

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Progress towards realization of a Quantum Matter Synthesizer

GUSTAF DOWNS, JONATHAN TRISNADI, CHENG CHIN, James Franck Institute, Enrico Fermi Institute, and Department of Physics, University of Chicago — We present our recent progress towards building a new type of optical lattice experiment. Once completed, the Quantum Matter Synthesizer (QMS) will be able to load atoms into a far-detuned lattice projected through a high numerical aperture objective lens, image the atomic distribution and cool the atoms to the vibrational ground state, and then dynamically turn off and rearrange lattice sites to achieve the desired filling fraction and spin order. We will achieve this dynamically rearrangeable lattice by forming our 2D optical potential with Digital Micromirror Devices (DMD). Here we report the performance of our MOT and initial dRSC, our scheme for transporting atoms from our chamber into our high-resolution imaging glass cell, and our structural design for stabilizing and isolating critical optical components near the glass cell as well as science goals.

Gustaf Downs

James Franck Institute, Enrico Fermi Institute, and Department of Physics, University of Chicago

Date submitted: 29 Jan 2016

Electronic form version 1.4