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**Gap protection and dynamical decoupling for reliable multi-qubit gates<sup>1</sup>**

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We propose a scheme for producing multi-qubit gates by adiabatically shuttling an electron between donors in silicon to produce operations that are diagonal in the computational basis. Exploiting the commutation of these diagonal operations, we can use single-qubit refocusing gates to cancel the sensitivity to low-frequency noise and details of the shuttling. This strategy of cancelling unwanted portions of an adiabatic process to build up robust multi-qubit operations could be applied to other systems.

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