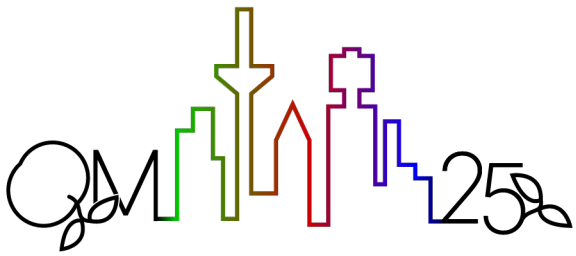

Contribution ID: **506** Type: **Oral**

Studying charm and beauty quark production and hadronisation with charm hadron measurements with ALICE

Monday 7 April 2025 17:55 (20 minutes)

Recent observations at the Large Hadron Collider (LHC) have revealed a significant enhancement in baryon production in hadronic collisions compared to e^+e^- and ep collisions, challenging the long-held assumption of fragmentation universality. This phenomenon, initially observed in the charm sector, has also been observed in the beauty sector, indicating a broader implication for heavy-flavor hadronization processes. This observation has led to the development of several models attempting to explain these observations, by implementing modified hadronization approaches with respect to the in-vacuum fragmentation process. Proposed mechanisms include color reconnection beyond leading-color approximation, hadronisation via coalescence, and feed-down from unobserved resonant states in a statistical hadronization approach.

To further elucidate this phenomenon, recent studies have focused on baryon-to-meson ratios as a function of event multiplicity. Intriguingly, evidence of a multiplicity dependence, with increased ratios in high-multiplicity events, has been observed in both the charm and beauty sectors, suggesting a possible connection between baryon enhancement and the local parton density. These investigations have significant implications also for heavy-ion physics, potentially bridging the gap between phenomena observed in proton-proton and heavy-ion collisions. A comprehensive understanding of these effects is essential for refining our theoretical models of heavy-quark hadronisation in hadronic environments.

In this contribution, new ALICE measurements of prompt and non-prompt Λ_c^+-baryon and D^0-meson production cross sections, evaluated on the dataset of proton-proton collisions at $\sqrt{s} = 13.6$ TeV collected during the LHC Run 3, will be reported. The Λ_c^+/D^0 production-yield ratios in the same collision system, both multiplicity integrated and as a function of multiplicity, will also be discussed and compared to state-of-the-art model predictions implementing different hadronisation approaches.

Category

Experiment

Collaboration (if applicable)

ALICE

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