Composite pulse sequences for robust universal control of singlet-triplet qubits[1] LEV S. BISHOP, Joint Quantum Institute and Condensed Matter Theory Center, University of Maryland, College Park, XIN WANG, EDWIN BARNES, JASON P. KESTNER, KAI SUN, SANKAR DAS SARMA, Condensed Matter Theory Center, University of Maryland, College Park — We consider composite pulse sequences for the exchange interaction in singlet-triplet qubits, in the presence of a finite magnetic field gradient (producing a term in the Hamiltonian similar in magnitude to the exchange interaction). We find pulse sequences achieving arbitrary rotations on the Bloch sphere, for which there is no first-order term in the error arising from fluctuations of the magnetic field gradient. We quantify the range of experimental parameters where our composite sequences can outperform naive uncorrected sequences.

Lev S. Bishop
Joint Quantum Institute and Condensed Matter Theory Center,
University of Maryland, College Park

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