Contribution ID: **729** Type: **Parallel**

Recombination of heavy quarks for meson and baryon production in a large range of collisions systems

Monday 7 July 2025 15:20 (20 minutes)

Measurements of heavy baryon production in pp, pA and AA collisions from RHIC to top LHC energies have recently attracted more and more attention, currently representing a challenge for the heavy-quark hadronization theoretical understanding. In such experiments there have been many indications of the formation of a deconfined phase of quarks and gluons called the quark-gluon-plasma (QGP).
The large baryon over meson ratio $\Lambda_c/D^0 \sim O(1)$ observed in both AA collisions at RHIC and LHC [1] as well as in pp collisions at 5.02 and 13 TeV has been well described by an hadronization approach based on the recombination of heavy quarks combined with fragmentation. The obtained ratio is, in general, quite larger than the one measured and expected in e^+e^-, ep collisions.
The same approach also predicts a quite large $\Xi_c/D^0 \sim 0.15$ and $\Omega_c/D^0 \sim 0.05$ in pp collisions, in quite good agreement with experimental measurements [2].
Given such successful predictions, we present here a critical assessment of the elements of the hadronization modeling that are mainly driving heavy baryon enhancement.
In addition, we discuss the extensions of the approach applied in order to supply the prediction for the multi-charmed baryon production, i.e. Ξ_{cc}, Ω_{cc} and Ω_{ccc}, over a wide system size scan from $PbPb$ to $KrKr$, $ArAr$ and OO [3], and the bottomed hadron production in pp and $PbPb$ collisions [4][5].
We can compare the coalescence prediction with the one coming from a statistical hadronization approach, investigating further the impact on the production coming from non-equilibrium features in the heavy-quark distribution that comes from the solution of relativistic Boltzmann or Langevin equation that describes the QGP evolution.

[1.] S. Plumari, V. Minissale, S.K. Das, G. Coci and V. Greco, Eur.Phys.J. C 78 (2018) no.4, 348
[2.] V. Minissale, S. Plumari and V. Greco, Physics Letters B 821 (2021) 136622.
[3.] V. Minissale, S. Plumari, Y.Sun and V. Greco, Eur.Phys.J.C 84 (2024) 3, 228
[4.] M.L. Sambataro, V. Minissale, S. Plumari and V. Greco,Phys.Lett.B 849 (2024) 138480
[5.] V. Minissale, V. Greco and S. Plumari, Phys.Lett.B 860 (2025) 139190

Secondary track

Authors: Prof. PLUMARI, Salvatore (Università di Catania, LNS-INFN); Prof. GRECO, Vincenzo (University of Catania, INFN-LNS); MINISSALE, Vincenzo (INFN - Sezione di Catania)

Presenter: MINISSALE, Vincenzo (INFN - Sezione di Catania)

Session Classification: T04

Track Classification: T04 - Ultra-relativistic Nuclear Collisions