Characterization of accumulation-mode Si/SiGe triple quantum dots

T. M. HAZARD, D. M. ZAJAC, X. MI, S. S. ZHANG, J. R. PETTA, Department of Physics, Princeton University — The transition from quantum dots fabricated from doped Si/SiGe quantum wells to undoped accumulation-mode structures has greatly improved the performance of few-electron quantum dots. Our accumulation-mode devices are reconfigurable and allow for operation as single, double, or triple quantum dots. In these devices, we measure typical charging energies $E_c = 5.7$ meV, orbital excited state energies as large as $E_o = 2.9$ meV, and valley splittings of up to $E_v = 80 \mu$eV. With the device configured as a triple quantum dot, we easily reach the (1,1,1) charge configuration. The gate architecture allows the interdot tunnel coupling to be tuned over a wide range, which is important for operation as an exchange-only spin qubit.

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