Abstract Submitted
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Entanglement of Two Singlet-Triplet Qubits[1] MICHAEL SHULMAN, OLIVER DIAL, SHANNON HARVEY, Harvard University, HENDRIK BLUHM, RWTH Aachen University, VLADIMIR UMANSKY, Weizmann Institute of Science, AMIR YACOBY, Harvard University — Semiconductor spin qubits are promising candidates for quantum computation because of their potential for scalability. However, their weak interaction with the environment, which leads to long coherence times, makes two-qubit operations challenging. We perform the first two-qubit operation between singlet-triplet qubits. The two qubit operation relies on the capacitive coupling between two adjacent qubits to generate a CPHASE gate. In order to combat low frequency noise we use a dynamically decoupled gate that maintains the two-qubit coupling while decoupling each qubit from its fluctuating environment. Using state tomography we measure the two-qubit density matrix and show that the operation produces the expected state. We extract a concurrence of 0.44 and a Bell state fidelity of 0.72, each providing definitive proof of entanglement.

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