MAR15-2014-020066

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

Half-quantum flow of a polariton spinor condensate in a ring geometry[1]

DAVID SNOKE, University of Pittsburgh

We have created a macroscopic ring trap for exciton-polaritons with long lifetime, about 200 ps at resonance. In this trap we have obtained Bose condensation of the polaritons, as seen in the strongly peaked energy spectrum and in the phase coherence across the trap, with coherence length of at least 50 microns. Studies of the phase gradient of the ring condensate show that it spontaneously goes into a quantized circulation state, sometimes circulating one way, sometimes the opposite way. Because this is a spinor condensate, states with only a half quantum of angular momentum are possible, accompanied by a 180-degree rotation of the polarization angle between the two spinor states. The circulating states with lowest energy in our experiments have this property, and in addition, the sign of the spin flips from one side of the ring to the other, unlike the case of a standard "half-quantum vortex."

[1]Supported by the National Science Foundation under Grant No. DMR-1104383.