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Heavy quark quenching from RHIC to LHC: MC@HQ generator compared to experiments

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Recently, we have proposed a microscopic approach for the quenching and thermalisation of heavy quarks (HQ) in URHIC [1-4], 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 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 would like to provide a general overview of our MC@HQ event generator and discuss the predictions of our model for D and B mesons and lepton production in URHIC and confront them with experimental results obtained so far by the various collaborations at RHIC and LHC. A particular focus will be devoted to the impact of the background medium, using several hydrodynamical schemes available nowadays. Perspectives for future observables like correlations will be proposed.

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[3] P.B. Gossiaux, V. Guiho, J. Aichelin, J. Phys. G: Nucl. Part. Phys. 37 (2010) 094019.

[4] P.B. Gossiaux et al., accepted for publication in Nuclear Physics A [arXiv:1209.0844].

Author: GOSSIAUX, Pol (Subatech)

Presenter: GOSSIAUX, Pol (Subatech)

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