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Strange nuclear physics at the LHC: at the frontiers of the standard model

Hadrons interact via a residual strong force that is unmeasured for most hadron species.

The measurement and quantitative understanding of the strong interaction among hadrons is considered to be one of the frontiers within the standard model of nuclear and particle physics.

Not only the interaction studies are important to understand the strong interaction in details, but their knowledge has important implication for the equation of state of neutron stars.

The ALICE collaboration recently demonstrated that by combining excellent particle identification and a momentum correlation analysis method applied to pp and p-Pb collisions at the LHC, it is possible to measure the strong interaction among all hadrons containing strange quarks and protons.

In this talk I will discuss the recent measurements carried out in this sector that allowed us to measure with unprecedented precision the following interactions: K^- p, p-Lambda, p-Sigma, p-Xi^- an p-Omega^-.

The measured correlation functions can be used to test predictions from chiral effective field theory or lattice calculations for different channels and so far unknown features of the strong interaction will be discussed. The consequences for the physics of neutrons stars will be presented.

These measurements open a new avenue in nuclear physics, with the potential of accessing the strong force between any hadron pair.