

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Coupling single bright spins with channels of intermediate dark spins in diamond¹ FELIX M. MENDOZA, RONALD HANSON, RYAN J. EPSTEIN, DAVID D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA 93106 — The nitrogen-vacancy (N-V) center in diamond has garnered interest as a room-temperature solid-state system not only for exploring electronic and nuclear spin phenomena but also as a candidate for spin-based quantum information processing. Recent experiments reveal the coupling of a single bright electron spin of an N-V center to small numbers of dark electron spins of nitrogen defects in its immediate vicinity, not otherwise detected in luminescence². We explore the possibility of utilizing this magnetic dipole coupling between bright and dark spins to couple two spatially separated single N-V center spins by means of intermediate dark nitrogen spins. The angle-resolved magneto-photoluminescence microscopy technique is extended to simultaneously detect a pair of single N-V centers a few microns apart.

¹This work was supported by AFOSR, DARPA/MARCO, DARPA/CNID and ARO.

²R.J. Epstein, F.M. Mendoza, Y.K. Kato and D.D. Awschalom, *Nature Physics* **1**, 94 (2005)

Felix M. Mendoza
Center for Spintronics and Quantum Computation,
University of California, Santa Barbara, CA 93106

Date submitted: 29 Nov 2005

Electronic form version 1.4