

## **SU(3) Dual QCD Quark-hadron phase transition at finite temperature & chemical Potential**

*Tuesday, 17 October 2023 15:30 (20 minutes)*

A Dual QCD formulation for SU(3) color gauge has been developed in terms of dual gauge potentials and taking into account the local as well as topological structure of the color gauge group into its dynamics. For the purpose of examining the nonperturbative characteristics of QCD, the dynamical configuration of the resulting dual QCD vacuum and its flux tube configuration have been examined. The thermal behavior of the nonperturbative QCD vacuum has been investigated for exploring the dynamics of quark-hadron phase transition at finite chemical potential. Related thermodynamic quantities and equation of state (EoS) to characterize quark matter have also been discussed within the framework of dual QCD-based hadronic bag which guarantees the critical parameters and the associated critical points for quark-hadron phase transition. These thermodynamic quantities are expected to play important roles in understanding the order of quark-hadron phase transition and are likely to predict the features of a first-order quark-hadron phase transition for finite chemical potential. Moreover, we have investigated the bulk properties of quark matter by constructing the free energy change and the associated surface tension for quark-hadron phase transition. For consistency and compatibility check, we have also compared our results with state-of-the-art three-loop Hard Thermal Loop perturbative results and available lattice QCD results and in the process found reasonable agreements.

**Primary author:** PUNETHA, Garima (LSM Campus, Soban Singh Jeena University Almora Uttarakhand, India)

**Co-author:** BANDHOPADHYAY, Aritra

**Presenter:** PUNETHA, Garima (LSM Campus, Soban Singh Jeena University Almora Uttarakhand, India)

**Session Classification:** Section 1