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Chiral and pion condensation in rotating strongly interacting matter

Summary

We investigate the influence of rotation on the chiral condensate in strongly interacting matter. We develop a self-consistent theoretical framework to study the inhomogeneous chiral condensate and the possible chiral vortex state in rotating finite-size matter in four-fermion interacting theories. For sufficiently rapid rotation, the ground state can be a chiral vortex state, a type of topological defect in analogy to superfluids and superconductors. The vortex state exhibits pion condensation, providing a new mechanism to realize pseudoscalar condensation in strongly interacting matter. In the presence of both rotation and a strong magnetic field, charged pion condensate can be formed.

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