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Study of the pΛ interaction in small collision systems using a common emission source

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In femtoscopy, the correlations between low relative momentum particles can be linked to their emission source function and final state interaction. In a recent precision measurement of the pΛ correlation function at the LHC, a deviation was found from the state-of-the-art chiral effective field theory model. If this discrepancy is related to the pΛ interaction, it would have important implications for the study of the nuclear equation of state and modeling of neutron stars.

This contribution introduces a new Monte Carlo model, called CECA, capable of evaluating the source function, by generating the spatial and momentum coordinates of single particles in small collision systems, at the time of hadronization. For this purpose, relativistic effects are taken into consideration, as well as the production of particles through intermediate short-lived resonances. Assuming a common emission source for all hadrons, measured proton-proton correlation functions by ALICE are used to constrain the source function. This allows the use of correlation techniques to access the pΛ interaction in previously unexplored low-energy regions. The obtained scattering length is smaller than the currently accepted values, highlighting the importance of using femtoscopy data as a complementary way of constraining the theory.

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