the heavy-quark dynamics in nucleus-nucleus collisions, so far possible at RHIC only through the inclusive measurement of electron spectra from c and b decays, is becoming now accessible at LHC also through the exclusive reconstruction of open-charm hadrons, thus providing a richer physical information useful to discriminate among different theoretical models.
A complete setup to study heavy-flavor observables in pp and AA collisions was recently developed by us: in the latter case the presence of a hot fireball leads to a modification of the final p_T-spectra. More specifically, the propagation of c and b quarks in the plasma (whose evolution is supposed to be described by relativistic hydrodynamics) is followed by solving the relativistic Langevin equation within a picture of multiple uncorrelated random collisions. The relevant heavy-quark transport coefficients are given a microscopic evaluation within the Hard Thermal Loop approximation, supplemented by a kinetic pQCD calculation for hard collisions.
The results obtained with this approach turned out to be in reasonable
agreement with the experimental data obtained at RHIC, in particular
for the R_AA of non-photonic electrons.
Here we extend the above study to the LHC case, at the current center-of-mass energy of 2.76 TeV. The first data on primary charged particle density obtained by the ALICE collaboration (dN_ch/deta˜1600 in central PbPb collisions) allow to provide an estimate of the initial conditions of the hydrodynamical evolution of the background medium. First results for the spectra, the R_AA and v_2 of open-charm hadrons and non-photonic single-electrons will be presented.

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