Abstract Submitted
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Spectroscopy of a many-electron InAs spin-orbit qubit[1] J. STEHLIK, M.D. SCHROER, K.D. PETERSSON, M. JUNG, J.R. PETTA, Department of Physics, Princeton University, Princeton, NJ 08544, USA — The ability to perform arbitrary single spin rotations is a crucial ingredient for solid state quantum computation using electron spins. However, achieving rapid and selective single spin rotations has been challenging. Strong spin-orbit materials are very promising in this regard, as the spin-orbit interaction can turn a periodic electric driving field into an effective oscillating magnetic field through a process called electric dipole spin resonance (EDSR). In this work we explore EDSR in an InAs nanowire spin-orbit qubit. The qubit is implemented using a many-electron double quantum dot (DQD) and is configured in Pauli-blockade, where electron transport is highly sensitive to processes that rotate spin. We use EDSR to probe the detailed level structure of the DQD. We find a strong current response in several regions of the parameter space, raising the prospects for fast spin rotations.

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