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Coherent Singlet-Triplet Oscillations in a Silicon-based Double Quantum Dot BRETT MAUNE, MATTHEW BORSELLI, BIQIN HUANG, THADDEUS LADD, PETER DEELMAN, KEVIN HOLABIRD, ANDREY KISELEV, IVAN ALVARADO-RODRIGUEZ, RICHARD ROSS, ADELE SCHMITZ, MARKO SOKOLICH, CHRISTOPHER WATSON, MARK GYURE, ANDREW HUNTER, HRL Laboratories LLC — We have performed coherent spin manipulation of a singlet-triplet qubit in a Si/SiGe double quantum-dot device fabricated in an undoped heterostructure. A charge stability diagram showed that the (0,0) charge state was reached and Pauli spin blockade was detected at the (1,1)-(0,2) anticrossing. A singlet-triplet splitting of $\sim$140 μeV in the (0,2) charge state provided a readout window sufficiently wide for singlet-triplet discrimination. We used the S/T$_-$ spin funnel, Rabi oscillation, and T_2* pulsing experiments to measure (1,1) exchange energies spanning $\sim$0.6-700 neV over a large detuning range and measured a T_2* of 360 ns, consistent with theoretical expectations for our device. Sponsored by the United States Department of Defense. Approved for Public Release, Distribution Unlimited. The views expressed are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

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