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Sigma0 Cross Section Measurements Towards a Glimpse of its Dalitz Decay

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The Σ^0 hyperon production in proton-proton collision events at GeV beam energies have intriguing dynamics involving multiple hadronic resonances in an interplay that has remained poorly understood. In addition, unraveling this mystery has proven to be an essential step towards novel measurements, such as the rare Σ^0 Dalitz decay ($\Sigma^0 \rightarrow \Lambda e^+ e^-$), the study of which may provide a unique probe of the hadron structure. This unraveling begins at the HADES experiment, where proton-proton data has been collected at a beam kinetic energy of 4.53 GeV, and with the pursuit of measuring Σ^0 production cross sections from its radiative decay ($\Sigma^0 \rightarrow \Lambda\gamma$). Such studies, as presented in this talk, are essential as a reference channel for measurement of the Dalitz decay branching fraction but also to understand the dominating background, production channel specific reconstruction efficiencies and the production of realistic Monte Carlo models. Furthermore, it sheds light on the role of resonances in the production of strange mesons in multi-body reactions.

Collaboration

HADES

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