

Abstract Submitted  
for the DAMOP12 Meeting of  
The American Physical Society

**Velocity Dependence of the Optical Force Produced by Adiabatic Rapid Passage**<sup>1</sup> DANIEL STACK, JOHN ELGIN, PETR M. ANISIMOV, HAROLD METCALF, Stony Brook University, Stony Brook, NY 11794-3800 — Adiabatic Rapid Passage (ARP) produces optical forces much larger than the ordinary radiative force, and is thought to work best when  $\Omega_0 \sim \delta_0 \gg \omega_m \gg \gamma$ , where  $\Omega_0$ ,  $\delta_0$ ,  $\omega_m$ , and  $\gamma$  are the Rabi frequency, sweep range, sweep rate, and natural decay rate respectively. We have observed strongly enhanced ARP forces on the  $2^3S_1 \rightarrow 2^3P_2$  transition of He outside of this parameter range with our improved apparatus described previously.<sup>2</sup> Our independent counter-propagating, chirped pulses allow greater freedom in the choice of relative beam parameters so we can detune the beams to simulate atomic motion. We will present our new data on the velocity dependence of the ARP force and compare these with our calculations.<sup>3</sup>

<sup>1</sup>Supported by ONR.

<sup>2</sup>D. Stack et al., Bull. Am. Phys. Soc. **56**, 153 (2011)

<sup>3</sup>D. Stack et al., Phys. Rev. A, **84**, 013420 (2011)

Harold Metcalf  
Stony Brook University, Stony Brook, NY 11794-3800

Date submitted: 30 Jan 2012

Electronic form version 1.4