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Raman Spectroscopy Using a Tilted 2D MOT[1] JONATHAN M. KWOLEK, ERIN KNUTSON, St. Mary's College of Maryland, FRANK A. NARDUCCI, EO Sensors Division - US Naval Air Systems Command — We demonstrate Raman spectroscopy using a cold and continuous beam of Rubidium atoms from a vapor-loaded, tilted two-dimensional magneto optical trap (2D MOT). The atoms emerge through a pinhole into an ultra-high vacuum chamber, and form a cold and slow moving beam of atoms with flux 10^9 atoms/sec with a most probable velocity of 10 m/s. The atoms travel across a set of laser beams which include an on-resonant state preparation beam, a beam tuned to drive a stimulated Raman transition, and another on-resonant readout beam. We observed Raman spectra which can include as many as 11 peaks. The width of the clock transition is consistent with the transit time of the atoms through the Raman fields. The width of the magnetic transitions is determined by laboratory magnetic noise. We have measured Rabi cycling on the clock transition using Raman beams in a co-propagating geometry by varying the laser power rather than pulse duration. Further developments will be made by introducing a momentum kick by using Raman beams in a counter-propagating geometry.

[1]Office of Naval Research

Jonathan Kwolek
St. Mary's College of Maryland

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