

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

Ondrej Lomicky

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## Abstract

1 The Quark-Gluon Plasma (QGP) produced in heavy-ion collisions can be stud-  
2 ied using hard probes, such as  $D^0$ -meson tagged jets created at the initial col-  
3 lision stage. The jet yield, shape, and its sub-structure get modified due to  
4 interactions with the medium compared with its vacuum propagation. This  
5 phenomenon is known as jet quenching.

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7 The transverse momentum ( $p_{\text{T}}$ ) fraction of the jet, carried by hadrons along  
8 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. The  
9 generalized angularities  $\lambda_{\alpha}^{\kappa}$  characterize the jet substructure and they can dis-  
10 tinguish jets initiated by light and heavy quarks, and gluons where the different  
11 choice of  $\kappa$  and  $\alpha$  parameters tunes the sensitivity of the observable to various  
12 jet aspects. Measurements of the nuclear modification factor  $R_{\text{CP}}$  of  $D^0$  jets  
13 as a function of the transverse momentum fraction  $z$  and the generalized angu-  
14 larities in heavy-ion collisions open ways to investigate modifications of heavy  
15 quark fragmentation function and jet substructure in the QGP. In addition,  
16 studying radial distribution of  $D^0$  mesons in jets allows one to investigate the  
17 charm quark diffusion in the medium.

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