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Superfluid vortices in dense quark matter

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Summary

Superfluid vortices in the color-flavor-locked (CFL) phase of dense quark matter are known to be energetically disfavored relative to well-separated triplets of so-called semi-superfluid color flux tubes. In this talk we will present results from our numerical stability analysis of superfluid vortices in dense quark matter. We identify (physical) regions of metastability/instability in the parameter space of the couplings of our effective theory. Furthermore, we discuss the structure of the unstable mode responsible for the decay in the case of vanishing gauge coupling. If a neutron star features a superfluid quark matter core, our analysis indicates that it is very likely that it would contain semi-superfluid vortices rather than superfluid vortices. We will point out possible implications of our results to neutron stars.

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