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Probing partonic collectivity in large and small collision systems with strange hadrons in ALICE

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Measurements of anisotropic flow can be used to study transport properties and the evolution of the quark-gluon plasma (QGP), the hot and dense medium produced in heavy-ion collisions that expands collectively. In recent years, several similar features have been observed in high-multiplicity collisions of small systems, such as pp or p–Pb. However, it is still under debate whether the origin of flow in small system is due to the creation of the QGP or other physics mechanisms.

In this talk, measurements of flow coefficients obtained from multiparticle correlations measured in Pb–Pb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV will be presented for different particle species, including strange ($\rm K^{\pm}, K^{0}_{s},$) and multi-strange ($\Xi^{\mp}, \Omega^{\mp}$) hadrons. However, such measurement is very challenging in small collision systems due to the significant non-flow contamination. Thanks to the unique pseudorapidity coverage of ALICE, we use the ultra-long-range di-hadron correlations together with the template fit method to obtain non-flow suppressed flow coefficients of identified particles, including strange hadrons ($\rm K^{\pm}, K^{0}_{s},$), in p-Pb and pp collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV and $\sqrt{s} = 13$ TeV, respectively. In the low $p_{\rm T}$ region, a mass ordering typical for Pb–Pb collisions is also observed in pp and p-Pb collisions, and in p–Pb can be described by hydrodynamic models. For the first time, with a statistical significance larger than 3σ, a baryon-meson splitting is observed at the intermediate $p_{\rm T}$ region in p-Pb collisions. These measurements can be quantitatively described by the model calculations which implement particle production mechanism from quark coalescence. It shows the evidence of partonic collectivity of strange quarks in p-Pb collisions.

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