

Abstract Submitted
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Exchange-controlled single-spin rotations in quantum dots

WILLIAM COISH, DANIEL LOSS, University of Basel — We show theoretically that arbitrary coherent rotations can be performed quickly (with a gating time ~ 1 ns) and with high fidelity on the spin of a single electron confined to a quantum dot using exchange. These rotations can be performed using experimentally proven techniques for rapid exchange control, without the need for spin-orbit interaction or ac electromagnetic fields. We expect that implementations of this scheme would achieve gate error rates on the order of $\eta \sim 10^{-3}$, within reach of several known error-correction schemes.

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