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Influence of final-state radiation on heavy-flavour observables in pp collisions

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Initial- and final-state radiation are important processes for the physical interpretation of high-energy collisions at the Large Hadron Collider. Calculations of these perturbative QCD corrections are, however, limited to probabilistic approximations using parton shower approaches in event generators. Although this Monte-Carlo DGLAP description is nowadays state-of-the-art, there still exist significant differences on the quantitative level. To address these open questions, it is important to investigate final-state radiation processes experimentally by identifying sensitive observables.

In this study, a new transverse momentum correlation observable, the momentum imbalance between D and Dbar mesons, is identified as a sensitive tool to study final-state radiation. This is shown by using simulations with the EPOS3+HQ model and the event generator Pythia 6. The presented results will focus on heavy-flavour particles only because these are most likely pair-produced in the initial stages of the collision. With the upcoming detector upgrades for LHC Run-3, statistically significant correlation measurements of these heavy-flavour particles will become feasible. In the end, this method can be extended to pA and AA data to study several aspects of energy loss in heavy-ion collisions.

Content type

Theory

Collaboration

Centralised submission by Collaboration

Presenter name already specified

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