

1       Measurements of jet acoplanarity and intra-jet  
2       broadening using semi-inclusive  $\gamma$ +jet and  $\pi^0$ +jet  
3       in central Au+Au and  $p+p$  collisions at  $\sqrt{s_{\text{NN}}}$   
4       =200 GeV with STAR

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6       We present measurements of the semi-inclusive distribution of charged-  
7       particle jets recoiling from  $\gamma$  and  $\pi^0$  triggers in  $p+p$  and central Au+Au  
8       collisions at  $\sqrt{s_{\text{NN}}} = 200$  GeV by STAR. The large uncorrelated jet back-  
9       ground in central Au+Au collisions is removed using mixed events, enabling  
10      systematically well-controlled measurements at very low jet transverse mo-  
11      mentum  $p_{\text{T}}^{\text{jet}}$  and large jet radius  $R$ . We report corrected distributions as a  
12      function of both  $p_{\text{T}}^{\text{jet}}$  and recoil azimuthal deflection with respect to trigger  
13      axis for  $R = 0.2$  and  $0.5$  jets. These measurements probe medium-induced  
14      jet yield suppression, intra-jet broadening, and jet acoplanarity, as well as  
15      the effect of the color charge of the jet-inducing parton in heavy-ion colli-  
16      sions. We also present comparisons to theoretical calculations incorporating  
17      Sudakov broadening in vacuum and jet quenching in the medium. These  
18      together provide a multi-messenger study of the physical processes driving  
19      the jet quenching phenomenon.