

1 Evolution of jet shapes and fragmentation  
2 functions in Au+Au collisions at  $\sqrt{s_{\text{NN}}} = 200$   
3 GeV with the STAR experiment at RHIC

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7 **Abstract**

8 The modification of jet substructure in heavy-ion collisions compared  
9 to that in the vacuum reference is one of the main features of jet quenching.  
10 Such modification has been observed at LHC kinematics with various  
11 observables, such as jet fragmentation and jet shapes. In this talk, we  
12 report measurements of the differential jet shape and semi-inclusive jet  
13 fragmentation functions in Au+Au collisions at  $\sqrt{s_{\text{NN}}} = 200$  GeV with  
14 the STAR detector at RHIC.

15 Based on the semi-inclusive population of jets recoiling from a high-  
16  $p_T$  trigger hadron, the fragmentation functions are constructed from the  
17 fraction of the transverse momentum of charged particles projected onto  
18 the jet axis over that of the jet. The fragmentation functions are cor-  
19 rected for uncorrelated background effects and instrumental effects via  
20 the Mixed-Event technique and unfolding, and the results for central and  
21 peripheral collisions will be compared. Similarly, the differential jet shape,  
22  $\rho(r)$ , is defined as the average fraction of the transverse momentum con-  
23 tained inside an annulus with inner radius  $r_a = r - \delta/2$  and outer radius  
24  $r_b = r + \delta/2$ . The differential jet shapes will be measured for full (charged  
25 + neutral) jets at low  $p_T$  (10-40 GeV/ $c$ ) using constituent information  
26 jet-by-jet. This kinematic range will provide a complementary measure-  
27 ment to the LHC to demonstrate whether there is a modification and a  
28 broadening of the jet profile at RHIC energies. The differential jet shapes  
29 will explore the dependence of modifications based on jet size ( $R$ ), cen-  
30 trality, event-plane angle (defined by the beam direction and the vector  
31 of the impact parameter), and additionally include a comparison to base-  
32 line p+p collisions. Both jet fragmentation function and jet shape results  
33 indicate medium-induced modifications in heavy-ion collisions.