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Measurement of D meson azimuthal anisotropy in Pb-Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV with the ALICE experiment

The ALICE experiment at the LHC is dedicated to the study of ultra-relativistic heavy-ion collisions, with the aim of investigating the high-density color deconfined state of strongly interacting matter that is expected to be formed in these collisions.

Heavy quarks serve as a probe of the dynamics of the medium since they are produced on short time scale and they propagate through the created matter.

In non-central collisions, it is interesting to study the presence of anisotropic patterns in the D meson azimuthal distribution with respect to the initial geometry symmetry plane. In particular, the coefficient of the second term of the Fourier expansion, called elliptic flow v_2 , is expected to bring insights into heavy quark interactions with the medium. A non-zero v_2 at low transverse momentum indicates a collective motion of charm quarks with respect to the bulk of created matter and their possible thermalization, while at high transverse momentum v_2 is sensitive to the path length dependence of the charm quark energy loss within the medium.

D mesons have been reconstructed via their hadronic decay channels ($D^0 \rightarrow K^- \pi^+$, $D^+ \rightarrow K^- \pi^+ \pi^+$ and $D^+ \rightarrow D^0 \pi^+$) in the central rapidity region. The measurement of D^0 , D^+ and D^+ elliptic flow and $D^0 R_{AA}$ versus event plane in semi-central Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV will be presented. The event plane, which is measured using charged tracks, is an estimate of the reaction plane defined by the impact parameter and the flight direction of the colliding nuclei.

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