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Measurement of non-prompt and prompt D^0 azimuthal anisotropy in Pb-Pb collisions at sqrt_s_NN = 5.02 TeV with CMS

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Heavy quarks are primarily produced via initial hard scatterings, and thus carry information about the early stages of the Quark-Gluon Plasma (QGP). Measurements of the azimuthal anisotropy of the final-state heavy flavor hadrons provide information about the initial collision geometry, its fluctuation, and more importantly, the mass dependence of energy loss in QGP. Due to the larger bottom quark mass as compared to the charm quark mass, separate measurements of charm and bottom hadron azimuthal anisotropy can shed new light on understanding the dependence of the heavy quark and medium interaction. Because of the high branching ratio and large D^0 mass, measurements of D^0 meson coming from B hadron decay (nonprompt D^0) can cover a broad kinematic range and be a good proxy of the parent bottom hadrons results. In this talk we report both on the prompt D^0 and the first nonprompt D^0 measurements of the azimuthal anisotropy elliptic (v_2) and triangular (v_3) coefficients of nonprompt D^0 in PbPb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV. The measurements are performed as functions of transverse momentum p_{T}, in three centrality classes, from central to midcentral collisions.. Compared to the prompt D^0 results, the nonprompt D^0 v_2 flow coefficients are systematically lower but have a similar dependence on p_{T} and centrality. A non-zero v_3 coefficient of the nonprompt D^0 is observed. The obtained results are compared with theoretical predictions. The comparison could provide new constraints on the theoretical description of the interaction between heavy quarks and the medium.

In-person participation

No

Primary author: STOJANOVIC, Milan (Purdue University)

Presenter: STOJANOVIC, Milan (Purdue University)

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