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Studies of exclusive production of η' and $f_1(1285)$ mesons in $p+p$ collisions at 4.5 GeV with HADES

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Studies of the axial-vector $f_1(1285)$ meson production at near threshold energies with HADES is particularly interesting because of its production mechanism. It involves vector meson fusion VV $(\rho\rho, \omega\omega) \rightarrow f_1$ which provide information about the $\rho\rho f_1$ and $\omega\omega f_1$ coupling constants. This in turn is very important for calculations of hadronic light-by-light (HLbL) scattering contributions to the muon anomalous magnetic moment and might give information about the unknown structure of the f_1 meson.

This contribution presents analysis of exclusive $f_1(1285)$ and η' production in the reaction $p+p \rightarrow p+p+f_1/\eta'$ at the center-of-mass energy of 3.46 GeV, utilizing data collected by the HADES experiment at GSI/FAIR.

The analysis focuses on the decay channel $f_1/\eta' \rightarrow \eta + \pi^+ + \pi^-$, followed by the eta decay $\eta \rightarrow \pi^0 + \pi^+ + \pi^-$, and includes the implementation of a kinematic fit utilizing a π^0 missing mass constraint for the η reconstruction. Because of its higher production yield, the η' signal will be used as a "standard candle" to estimate the $f_1(1285)$ production cross section.

Collaboration

HADES

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