



Contribution ID: 63

Type: **Experimental talk**

Study of kaon-proton interactions with ALICE at the LHC

Tuesday 18 May 2021 12:30 (20 minutes)

The precise knowledge of the strong interaction between kaons and nucleons is a key element needed for the chiral effective theories that describe the interaction between hadrons in the non-perturbative regime of QCD. Additionally, the knowledge of the interaction plays an important role in the study of the equation of state of dense baryonic matter, and hence has important implications for the modeling of neutron stars.

The first femtoscopy measurement of momentum correlations of $K^-p \leftrightarrow K^+p$ and $K^+p \leftrightarrow K^-p$ pairs in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV and of K_S^0p and $K_{S^0}^0p$ pairs in pp collisions at $\sqrt{s} = 13$ TeV using the ALICE detector will be presented. In this study the scattering parameters of Kp pairs associated with strong final state interactions as well as the source radii of the kaon-proton pairs using the Lednický-Lyuboshitz model have been determined.

The pair source size for pp collisions is of the order of 1 fm whereas for Pb-Pb is between 5 and 9 fm for the head-on collisions. This has a direct influence on the form of the observed correlation functions and allows to carry out for the first time a distance-dependent study of the kaon-nucleon interaction. The interaction parameters obtained for the $K^-p \leftrightarrow K^+p$ are compared to those extracted from scattering and kaonic atom experiments and are found to be compatible within the uncertainties of the experiment. The interaction of neutral kaons with protons is studied by comparing the measured correlation to state-of-the-art theoretical calculations.

Collaboration

ALICE

Author: KORNAKOV, Georgy (Warsaw University of Technology (PL))

Presenter: KORNAKOV, Georgy (Warsaw University of Technology (PL))

Session Classification: Open and New (Correlations)