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Measurement of the Spin Relaxation Time T_1 of Single Electrons in a Silicon MOS-Based Quantum Dot[1] MING XIAO, MATTHEW HOUSE, HONGWEN JIANG, UCLA — Spin relaxation time T_1 is an important measure of the interaction between a two-level quantum system and its environment. Measurement of T_1 for individual electrons in silicon based quantum dots has been long awaited. In this talk, we present such a measurement in an electrostatically-confined quantum dot (QD) on Si MOS based materials. Excited-state spectroscopy of the QD was performed using a charge sensing technique for identifying energy levels. T_1 was subsequently measured in the time-domain with a pump-and-probe method. We measured T_1 for spin-flip transitions between two magnetic field induced Zeeman sublevels and between singlet-triplet states, for an odd and even number of electrons respectively. For the QD that contains an unpaired spin, we found that T_1 depended strongly on the applied field. Possible mechanisms leading to the observed spin relaxation will be discussed.

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