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Anharmonic Traps for Scalable Quantum Information Processing with Trapped Ions[1] S. KORENBLIT, E.E. EDWARDS, K. KIM, K.R. ISLAM, L. LUO, J.D. STERK, T.A. MANNING, M.-S. CHANG, C. MONROE, JQI, University of Maryland Department of Physics and National Institute of Standards, G.-D. LIN, L.-M. DUAN, Focus Center and MCTP, Department of Physics, University of Michigan, D. STICK, M.G. BLAIN, Sandia National Laboratories, J. AMINI, R.E. SLUSHER, Signature Technology Laboratory, Georgia Tech Research Institute —
We report progress towards scalable quantum information processing using a linear crystal of 171Yb+ ions. Anharmonic traps can stably hold large numbers of nearly equally spaced ions. We implement novel, multi-segment micro- and surface-traps. These architectures may allow us to perform large-scale quantum computations and quantum simulations of systems that are classically intractable.

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