

Abstract Submitted  
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**Strong Optical Force Measurements Using Adiabatic Rapid Passage**<sup>1</sup> DAN STACK, JOHN ELGIN, HAROLD METCALF, Stony Brook University — Adiabatic Rapid Passage (ARP) is most robust in the parameter domain  $\Omega_0 \sim \delta_0 \gg \omega_m \gg \gamma$  where  $\Omega_0$ ,  $\delta_0$ , and  $\omega_m$  are the Rabi frequency, sweep range, and sweep rate respectively. Previous experimental work<sup>2</sup> has shown that very strong, long range optical forces can be produced on the  $2^3\text{S} \rightarrow 2^3\text{P}$  transition in He through the use of ARP sequences in an unconventional parameter domain. These optical forces rely on the coherent momentum exchange between the atoms and the light field. We expand on this work to include the use of independent counter propagating optical beams which allow for increased control of the experimental parameters, such as Doppler detuning to simulate the velocity of moving atoms. We present our experimental setup and our investigation of the velocity dependence of this large optical force.

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<sup>2</sup>X. Miao et al., Phys. Rev. A **75**, 011402 (2007).

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