Abstract Submitted
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Shaken lattice interferometry CARRIE WEIDNER, HOON YU, DANA ANDERSON, Univ of Colorado - Boulder/JILA — In this work, we report on progress towards performing interferometry using atoms trapped in an optical lattice. That is, we start with atoms in the ground state of an optical lattice potential $V(x) = V_0 \cos[2kx + \phi(t)]$, and by a prescribed phase function $\phi(t)$, transform from one atomic wavefunction to another. In this way, we implement the standard interferometric sequence of beam splitting, propagation, reflection, reverse propagation, and recombination. Through the use of optimal control techniques [1], we have computationally demonstrated a scalable accelerometer that provides information on the sign of the applied acceleration. Extension of this idea to a two-dimensional shaken-lattice-based gyroscope is discussed. In addition, we report on the experimental implementation of the shaken lattice system. [1] Palao, J.P, *et.al.* PRA 77, 063412, (2008).

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