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## What can we learn from femtoscopic and angular correlations of identified particles in ALICE?

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### Content

Two-particle correlations have proven to be a robust tool which allow the exploration of many physics phenomena present in high-energy particle collisions. In this talk we would like to focus on two techniques, namely femtосcopy and angular correlations, covering their most recent results from the ALICE experiment.

Femtoscopic correlations which arise from quantum statistics and final-state interactions, probe the space-time characteristics of particle production. Typically, these measurements for pions, kaons, and protons are employed to measure the size and test the hydrodynamic evolution of the system. However, the femtoscopic formalism is also sensitive to the amplitude of the wave function for a particle pair, which is directly related to the, in some cases poorly known, interaction cross section. In this talk we review recent results from ALICE femtосcopy studies including the following combinations of particles:  $K_S^0 K^\pm$ , all combinations of  $\Lambda$  and  $\bar{\Lambda}$  with  $K^+$ ,  $K^-$  and  $K_S^0$ , all combinations of proton (antiproton) and  $\Lambda$  ( $\bar{\Lambda}$ ) baryons.

In this talk, we also report the measurements of angular correlations of identified particles (for pions, kaons, protons,  $\Lambda$ , and respective antiparticles) in the relative pseudorapidity ( $\Delta\eta$ ) and azimuthal angle ( $\Delta\varphi$ ) space in pp collisions at  $\sqrt{s} = 7\text{ TeV}$ . The results reveal differences in particle production between baryons and mesons, which reflect the specific conservation laws for the relevant quantum numbers. Surprisingly, for baryon pairs where both particles have the same baryon number, a near-side anti-correlation structure is observed instead of a typical near-side peak originating from mini-jets. Such effects have usually been connected to conservation laws in  $e^+e^-$  collisions and were thought to be under theoretical control. In this talk however, we will illustrate that our results present a challenge to the contemporary models (PYTHIA, PHOJET). This surprising effect is further interpreted in the context of baryon production mechanisms in the fragmentation process.

### Session

Multiparticle correlations and fluctuations

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