Study of systematic uncertainties in jet shape measurements in $\sqrt{s_{NN}} = 200$ GeV Au+Au collisions at STAR

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Abstract

Jets are highly collimated sprays of particles emitted by energetic partons from hard scatterings. In relativistic heavy-ion collisions, these hard-scattered partons undergo various interactions with the surrounding Quark-Gluon Plasma (QGP) medium, resulting in the emitted jet being modified its energy and substructure relative to a baseline reference in pp collisions. Jet shape observables study the radial distributions of energy and particles in a jet, and aid us in understanding how jets are modified in the presence of the QGP medium. Recently, preliminary uncorrected measurements of these observables have been reported by the STAR experiment at RHIC energies. To study potential impact of the medium on these observables, further corrections due to detector effects need to be established. We embed PYTHIA 8 pp events into minimum-bias Au+Au events at $\sqrt{s_{NN}} = 200$ GeV, and pass them through a GEANT simulation of the STAR detector to estimate correction factors and associated systematic uncertainities for the jet shape measurements. This talk provides a status update of the jet shape measurements in $\sqrt{s_{NN}} = 200$ GeV Au+Au collisions by the STAR experiment.