Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Standoff detection of trace compounds enabled by continuum pulse shaping and coherent Raman scattering MARSHALL T. BREMER, ORIN YUE, VADIM V. LOZOVOY, MARCOS DANTUS, Michigan State University — Raman spectroscopy has long been pursued as means to detect hazards from a safe distance. This approach promises high chemical specificity, but is limited in sensitivity because of the very small Raman cross-section. We recently demonstrated detection of trace quantities using a non-linear counterpart, coherent anti-Stokes Raman scattering (CARS), which offers large signal enhancement over spontaneous Raman due to coherent signal addition. Utilizing a pulse shaper and the bandwidth inherent in a 5fs laser pulse, CARS spectra were acquired from an explosive simulant dissolved within thin polymer films. Further, the pulse shaper offers total control of the non-linear process, including selective excitation of particular vibrational modes, enabling single channel detection and associated opportunities for rapid chemical imaging. We will present standoff chemical images and associated CARS spectra acquired in a standoff configuration, demonstrating the applicability of the new spectroscopy in a realistic environment.

Marshall Bremer
Michigan State University

Date submitted: 11 Nov 2011 Electronic form version 1.4