Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Spin polarization of the ferromagnetic semimetal EuB_6 XIAOHANG ZHANG, STEPHAN VON MOLNAR, PENG XIONG, Department of Physics and MARTECH, Florida State University, ZACH FISK, Department of Physics, University of California at Irvine — Much progress has been made recently in the understanding of the electronic properties of EuB_6. However, the details of the electronic structure remain controversial. Several band structure calculations have produced different degrees of conduction-valence band overlap for the two spin subbands. In particular, some calculations predict a half-metallic band structure, ie, 100% spin polarization at the Fermi level[1]. We have performed direct measurements of the spin polarization of EuB_6 crystals using Andreev reflection spectroscopy. Planar junctions of EuB_6/Pb were fabricated on crystals grown with an Al flux method. The conductance spectra were measured using phase-sensitive detection at several temperatures below T_C of Pb. The spectra are well-described by the spin-polarized BTK model. More than seven junctions were measured and a spin polarization of $55 \pm 10\%$ is obtained. Our results indicate that in ferromagnetic EuB_6 the electrons and holes at the Fermi level are not fully spin-polarized. This work was supported by a FSU Research Foundation PEG grant and NSF grant under DMR-0503360.
[1]J. Kunes and W.E. Pickett, PRB 69, 165111 (2004); M. Kreissle and W. Nolting, PRB 72, 245117 (2005).

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Date submitted: 16 Nov 2006 Electronic form version 1.4