

Quantum Physics

Large Scale Quantum Computation in an Anharmonic Linear Ion Trap

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We propose a large-scale quantum computer architecture by stabilizing a single large linear ion chain in a very simple trap geometry. By confining ions in an anharmonic linear trap with nearly uniform spacing between ions, we show that high-fidelity quantum gates can be realized in large linear ion crystals under the Doppler temperature based on coupling to a near-continuum of transverse motional modes with simple shaped laser pulses.

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