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Studying the interaction between charm and light-flavor mesons

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In the last years, several exotic states have been observed in the charm sector; such particles cannot be interpreted as baryons or mesons and are thought to be either quark bags or molecular states. To unveil the nature of those states, it is crucial to experimentally constrain the strong force that governs the interaction between the charmed hadrons and other hadrons, e.g. via the measurement of the scattering parameters.

The knowledge of the charmed-hadron interactions is also essential for the study of ultrarelativistic heavy–ion collisions; in fact, during the hadronic phase of the fireball expansion, the charmed hadrons can interact with the other particles produced in the collision, mainly light hadrons, via elastic and inelastic processes. These interactions modify the heavy-ion observables, and to disentangle this effect from the signatures of the quark–gluon plasma formation, the scattering parameters of charmed hadrons with light flavours are required.

Despite the importance of constraining the charmed-hadron interactions, the available experimental knowledge is very scarce: so far, only the D-proton system was investigated. This contribution extends these studies to the open-charm and light-flavor meson systems. The final-state strong interaction is accessed using the femtoscopy method applied to high-multiplicity proton-proton collisions at $\sqrt{s} = 13$ TeV, collected by the ALICE Collaboration. Projections of the ALICE 3 performance for femtoscopic studies are also presented.

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