

2

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS ENCLOSURE COPY	
AD-A210 676 FIG ECTE 21 1989		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release Distribution unlimited	
6a. NAME OF PERFORMING ORGANIZATION Laboratoire de Physique Moléculaire et Atmosphérique		5. MONITORING ORGANIZATION REPORT NUMBER(S) EOARD TR 89-11	
6b. OFFICE SYMBOL (If applicable)		7a. NAME OF MONITORING ORGANIZATION European Office of Aerospace Research and Development	
6c. ADDRESS (City, State, and ZIP Code) Tour 13, Université P. et M. Curie 4, Place Jussieu 75252 PARIS CEDEX 05		7b. ADDRESS (City, State, and ZIP Code) Box 14 FPO New York 09510-0200	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION European Office of Aerospace Research & Development		8b. OFFICE SYMBOL (If applicable) LDG	
9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR 86-0190		10. SOURCE OF FUNDING NUMBERS	
8c. ADDRESS (City, State, and ZIP Code) Box 14 FPO New York 09510-0200		PROGRAM ELEMENT NO. 61102 F	TASK NO. D1
11. TITLE (Include Security Classification) STUDY OF HIGH FREQUENCY WATER VAPOR ABSORPTION PARAMETERS			
12. PERSONAL AUTHOR(S) Jean-Marie FLAUD and Claude CAMY-Peyret			
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM June 88 to June 89	14. DATE OF REPORT (Year, Month, Day) 1989/June/30	15. PAGE COUNT
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	WATER VAPOR Line positions	
		Lines intensities Spectral range : 8000-11500 cm ⁻¹ 13500-22700 cm ⁻¹	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report summarizes the results obtained on the H ₂ ¹⁶ O absorption spectrum in the spectral regions 8000-11500/cm ⁻¹ and 13500-22700/cm ⁻¹ . The spectra were recorded at high resolution with a Fourier transform spectrometer using a multipath cell allowing path lengths up to 434 m. A thorough analysis has been performed and greatly improved line positions, intensities and assignments have been obtained providing a precise and complete picture of the H ₂ ¹⁶ O spectra in the concerned spectral regions. These results of important atmospheric interest will be included in the next version of the HITRAN data base. (AW)			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL OWEN R COTE		22b. TELEPHONE (Include Area Code) (441) 409-4437	
		22c. OFFICE SYMBOL EOARD/LDG	

89 7 21 066

This report has been reviewed by the EOARD Information Office and is releasable to the National Technical Information Service (NTIS). At NTIS it will be releasable to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.



OWEN R. COTE
Chief, Geophysics and Space



FRED T. GILLIAM, Lt. Col, USAF
Chief Scientist

SCIENTIFIC REPORT

Grant number : AFOSR - 86 - 0190 DEF

STUDY OF HIGH FREQUENCY WATER VAPOR ABSORPTION PARAMETERS

Jean-Marie FLAUD and Claude CAMY-PEYRET

Laboratoire de Physique Moléculaire et Atmosphérique

Université Pierre et Marie Curie et C.N.R.S.

Tour 13, 4 place Jussieu, 75252 Paris cedex 05, France

30 June 1989

Final report - 1 June 1986 - 31 May 1989

This report is intended only for internal management used.

Prepared for :

European Office of Aerospace Research and Development

223/231 Old Marylebone Road, London NW1, 5th, U.K.

Distribution For	
AFOSR	☒
AFOSR	☐
AFOSR	☐
Justification	
By	
Contributor /	
Availability Codes	
Dist	Avail and/or Special
A-1	

Optical remote sensing and studies of the propagation of radiation through long atmospheric paths require a precise knowledge of the spectral parameters of molecular absorbers contributing to the opacity. Because of technological considerations, the first spectroscopic efforts were devoted to the mid and infrared regions. Recent advances in optics have now created a need for precise spectroscopic data from the near-infrared to the visible and the purpose of the project was to improve the spectroscopic parameters of water vapor which is, with oxygen, the main atmospheric absorber in this spectral region.

