

Abstract Submitted
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Optimizing Adiabaticity in NMR JONATHAN VANDERMAUSE, CHANDRASEKHAR RAMANATHAN, Dartmouth College — We demonstrate the utility of Berry's superadiabatic formalism for numerically finding control sequences that implement quasi-adiabatic unitary transformations. Using an iterative interaction picture, we design a shortcut to adiabaticity that reduces the time required to perform an adiabatic inversion pulse in liquid state NMR. We also show that it is possible to extend our scheme to two or more qubits to find adiabatic quantum transformations that are allowed by the control algebra, and demonstrate a two-qubit entangling operation in liquid state NMR. We examine the pulse lengths at which the fidelity of these adiabatic transitions break down and compare with the quantum speed limit.

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