

Abstract Submitted  
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**Enhancement of Rydberg-atom trapping efficiency in a ponderomotive optical lattice using lattice translations**<sup>1</sup> SARAH E. ANDERSON, GEORG RAITHEL, University of Michigan — We present experimental results on the one-dimensional trapping of cold <sup>85</sup>Rb Rydberg atoms in a ponderomotive optical lattice of laser wavelength 1064 nm. The challenge associated with this red-detuned lattice is that locations of potential minima in the ground state correspond to potential maxima in the Rydberg state. When ground state atoms in the lattice are excited to Rydberg states, they are located near potential maxima, and consequently trapping is limited. We present a method to overcome this difficulty by translating the lattice by  $\lambda/4$  immediately after excitation, thus bringing the locations of the potential minima in the Rydberg state to the locations of the atoms. We report experimental microwave spectroscopy results that confirm this lattice phase-shift technique as an effective method to enhance the lattice's trapping efficiency.

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