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Phase Stability and the Velocity Dependence of the ARP Force[1]
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— Adiabatic Rapid Passage (ARP) has been shown to produce optical forces much stronger than the usual radiative force.[2] Recent work[3] has found that the ARP force is very sensitive to the phase of the optical field. Thus, the use of two free running, oppositely detuned lasers is not the ideal way to achieve an accurate measurement of the velocity dependence by mimicking the Doppler shift. We believe that phase locking the two lasers to a third, master laser will address these phase concerns, thereby allowing a proper measure of the velocity dependence. We have implemented this in our experiment and will present the results obtained from this change. We will also compare these results to those obtained using independent lasers and comment on the implications.

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[2]X. Miao, Phys. Rev. A 75, 011402 (2007).
[3]J. Elgin, *Study of the Velocity Dependence of the Adiabatic Rapid Passage (ARP) Optical Force in Helium.* Ph.D Thesis, Stony Brook University, 2015.

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