Contribution ID: **34**   Type: **not specified**

The renormalization group and quark number fluctuations near the chiral phase transition

Wednesday, 25 August 2010 14:00 (1 hour)

Thermodynamics and the phase structure of the Polyakov loop-extended chiral quark–meson model is explored beyond the
mean-field approximation. The analysis of the model is based on the functional renormalization group method at finite temperature and baryon density. We focus on net-quark number fluctuations as well as their higher moments and discuss the influence of non-perturbative effects and the gluon background on their properties near the chiral crossover transition. We relate the model predictions with lattice QCD results and with the first data on net proton fluctuations in Au-Au collisions obtained at RHIC by the STAR Collaboration.

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