

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

AQuA: A 2D array of Rydberg coupled atomic qubits¹ KARA MALLER, MARTIN LICHTMAN, ALEX CARR, MICHAL PIOTROWICZ, TIAN XIA, LARRY ISENHOWER, MARK SAFFMAN, Univ of Wisconsin, Madison — We are developing a 2D array of optically trapped single atom qubits for quantum computation experiments. We demonstrate stochastic loading of an average of 30 Cs atom qubits in a 49 site array with $3.8 \mu\text{m}$ site to site spacing. Parallel qubit rotations are performed with microwaves and site selective single qubit gates are demonstrated using focused beams of two-frequency Raman light. Single qubit gate fidelity is characterized with randomized benchmarking. Using Rydberg excitation and blockade we demonstrate conditional phase shifts of pairs of trapped atoms and will report on progress towards running quantum algorithms in the array.

¹This work was supported by IARPA through ARO.

Mark Saffman
Univ of Wisconsin, Madison

Date submitted: 31 Jan 2014

Electronic form version 1.4