Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Thin Superconducting Rings and Cylinders in a Magnetic Field
ROBERT BEAIRD, DANIEL E. SHEEHY, ILYA VEKHTER, Louisiana State University — We examine the magnetic field dependence of the critical temperature (T_c) for a thin superconducting ring and thin- walled superconducting cylinder (of radius R), in the presence of a magnetic field (B). We include both the orbital effect and the Zeeman splitting of the quasiparticle bands. We derive a Ginzburg-Landau free energy functional and allow for the appearance of the spatially-modulated (Fulde-Ferrell-Larkin- Ovchinnikov) state. We explore the competition between the orbital effect and Zeeman splitting as a function of the ratio of R to the superconducting coherence length, the orientation of B with respect to the plane of the ring, and the Maki parameter (the ratio of the orbital and paramagnetic critical fields). We focus on the interplay of the periodicity and the overall suppression of T_c with applied B.

Robert Beaird
Louisiana State University

Date submitted: 18 Nov 2008 Electronic form version 1.4