Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Non-local spin transport devices with a tunable channel[1] J. MISURACA, J.-I. KIM, P. XIONG, S. VON MOLNAR, Department of Physics, Florida State University, K.K. MENG, J. LU, J.H. ZHAO, Institute of Semiconductors, Chinese Academy of Sciences — The spin lifetime in GaAs is known to vary strongly with carrier density near the metal to insulator transition [1]. However, a detailed study to optimize this lifetime is complicated because many replica samples need to be made and measured. This difficulty can be circumvented by employing Si:$Al_{0.3}Ga_{0.7}As$, a persistent photoconductor, as the spin transport medium. This material, which is structurally similar to GaAs, has been characterized and shown to have an effective carrier density which can be tuned *in situ* via photo-excitation from 10^{14} to 10^{18} cm^{-3}[2]. Heterostructures (2-μm Si:$Al_{0.3}Ga_{0.7}As$, a thin epitxial Fe layer, and a GaAs graded junction to create linear contacts between them) have been grown by MBE and non-local spin devices have been patterned by photolithography and wet etching. Magnetic measurements on Fe micro-patterns demonstrated the possibility of controlling the coercivity of the Fe electrodes [3]. Electrical characterization of the devices will be presented. [1] J. Kikkawa et al., Phys. Rev. Lett. 80, 4313 (1998) [2] J. Misuraca et al., Phys. Rev. B. 82, 125202 (2010) [3] K. K. Meng et al., Appl. Phys. Lett. 97, 072503 (2010).

[1]This work is supported by NSF DMR-0908625 and NSFC 10920101071.

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Date submitted: 14 Dec 2010 Electronic form version 1.4