

Contribution ID: 29

Type: not specified

## Exploring the QCD critical region in the QCD-like two flavor models

Friday 17 January 2014 14:25 (15 minutes)

We have calculated the phase diagram for exploring the critical behavior around the critical end-point (CEP) and located the chiral limit existence of the tri-critical point (TCP) in the  $\mu$  and T plane of the Polyakov loop extended Quark Meson Model (PQM) and the pure Quark Meson (QM) model which become effective Quantum-chromodynamics (QCD) like models due to the augmentation of the effective potential by the renormalized fermionic vacuum one loop fluctuation. These models yield the second order transition at  $\mu = 0$  on the temperature axis after incorporating the fermionic vacuum correction. The proximity of the TCP to the QCD critical end-point (CEP) has been quantified in the phase diagram. We have plotted the contours of appropriately normalized constant quark number susceptibility and scalar susceptibility around the CEP in different model scenarios. In order to investigate the qualitative as well as quantitative effect of the fermionic vacuum term and the Polyakov loop potential, on the critical behavior around CEP, we have compared the shape of these contours as obtained in different model calculations. Further, we have computed and compared the critical exponents resulting from the divergence of quark number susceptibility at the CEP in different model scenarios. The possible influence of the TCP on the critical behavior around CEP, has also been discussed. Finally, we plotted the temperature variation of the  $\sigma$  and  $\pi$  meson masses at  $\mu = 0$ ,  $\mu = \mu_{CEP}$  and  $\mu > \mu_{CEP}$  in different model scenarios and compared the emerging mass degeneration trend in the  $\sigma$  and  $\pi$ meson mass variations as the chiral symmetry gets restored at higher temperatures.

Author: TIWARI, Vivek Kumar (Allahabad University)