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Ω_c^0 production vs. multiplicity in proton–proton collisions at $\sqrt{s} = 13.6$ TeV with ALICE

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Charm-baryon production measurements in proton–proton (pp) collisions at the LHC provide valuable input for understanding charm-quark hadronization mechanisms and testing perturbative quantum chromodynamics (QCD) based calculations. Recent measurements show baryon-to-meson ratios significantly higher than those measured in e^+e^- collisions, suggesting a collision-system dependence of the fragmentation fractions, and challenging predictions based on a factorization approach. Several QCD-inspired models (e.g., Catania, POWLANG, QCM) and Monte Carlo event generators (e.g., PYTHIA 8, EPOS 4) attempt to describe charm-quark hadronization, but most fail to simultaneously reproduce the yields of both strange and non-strange charm baryons. Measurements of charm-baryon multiplicity-differential yields probe the interplay between fragmentation and coalescence processes and their evolution as a function of the event multiplicity, providing stringent constraints on hadronization models and improving our understanding of hadronization in small systems.

We present the status of the measurement of Ω_c^0-baryon production as a function of charged-particle multiplicity in pp collisions at $\sqrt{s} = 13.6$ TeV with ALICE, using data samples collected during LHC Run 3. The analysis reconstructs Ω_c^0 candidates via the hadronic decay channel $\Omega_c^0 \to \Omega^-\pi^+$ and its charge conjugate using a multiclass machine-learning classifier. The latest results on Ω_c^0 production as a function of p_T in inelastic events in the 0–100%, 0–10%, 10–50%, and 50–100% multiplicity-percentile intervals of the pp cross section will be shown.

Author: TORRES CABRERA, Maria Fernanda (University of Houston (US))

Presenter: TORRES CABRERA, Maria Fernanda (University of Houston (US))

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