Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Current-Induced Spin Polarization in Gallium Nitride[1] W. KOEHL, C. POBLENZ, M.H. WONG, U. MISHRA, J. SPECK, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA 93106 — Recent experimental studies have shown that when a current is passed through certain non-centrosymmetric semiconductors (GaAs, ZnSe), a net spin polarization may be generated throughout the material. However, the physical mechanism responsible for this phenomenon, known as current-induced spin polarization (CISP), is still poorly understood but known to exist at high temperatures in wide-bandgap semiconductors. [1] In order to further explore the degree to which CISP depends on the band structure and spin lifetimes of a material, we measure the phenomenon in GaN, a wide-bandgap, non-centrosymmetric semiconductor. A series of n-type GaN epilayers are grown in the wurtzite phase via molecular beam epitaxy at a variety of doping densities chosen to modulate the transverse spin lifetime, T_2^*, across its full available range. Using the Kerr effect, CISP is then characterized in these epilayers as a function of excitation energy over a range of temperatures.

[1] N. P. Stern, S. Ghosh, G. Xiang, M. Zhu, N. Samarth, and D. D. Awschalom, *Phys. Rev. Lett.* **97**, 126603 (2006).

[1]Work supported by the NSF and ONR.

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Date submitted: 20 Nov 2007 Electronic form version 1.4