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Hadronization studies at the LHC with ALICE

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Studies on the production of light- and heavy-flavour baryons are of prominent importance to investigate hadronization mechanisms at the LHC, in particular through the study of the evolution of the baryon-over-meson production ratio as a function of the transverse momentum. Measurements performed in pp and p-Pb collisions at the LHC have revealed unexpected features, qualitatively similar to what was observed in larger systems and, in the charm sector, not in line with the expectations based on previous measurements from e^+e^- colliders and in e-p collisions. These results suggest that charmed baryon formation might not be universal and that the baryon-over-meson ratio depends on the collision system. Models that better reproduce the Λ_c/D^0 ratio in pp collisions, some of them based on enhanced color reconnection mechanisms, expect a significant contribution to Λ_c yield from decays of heavier charm-baryon states.

The ALICE detector is well suited to detect charm baryons down to low p_{T} thanks to the excellent tracking capabilities and state-of-the-art particle identification. Λ_c baryons are reconstructed in the hadronic decay channels $\Lambda_c \to pK_s^0$ and $\Lambda_c \to pK\pi$ by means of machine-learning methods. A review of ALICE extensive measurements of protons, hyperons and charmed baryons, including the measurement of Λ_c production as a function of charged-particle multiplicity in pp and p-Pb collisions, will be presented. Comparison to phenomenological models will be also discussed. Emphasis will be given to the discussion of the impact of these studies on our understanding of hadronization processes. Finally, the status and prospects for Ξ_c and Σ_c measurements, as well as the planned measurements of Λ_b during LHC Run 3 data taking will be discussed.

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