Our work during the three years period of the contract has concerned the following spectral regions :

13500 - 22700 cm^{-1} [Ref.1,2]

8000 - 9500 cm^{-1} [Ref.3]

9500 - 11500 cm^{-1} [Ref.4]

and the following improvements* have been achieved as compared to the existing H_2^{16}O data presently reported in the HITRAN data base.

Line positions.

The accuracy on the line positions measured in the present work is, for well isolated lines, varying from 0.5×10^{-3} to $2 \times 10^{-3} \text{ cm}^{-1}$ depending on the spectral region; this improves greatly upon the previous data (accuracy $\simeq 10^{-2} \text{ cm}^{-1}$ for the better lines).

- Line assignments.

Real progress have been made in assigning the lines. In particular many new resonating lines have been attributed and some previous assignments were found erroneous.

*We give in this first part only the salient facts of the work. Far more details, the reader is requested to refer to the Appendix where the analysis process, the theoretical problems and the results are extensively described.

- Line intensities.

The average uncertainty on the line intensities is about 6-10% (However errors up to 50% exist for heavily blended lines). The lines intensities were measured either by the curve of growth method or using the peak absorption method (See Ref.3 for details). In this way, the intensities of all the observed lines were derived and it has to be underlined again that a real improvement has been obtained : For example, the results quoted in Table V of Ref.[3] show clearly that the previous intensities listed in the HITRAN data base are in error by a factor ranging from 2 to 7.

All the results (line position and intensities) which give a precise and complete picture of the H_2^{16}O absorption in the spectral ranges 8500 - 11500 and 13500 - 25250 cm^{-1} have been given through diskettes to L.S. Rothman who is charge of the HITRAN data base and should be included in the next version of the base. As a whole it appears that the contract has been properly fulfilled and has produced interesting scientific results.

REFERENCES

- [1] C. Camy-Peyret, J.-M. Flaud, J.-Y. Mandin,
J.-P. Chevillard, J. Brault, D.A. Ramsay, M. Vervloet
and J. Chauville.
The high resolution spectrum of water vapor between
16500 and 22700 cm^{-1}
J.Mol. Spectrosc. 113, 208-228 (1985)
- [2] J.-Y. Mandin, J.-P. Chevillard, C. Camy-Peyret and
J.-M. Flaud.
The high resolution spectrum of water vapor between
1300 and 16500 cm^{-1} .
J.Mol. Spectrosc. 116, 167-190 (1986)
- [3] J.-Y. Mandin, J.-P. Chevillard, J.-M. Flaud and
C. Camy-Peyret.
 H_2^{16}O : Line positions and intensities between 8000 and
9500 cm^{-1}
Can.J.Phys. 66, 997-1011 (1988)
- [4] J.-P. Chevillard, J.-Y. Mandin, J.-M. Flaud and C.
Camy-Peyret
 H_2^{16}O : Line positions and intensities between 9000 and
11500 cm^{-1}
Can.J.Phys. (Submitted).

APPENDIX

Detailed description of the spectral regions :

16500 - 22700 cm^{-1}

13200 - 16500 cm^{-1}

8000 - 9500 cm^{-1}

9500 - 11500 cm^{-1}

H_2^{16}O : Line positions and intensities between 8000 and 9500 cm^{-1} : the second hexad of interacting vibrational states: {(050), (130), (031), (210), (111), (012)}

J.-Y. MANDIN, J.-P. CHEVILLARD, J.-M. FLAUD, AND C. CAMY-PEYRET

Laboratoire de physique moléculaire et atmosphérique, Université Pierre-et-Marie-Curie et Centre national de la recherche scientifique, Tour 13, 4, place Jussieu, 75252 Paris CEDEX 05, France

Received May 30, 1988

Water vapor Fourier-transform spectra (resolution = 0.010 cm^{-1}) have been analyzed between 8000 and 9500 cm^{-1} . Accurate values of 441 rotational energy levels, belonging to the vibrational states (050), (130), (031), (210), (111), and (012) of the second hexad of H_2^{16}O , have been determined. Moreover, 500 line intensities have been accurately measured (uncertainty = 6%). To increase the number of experimental intensities (useful for atmospheric applications), we have set up a less sophisticated but faster method; this has led to the measurement of 1200 additional intensities, with an average uncertainty of about 10%.

