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Unveiling the scale of the emergence of non-universal behaviour in the fragmentation into heavy-flavour baryons with ALICE

Recent measurements of hadron production have revealed a non-universal behaviour in the fragmentation of partons into baryons in hadronic collisions compared to baselines in e^+e^- and ep collisions. Exploration of this phenomenon is most controlled in the heavy-flavour sector, where the large mass of charm or beauty quarks allows us to experimentally relate a heavy-flavour parton to the resulting hadron. This allows for well defined measurements of heavy-flavour jet fragmentation, enabling us to take steps beyond the traditional hadronic measurements in order to unveil the microscopic details of this non-universality. In this talk we present the first measurement of the fraction of the longitudinal momentum of Λ_c^+ -tagged jets carried by the Λ_c^+ baryons, as a function of both the jet and event multiplicities in pp collisions. We also present corresponding first measurements of these quantities for jets containing D^0 -mesons, where comparisons to the Λ_c^+ -tagged jets test the impact of local colour density on the modification of the baryon fragmentation functions. Using the new high statistics Run 3 data sample will allow for differential measurements not only in multiplicity, but also in jet transverse momentum, probing the partonic scales at which non-universal behaviour emerges. Additionally, we report the first measurements of the energy energy correlators (EECs) of jets containing Λ_c^+ baryons compared to those containing D^0 -mesons. The power of the EECs lies in separating the perturbative and non-perturbative regimes in the evolution of partons and provide a discriminating ingredient with which to pinpoint the scale at which the non-universality arises.

Category

Experiment

Collaboration (if applicable)

ALICE

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