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Progress towards two double-dot qubits in Si/SiGe: quadruple quantum dots RYAN H. FOOTE, DANIEL R. WARD, University of Wisconsin-Madison, DOHUN KIM, University of Wisconsin-Madison, Seoul National University, BRANDUR THORGRIMSSON, LUKE SMITH, D. E. SAVAGE, M. G. LAGALLY, MARK FRIESEN, S. N. COPPERSMITH, M. A. ERIKSSON, University of Wisconsin-Madison — We present the fabrication and electrical characterization of two types of gate-defined quadruple quantum dot devices formed in Si/SiGe heterostructures. We compare two designs, one which uses three layers of tightly overlapping gates and is similar to the work found in [1], and one which uses only two layers of gates and has significantly more open space between neighboring gates [2]. We demonstrate charge-state conditional quantum oscillations in the more open device, we compare the tunability of both devices with each other, and we discuss the implications of these measurements on a path towards larger numbers of coupled quantum dot qubits. This work is supported in part by ARO (W911NF-12-1-0607), NSF (DMR-1206915, PHY-1104660), ONR (N00014-15-1-0029) and the Department of Defense. Development and maintenance of the growth facilities used for fabricating samples supported by DOE (DE-FG02-03ER46028). DK acknowledges support from the Korea Institute of Science and Technology Institutional Program (Project No. 2E26681). This research utilized facilities supported by the NSF (DMR-0832760, DMR-1121288). [1] D. M. Zajac *et al.*, *Appl. Phys. Lett.* **106**, 223507 (2015). [2] D. R. Ward *et al.*, *npj Quant. Inf.* **2**, 16032 (2016).

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