

Event-multiplicity and event-shape dependence of open heavy-flavour production in pp collisions with ALICE at the LHC

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Heavy-quarks are sensitive probes for investigating the properties of the high- density medium formed in heavy-ion collisions. Their investigation in proton- proton (pp) collisions at the LHC, besides furnishing the necessary baseline for measurements in nucleus–nucleus collisions, provides precise tests for perturbative QCD (pQCD) calculations based on the factorization approach down to very low Bjorken- x values. The analysis of heavy-flavour production as a function of the multiplicity of charged particles produced in the collision and of event-shape variables, like sphericity, which classify events according to their topology, can give insight into multiple-parton-interaction phenomena. These studies provide an handle to understand the interplay of hard and soft processes and to search possible connections between small and extended interacting systems.

The excellent tracking and particle-identification capabilities of the ALICE detector allow to fully reconstruct hadronic decays of open-charm mesons at central rapidity and to study leptons from charm- and beauty-hadron decays at central and forward rapidities. In this contribution, the latest results on the production of D mesons and open heavy-flavour hadron decay electrons at mid-rapidity ($|y| < 0.8$) and open heavy-flavour hadron decay muons at forward rapidity ($2.5 < y < 4$) in pp collisions at various collision energies will be presented. On top of showing precise measurements of the p_T - and y -differential cross sections, which provide stringent constraints for pQCD calculations, studies addressing the dependence of open heavy-flavour production on the event-multiplicity will be discussed, along with comparison with model expectations. Finally, the dependence of the D^0 production on the event multiplicity and sphericity in pp collisions at $\sqrt{s} = 7$ TeV will be reported.

Summary

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