Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Magnetization-dependent T_c shift in F/S/F trilayers with strong ferromagnets ION C. MORARU, WILLIAM P. PRATT, NORMAN O. BIRGE, Michigan State University — Hybrid systems combining ferromagnetic (F) and superconducting (S) metals in contact exhibit a wide range of fascinating behaviors. Several experimental groups have used weak ferromagnetic alloys in F/S experiments to enhance the penetration of Cooper pairs into the ferromagnet. In an F/S/F trilayer structure, a difference in the critical temperature T_c, based on the mutual orientation of the outer ferromagnets, has been reported [1] in CuNi/Nb/CuNi. Systems with strong ferromagnets, on the other hand, present new challenges, due to the very different density of states and Fermi velocity for the two different spin bands. Using the strong ferromagnets Ni and NiFe (Permalloy) in F/S/F exchange-biased spin valves [2], we observe that the T_c for the parallel (P) orientation is lower than that of the anti-parallel (AP) case, i.e. T_c (P) $< T_c$ (AP). These results are consistent with theoretical expectations, but opposite to recent experimental work from another group where an inverse spin switch has been reported in a NiFe/Nb/NiFe structure [3]. [1] J. Y. Gu et al, Phys. Rev. Lett. 89, 267001 (2002). [2] I. C. Moraru et al., submitted for publication (2005). [3] A. Yu. Rusanov et al., cond-mat/0509156 (2005).

Ion C. Moraru
Michigan State University

Date submitted: 29 Nov 2005 Electronic form version 1.4