Des spectres par transformée de Fourier de la vapeur d'eau (résolution = 0.010 cm^{-1}) ont été analysés entre 8000 et 9500 cm^{-1} . Les valeurs précises de 441 niveaux d'énergie rotationnels, appartenant aux états vibrationnels (050), (130), (031), (210), (111), et (012) de la deuxième hexade d' H_2^{16}O , ont été déterminées. De plus, on a mesuré avec précision les intensités de 500 raies (incertitude = 6%). Dans le but d'augmenter le nombre d'intensités expérimentales (utiles pour les applications atmosphériques), une méthode moins sophistiquée mais plus rapide a été mise au point et a permis de mesurer 1200 intensités supplémentaires, avec une incertitude moyenne d'environ 10%.

Can. J. Phys. 66, 997 (1988)

1. Introduction

For atmospheric applications, it is important to know accurately the vibration-rotation spectrum of water. As a continuation of our previous work on this molecule, this paper presents a study of the 8000–9500 cm^{-1} spectral region. This region was first analyzed by Benedict (1), and improved results were later introduced by him in the atmospheric compilations (2). Then, using a grating spectrum of room-temperature water vapor and a Fourier-transform spectrum of heated water vapor ($T = 330$ K), both recorded with a resolution of 0.07 cm^{-1} , Flaud *et al.* (3) improved the accuracy of the energy levels. Finally, with the aid of oxygen-hydrogen flame spectra recorded on a Fourier-transform interferometer between 6400 and 7600 cm^{-1} , Camy-Peyret *et al.* (4) analyzed the $\nu_1 + \nu_2 + \nu_3 - \nu_2$ hot band and were able to determine rotational levels of the (111) vibrational state corresponding to high values of the J quantum number (up to $J = 26$). To observe new levels and to improve the accuracy of the previous results, we have studied several spectra (resolution = 0.010 cm^{-1}) recorded with the Fourier-transform spectrometer built by Brault (5) at the National Solar Observatory, Kitt Peak, AZ.

The analysis of these spectra has led to the determination of 441 accurate rotational energy levels belonging to the so-called second hexad of interacting vibrational states: {(050), (130), (031), (210), (111), (012)}.

To study high-resolution atmospheric spectra, one must know more than the wavenumbers and the assignments of the observable H_2^{16}O lines; it is also important to have at hand a complete and reliable list of individual line intensities. In the studied spectral region, knowledge of experimental intensities has been somewhat poor. Let us mention one temperature-insensitive line measured by Brault *et al.* (6) (uncertainty = 10%) and 33 line intensities measured by Cherepanov *et al.* (7) (uncertainty = 10%). That is why we have first measured 500 line intensities accurately (uncertainty = 6%). Besides, to extend this set of values, we have set up and successfully tested a faster method to obtain the intensities of all the other lines pertaining to the H_2^{16}O molecule. Thus, 1200 additional intensities have been measured, with an average uncertainty of about 10%. The method is described in Sect. 3, where the measured intensities are discussed.

2. Experimental details and analysis

Since numerous isotopic species of water absorb simultaneously, it is very useful to have spectra corresponding to different ratios of isotopic concentrations at one's disposal when assigning each line to a peculiar absorber, i.e., mainly H_2^{16}O , H_2^{18}O , or H_2^{17}O . For this reason, natural, ^{18}O -enriched, and ^{17}O -enriched water vapor spectra have been recorded with the aid of Brault's Fourier-transform apparatus (5). Moreover, because of the large range of line intensities, several spectra have been recorded at various path lengths and pressures, allowing us to cover a sufficiently large set of H_2^{16}O optical thicknesses. Thus, it is possible to measure the intensities of strong lines (up to $2.8 \times 10^{-2} \text{ cm}^{-2} \cdot \text{atm}^{-1}$) as well as very weak lines (as low as $5 \times 10^{-7} \text{ cm}^{-2} \cdot \text{atm}^{-1}$) (1 atm = 101.3 kPa). The experimental conditions and characteristics of the spectra are given in Table 1.

