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Results of hyperon-nucleon and hyperon-nucleon-nucleon interaction studies via femtoscopy carried out at ALICE

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The study of the strong interaction among hadrons is an essential question in nuclear physics. It has implications both for fundamental theories, such as QCD, as well as for the understanding of the structure of dense stellar objects, such as neutron stars.

Traditionally, the experimental access to the properties of the strong force is primarily realized by scattering and hypernuclei experiments. These do not provide the possibility to perform precision measurements for hadrons containing strangeness and probe primarily the two-body interaction. Consequently, the parameters of effective theoretical models, such as Chiral Effective Field Theory, cannot be constrained with the precision required to obtain solid physics conclusions on the aforementioned topics. These limitations are particularly relevant for the study of dense nuclear matter, where extensive knowledge of the genuine three-body forces is required.

In the past several years the use of correlation techniques, applied to particles created at high-energy colliders, have been proven capable of complementing and expanding our existing knowledge of the two-particle interactions, particularly in the strangeness sector. The present contribution provides an overview of the milestones reached by using correlation techniques to investigate the strong nuclear force. The main highlights are the precision studies within the nucleon-hyperon sector, alongside the extension of the analysis methods into the three-body sector.

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