Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Helical phases in broken parity superconductors[1] RAMINDER KAUR, University of Wisconsin-Milwaukee, DANIEL AGTERBERG, University of Wisconsin-Milwaukee, KAORI TANAKA, University of Saskatchewan, PAOLO FRIGERI, ETH, Zurich, MANFRED SIGRIST, ETH, Zurich — The recently discovered broken inversion superconductors, $CePt_3Si$, Li_2Pt_3B, and Li_2Pd_3B, have provided a unique opportunity to study the role of broken parity in the superconducting state. In these superconductors, a magnetic field leads to a novel inhomogeneous superconducting state, a helical phase. Although the origin of the helical phase is quite different from another well known inhomogeneous superconducting phase, Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state, the consequences of both phases are similar, for example; a relative enhancement of transition temperature as a function of magnetic field over that of a uniform state. FFLO states are quite unstable and hard to observe experimentally as that exist only in the low temperature and high field regime. Until now, the FFLO state has only been identified in $CeCoIn_5$ as an unusual magnetic field enhanced superconducting state near a quantum critical point. We argue that the helical phases is more stable than the FFLO state and will exist in all broken parity superconductors. We present results on the microscopic quasiparticle structure and the stability of the helical phase in broken inversion superconductors.

[1]DMR-0381665 National Science Foundation

Raminder Kaur
University of Wisconsin-Milwaukee

Date submitted: 30 Nov 2005 Electronic form version 1.4