

Abstract Submitted  
for the DAMOP10 Meeting of  
The American Physical Society

**Multi-species atom interferometry**<sup>1</sup> CATHERINE KLAUSS, IVAN HROMADA, WILLIAM HOLMGREN, VINCENT LONIJ, ALEX CRONIN, University of Arizona, Department of Physics — Our nanograting atom interferometer now works with Na, K, and Rb atom beams. We also have studied diffraction of Li, Sr, and He\* in the same apparatus. Comparing results from several atomic species provides new scientific opportunities. We measured ratios of atomic polarizabilities ( $\alpha_{\text{K}}/\alpha_{\text{Na}}$ ,  $\alpha_{\text{Rb}}/\alpha_{\text{Na}}$ , and  $\alpha_{\text{Rb}}/\alpha_{\text{K}}$ ) each with 0.3% uncertainty. We also measured the ratios of van der Waals atom-surface interaction strengths ( $C_3$  values) for Na, K, and Rb with 3% uncertainty. Many sources of systematic uncertainty such as atomic velocity or surface geometry are common-mode and cancel out when reporting these ratios. Our measurements with a multi-species atom interferometer therefore serve as improved tests of atomic structure calculations.

<sup>1</sup>This work was supported by the NSF

Catherine Klauss  
University of Arizona dept. of Physics

Date submitted: 22 Jan 2010

Electronic form version 1.4