To give an idea of the complexity of the spectrum, in Table 2 we report measured or previously computed band centers and band strengths for the main bands appearing in the studied spectral region. One can see that six interacting vibrational states are involved: they form the second hexad of H_2O , i.e., {(050), (130), (031), (210), (111), (012)}. The six corresponding cold bands have been observed, revealing numerous resonances that have complicated the assignments.

As an example, the $5\nu_2$ band could be observed owing to three strong interactions; two of them have been previously calculated by Ulenikov and Ushakova (8). These interactions occur between the levels (050)[761] and (130)[743], between (050)[660] and (210)[606], and between (050)[661] and (130)[643]. For these pair of interacting states, the mixing of the wavefunctions is so important that the assignment of the vibrational quantum numbers to each level is difficult. Thus, at the present time, the proposed attributions are a matter of convention.

Another example of strong perturbation involves the vibrational state (060), which actually pertains to the first decad. It exhibits a quadruple interaction (3) between the levels (060)[616], (130)[652], (210)[634], and (111)[624], so that the very weak $6\nu_2$ band can be observed through seven lines, corresponding to transitions arriving at the resonant level (060)[616].

TABLE 1. Experimental conditions and characteristics of the absorption spectra (1 atm = 101.3 kPa)

Type of spectrum	Unapodized resolution (10^{-3} cm^{-1})	Total pressure $P \pm 1\%$ (10^{-3} atm)	Average Lorentz half-width γ^L (10^{-3} cm^{-1})	Absorption path l (cm)	H_2^{16}O concentration x	H_2^{16}O optical thickness xPl ($\text{cm} \cdot \text{atm}$)
Natural	17.4	22.8	9.3	43 396	0.997	986
	14.5	1.97	0.8	43 396	0.997	85.3
^{18}O enriched	11.2	3.68	1.5	21 742	0.27 ± 0.01	21.6
	11.2	3.68	1.5	4 900	0.27 ± 0.01	4.87
	11.2	0.96	0.4	2 494	0.27 ± 0.01	0.65
^{17}O enriched	11.2	6.18	2.5	21 742	0.79 ± 0.03	106
Studied spectral region: $7900\text{--}9500 \text{ cm}^{-1}$ Signal-to-noise ratio: 500–2300				Cell temperature: $300 \pm 0.5 \text{ K}$ Average Doppler half-width γ^D : 0.013 cm^{-1}		

It was also possible to assign some lines in the $\nu_1 + 2\nu_2 + \nu_3 - \nu_2$ hot band.

The rotational energy levels of the second hexad are reported in Table 3. These new results are in good agreement with and improve upon our previous results (3, 4), as far as the accuracy and the coverage are concerned. The wavenumbers of the observed lines are listed in Table 4 along with their measured intensities, which are discussed in the next section.

3. Line intensities

We have already described the procedure used to derive precise, absolute H_2^{16}O line intensities (10). There are two main sources of difficulties: first, the necessity to accurately check the total pressure of H_2O in natural spectra, and to recalibrate the absolute concentrations of H_2^{16}O in the ^{18}O - and ^{17}O -enriched samples; second, the determination of the residual absorption due to traces of atmospheric water along the optical path. These two problems have been solved as explained in ref. 10, thus allowing us to perform reliable intensity measurements.

3.1. Measurement of line intensities by the curve-of-growth method: discussion of the results

The curve of growth of the equivalent-width method was used under the conditions described in ref. 11. In this way, the intensities of all the well-isolated lines were measured, with an average uncertainty of 6%. These values are listed in Table 4.

