Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

**Cavity enhanced absorption spectroscopy using a broadband prism cavity and a supercontinuum source** PAUL S. JOHNSTON, KEVIN K. LEHMANN, Department of Chemistry, University of Virginia — We report the design and construction of a cavity enhanced absorption spectrometer using broadband Brewster's angle prism retroreflectors and a spatially coherent 500 nm to >1.75 $\mu$m supercontinuum excitation source. Using prisms made from fused silica an effective cavity reflectivity of >99.99% at 1.064 $\mu$m was achieved. A proof of principle experiment was performed by recording the cavity enhanced absorption spectrum of the weak b-X (1←0) transition of molecular oxygen at 14529 $cm^{-1}$ and the fifth overtone of the acetylene C-H stretch at 18430 $cm^{-1}$. CCD frames were integrated for 150 sec and 30 sec, with 3 frames (each 100 $cm^{-1}$ wide) and 1 frame (266 $cm^{-1}$ wide) required to observe the $O_2$ and $C_2H_2$ spectra, respectively. A rms noise equivalent absorption ($\alpha_{min}$) of 7.21x$10^{-8}$ $cm^1Hz^{1/2}$ and 1.28x$10^7$ $cm^{-1}Hz^{1/2}$ with full width half maximum line widths of 0.18 $cm^{-1}$ and 0.44 $cm^{-1}$ was achieved for the molecular oxygen band and acetylene overtone.

Paul S. Johnston
Department of Chemistry, University of Virginia

Date submitted: 26 Jan 2009 Electronic form version 1.4