Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Investigating the Influence of the Talbot Effect on Novel 2D Atomic Dipole Trap Arrays for Use in Quantum Computing SERGIO AGUAYO, KATHARINA GILLEN-CHRISTANDL, California Polytechnic State University, San Luis Obispo — Many configurations of atomic dipole traps have been achieved with interesting applications in molecular, atomic, and biological physics. Our goal is to identify and characterize dipole trap configurations, in particular two-dimensional arrays of traps, that could be useful for quantum computing. Candidates are an array of Gaussian beams [1], a projected array of pinholes [2], or a projected array of opaque spots. In this project, we computationally investigate the onset and the influences of the Talbot effect on the trap array formed by passing a laser beam through masks with different arrangements of pinholes. We vary the distance between pinholes, the radius of the pinholes, the number of pinholes, etc. By exploring these options, we hope to make progress towards viable atomic dipole trap arrays which can be used in quantum computers. [1] Piotrowicz et al., Phys. Rev. A 88, 013420 (2013), [2] K. Gillen-Christandl, et al., Phys. Rev. A 82, 063420 (2010).

Katharina Gillen-Christandl
California Polytechnic State University, San Luis Obispo

Date submitted: 01 Feb 2019 Electronic form version 1.4