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Sensitivity to electronics error in coupled double quantum dot qubits ERIK NIELSEN, RICHARD MULLER, MALCOLM CARROLL, Sandia National Laboratories — Reducing the effects of electronics control error in double quantum dot (DQD) quantum bits (qubit) is a central challenge to the creation of a solid-state quantum computing architecture. We investigate a system of capacitively coupled DQDs which implement a variant of the controlled phase gate when using each DQD as a singlet-triplet qubit. We identify regimes in which the gate action is more robust to sources of noise such as error around the applied bias point due to electronics or charge noise. Energy spectra are found using a configuration interaction (CI) method that accurately captures the (2,0) configuration of the DQD system, which is important for operating in these potentially low-noise regimes. This work was supported by the Laboratory Directed Research and Development program at Sandia National Laboratories. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin company, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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