Abstract Submitted for the DAMOP05 Meeting of The American Physical Society

Berry Phase in Semiclassical Dynamics of Bogoliubov Quasiparticles CHUANWEI ZHANG, ARTEM DUDAREV, Department of Physics and Center for Nonlinear Dynamics, The University of Texas, Austin, Texas 78712-1081, QIAN NIU, Department of Physics, The University of Texas, Austin, Texas 78712-1081 — We develop a semiclassical theory for Bogoliubov waves by following the motion of wave-packets in real and momentum spaces. Because of the interaction between atoms, the semiclassical dynamics of Bogoliubov quasiparticles are found to be modified by the Berry phase and are very different from single particle excitations in a noninteracting system. We use this semiclassical approach to study the scattering of phonons by a vortex in a superfluid and calculate the transverse as well as longitudinal forces on the vortex.

> Chuanwei Zhang Department of Physics and Center for Nonlinear Dynamics The University of Texas, Austin, Texas 78712-1081

Date submitted: 26 Jan 2005

Electronic form version 1.4