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Type: **Parallel Talk**

Measurements of D^0 Meson Directed, Elliptic and Triangular Flow Using the STAR Detector at RHIC

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Since heavy quarks are predominantly created in the initial hard scatterings in a heavy-ion collision, they can access the information of the early time dynamics. Recently, it has been predicted that the transient magnetic field generated in heavy-ion collisions can induce a larger directed flow (v_1) for heavy quarks than for light quarks. The model calculation also suggests opposite signs of dv_1/dy for charm (c) and anti-charm (\bar{c}) quarks. This argues for heavy quarks offering a new approach to study the initial electromagnetic field. Furthermore, recent measurements at RHIC have shown that D^0 mesons in minimum bias and mid-central heavy-ion collisions exhibit significant elliptic (v_2) and triangular flow (v_3). Their flow magnitude follows the Number-of-Constituent-Quark (NCQ) scaling with light hadrons' in mid-central collisions. It will be particularly interesting to measure the centrality dependence of these observables and test whether and when the NCQ scaling breaks for charm hadrons.

STAR has collected high statistics data for Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV with the Heavy Flavor Tracker detector during 2014 and 2016, allowing us to achieve high precision anisotropic flow measurements for charm hadrons at RHIC energies. In this talk, we will report the first measurement of v_1 for the $D^0(\bar{u}c)$ and $\bar{D}^0(u\bar{c})$ mesons at $\sqrt{s_{NN}} = 200$ GeV Au+Au collisions and compare to those of light flavor hadrons and model predictions. We will present differential measurements of D^0 meson v_2 and v_3 in various centralities of Au+Au collisions, and compare them to those of light flavor hadrons to test the NCQ scaling. The D^0 v_2 measured in Au+Au collisions will also be compared to that measured in d+Au collisions to help understand the non-flow effects. Physics implications of these measurements will be discussed.

Content type

Experiment

Collaboration

STAR

Centralised submission by Collaboration

Presenter name already specified

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