

Abstract Submitted
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A compact system for single site atom loading of a neutral atom qubit array¹ BRAD DINARDO, JILA, University of Colorado, Boulder, STEVEN HUGHES, ColdQuanta, Inc, STERLING MCBRIDE, JOEY MICHALCHUK, SRI International Sarnoff, DANA Z. ANDERSON, JILA, University of Colorado, Boulder — We present progress towards single atom loading from a magneto optical trap reservoir to a bottle beam (BoB) array trap site for use in quantum computation. Our procedure involves vertically transporting cesium atoms via a moving molasses MOT from a 3D MOT chamber into a six sided, AR-coated, high optical access UHV science chamber. The cesium atoms are to be horizontally displaced 100 μm to a 7 x 7 array of blue-detuned BoB traps. Displacement of the atoms will be accomplished by means of a moving standing wave dipole trap. The single-site loading experiment will take place in the Atomic Qubit Array Cell (AQuA Cell) which is a compact, high performance UHV system that utilizes new miniature silicon and glass ion pump technology. The entire AQuA Cell is 0.6 liters. The cell, cooling, and transport optomechanics is incorporated in a package occupying about 0.028 cubic meters.

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