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Measurements of production of charm-hadron pairs in pp collisions with ALICE

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In hadron-hadron collisions at LHC energies, Multiple Parton Interactions (MPI), where multiple hard-parton scatterings can occur in the same collision, play a significant role. Among MPI scenarios, Double-Parton Scatterings (DPS) represent the simplest case. The DPS contribution to a given process with two final-states A and B can be expressed as the product of the cross-sections of the sub-processes involved for the independent production of A and B, divided by an effective cross section. The effective cross section, a phenomenological parameter, is related to the transverse overlap function between the partons of the proton. By investigating DPS, we gain insights into the evolution equations of Quantum Chromodynamics (QCD) concerning multi-parton distributions and potential correlations in color and spin degrees of freedom.

The production of heavy quarks (charm and beauty) occurs in hard-parton scatterings due to their large masses. Consequently, the study of DPS production can be performed via measurements of the production cross sections of charm-hadron pairs. In this contribution, we will discuss the latest measurements involving production of $\mathrm{D^0D^0}$, $\mathrm{D^0J/\psi}$, and $\mathrm{J/\psi J/\psi}$ pairs at midrapidity and forward rapidity in pp collisions, from Run 2 data samples at $\sqrt{s} = 13$ TeV and Run 3 data samples at $\sqrt{s}$ = 13.6 TeV, with the ALICE detector at the LHC.

Category

Experiment

Collaboration

ALICE

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