Abstract Submitted
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Mn ion spin dynamics in GaMnAs quantum wells[1] R.C. MYERS, M.H. MIKKELSEN, N.P. STERN, A.C. GOSSARD, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA 93106 — We investigate the spin precession of Mn ions within highly diluted GaMnAs-AlGaAs quantum wells grown by molecular beam epitaxy at intermediate temperatures [2]. An exciton bound to the neutral Mn acceptor (A^0_{Mn}) emits photons at an energy red-shifted from the free exciton emission, thus providing selective optical access to the Mn acceptors within the quantum wells. We observe that the Mn emission can be efficiently oriented using circularly polarized excitation, becoming increasingly efficient for narrow line width excitations close to the exciton absorption edge. In addition, Hanle effect measurements in the quantum wells reveal that the optically-induced polarization of the Mn emission tracks a sharp Lorentzian as a function of magnetic field in the Voigt geometry. We calculate the spin lifetime of the neutral Mn acceptor complex from the width of the Hanle curves and observe an exponential increase in the lifetime with decreasing Mn concentration.

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

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