

Quantum tornadoes: manipulating macroscopic quantum states in real time

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Constructing ultra-high finesse semiconductor microcavities produces quasiparticles called polaritons which can Bose condense even up to room temperature. The resulting macroscopic quantum states are directly visible and allow superflows to be imaged. Spontaneous oscillations, self-organised vortex lattices, and geometrical phase transitions are all part of the rich phenomena observed.

Recent references:

- [1] Nature Physics **8**, 190 (2012); G. Tosi et al., "Sculpting oscillators with light within a nonlinear quantum fluid"
- [2] Nature Communications **3**, 1243 (2012); G. Tosi et. al., "Geometrically locked vortex lattices in semiconductor quantum fluids"
- [3] Science **336**, 704 (2012); P. Cristofolini et al., "Coupling Quantum Tunneling with Cavity Photons"
- [4] Phys.Rev.Lett. **110**, 186403 (2013); P. Cristofolini et al., "Optical superfluid phase transitions and trapping of polariton condensates"