

Abstract Submitted
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Measurement of the Spin Relaxation Lifetime (T_1) in a One-Electron Strained-Si Accumulation-Mode Quantum Dot EDWARD CROKE, MATTHEW BORSELLI, ANDREY KISELEV, PETER DEELMAN, IVAN MILOSAVLJEVIC, IVAN ALVARADO-RODRIGUEZ, RICHARD ROSS, ADELE SCHMITZ, MARK GYURE, ANDREW HUNTER, HRL Laboratories, LLC — We report measurements of the spin-relaxation lifetime (T_1) as a function of magnetic field in a strained-Si, accumulation-mode quantum dot. An integrated quantum-point contact (QPC) charge sensor was used to detect changes in dot occupancy as a function of bias applied to a single gate electrode. The addition spectra we obtained are consistent with theoretical predictions starting at $N=0$. The conductance of the charge sensor was measured by applying an AC voltage across the QPC and a 3 k Ω resistor. Lifetime measurements were conducted using a three-pulse technique consisting of a load, read, and flush sequence. T_1 was measured by observing the decay of the spin bump amplitude as a function of the load pulse length. We measured decay times ranging from approximately 75 msec at 2T to 12 msec at 3T, consistent with previous reports and theoretical predictions. Sponsored by United States Department of Defense. Approved for Public Release, Distribution Unlimited.

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