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Measurements Of Non-Photonic Electron Production And Correlation With STAR Experiment

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Heavy quarks, primarily produced in initial hard scattering processes at the Relativistic Heavy Ion Collider (RHIC), are important tools for understanding the properties of the Quark-Gluon Plasma (QGP). The heavy quark interaction with the QGP can be studied through non-photonic electrons (NPE), which are produced from semi-leptonic decays of heavy flavor mesons. In $p+p$ collisions measurements of heavy flavor production serve as a test of the pQCD framework and are used as a baseline for comparison to measurements from heavy ion collisions. In $Au + Au$ and $d + Au$ the hot and cold nuclear matter effects can be quantified through the nuclear modification factors (R_{AA} , R_{dA}).

Models with different assumptions describe relatively well the suppression and elliptic flow of NPE at the top RHIC energy. New observables are required to discriminate between models. An energy dependence of R_{AA} and elliptic flow v_2 and correlations of non-photonic electrons to hadrons can be used to further probe the interaction of heavy quarks with the medium.

In this talk, we will present a new measurement of NPE production in $p+p$ collisions at $\sqrt{s} = 200$ GeV in a broad transverse momentum range ($0.4 < p_T < 12$ GeV/c). We will discuss the energy dependence of NPE production and azimuthal anisotropy measurements in $Au+Au$ collisions at $\sqrt{s_{NN}} = 39, 62.4$ and 200 GeV. Nuclear modification factor R_{AA} in $Au+Au$ collisions and R_{dA} in $d+Au$ collisions at $\sqrt{s_{NN}} = 200$ GeV will be presented too. Finally we will show NPE-hadron correlations in $Au+Au$ collisions at $\sqrt{s_{NN}} = 200$ GeV at midrapidity.

On behalf of collaboration:

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