

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Ultrafast Coercivity Dynamics in GaMnAs¹ KIMBERLEY HALL, JEREMY ZAHN, SAMUEL MARCH, Dalhousie University, XINYU LIU, JACEK FURDYNA, University of Notre Dame — The hole-mediated ferromagnetism in III-Mn-V diluted magnetic semiconductors opens up a whole host of possibilities for future multifunctional devices. Control over the ferromagnetic properties in these materials through hole density modulation has been demonstrated using electrical gates [1] and CW optical excitation [2], and more recently using femtosecond optical excitation [3,4]. Using time-resolved magneto-optical Kerr Effect spectroscopy, we have measured the magnetization and coercivity dynamics in GaMnAs. Our experiments reveal a subpicosecond ferromagnetic to paramagnetic phase transition followed by coercivity enhancement on longer time scales. Our findings are promising for possible applications in ultrafast, nonthermal magneto-optical recording using diluted magnetic semiconductors. [1] H. Ohno et al., *Nature* 408, 944 (2000). [2] S. Koshihara et al., *Phys. Rev. Lett.* 78, 4617 (1997). [3] J. Wang et al., *Phys. Rev. Lett.* 95, 167401 (2005). [4] J. Wang et al., *Phys. Rev. Lett.* 98, 217401 (2007).

¹This research is supported by NSERC, CFI, and the Canada Research Chairs program.

Kimberley Hall
Dalhousie University

Date submitted: 27 Nov 2007

Electronic form version 1.4