

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Frequency-Comb Velocity-Modulation Spectroscopy LAURA SINCLAIR, KEVIN COSSEL, JILA, University of Colorado, TYLER COFFEY, University of Colorado, JUN YE, JILA, National Institute of Standards and Technology and University of Colorado, ERIC CORNELL, JILA, National Institute of Standards and Technology and University of Colorado — We have developed a novel technique for broad spectral bandwidth rapid ion-sensitive spectroscopy. This technique combines the high sensitivity of velocity-modulation spectroscopy with the parallel nature and high frequency accuracy of cavity-enhanced direct frequency comb spectroscopy. Prior to this research, no techniques have been capable of high sensitivity velocity modulation spectroscopy on every parallel detection channel over such a broad spectral range. We have demonstrated the power of this technique by measuring the $A^2\Pi_u - X^2\Sigma_g^+$ (4,2) band of N_2^+ with an absorption sensitivity of 10^{-6} for each of 1500 simultaneous measurement channels spanning 150 cm^{-1} . A fully sampled spectrum with 75 MHz spacing consisting of interleaved measurements is acquired in under an hour. Currently, this technique is being used to map the electronic transitions of HfF^+ for the JILA electron electric dipole moment experiment. This work was funded by the NSF.

Laura Sinclair
JILA, University of Colorado

Date submitted: 06 Feb 2011

Electronic form version 1.4