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Vortices in a Bose-Einstein Condensate with Dipolar Interactions
ZULEYHA OZTAS, CEM YUCE — We study an off-axis vortex in a rotating Bose-Einstein condensate with dipole-dipole interactions in the Thomas–Fermi (TF) limit. We derive analytic results for small vortex displacements from the trap center and perform numerical calculations for large displacements. We prove that in an oblate trap the dipolar interaction energy increases as the vortex moves away from the trap centre contrary to the case in a prolate trap. We show that the dipolar interactions reduce (raise) the precision velocity of an off-center straight vortex in an oblate (prolate) trap. We find that the angular velocity which is the onset of metastability is lowered in the presence of dipolar interactions in an oblate trap while it is raised in a prolate trap.

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