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Event shape engineering for the D-meson elliptic flow in Pb-Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV with ALICE at the LHC

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Heavy-flavor mesons are effective tools to study the properties of the Quark-Gluon Plasma (QGP) created in ultra-relativistic heavy-ion collisions. Charm and beauty quarks are produced in hard scattering processes on timescales shorter than the QGP formation time due to their large masses and, thus, they experience the entire evolution of the medium interacting with its constituents via in-medium gluon radiation and collisional processes. The measurement of D-meson azimuthal anisotropy, quantified in terms of the elliptic flow v_2 , allows one to study whether low-momentum charm quarks, interacting with the medium constituents, participate in the collective expansion of the system. At high transverse momentum, the path length dependence of parton energy loss mechanisms can be tested. The dynamics of heavy quarks in the QGP can be further investigated through the Event Shape Engineering (ESE) analysis. Measuring the D-meson v_2 in classes of events defined on the basis of the average flow in a given centrality class allows to evaluate the correlation between the elliptic flow of soft hadrons and D mesons. Furthermore, it provides information about the effect of initial state fluctuations on the energy loss experienced by the heavy quark propagating in the QGP.

The measurement of the D-meson v_2 in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with ALICE performing an ESE analysis based on the selection of events according to the magnitude of the so-called reduced flow vector will be presented. The D mesons are reconstructed via their hadronic decay channels at mid-rapidity in the centrality classes 10-30% and 30-50%. The ratios of the D-meson yields measured in events with large and small average elliptic flow will be shown as well.

Content type

Experiment

Collaboration

ALICE

Centralised submission by Collaboration

Presenter name already specified

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