Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Atom Localization Beyond the Diffraction Limit Using EIT JARED MILES, ZACHARY SIMMONS, DENIZ YAVUZ, Univeristy of Wisconsin in Madison — The diffraction limit sets a minimum size for regions that can be resolved or addressed using light. We demonstrate an experiment where excitation of atoms to a specific hyperfine level is confined to ∼100nm wide bands, about 8 times smaller than the excitation wavelength. The technique uses the nonlinear power dependence of EIT to coherently transfer atoms only near the nodes of a standing wave. Increasing the standing wave intensity can produce vanishingly small low-intensity areas about the nodes and as a result atomic transfer occurs only in very narrow bands. Since regions smaller than the diffraction limit cannot be directly imaged, confirmation of narrowing is provided by an autocorrelation measurement technique. The experiment is performed using ^{87}Rb atoms trapped in an optical dipole trap and utilizes ∼100ns EIT pulses.

Jared Miles
Univeristy of Wisconsin in Madison

Date submitted: 28 Jan 2013 Electronic form version 1.4