

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

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## 1 Abstract

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

Jet fragmentation function is related to the transverse momentum fraction of the jet carried by hadrons ( $z = p_{\text{T,hadron}}/p_{\text{T,jet}}$ ) along the jet axis. The fragmentation function 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 the vacuum can provide insights to the underlying mechanism of jet quenching. Such modifications have been observed at the LHC for inclusive jets. A study of the fragmentation function for charm meson tagged jets can reveal further details about the flavor dependence of medium induced parton energy loss.

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 transverse momentum dependent invariant yields of the  $D^0$  jets and the first measurement of the transverse momentum fraction of  $D^0$  mesons in the jets. We also measure the nuclear modification factors as functions of the transverse momentum and the transverse momentum fraction. Additionally, we measure the radial profile of the  $D^0$  mesons in these tagged jets. Such flavor tagged measurements can help discriminate between different models of energy loss in the medium and study the properties of the QGP.