Nuclear Seminar

October 1st @ 2:00 PM in RM 179

System size and energy dependence of the near-side of high-pT triggered correlations in STAR

QCD predicts a phase transition in nuclear matter at high energy densities. This matter, called a Quark Gluon Plasma (QGP), should have very different properties from normal nuclear matter due to its high temperature and density. Jets can act as a calibrated probe to examine the QGP, however, reconstruction of jets in a heavy ion environment is difficult. Therefore jets have been studied in heavy ion collisions by investigating the spatial correlations between two intermediate to high-pT hadrons in an event. Previous studies have indicated that the near-side peak of high-pT triggered correlations can be decomposed into two parts, the jet-like correlation and the Ridge. The jet-like correlation is narrow in both azimuth and pseudorapidity and has properties consistent with vacuum fragmentation, while the Ridge is narrow in azimuth but broad in pseudorapidity and roughly independent of pseudorapidity within STAR's acceptance. We present data from Cu+Cu and Au+Au collisions at sqrt(s_NN) = 62 GeV and 200 GeV, which should allow more robust tests of models. The yields of the jet-like correlation and Ridge components are presented in both systems and at both energies. The trends in energy, system, and particle type dependence of the jet-like correlation and Ridge present a more accessible test for models than the absolute yields. Attempts have been made to explain the production of the Ridge component as coming from recombination, momentum kicks, Glasma flux tubes, and a plasma instability. However, few models have attempted to quantitatively calculate the characteristics of the Ridge. The wealth of data should help distinguish models for the production mechanism of the Ridge.

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