

Abstract Submitted  
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**Velocity Dependence of the ARP Force**<sup>1</sup> BRIAN ARNOLD, YIFAN FANG, HAROLD METCALF, Physics Dept., Stony Brook University, Stony Brook NY 11794-3800 — The optical force on atoms from coherent momentum exchange using adiabatic rapid passage (ARP) has been shown to be much larger than the usual radiative force<sup>2</sup>. To gauge its broader utility, we are measuring its velocity dependence,  $F(v)$ . We counterpropagate two beams from phase-locked lasers, perpendicular to an atomic beam, and measure the deflection of atoms out of the beam. The atomic velocity  $v$  is simulated by oppositely detuning these lasers by  $\pm\delta = \pm kv$  where  $k \equiv 2\pi/\lambda$ . We have been surprised to find that  $F(v)$  is asymmetric about  $v = 0$ , and are investigating a number of explanations for this observation. We further test the utility of the ARP force by measuring  $F(v)$  over a range of interaction times.

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

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