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Centrality dependence of D0 elliptic and triangular flow in Au+Au collisions at sNN=200 GeV at STAR

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Due to their large masses, heavy quarks are predominantly produced through initial hard scatterings in heavy-ion collisions and, as such, they experience the entire evolution of the hot and dense medium created in such collisions. Therefore, they can provide important insights into the properties of the strongly-coupled Quark Gluon Plasma (sQGP). For instance, the azimuthal anisotropy of charm quarks with respect to the reaction plane over a broad momentum range can provide information on the degree of thermalization for heavy flavor quarks in the medium and the bulk properties of the system. Specifically, at low transverse momenta we can examine the bulk properties in the strongly-coupled regime. Furthermore, several models have predicted that fluctuations in the initial conditions, together with strong charm-medium interactions, could lead to a finite triangular flow v_3 for the D^0 meson, providing another handle to study the early stages of the collisions.

In this talk we present the measurement of azimuthal anisotropy of D^0 mesons in Au+Au collisions at $\sqrt{s_{\rm NN}} =$ 200 GeV with the Heavy Flavor Tracker at STAR. Compared to previously reported D^0 v_2 in minimum-bias collisions, the significance of the new result is improved by a factor of 2-4, allowing the study of the transverse momentum and centrality dependence of D^0 elliptic and triangular flow for the first time. The results will be compared with the measurements of other particle species and a series of model calculations. Charm quark dynamics in the sQGP medium will be discussed and the question of whether charm quarks are as thermalized as light quarks will be addressed.

Preferred Track

Collective Dynamics

Collaboration

STAR

Author: HE, Liang (Purdue University)

Presenter: HE, Liang (Purdue University)

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