results on quark flavor dependence of flow in Au+Au collisions

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Introduction

Heavy quarks (charms and bottoms) are important probes of Quark-Gluon-Plasma:
- They are mainly produced in the initial hard scattering.
- Heavy quarks propagate through QGP
- Heavy quark flow is sensitive to diffusion(D) of QGP
- $J/\psi$ in QGP
- cc pair dissociated by color Debye screening
- May flow by recombination

Question: What mechanism does generate heavy quark flow?

Experimental Setup & Methods

Silicon Vertex Detectors

Charm and bottom separation
1. Measure DCAT of electrons
2. Determine BG ($\pi$, $\eta$, $\omega$, $\gamma$
3. Bayesian unfolding to extract B/D hadron based on HF electron DCAT and invariant yields.

See PRC 93, 034904 in detail

Summary

- PHENIX measured charm and bottom electron $v_2$ and $J/\psi$ $v_2$ in Au + Au collisions at $\sqrt{s_{NN}}$=200 GeV
- A finite charm electron $v_2$ with 3.5$\sigma$
- A hint of bottom electron $v_2$ with 1.1$\sigma$
- $v_2(b \rightarrow e) < v_2(c \rightarrow e)$ with 0.6$\sigma$
- A finite charm electron $v_2$ and a hint of positive $J/\psi$ $v_2$.
- The better description of the model suggests that charms are dragged by QGP and hadronized by coalescence.
- Model with coalescence describes data better than that w/o coalescence
- Charms dragged by QGP and hadronized by coalescence
- A hint of positive $J/\psi$ $v_2$, with 1.1$\sigma$
- $J/\psi$ $v_2 < v_2(c \rightarrow e)$ with 0.7$\sigma$ suggests the same mechanism above
- Need more statistics to distinguish the models

- PHENIX measured charm and bottom electron $v_2$ and $J/\psi$ $v_2$ in Au + Au collisions at $\sqrt{s_{NN}}$=200 GeV
- A finite charm electron $v_2$ and a hint of positive bottom electron and $J/\psi$ $v_2$.
- The better description of the model suggests that charms are dragged by QGP and hadronized by coalescence.
- Final results from available Au+Au date will provide more definitive measurement of heavy flavor $v_2$ and $R_{AA}$