

Study of charm fragmentation using charm-hadron angular correlation measurements with ALICE

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In recent years, measurements of charm baryon-to-meson yield ratios highlighted a modification of the hadronization process in proton-proton collisions with respect to $e+e-$ collisions. This invalidated the assumption at the basis of several theoretical calculations based on a factorisation approach that the cross section of charm hadrons can be calculated by parametrising the transition from charm quarks to charm hadrons with fragmentation functions tuned on to $e+e-$ data. Additionally, the measurement of charm-hadron-tagged jets and correlations provides direct insights into initial parton kinematics, fragmentation processes, and hadronization mechanisms, underscoring their significant importance.

In this presentation, we introduce the latest ALICE results on angular correlations between heavy-flavour (HF) hadrons (triggers) with charged particles, and on jets containing HF particles. In particular, we report the results of angular correlations between strange and non-strange D-meson triggers with charged particles in pp collisions, including the first studies performed on Run 3 data. We also show the comparison between angular correlations obtained considering charm mesons and charm baryon ($\Lambda+c$) triggers in pp collisions. These measurements will give insights into the differences in the charm fragmentation between charm baryons and mesons. We also present the final measurement of the longitudinal momentum fraction of jets carried by $\Lambda+c$ baryons in pp collisions at $\sqrt{s} = 13.6$ TeV. This observable is particularly valuable as it provides a more direct link to the charm fragmentation functions and imposes more stringent constraints on hadronization mechanisms.

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