Contribution ID: **380** Type: **not specified**

Probing the Quark-Gluon Phase Transition with Correlations and Fluctuations in Heavy Ion Collisions from the STAR Experiment

Tuesday 28 July 2009 15:40 (25 minutes)

The measurement of particle correlations and fluctuations has been suggested as a method to search for the existence of a phase transition in relativistic heavy ion collisions. A change in the observed fluctuations is expected in global quantities such as baryon number, strangeness, or charge near a QCD critical point or a first order phase transition.

Results for short and long-range multiplicity correlations (forward-backward) are presented for several systems (Au+Au, Cu+Cu, and pp) and energies (e.g. $\sqrt{s_{NN}}$ = 200 and 62.4 GeV). For the highest energy central A+A collisions, the correlation strength maintains a constant value across the measurement region. In peripheral collisions, at lower energies, and in pp data, the maximum appears at midrapidity. Results for K/pi and p/pi fluctuations are also shown as a function of centrality and collision energy.

Comparison to models with short-range (HIJING) and both short and long-range interactions (Parton String Model) do not fully reproduce central Au+Au data. This result may indicate a reduction in number of particle sources for central Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV and the possible formation of high density matter.

Author: TARNOWSKY, Terence (Michigan State University)

Presenter: TARNOWSKY, Terence (Michigan State University)

Session Classification: Heavy Ions I

Track Classification: Heavy Ion Physics/Hot and Dense QCD