

Abstract Submitted
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Dynamic polarization of Mn spins coupled to vertical optical cavities¹ G. CALUSINE, R.C. MYERS, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, California — Single magnetic spins in semiconductors can exhibit long lifetimes and are electrically controllable due to coupling of their spin states with those of the host semiconductor. In particular, Mn ions doped into GaAs quantum wells have spin lifetimes ~ 10 nanoseconds and can be optically manipulated in zero magnetic field². To study this system in the low density limit, we incorporate a distributed Bragg reflector optical cavity around the Mn containing wells, which enhances Mn luminescence and allows spatial isolation of a small number of Mn ions imaged using scanning micro-photoluminescence. In such structures, we observe unusually long Mn $T_2^* > 60$ ns. We discuss the effect of cavity coupling on spin dynamics Mn ions in the single ion limit.

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²R. C. Myers, M. H. Mikkelsen, J.-M. Tang, A. C. Gossard, M. E. Flatté, and D. D. Awschalom, *Nature Materials* **7**, 203 (2008).

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