Since 31 of these 500 intensities had already been measured by other authors (6, 7), comparisons have been made between their results and ours (Table 5). For each line, the ratio R of the two available intensities has been calculated, and we find an average value $\bar{R} = 1.03 \pm 0.08$, which denotes a negligible systematic shift inside the stated uncertainties. Therefore, it appears that the consistency of these two independent sets of results is excellent, allowing us to ascertain that reliable absolute intensities have been obtained in the present work.

We have also listed in Table 5 the intensities introduced by Benedict in the atmospheric compilations (2). Although these previous values reproduce the relative line strengths well enough, large discrepancies appear with the measured absolute values, confirming the need of precise, individual line-intensity measurements to generate a reliable database.

3.2. Measurement of line intensities by the central-depth method

To complete the set of intensities obtained above, we have used a faster method (12). This method is based on the fact that the central depth $\mathcal{A}(\sigma_0)$ of a line, observed under infinite

TABLE 2. Positions and intensities of the main H_2^{16}O bands appearing between 7500 and 9500 cm^{-1}

Band	Band center (cm^{-1})	Band intensity ($10^{-22} \text{ cm}^{-1}/(\text{molecule} \cdot \text{cm}^{-2})$ at 296 K)
$5\nu_2$	7552.0 ^a	0.028 ^a
$4\nu_2 + \nu_3 - \nu_2$	8238.84 ^{cd}	0.059 ^c
$\nu_1 + 3\nu_2$	8273.9757 ^e	2.4 ^c
$3\nu_2 + \nu_3$	8373.8526 ^e	36 ^c
$\nu_1 + 2\nu_2 + \nu_3 - \nu_2$	8733.9846 ^e	0.41 ^c
$2\nu_1 + \nu_2$	8761.5820 ^e	3.6 ^c
$\nu_1 + \nu_2 + \nu_3$	8807.0003 ^e	498 ^c
$6\nu_2$	≈ 8890	1.2 ^f
$\nu_2 + 2\nu_3$	9000.1365 ^e	12 ^c

^aValue calculated by Ulenikov and Ushakova (8).

^bMeasured value $\pm 20\%$ (this work), equal to the sum of the intensities of eight lines due to three resonating levels of (050).

^cValue from ref. 2.

^dAt room temperature, this weak hot band is not observable.

^eExperimental value (this work).

^fMeasured value $\pm 20\%$ (this work), equal to the sum of the intensities of seven lines due to the resonating level (060)[616].

resolution and centered at the wavenumber σ_0 , is related to its intensity S^0 (in $\text{cm}^{-2} \cdot \text{atm}^{-1}$) by

$$[1] \quad \mathcal{A}(\sigma_0) = 1 - \exp \{ -(S^0 xPl / \gamma^D) (\log 2 / \pi)^{1/2} k[0, (\log 2)^{1/2} \gamma^L / \gamma^D] \}$$

where $k(0, y)$ is the value of the reduced Voigt profile at the center of the line (see Table 1 for the other notations). For the low pressures that we are concerned with, the variation of the term between the braces from one line to another is mainly due to the variations of S^0 and γ^D , which is proportional to σ_0 ; thus,

$$[2] \quad \mathcal{A}(\sigma_0) = 1 - \exp (-S^0 \alpha / \sigma_0)$$

α being a constant. This is equivalent to

$$[3] \quad \alpha = -(\sigma_0 / S^0) \log [1 - \mathcal{A}(\sigma_0)]$$

For each recorded spectrum, an average value of the coefficient α is determined from the available experimental results, i.e., the line intensities previously obtained by the curve-of-growth method and the corresponding line depths. Then, for this spectrum, the average value of α is used to derive the intensities of the other lines from their measured depths.

