Multi-species atom interferometry\textsuperscript{1} 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\textsuperscript{*} in the same apparatus. Comparing results from several atomic species provides new scientific opportunities. We measured ratios of atomic polarizabilities \((\alpha_{\text{K}}/\alpha_{\text{Na}}, \alpha_{\text{Rb}}/\alpha_{\text{Na}}, \text{ and } \alpha_{\text{Rb}}/\alpha_{\text{K}})\) 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.

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