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Charmed-baryon production and hadronization studies with ALICE

Wednesday, June 3, 2020 10:30 AM (20 minutes)

The measurements of the charmed baryons are fundamental to investigate charm-quark production and hadronization mechanisms in different collision systems.

Recent measurements of charm-baryon production in small systems at LHC energies show a baryon-over-meson ratio significantly higher than that in e^+e^- and $e^\pm p$ collisions, and higher than expectations from Monte Carlo generators, tuned to reproduce these measurements, suggesting a violation of the universality of the fragmentation of charm in different collision systems.

Various mechanisms are recently being considered in the theory community to describe the measurements, such as multi-parton interactions, colour reconnection, ropes, or statistical hadronization approaches.

In nucleus-nucleus collisions, where a hot and dense Quark-Gluon Plasma (QGP) forms and collectively expands, the enhancement of baryon-to-meson ratios is predicted by theoretical models in which heavy quarks hadronize by coalescence with light quarks from the plasma. Measurements of Λ_c production in nucleus-nucleus collisions hint to a larger ratio to D mesons, with respect to the case of pp collisions.

Furthermore, the measurement of open heavy flavours as a function of multiplicity in pp and p-Pb collisions provides important information to understand how the possible presence of collective effects could modify the production of heavy-flavour hadrons.

The analysis of different charm baryon species, such as Σ_c and Ξ_c , give further insight into the study of the charm hadrons production in all systems.

In this talk, we present measurements of Λ_c , Ξ_c and Σ_c baryons performed with the ALICE detector at mid-rapidity in pp collisions at various collision energies.

The Λ_c/D^0 ratio measured in different collision systems and its multiplicity dependency from pp to p-Pb and Pb-Pb collisions will be shown. The R_{pPb} and the R_{AA} of the Λ_c will be discussed as well.

The results will be compared with predictions from Monte Carlo event generators in the pp system, and with models including CNM effects or the formation of a QGP in larger systems.

Collaboration (if applicable)

ALICE

Track

Heavy Flavor and Quarkonia

Contribution type

Contributed Talk

Primary author: CC CHAIRS, ALICE

Presenter: HILLS, Christopher (University of Liverpool (GB))

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