Measurements of Jet Anisotropy in Ru+Ru and Zr+Zr Collisions at $\sqrt{s_{NN}} = 200$ GeV at STAR

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Abstract

In ultra-relativistic heavy-ion collisions, hard scattered partons, which form jets, traverse and interact with the Quark-Gluon Plasma (QGP). Through these interactions, jets lose energy via collisional and radiative processes, known as jet quenching. The path-length dependence of jet quenching can be studied by measuring v_2^{jet}, the second-order Fourier coefficient quantifying the differential jet yield relative to the event plane. A finite v_2^{jet} is expected in mid-central heavy-ion collisions where a highly ellipsoidal QGP is produced, resulting in jets traversing in-plane interacting with less medium than those out-of-plane. To remove combinatorial jets that are created by clustering particles from the underlying event, a geometric matching requirement between hard core jets, found using only high transverse momentum (p_T) tracks, and jets found including also low-p_T constituents is utilized. The sensitivity of this method to the details of jet fragmentation is studied, and results of v_2^{jet} in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{NN}} = 200$ GeV with the STAR experiment will be shown, spanning multiple jet resolutions. Such measurements in medium-sized collision systems such as Ru+Ru and Zr+Zr can help distinguish between competing models and bridge the gap between smaller p+A and larger A+A systems.

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