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Studies of final-state interactions via femtoscopy in ALICE

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Femtoscopy is a technique allowing measurements of the space-time characteristics of particle production using correlations arising from the effects of quantum statistics and final state interactions. Typically, it is used for measurements of source sizes for pions, kaons, and protons in order to test the hydrodynamic evolution of the system by looking at the dependence of the HBT radii on multiplicity and pair transverse momentum k_{T}.

The femtoscopic formalism is however sensitive not only to the properties of the source but also to the interaction kernel for a pair of particles, which is directly related to pair interaction cross-section. We show the first measurements of K^0_S-$\mathrm{K}^{\pm}$ correlation functions in PbPb collisions. These correlations originate from the final-state interactions which proceed through the $a_0(980)$ resonance. The ALICE data show that the a_0 final state interaction describes the measured correlation well. The radii extracted from K^0_S-K^- and K^0_S-K^+ systems are found to be equal within uncertainties. The results are also compared with those from ALICE identical-kaon measurements and the parameters of the a_0 resonance are constrained.

The same approach can be applied to baryons to extract the cross-section of the baryon-(anti)baryon interactions. We will show preliminary results from baryon correlations, including protons and Λs. The extraction of the cross-sections is complicated by the presence of the so-called "residual correlations" originating from the weak decay products. A fitting method accounting for these residual correlations is employed in the case of p-p, p-$\overline{\mathrm{p}}$ and $\overline{\mathrm{p}}$-$\overline{\mathrm{p}}$ correlations.

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