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Collective flow measurement of $D_{\mathrm{S}}^{\pm}$ meson in PbPb collision at 5.02 TeV with CMS experiment

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The interaction of heavy quarks with the quark-gluon plasma (QGP) significantly influences their azimuthal distribution and transverse momentum (p_{T}) spectrum, making azimuthal anisotropy coefficients (v_n) and nuclear modification factors (R_{AA}) essential tools for studying QGP properties, as they reveal collective flow and energy loss mechanisms of heavy quarks. In this talk, we present the first measurements of the elliptic (v_2) and triangular (v_3) flow coefficients of $D_s^{\pm}$ mesons in lead-lead (PbPb) collisions at a center-of-mass energy of 5.02 TeV, using the CMS experiment. The measurements, performed as a function of transverse momentum across various centrality classes, set a new standard of precision at this energy, expanding the kinematic range compared to previous studies. The broader kinematic coverage and the first-ever v_3 measurement of $D_s^{\pm}$ mesons provide new insights into charm quark flow generation mechanisms and the impact of hadronization on flow. We compare the flow of $D_s^{\pm}$ mesons with that of D^0 mesons to investigate the potential effect of strange quark hadronization. These results also offer a unique opportunity to explore the influence of initial-state effects on heavy quark dynamics. Additionally, comparison with theoretical models provides critical validation of the underlying physics mechanisms governing these processes.

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