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Probing particle production and transport in small collision systems with ALICE

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Many recent measurements in small collision systems such as pp and p–Pb collisions show signs of collective behavior of produced particles. The two-particle number and transverse momentum (differential) correlators and charged-particle balance function measurements in Pb–Pb collisions provided valuable information about the particle production mechanisms and their time evolution as well as about the transport properties of the created medium, such as the ratio of shear viscosity to entropy density. Thus, these correlation functions have a great potential to help disentangle the particle production mechanisms and the origin of the collective-like behavior in small collision systems.

In this talk, the two-particle correlation function and the charged-particle balance function will be presented in pp and p–Pb collisions at different energies. Their widths will be compared with the widths in Pb–Pb collisions showing the evolution of the correlation functions with the charged-particle multiplicity. The results are compared with different Monte Carlo models, such as PYTHIA, DPMJET and HIJING. Moreover, the first measurement of these correlation functions in pp collisions at 13.6 TeV, collected during Run 3, will be presented, where the large collected data set enables for a significant reduction of statistical uncertainties.

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