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Latest ALICE results on charm and beauty hadronization mechanisms and baryon production in hadronic collisions

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Studying heavy-flavor mesons and baryons in hadronic collisions provides unique access to the properties of heavy-quark hadronisation in the presence of large partonic densities, where new mechanisms of hadron formation beyond in-vacuum fragmentation can emerge. It also tests calculations of perturbative QCD and explores the role of cold nuclear matter effects. Examining heavy-flavor production in different collision systems and event multiplicities reveals insights into multi-parton interactions and the emergence of strongly interacting mediums in high-multiplicity pp and p-Pb collisions. In particular, recent measurements in pp collisions showed an increase in the baryon-to-meson ratio with respect to e^+e^- collisions, suggesting that the fragmentation of charm is not universal across different collision systems. The measurements of charm baryons in pp and p-Pb collisions provide insights into the hadronisation mechanisms at much larger charged-particle densities. They also provide constraints to the effects on the particle spectra of heavy-flavour hadrons generated by the presence of collective effects.

In this talk, we will present a selection of the latest charm and beauty production measurements in pp collisions and p-Pb with ALICE, which can shed light on the modification of the heavy-quark hadronisation mechanisms. We will discuss more precise measurements of prompt and non-prompt D mesons in pp collisions at $\sqrt{s} = 13$ TeV, enabling a quantitative comparison of the hadronization properties between beauty and charm mesons. The latest measurements of prompt charm strange baryon (Λ_c^0) and non-prompt charm baryon (Λ_c^+) production and the corresponding baryon-to-meson ratio in the hadronic collisions will be presented. New measurements of the Ω_c^0 from semileptonic decay and recent measurements of resonant D_{s1}^+ and D_{s2}^{*+} states will be discussed. Finally, the status and prospects for the reconstruction of charm mesons and baryons on LHC Run 3 data, using the upgraded ALICE apparatus will be shown for the first time.

Collaboration / Activity

ALICE

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