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Observation of multiplicity dependence of charmed baryon-to-meson ratios in proton-proton collisions at $\sqrt{s} = 13\sqrt{2}$ TeV

The production of prompt Λ_c^+, D^0 hadrons, and their ratios, Λ_c^+, D^0 are measured at midrapidity ($|y| < 0.5$) with the ALICE detector in proton-proton collisions at $\sqrt{s} = 13\sqrt{2}$ TeV. The measurements are performed as a function of the candidate transverse momentum (p_T), in intervals of charged-particle multiplicity, measured with two multiplicity estimators covering different pseudorapidity regions.

The baryon-to-meson Λ_c^+, D^0 ratios show an enhancement in the highest multiplicity interval with respect to the lowest one, with a significance of 5.2σ for $p_T < 10$ GeV/c. A similar trend with multiplicity is observed comparing the measurements to a theoretical model that explains the multiplicity dependence by canonical treatment of quantum charges in the statistical hadronisation model. Qualitatively, the measurements are described also by theoretical calculations based on augmented baryon productions, implementing colour reconnection mechanisms beyond the leading colour approximation. The Λ_c^+, D^0 ratios were found to have a similar shape and magnitude as the measured Λ/K_s^0 ratios in comparable multiplicity intervals.

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