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*Quantum control for high-fidelity multi-qubit gates*

Quantum control for error correction is critical for the practical use of quantum computers. We address quantum optimal control for single-shot multi-qubit gates by framing it as a feasibility problem for the Hamiltonian model that is then solved with standard global optimization software. Our approach yields faster high-fidelity ( $>99.99\%$ ) single-shot three-qubit-gate control than obtained previously, and it has also enabled us to solve the quantum-control problem for a fast high-fidelity four-qubit gate.