Gate-set tomography on two coupled transmons[1] MARCUS SILVA, DIEGO RISTE, COLM RYAN, Raytheon BBN Technologies, ERIK NIELSEN, KENNETH RUDINGER, ROBIN BLUME-KOHOUT, Sandia National Laboratories — Gate set tomography (GST) is a high-accuracy method of reconstructing the evolution of a quantum register [Blume-Kohout et al., arXiv:1310.4492 and Blume-Kohout et al., arXiv:1605.07674]. We describe the implementation of GST on two coupled transmon qubits. The ideal gate set includes single-qubit gates and an entangling gate locally equivalent to a CNOT. The analysis shows good agreement with predictions from theoretical models of our system – including the effects of coherent errors, which serve to illustrate important differences between average infidelity and diamond norm error rates. Finally, we describe how to mitigate these errors for improved performance.

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