Studies of Heavy-Flavor Jet Modification Using D0-Hadron Correlations in Azimuth and Pseudorapidity in Au+Au Collisions at 200 GeV at the STAR Experiment

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Heavy flavor (HF) quarks (charm, bottom) are important probes of the medium produced in relativistic heavy-ion collisions as they are produced in the early, hard partonic interactions, 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. The evolution of the near-side peak's yield and widths on ($\Delta\eta$, $\Delta\phi$) as a function of centrality show strong modification of the charm-containing jet as the partonic medium increases in size, while the peripheral correlations agree with predictions from PYTHIA. Similar modification with centrality is also seen when comparing the HF correlations to those from light-flavor mesons.