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Measurements of Λ_c^+ and D_s^+ productions in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV from STAR

Tuesday, February 7, 2017 5:30 PM (20 minutes)

Quark coalescence has been proposed as a new hadronization mechanism to explain the Number-of-Constituent-Quark scaling for meson/baryon elliptic flow as well as the enhancement in baryon-to-meson ratios in heavy ion collisions in the intermediate p_T range (2<p_T<6 GeV/c) for both light and strange flavor hadrons. If the coalescence mechanism also plays a significant role for charm quark hadronization inside the hot and dense medium, one would expect enhancements in the D_s^+ and Λ_c^+ yields in heavy-ion collisions relative to p+p collisions. The magnitudes of the enhancements are sensitive to the QGP dynamics, e.g. the degree of thermalization for charm quarks, the amount of strangeness enhancement, etc. Knowledge of the yields for different charm hadrons is also critical for determining the total charm quark yield in heavy-ion collisions.

In this presentation, we will report the first measurement of Λ_c^+ baryon ($c\tau \sim 60\mu m$) production in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV from the STAR experiment. A significantly improved measurement of D_s^+ production with about a factor of 7 increase in signal significance compared to the previous results will also be reported. The Λ_c^+ and D_s^+ hadrons are reconstructed through their hadronic decay channels ($\Lambda_c^+ \to p + K + \pi$, $D_s^+ \to \phi(1020) + \pi$) using topological selections enabled by the STAR Heavy Flavor Tracker (HFT). The transverse-momentum spectra of Λ_c^+ and D_s^+ as well as their ratios to non-strange D meson will be presented and compared to theoretical calculations. In addition, nuclear modification factor and elliptic flow for D_s^+ will be presented. Physics implications on charm quark hadronization mechanisms in the QGP as well as the QGP medium properties will be discussed.

Preferred Track

Open Heavy Flavors

Collaboration

STAR

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