A vortex dipole in a trapped 2D Bose condensate

WEIBIN LI, MASUD HAQUE, STAVROS KOMINEAS, MPI-PKS Dresden, Germany — We study the dynamics and the stationary states of a vortex-antivortex pair in a two-dimensional Bose condensate in a circular trap. The dynamics of this system turns out to be surprisingly complicated, reflecting the nonlinearity of the underlying Gross-Pitaevskii equation. We use a combination of methods — a time-dependent variational calculation, explicit numerical solutions of the time-dependent and time-independent Gross-Pitaevskii equations, and an exact solution of the non-interacting case — to uncover the physics of the vortex dipole system.