

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Composite pulse sequences for Z-rotations robust against small magnetic field gradient in singlet-triplet qubits¹ XIN WANG, EDWIN BARNES, LEV S. BISHOP, JASON P. KESTNER, KAI SUN, SANKAR DAS SARMA, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park — We design piecewise composite pulse sequences of the exchange interaction in singlet-triplet qubits, suitable for achieving a Z-rotation along the Bloch sphere of arbitrary angle under the influence of a small stray magnetic field gradient. We explicitly show that upon appropriately choosing the pulse parameters, the error arising from the magnetic field gradient can be canceled at least to the third order. Examining the error as a function of the magnetic field gradient, we estimate the magnitude of fluctuation in the magnetic field gradient that can be tolerated under certain quantum error correction threshold.

¹This work is supported by IARPA, LPS-CMTC and CNAM.

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Date submitted: 27 Nov 2011

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