SELF- AND AIR-BROADENED OXYGEN A-BAND PARAMETERS

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Self- and air-broadened oxygen A-band spectra, previously reported by Brown and Plymate[a] were combined with new higher pressure (1 to 3 atm) spectra of air and fitted with a multispectrum analysis to investigate lineshapes and to improve the precision of the molecular parameters for the O_2 A-band at 13100 cm^{-1}. These data were recorded with the McMath-Pierce Fourier-transform interferometer located at the National Solar Observatory on Kitt Peak in Arizona. The transition wavenumbers have been referenced to recent stabilized cavity-ring-down laser measurements of Robichaud et al.[b] calibrated against a ^{39}K standard. Deviations from the conventional Voigt profile were observed while better fits were obtained with Dicke-narrowing (Rautian or Galatry) and speed-dependent Voigt linehapes. Line-mixing, apparent in the higher pressure air spectra, was successfully fit through the R-branch head with first-order Rosenkranz coefficients exhibiting odd-even J staggering indicative of interbranch spin-rotation coupling. The results will be compared to other literature measurements and theoretical models of the oxygen A-band.[c]

[a] L. R. Brown and C. Plymate, J. Mol. Spectrosc. 199, 166 (2000).

[b] D. J. Robichaud, J. T. Hodges, P. Maslowski, L. Y. Yeung, M. Okumura, C. E Miller and L. R. Brown, J. Mol. Spectrosc. (2008) in press

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