

J/ψ and D^0 associated production measurements with ALICE Run 3

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Multiple Parton Interactions (MPI) represent an essential feature of hadron-hadron collisions, adding significant richness to the event structure observed in high-energy physics. These processes occur when several partons from each colliding hadron undergo interactions within the same collision. Among the MPI mechanisms, Double Parton Scattering (DPS) stands out as the most straightforward case, involving two independent parton scatterings taking place simultaneously. The characterization of DPS in proton-proton collisions typically relies on the effective cross section, a phenomenological quantity that reflects the transverse distribution and overlap of partons inside the proton. Investigations of DPS provide a useful window into the dynamics of Quantum Chromodynamics (QCD), in particular the behavior of multi-parton distributions and possible correlations in spin and color degrees of freedom.

The production of heavy quarks, such as charm and beauty, offers a sensitive probe of DPS because their large masses ensure that their creation is driven by hard-scattering processes. Measurements of charm-hadron pair production therefore serve as an effective tool to study DPS involving heavy quarks. In this work, we present new results on the production of D^0 - J/ψ pairs in proton-proton collisions at $\sqrt{s} = 13.6$ TeV. The analysis, carried out with the ALICE detector during Run 3 of the Large Hadron Collider (LHC), covers both midrapidity and forward rapidity regions.

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