Contribution ID: **589** Type: **Parallel**

Investigating excited N states via the measurement of ρ^0-p final-state interaction with ALICE

Thursday 10 July 2025 09:21 (17 minutes)

Experimental data on the interaction between vector mesons and nucleons are a crucial input for understanding the pattern of in-medium chiral symmetry restoration (CSR) and dynamically generated excited nucleon states. However, accessing these interactions is hampered by the short-lived nature of the vector mesons, making traditional scattering experiments unfeasible. In recent years the ALICE Collaboration performed femtoscopy studies with particle pairs produced in nucleus–nucleus collisions to investigate the interactions on challenging systems like ϕ—p.
Leveraging the excellent PID capabilities of the ALICE experiment, coupled with the copious production of ρ^0 mesons and protons at the LHC in pp collisions, ALICE presents the first-ever measurement of the ρ^0–p correlation function as a function of the relative momentum. The data are interpreted employing calculations within the framework of unitarised chiral perturbation theory in a coupled-channel ansatz. This measurement represents an unprecedented opportunity to study the nature of the excited N, in particular N(1700) and N(1900), unveiling if these states are molecular in nature and shedding light on possible signatures of CSR at LHC energies

Secondary track

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Session Classification: T05

Track Classification: T05 - QCD and Hadronic Physics