TABLE 3. Experimental rotational energy levels for the vibrational states (050), (130), (031), (210), (111), and (012) of the second hexad of $H_2^{16}O$

J K _a K _c	0 5 0		1 3 0		0 3 1		2 1 0		1 1 1		0 1 2	
	E CM ⁻¹	DELTA.E.M 10 ⁻³ CM ⁻¹	E CM ⁻¹	DELTA.E.M 10 ⁻³ CM ⁻¹	E CM ⁻¹	DELTA.E.M 10 ⁻³ CM ⁻¹	E CM ⁻¹	DELTA.E.M 10 ⁻³ CM ⁻¹	E CM ⁻¹	DELTA.E.M 10 ⁻³ CM ⁻¹	E CM ⁻¹	DELTA.E.M 10 ⁻³ CM ⁻¹
0 0 0			8273.9757	0.9 1	8273.8526	0.9 1	8781.5820	0.9 1	8807.0003	0.9 1	9000.1385	0.9 1
1 0 1			8297.3748	0.8 2	8397.4851	0.8 3	8784.8595	0.8 2	8830.2318	0.5 3	9023.4801	0.8 2
1 1 1			8323.2934	0.5 3	8421.1849	0.8 2	8799.8411	0.8 3	8844.5372	0.6 2	9037.1985	0.9 3
1 1 0			8329.3675	0.9 2	8427.3878	0.8 2	8806.1589	0.8 2	8850.1068	0.9 2	9042.8357	0.9 2
2 0 2			8342.1816	0.5 3	8442.6467	0.4 4	8826.5301	0.6 3	8875.3088	0.4 4	9068.7511	0.5 3
2 1 2			8364.0667	0.4 4	8462.6636	0.5 3	8840.2759	0.5 3	8885.2071	0.5 4	9078.2632	0.8 2
2 1 1			8382.2429	0.5 3	8480.8386	0.5 4	8858.7782	0.8 3	8903.4971	0.5 4	9095.1640	0.5 3
2 2 1			8456.9515	0.4 4	8546.8855	0.5 3	8899.8365	0.4 4	8944.8328	0.8 3	9135.8432	0.4 4
2 2 0			8457.7662	0.8 3	8551.0246	0.4 4	8902.6981	0.5 4	8945.9844	0.4 4	9137.2544	0.5 4
3 0 3			8408.8032	0.5 3	8510.3748	0.5 4	8894.0343	0.5 3	8929.9838	0.4 5	9133.5817	0.5 4
3 1 3			8424.6073	0.5 4	8523.1089	0.4 4	8900.4998	0.5 4	8945.8631	0.4 5	9139.0696	0.5 4
3 1 2			8480.7883	0.4 4	8580.1444	0.5 4	8933.2054	0.6 4	8978.8748	0.4 5	9172.5097	0.4 4
3 2 2			8527.3214	0.4 5	8620.9529	0.5 5	8988.7593	0.4 5	9014.0213	0.4 5	9206.8693	0.5 5
3 2 1			8532.1231	0.4 5	8625.8978	0.5 4	8978.5490	0.4 4	9020.1745	0.4 6	9212.4698	0.4 5
3 3 1			8580.8491	0.8 4	8748.8280	0.5 3	9057.7873	0.8 3	9098.3970	0.5 5	9287.2090	0.5 5
3 3 0			8580.7373	0.4 5	8748.8485	0.6 2	9087.9240	0.4 5	9098.8098	0.5 4	9287.4368	0.4 5
4 0 4			8496.8658	0.5 3	8595.5868	0.4 4	8976.3024	0.8 3	9022.3355	0.4 5	9218.1529	0.4 6
4 1 4			8504.3714	0.4 4	8602.4806	0.5 3	8979.6580	0.5 4	9025.1513	0.5 4	9218.8597	0.5 3
4 1 3			8583.8942	1.7 3	8684.1048	0.4 4	9033.0270	0.6 3	9079.7163	0.4 6	9273.2362	0.5 5
4 2 3			8620.2655	0.4 5	8714.6102	0.5 4	9081.1532	0.4 4	9105.4314	0.4 6	9288.2124	0.4 5
4 2 2			8633.0957	0.4 5	8728.4734	0.4 4	9077.3573	0.5 4	9121.5192	0.3 7	9315.1839	0.5 4
