

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Confinement engineering of s-d exchange interactions in GaMnAs quantum wells¹ N.P. STERN, R.C. MYERS, M. POGGIO, A.C. GOSSARD, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA 93106 — Recent measurements of coherent electron spin dynamics have observed antiferromagnetic *s-d* exchange coupling between conduction band electrons and electrons localized on Mn²⁺ impurities in GaMnAs quantum wells ². Here we discuss systematic measurements of the *s-d* exchange interaction in Ga_{1-x}Mn_xAs/Al_yGa_{1-y}As quantum wells with different confinement potentials using time- resolved Kerr rotation spectroscopy. Extending previous investigations of the well width dependence of the *s-d* exchange, $N_0\alpha$, we find that the magnitude of the exchange parameter, $N_0\alpha$, varies as a function of both well width and well depth (y). Both phenomena reduce to a general dependence on confinement energy, which is well-fit to a model taking into account the effect of kinetic exchange and band mixing on the exchange parameters.

¹Work supported by DARPA, ONR, NSF, and the Fannie and John Hertz Foundation.

²R. C. Myers, M. Poggio, N. P. Stern, A. C. Gossard, and D. D. Awschalom, *Phys. Rev. Lett.* **95**, 017204 (2005).

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Date submitted: 29 Nov 2005

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