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Dynamical Formation of Vortices in Cold Atom Collisions

The transfer of orbital angular momentum(OAM) and the dynamical evolution of vortices in non-relativistic superfluid are studies with Gross-Pitaeviskii Equation (GPE). The OAM can be initialized by a rotating BEC, or a non-central collision between two cold atom clouds in BEC. The stationary property as well as the dynamical formation and evolution of vortices and vortex-antivortex pairs are investigated in different situations. With high precision simulation, we demonstrate that the primary vortices can be considered as a basic degree of freedom in a system maintaining a sizable OAM, the primary vortices are generates in a process similar to the spin-orbital coupling.

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