

## LINE PARAMETERS OF CARBON DIOXIDE IN THE 4850 $\text{cm}^{-1}$ REGION

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The spectral region near 4850  $\text{cm}^{-1}$  is used to monitor atmospheric carbon dioxide, but current accuracies of the line intensities and line shape coefficients do not permit carbon dioxide mixing ratios to be obtained to 1 ppm (about one part in 400). To improve the line parameters, we are remeasuring the prominent  $\text{CO}_2$  bands in this region specifically to characterize the non-Voigt effects of line mixing and speed dependence at room temperature.

The laboratory spectra of air- and self-broadened  $\text{CO}_2$  have been recorded at a variety of pressures, path lengths, mixing ratios and resolutions (0.005 to 0.01  $\text{cm}^{-1}$ ) with two different Fourier transform spectrometers (the McMath-Pierce FTS at Kitt Peak and a Bruker 125 HR FTS at JPL). The line parameters of some 2000 transitions are being derived by simultaneous multispectrum fitting<sup>a</sup> using a few dozen spectra encompassing a 230  $\text{cm}^{-1}$  wide spectral interval. The rovibrational constants for line positions and the band intensities and Herman-Wallis coefficients are being retrieved directly from the spectra, rather than floating positions and intensities individually.<sup>b</sup> Self and foreign Lorentz widths and pressure shifts are being determined for the stronger bands while non-Voigt coefficients describing line mixing and speed dependence are being obtained for at least one of the strongest bands.<sup>c</sup>

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<sup>a</sup>D. Chris Benner, C. P. Rinsland, V. M. Devi, M. A. H. Smith, and D. A. Atkins, *JQSRT* 1995;53:705-21.

<sup>b</sup>V. M. Devi, D. Chris Benner, L. R. Brown, C. E. Miller, and R. A. Toth, *J. Mol. Spectrosc.* 2007;245:52-80.

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