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Atomic State Localization using EIT in Cold Atoms[1] ZACH SIMMONS, NICHOLAS PROITE, DENIZ YAVUZ, University of Wisconsin Madison — We present a proof-of-principle experiment in which the population of an atomic level is spatially localized using EIT. We exploit the nonlinear dependence of atomic level transfer on the ratio of probe and coupling powers in EIT. By employing a spatially varying coupling beam, it is possible to localize an atomic state to only where the coupling beam nearly vanishes. In a Rb MOT experiment, we demonstrate this by showing that the population of a specific hyperfine level is localized to a region much smaller than the spatial period of the applied sinusoidally varying coupling beam. This technique shows promise for manipulating atoms at sub-wavelength and possibly nanometer spatial scales, with potential important applications in quantum computing and high resolution imaging.

[1]support from AFOSR

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