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Measurement of the pT-differential cross section and fragmentation function of D0-tagged jets in pp collisions with ALICE

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The production of heavy quarks in proton-proton (pp) is described in the framework of perturbative Quantum Chromo-Dynamics (pQCD) via the leading order process $gg(qq) \rightarrow QQ$. Among higher-order processes, gluon splitting $gg(qq) \rightarrow gg \rightarrow gcc$ is known to account for a large fraction of the charm produced at the LHC. Charmed hadrons coming from the fragmentation of charm quarks produced in the leading order process are expected to carry a larger fraction of the total jet momentum, as compared to those coming from gluon splitting. Therefore the measurement of the charm jet fragmentation functions (FFs) can be used to improve our understanding of the charm production mechanisms.

Heavy-flavor jets can also provide important insights into the Quark-Gluon Plasma (QGP) produced in ultra-relativistic heavy-ion collisions, as heavy quarks are predicted to interact with the QGP constituents differently compared to light quarks and gluons. Measuring charm jets gives a better estimate of the initial parton energy when compared to single-hadron measurements, which allows a more precise test of heavy-quark transport models of the QGP in the low momentum region, where the effect of the quark mass is expected to be more prominent.

We present the measurement of the production of charm jets tagged with fully reconstructed D^0 mesons in minimum bias pp collisions at $\sqrt{s} = 7$ TeV with the ALICE detector. The production of charm jets is investigated both in the p_T-differential cross section and in the distribution of the jet momentum fraction (z) carried by the D^0 meson. D^0-meson candidates are identified in their hadronic decay channel $D^0 \rightarrow K^- \pi^+$ and combined with the other tracks reconstructed in the central barrel using the anti-k_T jet-finding algorithm.

Content type

Experiment

Collaboration

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