

Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Technique for Rapid Raman Spectrography of Cold Alkali Vapors.¹ FREDRIK FATEMI, MATTHEW TERRACIANO, ZACHARY DUTTON, MARK BASHKANSKY, Naval Research Laboratory — We demonstrate a simple technique for single-shot imaging of magnetic sublevel distributions in cold atoms. The technique relies on velocity-selective stimulated Raman transitions in a magnetic field. The Raman transitions couple sublevels between the two hyperfine manifolds so that each possible transition pathway is resonant only for a specific velocity. Cold atoms expanding from a magneto-optical trap are exposed to a brief (~ 1 ms) counterpropagating pulse in a lin-perp-lin configuration. Ballistic expansion of the atom sample separates the atoms according to their velocities, so that the each sublevel's population is easily observed using fluorescence imaging from cycling transition light. We demonstrate this technique for a variety of optical pumping configurations in both Rb85 and Rb87.

¹Supported by ONR and DARPA.

Fredrik Fatemi
Naval Research Laboratory

Date submitted: 23 Jan 2009

Electronic form version 1.4