Measurement of the J/ψ Fragmentation Function in pp Collisions at $\sqrt{s}$ = 13.6 TeV with ALICE

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The study of jets containing a J/ψ meson offers a unique probe of quarkonium production mechanisms and parton-shower dynamics. In this analysis, the fragmentation function, defined as the longitudinal momentum fraction of the J/ψ relative to the jet, is measured using proton–proton collision at $\sqrt{s}$ = 13.6 TeV collected by ALICE during LHC Run 3. The substantial upgrades of the ALICE detector, particularly the implementation of continuous readout, have enabled an unprecedented increase in statistics at midrapidity. This significantly reduces uncertainties and allows for high-precision measurements with finer granularity and an extended kinematic range for fragmentation-function measurements, providing critical input for theoretical developments. Jets are reconstructed using the anti-k_{T} algorithm across a wide transverse momentum spectrum. The fragmentation function is presented separately for prompt and non-prompt J/ψ mesons decaying into electron–positron pairs. Results are compared to PYTHIA predictions and other state-of-the-art models, offering a stringent test of quarkonium production mechanisms in a clean proton–proton environment. These measurements also establish a crucial baseline for heavy-ion collisions, where phenomena such as J/ψ suppression and charm-quark recombination in the quark-gluon plasma can be further explored.