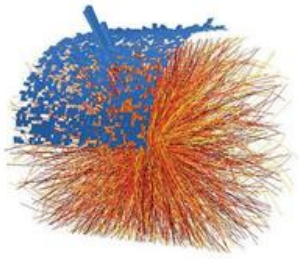

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Constraining heavy-quark energy loss with the joint analysis of D-mesons and non-prompt J/Psi nuclear modification factors

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The mass dependence of particle production at intermediate transverse momentum in ultrarelativistic heavy ion collisions provides a unique opportunity to better constrain the models of parton energy loss in the quark gluon plasma. This mass-hierarchy, first observed for most central collisions at LHC, has been recently extended to several classes of centrality, combining D-mesons nuclear modification factor ($R_{\rm AA}$) of the ALICE collaboration with the one of non-prompt J/ψ stemming from B-meson decay of the CMS collaboration.

In our contribution, we first analyse the respective mass dependence of collisional energy loss and of radiative energy loss. For the later case, a special care of the gluon phase-space boundary is taken. The quantitative importance of such an effect at intermediate energies has indeed recently been demonstrated in [1].

We then present theoretical calculations for the joint $R_{\rm AA}$ of D-mesons, B-mesons and non-prompt J/ψ vs centrality, adopting either pure collisional energy loss scenario, pure radiative, or a cocktail of both types. For this purpose, energy loss mechanisms have been implemented in a Boltzmann transport (which does not suffer from the flaws of the Fokker-Planck evolution equation), while light partons are distributed in space and time along the hydrodynamical evolution of the hot medium initiated according to the state of the art EPOS. This approach has proven [2] to explain successfully several observables measured at RHIC and LHC, such as the $R_{\rm AA}$ of open heavy flavor mesons and of non-photonic single electrons in most central collisions as well as the elliptic flow of those particles.

References

[1] J. Aichelin, P.B. Gossiaux and Th. Gousset, Phys. Rev. D 89 (2014) 074018;
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