Contribution ID: **590** Type: **Parallel**

Accessing Three-Body Dynamics with p–d and Λ–d Correlations in pp Collisions at 13.6 TeV with ALICE

Femtoscopic correlations between hadrons provide valuable insight into the short-range dynamics of hadronic interactions, with significant implications for fundamental physics and astrophysical phenomena. The composition of neutron stars depends on the interplay between two- and three-body forces involving nucleons and hyperons. Knowledge about the latter is scarce, mainly derived from hypernuclei data. New experimental efforts are needed to constrain three-body dynamics.

The ALICE Collaboration presents new results for proton-deuteron (p–d) and Lambda-deuteron (Λ–d) femtoscopy in high-energy proton-proton (pp) collisions at $\sqrt{s}$ = 13.6 TeV, collected during Run 3 of the LHC. While p–d correlations have been previously measured, the results presented benefit from 20 times more statistics, thanks to the larger dataset available in Run 3, enabling a more detailed exploration of the p–d system's three-body dynamics. Additionally, the Λ–d femtoscopy presented here is the first-ever measurement in ultra-relativistic pp collisions at 13.6 TeV, extending previous studies at lower energies and offering new insights into the interaction between Λ hyperons and deuterons. The measured correlation functions are compared with theoretical models, providing unique access to the short-range dynamics of these three-body systems. In this work, we discuss these results and their broader implications, particularly for advancing our understanding of the role of three-body interactions in the structure of neutron stars.

Secondary track

Author: COLLABORATION, ALICE

Session Classification: T05

Track Classification: T05 - QCD and Hadronic Physics