

Accessing the genuine three-baryon interactions via femtoscopic studies in pp collisions at $\sqrt{s} = 13$ TeV with ALICE

ALICE Collaboration
Talk abstract for NUCLEUS 2021

June 29, 2021

Abstract

The femtoscopic studies done by the ALICE Collaboration provided results with unprecedented precision for the short-range strong interactions between different hadron pairs. The next challenge is the development of the three-particle femtoscopy which will deliver the first ever direct measurement of genuine three-body forces. Such results would be a crucial input for the low-energy QCD and neutron star studies. In particular, the momentum correlation of p-p-p triplets can provide information about genuine three-nucleon forces while the p-p- Λ interaction is a necessary piece to understand if the production of Λ hyperons occurs in neutron stars.

In this talk, the first study of p-p-p and p-p- Λ correlations will be presented. The results were obtained using high-multiplicity pp collisions at $\sqrt{s} = 13$ TeV measured by ALICE at the LHC. The measured three-body correlation functions include both three- and two-particle interactions. The cumulant method was applied to subtract lower-order contributions and infer directly on the genuine three-body forces. The two-particle contributions were estimated both experimentally by applying mixed-event technique, and mathematically by projecting known two-body correlation functions on the three-body systems. The measured p-p-p and p-p- Λ correlation functions and the corresponding cumulants will be shown.