Observing jet quenching using generalized jet angularities in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV from STAR

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Jets originating from hard-scattered partons in the early stages of heavy-ion collisions travel through the Quark Gluon Plasma (QGP) and are modified or quenched relative to a p+p collision baseline. Moments of the jet's transverse momentum ($p_{\rm T}$) profile in the $\eta - \phi$ plane relative to the jet-axis are an important class of jet substructure observables to study in medium modifications of the jet's radiation and fragmentation patterns called generalized jet angularities. Previous measurements of these angularities have been performed using quenched jets from Pb+Pb collisions at $\sqrt{s_{\rm NN}} = 2.76$ TeV in the LHC, and similar measurements using heavy-ion collisions at RHIC energies will probe jet quenching in a region of phase space that is complementary to the region probed in the LHC.

In this study, we present nuclear modification factors ($R_{\rm AA}$) using simultaneous fully corrected measurements of various generalized jet angularities using jets from Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV and p+p collisions at $\sqrt{s} = 200$ GeV collected by the STAR experiment. We also explore a novel machine-learning based method that measures the degree to which quenched and unquenched jets are distinguishable. Both these measurements are differential in centrality of the Au+Au collisions.