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Heavy-flavour meson and baryon production in high-energy nucleus-nucleus collisions

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Recent experimental measurements display an enhanced production of charmed baryons in high-energy nucleus-nucleus collisions. Quite surprisingly the same is found in proton-proton collisions, in which the relative yields of charmed baryons do not agree with the expectations based on e+e- collisions and with the predictions of those QCD event generators in which the hadronization stage is tuned to reproduce this more elementary situation.
Medium modification of hadronization, via some mechanism of recombination with light thermal partons, has been known for long to be an essential ingredient to implement in transport calculations in order to describe experimental data of heavy-flavour production in nucleus-nucleus collisions. This is true both for the momentum and angular distributions of the final charmed/beauty hadrons and for their relative yields.
In this talk I will present the main features of a novel hadronization scheme we developed and implemented in our POWLANG transport setup, showing also our first results for the heavy-flavour particle ratios and flow coefficients in nucleus-nucleus collisions, in satisfactory agreement with recent experimental data. The model is based on the formation of color-singlet clusters via recombination of a charm quark with a light thermal antiquark or diquark (assumed to be present in the medium around the critical temperature) from the same fluid cell. If the cluster is sufficiently light it undergoes a two-body decay, if its invariant mass is larger it is treated as a Lund string and accordingly fragmented. The model has some nice features: modelling hadronization as a 2->N process allows exact four-momentum conservation; involving particles from the same fluid-cell it contains by construction space-momentum correlations; recombination with diquarks allows one to describe charmed-baryon production; at large pT it naturally approaches standard vacuum-like fragmentation.
A consistent modelling of the proton-proton reference, with the assumption of the formation of a small short-lived QGP droplet, in medium heavy-quark transport and hadronization is currently under development and preliminary results will be shown.

Primary author: BERAUDO, Andrea (INFN, sezione di Torino (IT))

Co-authors: Dr DE PACE , Arturo (INFN); MONTENO, Marco (INFN Torino (IT)); NARDI, Marzia (INFN); PRINO, Francesco (Universita e INFN Torino (IT)); PABLOS, Daniel (INFN Torino)

Presenter: BERAUDO, Andrea (INFN, sezione di Torino (IT))

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