Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Defect-Free 2D Arrays of Several Hundred ^{87}Rb Atoms in Optical Tweezers[1] TOUT WANG, Harvard University and Gordon College, HARRY LEVINE, ALEXANDER KEESLING, GIULIA SEMEGHINI, AHMED OMRAN, SEPEHR EBADI, DOLEV BLUVSTEIN, MARKUS GREINER, Harvard University, VLADAN VULETIC, Massachusetts Institute of Technology (MIT), MIKHAIL LUKIN, Harvard University — Neutral atoms trapped in optical tweezer arrays have become a compelling platform for quantum simulation and quantum information processing. Recent experiments from our group have demonstrated the entanglement of up to 20 atoms and the implementation of high-fidelity multi-qubit gates via Rydberg excitations in defect-free 1D arrays of ^{87}Rb. Recently, we have expanded our experimental capabilities to be able to produce large, defect-free arrays of several hundred atoms in programmable 2D geometries. I will describe our latest experiments with these 2D arrays of atoms, and discuss the possibilities for quantum simulation and quantum computation with this platform.

[1]Financial support from CUA, NSF, Vannevar Bush Faculty Fellowship, DOE, ONR, NDSEG, MPHQ, and Hertz Foundation

Tout Wang
Harvard University and Gordon College

Date submitted: 31 Jan 2020 Electronic form version 1.4