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Heavy-flavour correlations and multiplicity dependence in pp and p–Pb collisions with ALICE

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The study of heavy-quark production (charm and beauty) in pp collisions at LHC energies allows us to test perturbative QCD calculations and provides a reference for studies in heavy-ion collisions. Measurements in p–Pb collisions help to characterize the effects due to the presence of a nucleus in the collision (cold nuclear matter effects). ALICE has provided measurements of the nuclear modification factor $R_{\rm pPb}$ in the heavy-flavour sector. More differential measurements of charm and beauty production in pp and p–Pb collisions can provide further insight on the above topics.

The analysis of angular correlations between heavy-flavour particles and charged particles allows us to characterize the heavy-quark fragmentation process and is sensitive to their production mechanism. Differences between the measurements in pp and p–Pb collisions can give insight on how cold nuclear matter effects affect the heavy-quark production and hadronisation in p–Pb collisions. In the analysis of hadron-hadron correlations in p–Pb collisions, a double-ridge long-range structure was observed, possibly coming from a collective behavior of the system or gluon saturation in the initial state. This feature can be investigated for heavy quarks as well through heavy-flavour correlation studies. Moreover, the study of heavy-flavour production in pp collisions as a function of the charged-particle multiplicity is a powerful tool to investigate the interplay between hard and soft QCD processes responsible for particle production in hadronic collisions and provides information on the role of multi-parton interactions.

We present ALICE measurements of azimuthal correlations between prompt D mesons and heavy-flavour decay electrons with charged hadrons in pp collisions at $\sqrt{s}$ = 7 TeV and p–Pb collisions at $\sqrt{s_{\rm NN}}$= 5.02 TeV. We also show the per-event yields of D mesons as a function of the charged-particle multiplicity in pp collisions at $\sqrt{s}$ = 7 TeV.

On behalf of collaboration:

ALICE

Primary author: COLAMARIA, Fabio Filippo (Universita e INFN, Bari (IT))

Presenter: COLAMARIA, Fabio Filippo (Universita e INFN, Bari (IT))

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