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Experimental access to the three-body forces between hadrons with ALICE.

Measurements of correlations between particle pairs with low relative momentum via femtoscopy in pp collisions have been recently demonstrated to be very sensitive to the effects of the final-state strong interaction. Such studies face now a new challenge with the extension for the first time to three-body systems. The presented results are obtained using high-multiplicity pp collisions at $\sqrt{s}$ = 13 TeV recorded by ALICE at the LHC.

The first measurement of the genuine three-body effects obtained from p–p–p, p–p–Λ, p–p–K^+ and p–p–K^- correlation functions are obtained by utilising the formalism of the three-particle cumulants. Such measurements provide information on the genuine three-particle interaction and constitute important inputs for the calculation of the equation of state of neutron stars and the formation of kaonic nuclei.

In the studies of the strong interaction among hadrons, ALICE has flared out its femtoscopic studies to nuclei with the measurement of the proton-deuteron correlation function. The data that cannot be reproduced by simple two-body calculations considering p-d scattering parameters, and the necessity of using full three-body calculations is demonstrated. The obtained results bring also valuable information on the mechanism of formation of light nuclei in hadron-hadron collisions.

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