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Study of heavy-quark production and hadronization in small collision system at the LHC with ALICE

Heavy quarks (charm and beauty) have masses much larger than the QCD scale parameter. Due to this they are typically produced in hard scattering processes with large Q^2 in hadronic collisions, and offer a unique perspective to study the transition from quark to hadrons in these collision systems. Recent production measurements of heavy-flavour baryons and mesons in proton-proton collisions at midrapidity show heavy-flavour baryon-to-meson ratios significantly higher than those measured in $e+e-$ collisions, which challenges the universality of fragmentation functions across different collision systems. Thus, further and more precise measurements of heavy-flavour production-yield ratios are crucial to study the heavy quark hadronization in a partonic rich environment like the one produced in pp collisions at the LHC energies. In p-Pb collisions, a modification of the hadronization mechanisms could be present due to cold nuclear matter effects and possible collective phenomena.

In this contribution, measurements of the meson-to-meson and meson-to-baryon ratios with ALICE in pp and p-Pb collisions will be shown. A systematic comparison between data and models will help to understand heavy-quark hadronization in pp and p-Pb collisions. To conclude, the first studies of heavy-flavour hadron reconstruction using large data sample of pp collisions at $\sqrt{s} = 13.6$ TeV from Run 3 will also be presented.

Field of contribution

Experiment

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