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**A Fast Ramsey-Bordé Interferometer with Cold Lithium** ERIC COPENHAVER, KAYLEIGH CASSELLA, HOLGER MUELLER, University of California, Berkeley — We demonstrate light-pulse interferometry with bosonic lithium in both Mach-Zehnder and Ramsey-Bordé geometries. We capture 12 million Li-7 atoms at 200 $\mu$K and build a fast interferometer with ($\sim$ 100 ns) stimulated Raman pulses and short interrogation times (tens to hundreds of microseconds). We achieve approximately 20% of the maximum fringe contrast, which is limited to 25% by non-interfering atomic trajectories. The contrast decays at a rate consistent with the limit set by thermal expansion out of the Raman beam. The signal in a Ramsey-Bordé interferometer scales inversely with mass and highlights the advantage of interferometry with light atoms like lithium. This allows for a measurement of the fine structure constant with shorter interrogation times than interferometers based on heavier atoms. Additionally, fast interferometers may have applications in the detection of high frequency signals resulting from exotic physics.

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