

1 **Measurements of jet yield and acoplanarity using semi-inclusive**
2 **γ_{dir} +jet and π^0 +jet distributions in $p+p$ and central Au+Au**
3 **collisions at $\sqrt{s_{NN}} = 200$ GeV by STAR**

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6 We report high-statistics measurements of semi-inclusive distributions of
7 charged jets recoiling from high- E_T direct photon (γ_{dir}) and π^0 triggers in
8 $p+p$ and central Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. In a semi-inclusive
9 approach, event bias is induced solely by the choice of trigger; separately
10 utilizing γ_{dir} and π^0 triggers therefore provides direct comparison of effects
11 due to jet quenching - the suppression of energetic partons due to the energy
12 loss in the Quark-Gluon Plasma (QGP) - for jet populations with differ-
13 ent quark/gluon fractions and different in-medium path length distributions.
14 Jets are reconstructed from charged particles using the anti- k_T algorithm
15 with jet resolution parameters $R_{\text{jet}} = 0.2$ and 0.5 . The large uncorrelated
16 background in central Au+Au collisions is removed statistically using a mixed
17 event technique. This enables a jet measurement with well-controlled sys-
18 tematic uncertainties extending to low jet transverse momentum (p_T) and
19 large R_{jet} , which are of particular importance in searching for large-angle jet
20 scattering. We report recoil jet yield and trigger-jet acoplanarity distribu-
21 tions for jets with $p_T > 5$ GeV/ c . The comparison of recoil yields in Au+Au
22 and $p+p$ collisions at fixed R_{jet} probes energy loss in heavy-ion collisions,
23 while the comparison of recoil yields for different R_{jet} in Au+Au and $p+p$
24 collisions probes intra-jet broadening due to jet quenching. The modification
25 of trigger-jet acoplanarity distributions in central Au+Au collisions relative
26 to $p+p$ collisions is sensitive to QGP transport parameters, and can be used
27 to search for evidence of large-angle scattering of jets off of quasi-particles
28 in the QGP. The measured recoil yields and acoplanarity distributions are
29 compared to theoretical calculations.