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Measurements of semi-inclusive γ +jet and hadron+jet distributions in heavy-ion collisions at $\sqrt{s_{NN}} = 200$ GeV with STAR

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We present measurements of the semi-inclusive distribution of charged-particle jets recoiling from γ and π^0 triggers in $p+p$ and central Au+Au collisions, and from charged hadron triggers in smaller collision systems (Ru+Ru and Zr+Zr) at $\sqrt{s_{NN}} = 200$ GeV by STAR. The large uncorrelated background in heavy-ion collisions is removed using the event mixing technique, enabling systematically well-controlled measurements at very low jet transverse momentum p_T^{jet} and large jet radius R . We report corrected distributions as a function of both p_T^{jet} and recoil azimuthal deflection with respect to trigger axis for $R = 0.2$ and 0.5 jets in $p+p$ and Au+Au collisions. These measurements probe medium-induced jet yield suppression, intra-jet broadening, and jet acoplanarity, as well as their dependence on the color charge in heavy-ion collisions. We also present comparisons to theoretical calculations incorporating Sudakov broadening in vacuum and jet quenching in the medium. Jet yield suppression in central to peripheral collisions is measured in Ru+Ru and Zr+Zr collisions to study the system size dependence of jet energy loss. These together provide a multi-messenger study of the physical processes driving the jet quenching phenomenon.

Experiment/Theory

STAR

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