



Contribution ID: 286

Type: Oral Presentation

## Probing Hot and Dense Matter with c and b Measurements with PHENIX VTX Tracker

*Friday 17 August 2012 15:00 (20 minutes)*

Well-calibrated penetrating probes are essential for investigating the properties of the hot, dense medium created in high-energy nuclear collisions at RHIC. One such probe are hadrons which carry heavy flavor (charm and bottom quarks). They are a powerful tool for studying the medium because they are generated early in the reaction and subsequently propagate through the created matter.

Two very striking results have already been seen for open heavy flavor from the PHENIX experiment via the measurement of electrons from semi-leptonic decays of hadrons carrying charm or bottom quarks. First, heavy mesons, despite their large mass, exhibit a suppression at high transverse momentum compared to that expected from p+p interactions. This suppression is found to be similar to that of light mesons which implies a substantial energy loss of fast heavy quarks while traversing the medium. Secondly, an elliptic flow is observed for heavy mesons which is comparable to that of light mesons like pions. This implies that the same heavy quarks are in fact sensitive to the pressure gradients driving hydrodynamic flow—giving new insight into the strongly coupled nature of the QGP fluid at these temperatures. In these early results, PHENIX was not able to distinguish electrons from c and b independently. In order to understand these medium effects in more detail it is imperative to directly measure the nuclear modification and the flow of c and b separately.

With the addition of the silicon vertex tracker, VTX, to PHENIX these direct measurements are now possible. We will present the latest PHENIX measurements of single electrons from beauty and charm decays, emphasizing the flow,  $v_2$ , and nuclear modification factor, RAA, including the latest progress with the VTX.

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**Session Classification:** Parallel 6A: Heavy Flavor & Quarkonia (Chair Y. Akiba)