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The influence of bulk evolution models on heavy-quark phenomenology

Heavy quarks are considered as one of the essential probes to study the interior of a QGP. The experimental observables contain only the combined information about the expansion of the system and the elementary interaction of heavy quarks with the plasma constituants. In order to asses the latter, we have to understand the influence of different expansion scenarios on the observables. In practice, models proposed by various groups for interpreting RHIC heavy quark data should be thoroughly compared before one can progress towards the understanding of LHC data. In this contribution we report on the joint effort of SUBATECH and TAMU in this respect: We study the impact of different Quark-Gluon Plasma expansion scenarios in heavy-ion collisions on spectra and elliptic flow of heavy quarks. For identical heavy-quark transport coefficients relativistic Langevin simulations with different expansion scenarios can lead to appreciable variations in the calculated suppression and elliptic flow of the heavy-quark spectra, by up to a factor of two. A cross comparison with two sets of transport coefficients supports these findings, illustrating the importance of realistic expansion models for quantitative evaluations of heavy-quark observables in heavy-ion collisions. It also turns out that differences in freeze-out prescriptions and Langevin realizations play a significant role in these variations. Light-quark observables are essential in reducing the uncertainties associated with the bulk-matter evolution, even though uncertainties due to the freeze-out prescription persist.

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