



# XXIV QUARK MATTER DARMSTADT 2014

Contribution ID: 375

Type: Poster

## Conserved Charge Fluctuations and Susceptibilities in Strongly Interacting Matter

*Tuesday 20 May 2014 16:30 (2 hours)*

The conserved charge fluctuations, as quantified by the corresponding susceptibilities, provide important information about the charge-carriers and their dynamical correlations in strongly interacting matter such as the quark-gluon plasma. Using the gauge-gravity correspondence approach, we study the patterns of conserved charge fluctuations in two types of holographic models for QCD, the D4/D8 and the D3/D7 models. We compute and compare the quark number susceptibilities in both models and find an interesting common feature of the two: at very strong coupling higher order susceptibilities are suppressed and the conserved charge fluctuations become purely Gaussian. In light of the state-of-the-art lattice QCD results we also discuss what we can learn from these susceptibilities about the underlying degrees of freedom in the  $1 \sim 2T_c$  quark-gluon plasma and examine the viability of different ideas such as holography, quasi-particles, as well as bound states. From analysis of second order cross-flavor susceptibilities we conclude that the bound states exist and are important in the  $1 \sim 2T_c$  region. Based on that we have further constructed model with predictions for several ratios of fourth-order susceptibilities that are in good agreement with lattice QCD results.

Reference: Shuzhe Shi and Jinfeng Liao, JHEP06(2013)104[arXiv:1304.7752].

### On behalf of collaboration:

None

**Authors:** LIAO, Jinfeng (Indiana University); SHI, Shuzhe (Tsinghua University)

**Presenter:** SHI, Shuzhe (Tsinghua University)

**Session Classification:** Poster session

**Track Classification:** QCD at High Temperature and/or Density