

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Normal modes of a ring-shaped BEC with vortices** SUNGJONG WOO, Univ of Mass Lowell, YOUNG-KYUN KWON, Kyung Hee University, Univ of Mass Lowell — Recently, a ring-shaped BEC was realized experimentally at NIST and long lasting perpetual current was observed. Using Bogoliubov-de Gennes equations, we have analyzed dynamics of such a non-simply connected rotating condensate system with quantized vortices. Surface modes of a simply connected rotating BEC are known to be associated with driven vortices that can make interactions with the vortex lattice that exists due to the rotation. In our current work, it has been found that stable vortex dipoles or velocity dipoles that do not exist in a normal mode for a simply connected BEC, exist in a non-simply connected case generating “inner” surface modes. The interactions of such inner surface modes with quantized vortices as well as the stability of the perpetual current related to the low lying excitations will be discussed. How the angular dispersion relation changes as a BEC makes a transition from a simply connected to a ring-shaped one will also be presented.

Sungjong Woo  
University of Massachusetts Lowell

Date submitted: 21 Nov 2008

Electronic form version 1.4