LINE MIXING EFFECTS OF O_2 A-BAND WITH PHOTOACOUSTIC SPECTROSCOPY IN SUPPORT OF REMOTE SENSING

THINH Q. BUI[a], DANIEL HOGAN, PRIYANKA M. RUPASINGHE, MITCHIO OKUMURA, *California Institute of Technology, Division of Chemistry, MC 127-72, Pasadena, CA 91125*; DAVID A. LONG and JOSEPH T. HODGES, *NIST, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070*; CHARLES E. MILLER, *Jet Propulsion Laboratory, California Institute of Technology, MS 183-901, Pasadena, CA 91109*.

To achieve NASA's strategic scientific mission of monitoring global atmospheric CO_2 at an unprecedented precision of 0.25%, we perform laser based measurements and lineshape studies of the reference atmospheric target O_2 A-band at 760nm to meet the precision requirements of current (ACOS/GOSAT/TCCON) and future (OCO-2/OCO-3/ASCENDS) remote sensing applications. We utilize a novel, high precision (0.01% uncertainty) photoacoustic spectrometer (PAS), at high spectral resolution with a large dynamic range, to provide unique measurements of unsaturated lineshapes of the O_2 A-band to study line-mixing effects currently unaccounted for in spectroscopic databases like HITRAN. Line mixing effects along with other non-Voigt features (Dicke narrowing, collisional induced absorption) will be captured for remote sensing relevant pressures (0.1atm-5atm) and incorporated into a new spectral line profile. We discuss our progress towards this goal.

[a] Support from NSF Graduate Fellowship and NASA OCO Funding are gratefully acknowledged