4 3 2			8758.5309	0.4 6	8843.2422	0.5 3	9152.6024	0.4 6	9193.1213	0.5 4	9383.1179	0.4 6
4 3 1			8757.1408	0.4 5	8844.0501	0.4 5	9153.6465	0.6 5	9194.5310	0.3 7	9384.6500	0.5 5
4 4 1			8929.4482	0.5 5	9006.5511	0.9 2	9268.0138	0.9 1	9305.9035	0.6 3	9480.9535	0.5 3
4 4 0			8929.4538	0.8 4	9006.6028	0.9 3			9305.9227	0.4 4	9490.9858	0.8 3
5 0 5			8598.8953	0.8 3	8697.9984	0.5 4	9075.8041	0.6 3	9121.7438	0.5 5	9318.1914	0.4 5
5 1 5			8602.7915	0.8 3	8702.4830	0.8 3	9077.1775	0.8 3	9123.0328	0.4 5	9317.0855	0.5 4
5 1 4			8690.1070	0.4 4	8791.0098	0.5 3	9194.1591	0.4 4	9200.8891	0.5 5	9394.9785	0.4 4
5 2 4			8735.0801	0.4 5	8830.1735	0.4 5	9173.5681	0.5 5	9218.0423	0.4 6	9411.8378	0.5 5
5 2 3			8781.8609	0.4 5	8888.8007	0.5 3	9204.8481	0.4 6	9249.2424	0.4 6	9444.6503	0.4 5
5 3 3			8876.3471	0.6 4	8964.0548	0.4 5	9271.2584	0.8 5	9310.9958	0.3 8	9502.7010	0.4 6
5 3 2			8878.5865	0.4 5	8967.1091	2.1 2	9275.0795	0.4 5	9316.3730	0.4 5	9506.2270	0.4 6
5 4 2					9127.9581	0.5 4			9424.3701	0.4 7	9611.5374	0.4 5
5 4 1					9128.0922	0.5 3			9424.5443	0.4 6	9611.8068	0.4 5
5 5 1			9297.2198	0.5 5	9324.0651	0.5 3			9583.9958	0.6 4	9745.1993	0.9 3
5 5 0			9297.2379	0.8 4	9324.1040	0.5 5			9583.9958	2.8 3	9745.1993	0.5 4
6 0 6			8715.9808	0.8 3	8817.2439	0.4 3	9191.8591	2.0 3	9238.3324	0.4 5	9432.5134	0.5 4
6 1 6			8719.4056	0.5 3	8819.6842	0.5 3	9192.8429	0.8 4	9238.8819	0.5 4	9433.5040	0.4 4
6 1 5			8837.4273	0.8 4	8938.6840	0.5 4			9340.9727	0.4 6	9535.4280	0.5 5
6 2 5			8870.9870	0.5 4	8968.7914	0.8 3	9306.1216	0.5 4	9350.9494	0.4 8	9545.2639	0.4 5
6 2 4			8917.0931	0.9 2	9014.0735	0.4 4			9399.9911	0.4 6	9599.1813	0.5 4
6 3 4			9021.0702	0.5 5	9106.5450	0.5 4	9414.2549	0.4 6	9452.7325	0.4 5	9649.2485	0.4 7
6 3 3					9118.8814	0.4 4	9423.6493	0.9 1	9485.1068	0.3 8	9657.8168	0.9 2
6 4 3			9195.3847	2.9 1 1	9273.6265	0.9 3			9567.3099	0.5 4	9756.2072	0.1 8
6 4 2					9274.1489	0.4 4			9588.2089	0.3 7	9757.5498	0.5 5
6 5 2			9402.2344	0.4 8	9470.2122	0.5 4			9708.8013	0.5 6	9891.1582	0.4 4
6 5 1					9470.6558	0.4 6			9708.8066	0.1 7	9891.1582	0.6 3
6 6 1	9194.0115	0.5 5			9692.4978	0.9 2			9871.1843	0.9 3	10047.5192	0.2 2
6 6 0	9192.1774	2.9 2			9692.5015	0.6 2			9871.1843	0.6 3	10047.5192	2.7 2
