Abstract Submitted
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State of the art in Van der Waals atom-surface potential measurements[1] VINCENT LONIJ, CATHY KLAUSS, WILL HOLMGREN, ALEX CRONIN, University of Arizona — Van der Waals and Casimir-Polder potentials are the dominant interactions between charge-neutral objects at nano- to micrometer length scales. As such they have attracted considerable interest in the field of nanotechnology. Understanding of these potentials is important in searches for new forces such as deviations from Newtonian potentials at very short length scales and vacuum friction. We have recently made significant advances in precision measurements of the Van der Waals atom-surface potential strength (C3). Using either interferometer or diffraction experiments we are able to determine the interaction strength (C3) between an atom and a nano-grating with a precision of 6%. This is a factor of 5 improvement over previous diffraction experiments. We also report ratios of C3 for different atoms with a precision of better than 3%. At this level of precision we are sensitive to the contribution of core electrons in the atom as well as the geometry of the surface. We have already been able to set an upper limit on the magnitude of non-newtonian potentials for lithium that is competitive with previous limits.

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