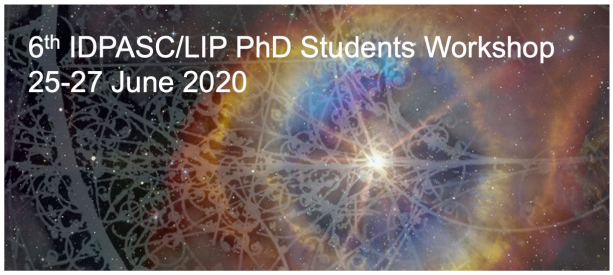

Contribution ID: **46** Type: **PhD student talk**

Functional renormalization group study of the critical region of the quark-meson model with vector interactions

Friday, 26 June 2020 10:40 (12 minutes)

The critical region of the two flavour quark-meson model with vector interactions is explored using the Functional Renormalization Group, a non-perturbative method that takes into account quantum and thermal fluctuations. Special attention is given to the low temperature and high density region of the phase diagram, which is very important to construct the equation of state of compact stars.
As in previous studies, without repulsive vector interaction, an unphysical region of negative entropy density is found near the first order chiral phase transition. We explore the connection between this unphysical region and the chiral critical region, especially the first order line and spinodal lines, using also different values for vector interactions. We find that the unphysical negative entropy density region appears because the $s = 0$ isentropic line, near the critical region, is displaced from its $T = 0$ location. For certain values of vector interactions this region is pushed to lower temperatures and high chemical potentials in such way that the negative entropy density region on the phase diagram can even disappear. In the case of finite vector interactions, the location of the critical end point has a non-trivial behaviour in the $T - \mu_B$ plane, which differs from that in mean field calculations.

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Session Classification: Session 5