

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

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1 Abstract

1 The properties of the Quark Gluon Plasma (QGP) produced in heavy-ion collisions can
2 be studied by using jets generated in hard scattering processes at the early stages of the
3 collision. These jets lose energy and have their shower structure modified compared to those
4 in vacuum by a process called ‘jet quenching’ in the QGP.

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

13 We report measurements of D^0 meson tagged jets in Au+Au collisions at $\sqrt{s_{\text{NN}}} =$
14 200 GeV, collected by the STAR experiment at RHIC. We show the transverse momen-
15 tum spectra of the D^0 jets and the first measurement of the transverse momentum fraction
16 of D^0 mesons in the jets. Such flavor tagged measurements can help discriminate between
17 different models of energy loss in the medium and study the properties of the QGP.