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Double quantum dot with tunable coupling in an enhancement-mode silicon metal-oxide semiconductor device with lateral geometry
L.A. TRACY, R.W. YOUNG, G.A. TEN EYCK, K. ENG, K.D. CHILDS, J.R. WENDT, R.K. GRUBBS, J. STEVENS, M.P. LILLY, M.S. CARROLL, Sandia National Labs, E.P. NORDBERG, Sandia National Labs; University of Wisconsin-Madison, C. BORRAS PINILLA, Universidad Industrial de Santander-Colombia, H.L. STALFORD, Sandia National Laboratories; University of Oklahoma-Norman, M.A. ERIKSSON, University of Winsconsin-Madison — We present transport measurements of a tunable silicon metal- oxide-semiconductor double quantum dot device with lateral geometry. Experimentally extracted gate-to-dot capacitances show that the device is largely symmetric under the gate voltages applied. Intriguingly, these gate voltages themselves are not symmetric. Comparison with numerical simulations indicates that the applied gate voltages serve to offset an intrinsic asymmetry in the physical device. We also show a transition from a large single dot to two well isolated coupled dots, where the central gate of the device is used to controllably tune the interdot coupling.
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