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T₁ spin lifetimes in n-doped quantum wells and dots JOHN COLTON, KEN CLARK, DANIEL CRAFT, JANE CUTLER, DAVID MEYER, TYLER PARK, Brigham Young University — We have used a pump probe technique to measure T_1 spin lifetimes in n -type GaAs quantum wells and InAs self-assembled quantum dots. The circularly polarized pump laser pulse aligns the spins; the linearly polarized probe laser pulse probes the spin states of the selected well (or dots) via the Kerr (or Faraday) effect at some later time. Results for the quantum well sample include a spin-filling effect that depends on the direction from which the probe laser wavelength approaches that of the well, and spin lifetimes ranging from 50 to 2000 ns (depending on temperature and field conditions). The InAs quantum dots, doped such that each dot has approximately one extra electron, display T_1 lifetimes longer than 5 ms at 1 T and 1.5 K.

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