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Real-time readout and lifetime measurements of single-triplet states in a Si/SiGe double quantum dot JONATHAN PRANCE, ZHAN SHI, University of Wisconsin-Madison, CHRISTIE SIMMONS, Massachusetts Institute of Technology, DON SAVAGE, MAX LAGALLY, University of Wisconsin-Madison, LARS SCHREIBER, LIEVEN VANDERSYPEN, Kavli Institute of Nanoscience, TU Delft, MARK FRIESEN, ROBERT JOYNT, SUE COPPERSMITH, MARK ERIKSSON, University of Wisconsin-Madison — The singlet and triplet states of a two-electron double quantum dot can be used as the basis for a logical qubit that combines fast gating and robust readout via Pauli spin blockade. We present measurements of the lifetimes of these states in a Si/SiGe double dot at magnetic fields between 1T and 0T [1]. The lifetimes are found by analyzing the statistics of repeated single-shot measurements of the spin state of the system. This technique allows multiple relaxation processes to be observed simultaneously. At zero magnetic field we find that all four spin states have lifetimes of approximately 10ms. With increasing magnetic field the lifetimes of the S and T0 states show no noticeable change, while the lifetime of the T- state rises, reaching 3 seconds at 1T. [1] J. R. Prance, et al., e-print: arxiv.org/abs/1110.6431

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