

Abstract Submitted
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Spin interactions in InAs quantum dots M.F. DOTY, M.E. WARE, E.A. STINAFF, M. SCHEIBNER, A.S. BRACKER, D. GAMMON, I.V. PONOMAREV, T.L. REINECKE, Naval Research Laboratory, V.L. KORENEV, A.F. Ioffe Physical Technical Institute — Fine structure splittings in optical spectra of self-assembled InAs quantum dots (QDs) generally arise from spin interactions between particles confined in the dots. We present experimental studies of the fine structure that arises from multiple charges confined in a single dot [1] or in molecular orbitals of coupled pairs of dots. To probe the underlying spin interactions we inject particles with a known spin orientation (by using polarized light to perform photoluminescence excitation spectroscopy experiments) or use a magnetic field to orient and/or mix the spin states. We develop a model of the spin interactions that aids in the development of quantum information processing applications based on controllable interactions between spins confined to QDs. [1] Polarized Fine Structure in the Photoluminescence Excitation Spectrum of a Negatively Charged Quantum Dot, *Phys. Rev. Lett.* 95, 177403 (2005)

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