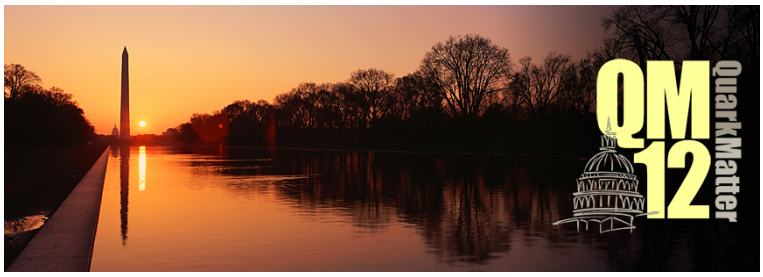

Contribution ID: **168** Type: **Oral Presentation**

Study of the Sixth Order Cumulant of Net-proton Distributions Measured in STAR at RHIC

Tuesday, August 14, 2012 5:25 PM (20 minutes)

In high-energy nuclear collisions, we study the properties of the excited nuclear matter with QCD degrees of freedom and search for the signals of the QCD phase transition. The ratios of the cumulants of conserved number distributions are sensitive to the correlation length of the system created in heavy-ion collisions, hence they are considered as good observables to study phase transitions. QCD based calculations suggests that the ratios of the sixth to second (C_6/C_2) order cumulants of the net baryon number distributions will change rapidly in the phase transition region of the QCD phase diagram. They are found to deviate considerably from predictions of the hadron resonance gas model which reproduce the fourth to second (C_4/C_2) order cumulants of the net proton number distributions at RHIC top energies.

The STAR experiment, with large and uniform acceptance and excellence in particle identification, is ideal to study the QCD phase structure. The data collected in 2010 and 2011 allow us to study the C_6/C_2 ratio. In this talk, we will present the ratio of the sixth to second order cumulants of net-proton multiplicity distributions from minimum biased Au+Au collisions at $\sqrt{s_{NN}}$ = 19.6, 27, 39, 62.4 and 200 GeV. Both protons and anti-protons are cleanly identified within $|y| < 0.5$ and 0.4$< p_T <$0.8 GeV/c by the STAR Time Projection Chamber. For beam energies above 39 GeV, the ratios are consistently close to but below unity, while they have larger values below 39 GeV. Some implications of the new results will be discussed within the context of Polyakov loop-extended-Quark-Meson (thermal model) and UrQMD (transport model) models.

Primary author: Ms CHEN, Lizhu (Central China Normal University)

Presenter: Ms CHEN, Lizhu (Central China Normal University)

Session Classification: Parallel 2C: Correlations & Fluctuations (Chair X. Dong)

Track Classification: Correlations and fluctuations