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Influence of a realistic medium description including fluctuations on heavy quark observables

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The observation of strong jet quenching and of high-p_T hadron suppression in relativistic heavy-ion collisions are striking experimental signatures for the formation of a deconfined QCD plasma in which partons suffer from medium-induced energy loss. In particular, heavy quarks represent key probes for revealing the properties of the produced matter.
In this talk, we discuss the consequences of a realistic medium description with fluctuating initial conditions on heavy-quark observables. For this purpose, we combine our Monte-Carlo approach to heavy-quark in-medium propagation MC@sHQ [1] with the full 3+1 dimensional fluid dynamic expansion from EPOS [2]. This allows for
a consistent treatment of both the heavy-quark production and the collisional and radiative processes leading to the in-medium energy loss of heavy quarks. On an event-by-event basis, we report on R_{AA} and v_2 for D and B mesons for RHIC and LHC conditions and confront our results with recent experimental observations. The use of the lattice equation of state in the EPOS fluid dynamics allows us to study the nature of the effective degrees of freedom in the vicinity of the crossover transition [4], as a proportion of hadronic degrees of freedom above T_c reduces the energy loss of heavy quarks.

[1] P. B. Gossiaux and J. Aichelin, Phys. Rev. C 78 (2008) 014904
[2] K. Werner et al., arXiv:1203.5704,
[3] P. F. Kolb and U. W. Heinz, In *Hwa, R.C. (ed.) et al.: Quark gluon plasma* 634-714
[4] C. Ratti et al., Phys. Rev. D 85 (2012) 014004

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