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Experimental hint of the genuine three-hadron interactions using femtoscopy in pp collisions with ALICE

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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 femtoscopic 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.

Primary author: ŠERKŠNYTĖ, Laura (Technical University of Munich)

Presenter: ŠERKŠNYTĖ, Laura (Technical University of Munich)

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