Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Topological and geometrical interactions between quantum vortices near zero temperature RAN CHENG, XIAO LI, QIAN NIU, University of Texas at Austin — With new velocity-dependent term discovered, various types of interactions between quantum vortices in 2-d superfluid Helium and BEC near zero temperature are unified via Berry Phase theory. Originated from the finite compressibility of the fluid, the topological statistical gauge field of an vortex breaks down to geometrical gauge field mediating local interactions. This new interaction modifies the cyclotron motion of a pair of identical vortices, and changes the pattern of orbits of a pair of vortex-antivortex. Damping effect due to finite temperature is treated phenomenologically, which does not invalidate our essential conclusions.

Ran Cheng
University of Texas at Austin

Date submitted: 19 Nov 2010 Electronic form version 1.4