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Prospects for measuring heavy-flavour hadron decay electron - jet correlations with the ALICE detector

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The ALICE Collaboration measured a significant suppression of the production of high transverse momentum $(p_{\rm T})$ electrons from heavy-flavour hadron decays at central rapidity in Pb-Pb collisions with respect to protonproton collisions. This indicates that charm and beauty quarks interact significantly, losing energy, with the Quark Gluon Plasma (QGP) formed in heavy-ion collisions. The study of azimuthal correlations between electrons from heavy-flavour hadron decays and jets opens the possibility to measure the properties of jets coming from heavy-quark fragmentation, complementing the information on the energy-loss mechanism provided by single-particle observables. In particular, the request of a high $p_{\rm T}$ 'trigger' electron can select preferentially electrons and jets deriving from quark pairs produced at the surface of the QGP fireball, allowing us to study in more detail the dependence of the energy loss on the path length travelled by the quark in the medium. Furthermore, by varying the jet radius, the angular distribution of the radiated energy can be investigated.

Besides providing a reference for the Pb-Pb case, the analogous study in pp and p-Pb collisions can supplement the measurements of $p_{\rm T}$ -differential cross sections of charm and beauty particles with angular-differential information, adding sensitivity to the different heavy-flavour production processes (e.g. pair production vs. gluon splitting).

The analysis status and the prospect for such measurements in pp, p-Pb and Pb-Pb collisions with the ALICE detector will be discussed.

On behalf of collaboration:

ALICE

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