QUARK MATTER 2015
Sep. 27 – Oct. 3, 2015 Kobe, Japan

Contribution ID: **285** Type: **Poster**

Using Unfolding Techniques to Separate Charm and Bottom Contributions to Single Electron Yields from Semi-leptonic Decays of Heavy Flavor Hadrons Measured by PHENIX

Tuesday 29 September 2015 16:30 (2 hours)

Measurements of heavy quark (charm and bottom) production provide important constraints on the nature of the quark gluon plasma produced in high energy heavy ion collisions, as they are created only during the initial collision and therefore probe the full evolution of the medium. The PHENIX Collaboration has previously measured open heavy flavor production via the yields of electrons from semi-leptonic decays of charm and bottom hadrons in $p+p$ and Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. The results indicate a significant suppression of the combined charm and bottom decay electrons for $p_T > 5$ GeV/c, but by themselves provide little constraint on the modification of the separate parent hadron distributions. The installation of the PHENIX silicon vertex detector in 2011 allowed for the measurement of the displaced vertex of these electrons for the first time at RHIC. In order to separate the contributions from charm and bottom hadrons, Bayesian unfolding techniques can be applied to the p_T and displaced vertex dependence of the yield of electrons from open heavy flavor decays. This separation provides further constraints on energy loss and transport mechanisms in the medium produced in heavy ion collisions. This poster will present the unfolding techniques utilized in separating these contributions, as well as the status of the analysis in $p+p$ and Au+Au collisions from PHENIX.

On behalf of collaboration:

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Session Classification: Poster Session

Track Classification: Open Heavy Flavors and Strangeness