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Single-shot readout of accumulation mode Si/SiGe spin qubits using RF reflectometry CHRISTIAN VOLK, FREDERICO MARTINS, FILIP MALINOWSKI, CHARLES M. MARCUS, FERDINAND KUEMMETH, Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen, 2100 Copenhagen, Denmark — Spin qubits based on gate-defined quantum dots are promising systems for realizing quantum computation. Due to their low concentration of nuclear-spin-carrying isotopes, Si/SiGe heterostructures are of particular interest. While high fidelities have been reported for single-qubit and two-qubit gate operations, qubit initialization and measurement times are relatively slow. In order to develop fast read-out techniques compatible with the operation of spin qubits, we characterize double and triple quantum dots confined in undoped Si/Si_{0.7}Ge_{0.3} heterostructures using accumulation and depletion gates and a nearby RF charge sensor dot. We implement a RF reflectometry technique that allows single-shot charge read-out at integration times on the order of a few μ s. We show our recent advancement towards implementing spin qubits in these structures, including spin-selective single-shot read-out.

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