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Probing small systems with heavy quarks with ALICE at the LHC

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Content

Heavy quarks (charm and beauty) are produced in the initial stages of the collisions due to their large masses. This allows them to probe the full evolution of the system, interacting with the Quark-Gluon Plasma (QGP) created in high-energy heavy-ion collisions. In p-Pb collisions, Cold Nuclear Matter effects can modify the heavy-flavour production spectra at low momentum.

The study of small systems, such as p-Pb collisions, is a baseline for Pb-Pb collisions. It is important to look for possible Cold Nuclear Matter effects in the presence of the nucleus and collective behavior. Also in small systems, a double-ridge structure has been observed in the angular correlation of light-flavor particles. This structure is similar to the one observed in Pb-Pb collisions, where it is associated with collective effects. The physical origin of this structure in p-Pb collisions is still debated, in particular regarding the role of hydrodynamics and initial conditions in such system. The measurement of heavy-flavour production provides additional information to investigate the collective dynamics of small systems and to understand whether heavier quarks also take part to this behavior.

At mid-rapidity, ALICE can measure heavy-flavour production by reconstructing charm mesons and baryons in hadronic decay channels as well as by identifying electrons from heavy-flavour hadron decays. At forward rapidity, heavy-flavour production is studied with muons from heavy-flavour hadron decays. Recent results on heavy-flavour production, angular correlation with charged particles, measured in p-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV, also differentially in event multiplicity, will be presented. In particular, the study of the angular correlations of heavy-flavour hadron decay electrons and D mesons with charged particles will be shown.

Session

Multiparticle correlations and fluctuations

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