Contribution ID: **85** Type: **Oral**

Heavy quark quenching and elliptic flow from RHIC to LHC: can the experimental results be understood by pQCD?

Tuesday, 5 November 2013 13:30 (20 minutes)

Recently, we have proposed a microscopic approach for the quenching and thermalisation of heavy quarks (HQ) in URHIC
\cite{Gossiaux:2008,Gossiaux:2009,Gossiaux:2010,Gossiaux:2011}, assuming that they interact with light partons through both elastic and radiative processes evaluated by resorting to some parameterization of the running coupling constant, while those partons are spatially distributed along the hydrodynamical evolution of the hot medium. This approach is able to
explain successfully several observables measured at RHIC and LHC, such as the nuclear modification factor and the elliptic flow of open heavy flavor mesons and non-photonic single electrons. The diffusion coefficient of heavy quarks in the quark gluon plasma – a fundamental property of this state of matter – can thus be extracted and compared with recent lattice calculations.

In this contribution, we provide a general overview of our MC@HQ event generator which can presently be coupled
to the hydrodynamical evolution of the plasma as realized by the KOLb-Heinz approach or by the EPOS model. We discuss the influence of the different hydrodynamical evolution on the predictions for heavy mesons. We confront the results of our model for D and B mesons as well as for the lepton production in URHIC with experimental results obtained so far by the various collaborations at RHIC and LHC. Perspectives for future observables like correlations will be proposed.

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Keywords

Heavy mesons, Raa and V2

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Session Classification: High Transverse Momentum Light and Heavy Flavor Hadrons

Track Classification: High Transverse Momentum Light and Heavy Flavor Hadrons