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Study of charm fragmentation with charm meson and baryon angular correlation measurements with ALICE

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The study of charm-quark production and hadronisation provides crucial insights into the mechanisms of Quantum Chromodynamics (QCD) at the interface between the perturbative and non-perturbative regimes. Differential measurements of jets containing charm hadrons further shed light on QCD processes such as parton-shower evolution and hadronisation. In particular, angular correlations between charm hadrons and charged particles provide valuable information on charm-jet topology and charm-quark hadronisation. Such studies also help to test and constrain theoretical models and Monte Carlo generators describing charm production in proton–proton (pp) collisions.
This contribution presents ALICE measurements of angular correlations between charm hadrons and charged particles in pp collisions at $\sqrt{s} = 13.6$ TeV. The azimuthal correlations are studied separately for charm mesons with and without strange quarks and for charm baryons, providing tools to characterise charm hadronisation via the structure and composition of the associated charm jet. Measurements of heavy-flavour correlations with identified particles are also presented, aimed at testing local quantum-number conservation. Together, these results provide new insights into charm fragmentation and hadron formation in small collision systems.

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