

LINE MIXING EFFECTS OF O₂ A-BAND WITH PHOTOACOUSTIC SPECTROSCOPY IN SUPPORT OF REMOTE SENSING

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To achieve NASA's strategic scientific mission of monitoring global atmospheric CO₂ at an unprecedented precision of 0.25%, we perform laser based measurements and lineshape studies of the reference atmospheric target O₂ 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 O₂ 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.

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