Abstract Submitted for the DAMOP05 Meeting of The American Physical Society

Photon Recoil Momentum in Dispersive Media GRETCHEN K. CAMPBELL, AARON E. LEANHARDT, JONCHUL MUN, MICAH BOYD, ERIK STREED, WOLFGANG KETTERLE, DAVID E. PRITCHARD, MIT — We have measured a systematic shift of the photon recoil momentum due to the index of refraction of a dilute gas of atoms. The recoil frequency was measured with a two pulse light grating interferometer using near resonant laser light. By measuring the resulting frequency as a function of the laser detuning, we found a distinctive dispersive shape for  $\omega_{rec}$  that fit the recoil momentum as  $n\hbar k$ , where n is the index of refraction of the gas. For high atomic densities, this shift can have a significant effect on atom interferometers, and is of particular importance for precision measurements of h/m with cold atoms.

Gretchen Campbell MIT

Date submitted: 28 Jan 2005

Electronic form version 1.4