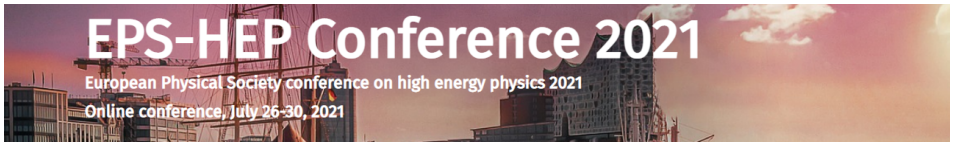

Contribution ID: **572** Type: **Poster**

Investigation of three-body nuclear forces via the femtoscopy method in pp collisions at $\sqrt{s} = 13$ TeV with ALICE

The femtoscopic studies performed by the ALICE Collaboration in pp and p–Pb collisions provide results with unprecedented precision for the short-range strong interactions between several hadron pairs containing nucleons, kaons or hyperons. Three-particle femtoscopy goes one step further and aims to provide the first direct measurement of genuine three-body forces at short distances. The cases of proton-proton-proton and proton-proton-Λ interactions are studied first. Currently, the theoretical models describing these three-body strong interactions are constrained by the binding energies of nuclei and hypernuclei, which are strongly affected by many-body effects. A direct measurement of unbound three-body states is hence crucial to pin down the underlying interaction and also for the resulting equation of state of neutron stars, that strongly depends on this. In this talk, the first femtoscopic p-p-p and p-p-Λ correlation studies are presented. The results are obtained using high-multiplicity pp collisions at $\sqrt{s} = 13$ TeV measured by ALICE. The three-body femtoscopic correlation functions, measured as function of the Lorentz invariant Q_3 kinematic variable, include contributions from the genuine three-body as well as two-body interactions. The formalism of multivariate cumulants is applied to remove the lower order contributions. The latter are estimated with two independent methods: one based on the mixed-event technique and another employing mathematical projectors of two-body correlation functions. In this contribution, the p-p-p and p-p-Λ correlation functions will be shown as well as the corresponding cumulants using the two methods. These results represent the first ever direct measurement of genuine three-baryon interaction at short distances.

Collaboration / Activity

ALICE

First author

Email

Primary authors: COLLABORATION, ALICE; DEL GRANDE, Raffaele; DEL GRANDE, Raffaele (Technische Universität München)

Presenters: DEL GRANDE, Raffaele; DEL GRANDE, Raffaele (Technische Universität München)

Session Classification: T01: Astroparticle and Gravitational Waves

Track Classification: Astroparticle and Gravitational Waves