

MEASUREMENTS of BAND INTENSITIES, HERMAN-WALLIS PARAMETERS, and SELF-BROADENING LINE-WIDTHS of the 30011+00001 and 30014←00001 BANDS of CO₂ at 6503 cm⁻¹ and 6076 cm⁻¹. L. P. Giver, L. R. Brown, R. B. Wattson, M. N. Spencer, and C. Chackerian, Jr.

Rotationless band intensities and Herman-Wallis parameters are listed in HITRAN tabulations (Rothman, *et al.* J. Q. S.R.T. 48, 537, 1992) for several hundred CO₂ overtone-combination bands. These parameters are based on laboratory measurements when available, and on DND calculations for the unmeasured bands. The DND calculations for the Fermi interacting $n\nu_1+\nu_3$ polyads show the a_2 Herman-Wallis parameter varying smoothly from a negative value for the first member of the polyad to a positive value for the final member. Johns' (J. Mol. Spec. 134, 433, 1989) measurements of the $\nu_1+\nu_3$ dyad are consistent with the DND calculations for the a_2 parameter, as are our recent measurements (submitted to J. Mol. Spec.) of the $4\nu_1+\nu_3$ pentad. However, the measurement-based values in the HITRAN tables for the $2\nu_1+\nu_3$ triad and the $3\nu_1+\nu_3$ tetrad do not support the DND calculated values for the a_2 parameters. We therefore decided to make new measurements to improve some of these intensity parameters.

With the McMath FTS at Kitt Peak National Observatory/National Solar Observatory we recorded several spectra of the 4000 to 8000 cm⁻¹ region of pure CO₂ at 0.011 cm⁻¹ resolution using the 6 meter White absorption cell. The signal/noise and absorbance of the first and fourth bands of the $3\nu_1+\nu_3$ tetrad of ¹²C¹⁶O₂ were ideal on these spectra for measuring line intensities and broadening widths. Our self-broadening results agree with the HITRAN parameterization, while our measurements of the rotationless band intensities are about 15% less than the HITRAN values. We find a negative value of a_2 for the 30011 ← 00001 band and a positive value for the 30014-00001 band, whereas the HITRAN values of a_2 are positive for all four tetrad bands. Our a_1 and a_2 Herman-Wallis parameters are closer to DND calculated values than the 1992 HITRAN values for both the 30011←00001 and the 30014-00001 band.

Part of the research reported in this paper was performed at the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.

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Time required: 10 min.

Session in which paper is recommended for presentation: 4: Infrared Experimental.