Hard Probes 2018: International Conference on Hard & Electromagnetic Probes of High-Energy Nuclear Collisions

Contribution ID: **216** Type: **2a) Jets and high-pT hadrons (TALK)**

Studies of Heavy-Flavor Jets Using D^0-Hadron Correlations in Azimuth and Pseudorapidity in Au+Au Collisions at 200 GeV at the STAR Experiment

Tuesday 2 October 2018 15:20 (20 minutes)

Heavy flavor (HF) quarks (charm, bottom) are important probes of the medium produced in relativistic heavy-ion collisions because they are formed in the early stage and propagate throughout the lifetime of the system. HF-meson spectra and azimuthal anisotropy (v_2) measurements have been reported by experiments at RHIC and the LHC, and they suggest strong interactions of HF quarks with the medium. D^0-meson + charged hadron correlations on relative pseudorapidity and azimuth ($\Delta\eta$, $\Delta\phi$) provide a method for disentangling correlation structures on ($\Delta\eta$, $\Delta\phi$) –allowing for separation of structures related to jets and bulk phenomena directly, with the D^0-meson serving as a proxy for a heavy-flavored jet. The D^0-meson is reconstructed via its hadronic decay channel using the Heavy Flavor Tracker (HFT) in STAR, which allows for rejection of background via identification of secondary decay vertices.

In this talk, we present two-dimensional D^0-hadron correlations as a function of centrality in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. These data reveal a jet-like, peaked structure at ($\Delta\eta$, $\Delta\phi$) = (0, 0) (near-side), and a $\Delta\eta$-independent azimuthal harmonic modulation similar to that reported for light-flavor dihadron correlations. Here, we focus on the evolution of the near-side peak's yield and widths on ($\Delta\eta$, $\Delta\phi$) as a function of centrality. Finally, the evolution of all of the jet-peak parameters will also be compared to various light-flavor hadron correlations.

Summary

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Session Classification: Parallel 3