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Leakage of The Quantum Dot Hybrid Qubit in The Strong Driving Regime[1] YUAN-CHI YANG, MARK FRIESEN, S. N. COPPERSMITH, Univ of Wisconsin, Madison — Recent experimental demonstrations of high-fidelity single-qubit gates suggest that the quantum dot hybrid qubit is a promising candidate for large-scale quantum computing. The qubit is comprised of three electrons in a double quantum dot, and can be protected from charge noise by operating in an extended sweet-spot regime. Gate operations are based on exchange interactions mediated by an excited state. However, strong resonant driving causes unwanted leakage into the excited state. Here, we theoretically analyze leakage caused by strong driving, and explore methods for increasing gate fidelities.

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