Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Skyrmion Flux Lattices in p-wave Superconductors[1] QI LI, JOHN TONER, DIETRICH BELITZ, University of Oregon — In p-wave superconductors, topological excitations known as skyrmions are allowed, in addition to the usual vortices. In strongly type-II materials in an external magnetic field, a skyrmion flux lattice is expected to be energetically favored compared to a vortex flux lattice [1]. We analytically calculate the energy, magnetization curves ($B(H)$), and elasticity of skyrmion flux lattices in p-wave superconductors near the lower critical field H_{c1}, and use these results with the Lindemann criterion to predict their melting curve [2]. In striking contrast to vortex flux lattices, which *always* melt at an external field $H > H_{c1}$, skyrmion flux lattices *never* melt near H_{c1}. This provides a simple and unambiguous test for the presence of skyrmions. In addition, the internal magnetic field distributions (which are measurable by muon spin rotation techniques [3]) of skyrmion and vortex lattices are very different.

[1] A. Knigavko, B. Rosenstein, and Y.F. Chen, Phys. Rev. B **60**, 550 (1999).
[2] Qi Li, John Toner, and D. Belitz, cond-mat/0607391
[3] J.E. Sonier, J. Phys. Cond. Matt. **16**, S4499 (2004)

[1]This work was supported by the NSF under grant No. DMR-05-29966.

Qi Li
University of Oregon

Date submitted: 30 Oct 2006 Electronic form version 1.4