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Large Momentum Separation Contrast Interferometry with Yb Bose-Einstein condensates[1] KATHERINE MCALPINE, DANIEL GOCHNAUER, BENJAMIN PLOTKIN-SWING, SUBHADEEP GUPTA, University of Washington — Using standing-wave light pulses on a Yb Bose-Einstein condensate (BEC) source, we demonstrate a symmetric three-path contrast atom interferometer with large momentum separation of up to 112 photon recoils between outer paths [1]. The interferometer phase evolution is quadratic with number of recoils, reaching a rate as large as 7×10^7 radians/s. In addition to the symmetric geometry and narrow-momentum BEC source, the observed phase stability and robust scalability depends crucially on the suppression of undesired diffraction phases through a careful choice of atom optics parameters. We will discuss our theoretical model for these phases and compare to experimental results for various pulse parameters. We will also discuss the applicability of our method towards a new measurement of the fine-structure constant and a test of quantum electrodynamics.
[1] B. Plotkin-Swing et al, arXiv:1712.06738

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Katherine Mcalpine
Univ of Washington

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