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Heavy-flavour jet production and charm fragmentation

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Heavy quarks (charm and beauty) are produced in hard parton scatterings in the early stage of hadronic collisions. Therefore, they are ideal probes to investigate the properties of the Quark-Gluon Plasma (QGP) produced in ultra-relativistic heavy-ion collisions. Measurements of heavy-flavour jets give a direct access to the initial parton kinematics and can provide constraints for heavy-quark energy-loss models, in particular adding information on how the radiated energy is dissipated in the medium. Studies of angular correlations between heavy-flavour particles and charged particles allow us to characterize the heavy-quark fragmentation process and its possible modification in a hot nuclear matter environment.

Measurements in pp collisions provide the necessary reference for the interpretation of heavy-ion collision results, allowing us to characterize the heavy-quark production and fragmentation in vacuum. Studies in p-Pb collisions give insight on how the heavy-quark production and hadronisation into jets is affected by the cold nuclear matter effects.

This contribution will focus on the latest studies of heavy-flavour jets and D-meson correlations with charged particles with the ALICE detector in pp collisions at $\sqrt{s_{\rm NN}} = 5.02$, 7, 13 TeV and in p-Pb and Pb-Pb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV. In particular, the azimuthal correlations between D mesons and charged particles in pp and p-Pb collisions will be compared with various Monte Carlo event generators.

Production of charged jets tagged with D mesons and heavy-flavour hadron decay electrons will be reported in pp and p-Pb collisions. In addition, recent studies of the jet-momentum fraction carried by the D meson in pp collisions will be presented. Measurements of the nuclear modification factor of heavy-flavour jets in p-Pb and Pb-Pb collisions will be also discussed.

Collaboration name

ALICE

Track

Heavy Flavour

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