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Measurement of hadron suppression at 14.5 GeV and study of its connection with the disappearance of other QGP signatures at low $\sqrt{s_{NN}}$ in Au+Au collisions with STAR at RHIC in BES I

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At top RHIC energies and at the LHC, the suppression of high transverse momentum (p_T) hadrons provides evidence for partonic energy loss in a QGP. We study jet quenching in the RHIC BES by investigating the centrality dependence of the binary-collision-scaled high- p_T yields. In this representation we can see if the scaled yield decreases as we go to larger overlap regions and higher energy densities. Phenomena like radial flow that increase the yield in this measurement are all expected to become stronger for more central collisions. Measurement of a decrease in the scaled yield while studying more central collisions can serve as possible evidence for jet quenching if initial state effects can be accounted for. One such effect is the suppression of per nucleon cross sections in heavier nuclei relative to lighter nuclei for Bjorken $x > 0.3$ first measured by the European Muon Collaboration (EMC). Even at energies and centralities where this signature is lost a QGP may still be formed since the suppression caused by energy loss must overpower all the phenomena responsible for enhancement. Measurements will be shown for several ranges of p_T for 7.7, 11.5, 14.5, 19.6, 27, 39, and 62.4 GeV data showing that relative hadron suppression persists for collisions at least down to 14.5 GeV.

Models have also shown that the development of v_3 and a ridge requires the presence of a low viscosity QGP phase. To further investigate the presence of the QGP at these lower energies and whether the observed hadron suppression coincides with onset of other QGP signatures, we cross-examine the energy and centrality dependence of v_3 . We find that for collisions with $N_{part} < 50$, the ridge and v_3 disappear for energies below 14.5 GeV, suggestive of a turn-off of the QGP. But for $N_{part} > 50$, v_3 and the ridge persist down to the lowest energies, consistent with the hadron suppression defined in the new variable at the lower beam energies.

On behalf of collaboration:

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