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Renormalization Group Consistent treatment of NJL Color Superconductivity

The Nambu-Jona-Lasinio (NJL) model and specifically its extension to color superconductivity (CSC) is an effective model for investigating dense quark matter. However, the reliability of its results is challenged by cut-off artifacts emerging near cut-off energy scales. In this presentation, I focus on a Renormalization Group (RG) treatment that successfully eliminates these artifacts(arXiv number: 2408.06704). Our study reveals a substantial change in the previously established phase diagram of neutral CSC matter. The RG-consistent treatment not only eliminates cut-off artifacts but also aligns with an earlier Ginzburg-Landau analysis, suggesting the appearance of a so-called dSC phase in the Color-Flavor Locked (CFL) melting pattern. The new model offers improved phenomenological aspects of speed of sound, demonstrating reliability at higher densities, which is crucial for investigating potential CSC phases in neutron star mergers.

Category

Theory

Collaboration (if applicable)

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