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Charm mesons in the LHCb fixed-target experiment: phenomenology and production asymmetry

Thursday, 25 June 2026 15:00 (25 minutes)

The production of open charm mesons in the fixed-target mode of the LHCb experiment provides a unique opportunity to study QCD dynamics at moderate center-of-mass energies and large Bjorken-x. In previous studies, the production of D mesons was investigated within the k_T-factorization approach, including the standard gluon–gluon fusion mechanism, the gluon–charm channel associated with intrinsic charm, and the recombination mechanism.

In this contribution we extend these studies by incorporating a more realistic description of the hadronization stage using the Pythia 8 event generator. This allows us to investigate the role of string fragmentation and the possible impact of color reconnection effects on the resulting D-meson spectra and production asymmetries. In addition, we explore the influence of nuclear effects in proton–nucleus collisions relevant for the fixed-target configuration of LHCb. For comparison, predictions obtained within the MadGraph5_aMC@NLO formalism matched to a parton shower (aMC@NLO+PS) will also be presented.

We analyze rapidity and transverse momentum distributions of D mesons and discuss their sensitivity to the modeling of hadronization in the backward rapidity region. The results are compared with available LHCb measurements, and the implications for the interpretation of charm production mechanisms in the fixed-target regime are discussed.

Collaboration

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