Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Effects of disorder in parity violating superconductors PAOLO FRIGERI, MANFRED SIGRIST, Theoretische Physik ETH-Hoenggerberg CH-8093 Zuerich, Switzerland, DANIEL AGTERBERG, Department of Physics, University of Wisconsin-Milwaukee, Milwaukee, WI 53201, AKIHISA KOGA, Department of Applied Physics, Osaka University, Suita, Osaka 565-0871, Japan — In materials without an inversion center of symmetry the spin degeneracy of the conducting band is lifted by spin orbit coupling (SOC). If the splitting of the non-degenerate quasi-particle energy spectrum is larger than the energy scale of the superconducting gap, i.e., $\alpha > k_B T_c$, only one spin-triplet pairing channel survives to the lack of the inversion symmetry. In the limit of larger α, i.e, $\alpha >> k_B T_c$, the spin susceptibility in case of spin-singlet and protected spin-triplet paring are similar, making it difficult to determine the pairing type through Knight shift measurements. However, Anderson's theorem concerning non-magnetic impurities still holds. This should make possible to discriminate experimentally at least between conventional and unconventional pairing. If the density of states at the Fermi level is different for the two non-degenerate bands, the spin-triplet and the spin-singlet pairing channels mix, modifying further the response of the system on disorder. The impurity dependence of the critical temperature, the spin susceptibility, and the paramagnetic limiting field have been studied using the Born approximation for various combinations of the pairing channels, and different distributions of the conduction electrons on the two non-degenerate bands.

Paolo Frigeri
Theoretische Physik ETH-Hoenggerberg CH-8093 Zuerich, Switzerland

Date submitted: 01 Dec 2004 Electronic form version 1.4