

Abstract Submitted
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Multi-color, Multi-path Optical Beam Steering Utilizing High Performance MEMS Mirrors¹ CALEB KNOERNSCHILD, CHANGSOON KIM, Duke University, FELIX LU, Applied Quantum Technologies, JUNGSANG KIM, Duke University — Scaling current atomic based quantum computer experiments beyond individual gate operations requires an efficient means of distributing laser resources across an array of trap sites. Micro-electromechanical system (MEMS) technology can provide the scalability and flexibility in an optical beam steering system to effectively share multiple, independent lasers among trap sites within a 1D or 2D qubit array. Controllable micro mirrors with broadband reflective metal coatings enable concurrent multi-wavelength beam steering along multiple beam paths as well as wavelength multiplexing along the same beam path. We demonstrate a MEMS based beam steering system that addresses 49 locations in a 7x7 array with two separate wavelengths at 635 nm and 780 nm. This system features switching speeds between lattice sites of 4 μ s and -29 dB residual optical intensity at neighboring array locations.

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