

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Measurement of the spin polarization of the magnetic semiconductor EuS with zero-field and Zeeman-split Andreev reflection spectroscopy¹ CONG REN, J. TRBOVIC, J.G. BRADEN, R.L. KALLAHER, J.S. PARKER, P. SCHLOTTMANN, S. VON MOLNAR, P. XIONG, DEPARTMENT OF PHYSICS/MARTECH, FLORIDA STATE UNIVERSITY TEAM — Measurements of the spin polarization (\mathbf{P}) of doped EuS using zero-field and Zeeman-split Andreev reflection spectroscopy (ARS) on EuS/Al planar junctions are reported. EuS films (100nm thick) of different conductivities were grown via UHV electron-beam deposition at various substrate temperatures. A thin (7nm) Al film was used as the counterelectrode. The zero-field ARS spectra can be fit straightforwardly, with *zero* spectral broadening and expected gap values, to the spin-polarized BTK model. The fits consistently yield \mathbf{P} on the order of 80% regardless of the barrier strength. Moreover, we performed ARS in the presence of a Zeeman-splitting of the quasiparticle density of states in Al. The Zeeman-split ARS spectra are well described theoretically by combining the solution to the Maki-Fulde equations with the spin-polarized BTK analysis. The results have provided an independent verification of the validity of the zero-field ARS, and demonstrated the utility of field-split superconducting spectroscopy on Andreev junctions of arbitrary barrier strengths.

¹This work was supported by DARPA SPINS program.

Peng Xiong
Florida State University

Date submitted: 30 Nov 2005

Electronic form version 1.4