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Coulomb Blockade in Double Top Gated Si MOS Nano-Structures with Integrated Charge Sensing E.P. NORDBERG, University of Wisconsin - Madison, G.A. TEN EYCK, Sandia National Laboratories, H.L. STALFORD, University of Oklahoma, R.P. MULLER, R.W. YOUNG, K. ENG, L.A. TRACY, K.D. CHILDS, Sandia National Laboratories, J.R. WENDT, R.K. GRUBBS, J. STEVENS, M.P. LILLY, Sandia National Laboratories, M.A. ERIKSSON, University of Wisconsin - Madison, M.S. CARROLL, Sandia National Laboratories — Measurements of Si-MOS quantum dots with an open lateral non-collinear geometry are discussed. Periodic, single-period Coulomb blockade is observed. The measured gate-to-dot capacitances are consistent with 3D finite element calculations of the capacitance matrix for a lithographically defined quantum dot, indicating that the quantum dot confinement potential is dominated by the lithographically patterned gates and not by disorder. We report characterization of some of the critical process steps, and we correlate low disorder behavior with a quantitative defect density. We also present charge-sensing measurements of the quantum dot using a nearby disordered constriction. The sensitivity of the charge sensing is as high as a 3% change in current due the change of one electron occupation in the sensed quantum dot. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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