



19th International Conference on QCD in Extreme Conditions (XQCD 2023)

Contribution ID: 95

Type: **Poster**

Renormalization group consistent treatment of neutral color-superconducting matter

Wednesday 26 July 2023 19:35 (25 minutes)

The phase diagram of dense matter relevant for neutron stars is typically studied with effective models. These models are nonrenormalizable and must be regularized in order to obtain finite results, leading to regularization artefacts near the cutoff. We study neutral dense matter in a three-flavour Nambu-Jona-Lasinio type model that includes a diquark interaction leading to the formation of color superconducting condensates at high densities. Regularizing the model, e.g. with a sharp three momentum cutoff, leads to a decrease of the color superconducting condensate at large baryon chemical potential. We show how this cutoff artefact can be cured in a renormalization group consistent way based on the scheme developed by Braun et al. We present the resulting phase diagram and give a short outlook on the implications for the neutron star equation of state.

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Session Classification: Poster session