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Physics prospects of central exclusive production in pp collisions with ALICE Run 3 data

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Central exclusive production (CEP) is a diffractive process in which the colliding particles remain intact. Three different processes are involved: photon-photon exchange, photon-pomeron exchange and double-pomeron exchange. Each process produces distinguishable states with specific sets of quantum numbers, making CEP measurements a unique tool for searching for exotic resonances. Furthermore, measurements of well-known states in CEP can provide a clean probe of the structure of matter. For example, the photoproduction of the J/ψ (via photon-pomeron exchange) can be used for probing the low- x gluon content of protons.

In ALICE, events of the CEP can be identified by its signature of double-gap in pseudorapidity. Relying on the tracking and particle identification capabilities in the central barrel of ALICE, various final state two particle systems can be measured including $\pi^+\pi^-$ and K^+K^- . In addition, heavy vector mesons such as J/ψ can be studied via their decay into $\mu^+\mu^-$ pair.

In this contribution, we will present the performance of the ALICE Run 3 detector for measurements of double-gap events in pp collisions at $\sqrt{s} = 13.6$ TeV. In addition, we will discuss physics prospects of central exclusive production in pp collisions with ALICE detector.

Category

Experiment

Collaboration (if applicable)

ALICE

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