Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Time-resolved spectroscopy of electron spin dynamics in ZnO[1]
VANESSA SIH, SAYANTANI GHOSH, DAVID D. AWSCHALOM, Department of Physics, University of California, Santa Barbara, CA 93106, SEUNG-YOUNG BAE, SHAN WANG, Department of Materials Science and Engineering, Stanford University, Stanford, CA 94305, GEORGE CHAPLINE, SHEILA VAIDYA, Lawrence Livermore National Laboratory, Livermore, CA 94550 — The prediction of room temperature ferromagnetism in magnetically-doped wide band gap semiconductors has galvanized interest in using zinc oxide for spintronic applications. In addition, ZnO has small spin-orbit coupling and a naturally low abundance of nuclear spins, which is expected to contribute to long spin coherence times. Time-resolved Faraday rotation is used to monitor electron spin dynamics in commercially available bulk single crystal ZnO wafers and thin films grown by pulsed laser deposition on sapphire substrates[2]. Measurements are performed over a range of temperatures and magnetic fields, with spin coherence persisting to room temperature in both bulk and thin film samples. We investigate the role of intrinsic defects in ZnO on spin decoherence through a systematic comparison of thin films grown under varying oxygen partial pressures and bulk samples.

[1]Work supported by DARPA
[2]S. Ghosh, V. Sih, S. Y. Bae, S. Wang, G. Chapline, S. Vaidya and D. D. Awschalom, *in preparation* (2004)

Vanessa Sih
Department of Physics, University of California, Santa Barbara, CA 93106

Date submitted: 19 Nov 2004 Electronic form version 1.4