

Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

A precision measurement of atomic recoil frequency using grating¹ MATTHEW WEEL, SCOTT BEATTIE, IAIN CHAN, ERIC ROTBERG, A. KUMARAKRISHNAN, York University — We have used a time domain atom interferometer to measure the atomic recoil frequency to a precision of 2.5 parts per million by manipulating trapped ^{85}Rb atoms in the $F=3$ ground state. Our studies confirm that the measurement is insensitive to a range of common systematic effects such as AC Stark shifts, strength of the atom field coupling, magnetic fields, field gradients and the distribution of atoms in the magnetic sub-levels of the ground state. The measurement is in excellent agreement with the recoil frequency inferred from previous measurements of transition wavelength and the atomic mass. Our studies suggest that significant improvements can be achieved in an atomic fountain. We also discuss measurements of gravity and sensitivity to magnetic field gradients.

¹Work Supported by CFI, OIT, PRO, NSERC and York University

Matthew Weel

Date submitted: 28 Jan 2005

Electronic form version 1.4