Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Equation of Motion of a Quantum Vortex. TIMOTHY COX, University of British Columbia, PHILIP STAMP, University of British Columbia and the Pacific Institute of Theoretical Physics — Understanding the motion of vortices in quantum fluids is key to understanding the dynamics of such fluids. The motion of quantum vortices has long been understood in terms of the Hall-Vinen-Iordanski (HVI) equations. A fully quantum mechanical treatment of vortex motion in a two-dimensional Bose superfluid[1] leads to a modified version of the HVI equations which include significant history dependent forces and a fluctuating noise force. The dynamics deviates from that described by the HVI equations when the frequency of motion is higher than the temperature. We describe the consequences of the memory and noise for the motion of a single superfluid vortex as well as the circumstances under which their effects should be experimentally observable. [1] Thompson and Stamp, Phys Rev Lett. 108, 184501 (2012)

Timothy Cox
University of British Columbia, Vancouver

Date submitted: 06 Nov 2015 Electronic form version 1.4