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Charged beauty-tagged jet measurement with impact parameter method in proton–proton collisions in Run3

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Heavy-flavour jets, defined as collimated bunches of hadrons originating from the fragmentation of heavy-flavour quarks such as beauty quarks, are produced in high-energy collisions. The cross section of heavy-flavour quark production can be calculated using perturbative quantum chromodynamics (pQCD) due to their generation through high momentum transfer at low p_T, attributed to their significant mass.
Since heavy-flavour quarks are created in the initial stages of collisions, before the formation of the quark-gluon plasma (QGP), they serve as effective probes for studying QGP properties. With the ALICE detector's upgrades for Run 3, a significant increase in statistics and spacial resolution have been achieved, enhancing the precision and significance of cross-section analyses of heavy-flavor jets. The heavy-flavour jets can be identified by impact parameter distribution of their constituents, since heavy-flavour hadrons have much longer lifetimes than light-flavour hadrons.
In this study, we will present the first look with ALICE at heavy-flavour jet tagging using the impact parameter method in pp collisions at $\sqrt{s} = 13.6\,\mathrm{TeV}$ in Run 3.

Category

Experiment

Collaboration

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