

Measurement of D^0 Meson Tagged Jets in Au+Au Collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV at STAR

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Abstract

The Quark-Gluon Plasma (QGP) produced in heavy-ion collisions can be studied using hard probes, such as jets created at the initial collision stage. The properties of these jets, including their structure or energy loss, are modified due to interactions with the medium, in contrast to their propagation through a vacuum. This effect is called jet quenching.

The transverse momentum (p_{T}) fraction of the jet, carried by hadrons along the jet axis ($z = \vec{p}_{\text{T, hadron}} \cdot \vec{p}_{\text{T, jet}} / |p_{\text{T, jet}}|^2$), is related to jet fragmentation and the generalized angularities ($\lambda_{\alpha}^{\kappa} = \sum_i (p_{\text{T}, i} / p_{\text{T, jet}})^{\kappa} (\Delta R_i / R_{\text{jet}})^{\alpha}$) characterize the jet substructure and can distinguish jets initiated by light and heavy quarks, and gluons where the different choice of κ and α parameters tunes the sensitivity of the observable to various jet aspects. The measurement of the transverse momentum fraction z and the angularities $\lambda_{\alpha > 0}^{\kappa=1}$ open ways to investigate modifications of the fragmentation function and jet substructure caused by jet quenching.

In this contribution, we report the measurement of D^0 meson tagged jets in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV by the STAR experiment at RHIC. We present the nuclear modification factors as a function of $p_{\text{T, jet}}$ and z , measurements of generalized angularities, and the radial profile of the D^0 mesons for D^0 jets in heavy-ion collisions. These results may help distinguish between various models describing jet quenching and heavy flavor quark in-medium energy loss.