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Adiabatically-controlled two-qubit gates using quantum dot hybrid qubits ADAM FREES, University of Wisconsin-Madison, Madison, WI 53706, JOHN KING GAMBLE, Center for Computing Research, Sandia National Laboratories, Albuquerque, NM 87123, MARK FRIESEN, S. N. COPPERSMITH, University of Wisconsin-Madison, Madison, WI 53706 — With its recent success in experimentally performing single-qubit gates, the quantum dot hybrid qubit is an excellent candidate for two-qubit gating. Here, we propose an operational scheme which exploits the electrostatic properties of such qubits to yield a tunable effective coupling in a system with a static capacitive coupling between the dots. We then use numerically calculated fidelities to demonstrate the effect of charge noise on single- and two-qubit gates with this scheme. Finally, we show steps towards optimizing the gates fidelities, and discuss ways that the scheme could be further improved. This work was supported in part by ARO (W911NF-12-0607) (W911NF-12-R-0012), NSF (PHY-1104660), ONR (N00014-15-1-0029). The authors gratefully acknowledge support from the Sandia National Laboratories Truman Fellowship Program, which is funded by the Laboratory Directed Research and Development (LDRD) Program. Sandia is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the US Department of Energy's National Nuclear Security Administration under Contract No. DE-AC04-94AL85000.

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