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Fighting noise from the Si/SiO2 interface with optimal control
KEVIN YOUNG, DYLAN GORMAN, K. BIRGITTA WHALEY, University of California - Berkeley — Electron donors in Si offer an attractive route to scalable quantum computation. When positioned close to the Si/SiO2 interface, however, donors are subject to strong decoherence due to, eg. coupling to trapped paramagnetic defects. These defects generate 1/f type dephasing noise. This system possesses a large asymmetry in the amplitude and phase relaxation times, T1 and T2, of the donor. We present a technique for the construction of numerically optimized pulse sequences designed to exploit this asymmetry to maximize the coherence of an arbitrary quantum state. Our results compare favorably to other dynamical decoupling procedures.

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