

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

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1 Abstract

The properties of the Quark-Gluon Plasma (QGP) produced in heavy-ion collisions can be studied using jets generated in hard scattering processes at the early stages of the collision. These jets lose energy and have their shower structures modified relative to that in the vacuum due to jet-medium interaction — known as ‘jet quenching’.

The transverse momentum (p_T) fraction of the jet carried by hadrons along the jet axis ($z = p_{T,\text{hadron}}/p_{T,\text{jet}}$) is related to the jet fragmentation function, and connects the production of quarks and gluons in the perturbative regime with the hadronized final-state particles in the non-perturbative regime. In the QGP medium, modifications to the fragmentation function compared to that in a vacuum can provide insights into the underlying mechanism of jet quenching. A study of the fragmentation function for charm meson tagged jets can reveal further details about the flavor dependence of the medium-induced parton energy loss.

In this poster, we report measurements of D^0 meson tagged jets in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV, collected by the STAR experiment at RHIC. We show the nuclear modification factors as a function of $p_{T,\text{jet}}$ and z for D^0 jets. Additionally, we report the radial profile of the D^0 mesons in these tagged jets. Such flavor tagged measurements can help to discriminate between different models of jet quenching in the medium and study the properties of the QGP.