

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

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

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

12 We report the measurements of D^0 meson tagged jets in Au+Au collisions at $\sqrt{s_{\text{NN}}} =$
13 200 GeV, collected by the STAR experiment at RHIC. We show the p_T dependent invariant
14 yields, the first measurement of the z distribution, and the nuclear modification factors as a
15 function of p_T and z for D^0 jets. Additionally, we report the radial profile of the D^0 mesons
16 in these tagged jets. Such flavor tagged measurements can help to discriminate between
17 different models of energy loss in the medium and study the properties of the QGP.