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Studies of heavy quark diffusion in QGP with nonprompt D^0 collectivity and jet- D^0 angular correlations in PbPb collisions

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Measurements of the correlations of the final-state heavy flavor hadrons are of great interest since they provide information about the initial collision geometry and its fluctuation. More importantly, those measurements could reveal the mass dependence of parton energy loss and quark diffusion in the Quark-Gluon Plasma (QGP). In this talk, we report the first measurement of the azimuthal anisotropy of nonprompt D^0 in PbPb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. The elliptic (v_2) and triangular (v_3) coefficients are performed as functions of D^0 transverse momentum p_T , in three centrality classes. Compared to the results from promptly produced D^0 , the nonprompt D^0 v_2 flow coefficients are systematically lower. But those results have a similar dependence on p_T and centrality. A non-zero v_3 coefficient of the nonprompt D^0 is seen in PbPb data. We also present the first azimuthal angular correlation measurement between jets and D^0 mesons in pp and PbPb collisions. The jet- D^0 correlation measurement is performed using jets with $p_T > 60$ GeV and D^0 mesons with $p_T > 4$ GeV. In PbPb collisions at 5.02 TeV, compared to the pp, the D^0 distribution hints at the diffusion of charm quarks in the medium, created in heavy-ion collisions. The results could provide new constraints on the mechanism of the heavy quark diffusion and energy loss in the QGP.

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