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Resonant Microwave Control of a Symmetric Exchange-Only Spin Qubit[1] J. MEDFORD, Harvard University, J. BEIL, Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen, J. M. TAYLOR, Joint Quantum Institute, NIST, H. LU, A. C. GOSSARD, Materials Department, University of California, Santa Barbara, C. M. MARCUS, Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen — We demonstrate two-axis control of an exchange-only spin qubit in a GaAs triple quantum dot using a resonant microwave excitation. The qubit is operated in a regime where two separate exchange interactions are active simultaneously, suppressing leakage out of the qubit subspace and providing some immunity to charge noise. Spectroscopic probes of the qubit reveal that the resonance frequency can be adjusted between 100 MHz and 1.5 GHz with a voltage applied to the middle quantum dot. We find a coherence time $T_2 \sim 20$ μs for a 64 pulse Carr-Purcell-Meiboom-Gill dynamical decoupling sequence. Finally, analysis of the coherence time for multiple sequences reveals a power spectrum $S(\omega) \sim \omega^{-0.9}$, which suggests that the fluctuating Overhauser fields are not the dominant source of dephasing in this system.

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