

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Line generated 2D grid for neutral atom trapping¹ MARTIN LICHTMAN, MARK SAFFMAN, University of Wisconsin-Madison — A phase-insensitive light field is desirable for stably trapping neutral atoms for quantum computing. Techniques are presented for creating a rectilinear array of atom trapping sites using holographically shaped beams with a gaussian profile in one transverse dimension, and a top-hat line profile in the other transverse dimension. This line generated grid creates an inherently 2D trap array at the focal plane, so that a low-crosstalk addressable qubit register may be implemented. The light field is projected from only one direction, and is insensitive to phase fluctuations and to misalignment in 2 degrees of freedom. This technique creates traps with depth twice that of previous singly-projected designs. Preliminary results for an 81-site cesium qubit register are presented.

¹Work supported by the IARPA MQCO program.

Martin Lichtman
University of Wisconsin-Madison

Date submitted: 27 Jan 2015

Electronic form version 1.4