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**Measurement of the electron spin relaxation time in a silicon quantum dot using single-shot readout** J.R. PRANCE, C.B. SIMMONS, B.J. VAN BAEL, TECK SENG KOH, ZHAN SHI, D.E. SAVAGE, M.G. LAGALLY, R. JOYNT, MARK FRIESEN, S.N. COPPERSMITH, M.A. ERIKSSON, University of Wisconsin-Madison — Electron spins in Si/SiGe quantum dots are promising candidates as qubits for quantum information processing, because spins in silicon couple weakly to the host material. We present a measurement of the spin lifetime for electrons in a silicon quantum dot. The spin state of individual electrons is measured using single-shot charge readout and spin-to-charge conversion: only spin-up electrons will tunnel off the quantum dot. Charge sensing is performed with an integrated quantum point contact that detects single electron tunnel events as steps in current. We determine the relaxation time by measuring the fraction of measurements that contain spin-up tunneling events as a function of the time that the electron spins are held on the quantum dot. We observe a clear decay in this spin-up fraction versus time, and an exponential fit yields $T_1 \sim 2.8$ seconds at a magnetic field of 1.85 T.

J. R. Prance
University of Wisconsin-Madison

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