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Lithium tune-out measurement using light-pulse atom interferometry ERIC COPENHAVER, KAYLEIGH CASSELLA, University of California, Berkeley, ROBERT BERGHAUS, Darmstadt University of Technology, HOLGER MLLER, University of California, Berkeley — With only three electrons, lithium is a testbed for rigorously comparing measurements of atomic parameters to theoretical calculations using ab initio wave functions. A precision measurement of lithium's tune-out wavelength - at which the dynamic polarizability vanishes and the AC Stark shifts from nearby transitions cancel - can inform approximation methods employed in calculations of the dynamic polarizability. Lithium may also be used as an accurate reference species for measurements of the dynamic polarizability in co-trapped atomic species whose values are less precisely known. Here, we present progress towards a sub-ppb measurement of the 671-nm tune-out wavelength in lithium-7 using light-pulse atom interferometry. For our thermal cloud, in which the velocity spread is much larger than the recoil speed, we cannot directly address a single arm of the interferometer as is conventional. We instead pursue a new method in which a beam irradiates the center of cloud between two pairs of $\pi/2$ pulses. Opposite phase shifts on opposite sides of the beam center impose a spatial pattern on the cloud, reversing sign as the irradiation is tuned through the tune-out wavelength.

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