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Measuring the groomed shared momentum fraction (z_g) in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV at STAR using a semi-inclusive approach

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Jet quenching is one of the main signals used to investigate the properties of a strongly interacting quark-gluon plasma (QGP). Jet quenching can manifest as more than just energy loss, it can also be seen in the modification of jet substructure. This work focuses on measuring the substructure observable z_g, a byproduct of softdrop grooming, which probes the physics of the first hard splitting of a hard-scattered parton. This analysis employs a semi-inclusive approach, selecting candidate jets found within the recoil region of a high transverse momentum trigger particle. Requiring a high transverse momentum trigger object induces a surface bias on the event selection, causing selected candidate jets in the recoil region to be biased towards having a longer path length within the medium. Jets with a longer path length in the medium are expected to be more quenched and thus are good candidates to search for modification of z_g at RHIC energies. Contribution from combinatorial jets due to the large fluctuating background found in central Au+Au events is subtracted from the signal at the ensemble level, using a mixed events technique. This approach to eliminate combinatorial jet contributions differs from a past measurement of z_g at STAR that did not find any modification of z_g, which imposed a hard core requirement for jet candidates, effectively biasing the selection of jets to have a shorter path-length in the QGP medium and reducing the potential signal for modification of z_g. In this poster we will present the techniques used and the current preliminary results from the ongoing analysis at STAR.

Collaboration (if applicable)

STAR

Track

Jets and High Momentum Hadrons

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