Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Dynamical Nuclear Polarization via Triplet States in Self-Assembled Quantum Dot Molecules S. C. BADESCU, D. KIM, A. S. BRACKER, D. GAMMON, T. L. REINECKE, Naval Research Laboratory, Washington DC — Recent experiments on self-assembled quantum dot molecules used molecular trion states to initialize and measure optically the electron spin in one of the dots [1]. The key to this experiment is the anticrossing of two electron-triplet states in a magnetic field in Faraday configuration, which is due to spin-orbit coupling and electron-hole exchange. The experimental spin initialization and readout plots exhibit bifurcation and hysteresis features attributable to nuclear polarization. Here we present results for these effects from a model accounting for the feedback between the dynamical nuclear polarization and the electron spin states in the two dots, determined by the optical pumping and the asymmetric exchange. We explain the correlations between the nuclear polarizations in each of the dots and the asymmetry between the nuclear effects for the two measured electron states. [1] D. Kim et al, Phys. Rev. Lett. **101** (2008)

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Date submitted: 21 Nov 2008 Electronic form version 1.4