Contribution ID: **463**   Type: **Poster**

Current status and future prospects of measuring hadronic interactions in pp collisions at 13.6 TeV with ALICE

Saturday 9 September 2023 11:28 (5 minutes)

Understanding the strong interaction between nucleons and hyperons is fundamental for the microscopic description of bound systems as well as for modeling the equation of the state of dense stellar objects, such as neutron stars. Conventional scattering and hypernuclei measurements are insufficient to support theoretical predictions about the interaction between hadrons containing strangeness. Recently, the ALICE Collaboration has shown that two-particle correlation measurements are a prominent tool for studying strong interaction in detail.

During the ongoing Run 3 data-taking period at the LHC, the upgraded ALICE detector will deliver an increased luminosity that will enable precision studies of interactions in hadronic systems with strangeness up to S=-3 and with charm quark content. Consequently, it will be possible to test lattice QCD calculations and chiral effective field theory models with unprecedented accuracy. This will require constraining the emission source using correlation measurements of particle pairs for which the final-state interaction is well known. For this, the p-p correlations were measured for the first time in Run 3 and will be presented in this talk. In addition, the p-Λ correlation function was measured as a benchmark in the S=-1 sector. This is essential for the investigation of three-body nuclear forces, which are a vital missing element in the description of dense nuclear matter. The prospects for these future studies are discussed.

Category

Experiment

Collaboration (if applicable)

ALICE

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Session Classification: Flash Talks

Track Classification: Light and strange flavor