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Effect of exchange interaction on spin dephasing in a double quantum dot[1] EDWARD LAIRD, JASON PETTA, ALEX JOHNSON, Harvard University, AMIR YACOBY, Weizmann Institute of Science, CHARLES MARCUS, Harvard University, MICAH HANSON, ART GOSSARD, University of California, Santa Barbara — We use a pulsed-gate technique to study mixing of singlet and triplet spin states in a two-electron double quantum dot with a tunable exchange interaction. Spin dynamics in this system are governed by the interplay of exchange (which tends to preserve spin correlations) and hyperfine interaction with the lattice nuclei (which tends to destroy them.) When the two interaction strengths are comparable, we observe saturation of dephasing and damped temporal oscillations, persisting well beyond the hyperfine dephasing time, of the spin correlator. Both features of the data show good agreement with predictions from a quasistatic model of the hyperfine field.

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