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Dispersive Readout of a Few-Electron Double Quantum Dot with Fast rf Gate-Sensors[1] ALICE MAHONEY, JAMES COLLESS, JOHN HORNIBROOK, ANDREW DOHERTY, DAVID REILLY, ARC Centre of Excellence for Engineered Quantum Systems, School of Physics, The University of Sydney, Sydney, NSW 2006, Australia., HONG LU, ART GOSSARD, Materials Department, University of California, Santa Barbara, California 93106, USA. — We report the dispersive charge-state readout of a double quantum dot in the few-electron regime using the *in situ* gate electrodes as sensitive detectors. We benchmark this gate-sensing technique against the well established quantum point contact (QPC) charge detector and find comparable performance with a bandwidth of $\sim$ 10 MHz and an equivalent charge sensitivity of $\sim 6.3 \times 10^{-3}$ e/$\sqrt{\text{Hz}}$. Dispersive gate-sensing alleviates the burden of separate charge detectors for quantum dot systems and promises to enable readout of qubits in scaled-up arrays.

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