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Chiral soliton lattice in dense matter under rotation

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We study anomaly-induced effects on dense QCD matter under rotation. We show that the chiral perturbation theory under rotation has the topological term that accounts for the chiral vortical effect. We find that, due to the presence of this new term, the ground state of QCD under rotation is the chiral soliton lattice (CSL) for the neutral pion or η' meson. This state is a periodic array of topological solitons which spontaneously breaks parity and continuous translational symmetries. In particular, the CSL for the η' meson is energetically more favorable than the QCD vacuum and that of the neutral pion when the baryon chemical potential is much larger than the isospin chemical potentials.

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