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 Plymatea 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 O₂ 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 ³⁰K 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

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