7 0 7			8851.8542	0.8 3	8953.4284	0.8 3	9328.4387	0.8 3	9372.2059	0.8 4	9568.8983	0.5 3
7 1 7			8853.8840	0.9 2	8954.7158	0.5 3	9329.1142	0.9 2	9372.4745	0.4 4	9568.5014	1.7 3
7 1 6			9003.7457	0.5 4	9104.9310	0.9 3	9451.2803	2.0 3	9487.9804	0.4 8	9692.2730	0.5 4
7 2 6					9123.5949	0.4 4	9457.9571	0.9 2	9501.2464	0.6 6	9700.3278	0.5 5
7 2 5			9097.9341	0.8 5	9198.8698	0.8 2			9586.8990	0.4 7	9778.2406	0.4 4
7 3 5					9278.0491	0.4 6	9587.7718	0.5 7	9615.8478	0.4 8	9808.8121	0.5 6
7 3 4					9294.3727	6.2 2			9644.3091	0.5 5	9836.4775	0.6 2
7 4 4					9443.3900	0.4 6			9734.0806	0.4 6	9924.9838	0.9 3
7 4 3			9382.8592	2.1 3	9445.1825	1.7 4			9737.3096	0.4 7	9929.0171	0.4 8
7 5 3			9572.9497	0.4 7	9640.9213	0.4 5			9873.2257	0.4 6	10080.9115	0.7 4
7 5 2					9838.4577	0.4 6	9842.9082	0.5 8	9873.2855	0.5 5	10081.1207	0.4 6
7 6 2					9862.1385	0.9 3			10037.1217	0.6 4	10213.7228	0.7 4
7 6 1	9368.9179	2.9 1			9862.1707	2.9 1 2			10037.1217	8.0 3	10213.7246	0.6 4
7 7 1					10108.3060	0.9 1			10232.2950	0.6 4	10395.4564	2.7 2
7 7 0					10108.3060	0.9 1			10232.2950	2.6 2	10395.4564	0.9 2
8 0 8			9004.7029	0.6 2	9106.7089	0.8 3	9476.3679	0.9 2	9523.4780	0.5 4	9718.2038	0.9 2
8 1 8			9006.0361	0.9 3	9107.2179	0.8 2	9476.5040	0.9 2	9523.8110	0.5 3	9718.5384	0.9 3
8 1 7			9168.6963	2.9 1	9286.1802	0.8 3			9671.4469	0.4 8		
8 2 7			9263.1157	0.8 4	9299.7802	0.7 2	9628.3899	0.9 2	9674.2219	0.5 6	9868.3028	0.5 6
8 2 6					9404.6689	0.5 5			9779.2079	0.4 8	9973.1268	0.8 4
8 3 6					9485.6532	0.8 2	9793.9282	0.6 5	9800.4075	0.4 5	9995.3737	0.6 6
8 3 5					9499.6484	0.6 4			9848.9298	0.4 5	10049.2999	0.8 3
8 4 5									9924.1837	0.5 5	10117.0061	0.5 4
8 4 4					9641.6870	0.8 7			9922.8918	0.4 6		
8 5 4									10083.8795	0.5 5	10294.6702	0.6 7
8 5 3					9833.4330	0.5 6			10084.2421	0.4 6	10295.2708	0.5 6
8 6 3									10227.1479	0.7 4	10404.0878	2.1 3
8 6 2					10067.8455	0.8 3			10227.0278	0.4 4		
8 7 2					10209.8378	1.7 3			10426.4276	0.6 4	10587.9557	0.6 2
8 7 1					10209.8404	0.5 4			10426.4276	0.5 5	10587.9557	3.3 1
8 8 1									10640.0840	2.9 2		
8 8 0									10640.0840	0.9 2		

TABLE 3 (concluded)

J K A R C	0 5 0		1 3 0		0 3 1		2 1 0		1 1 1		0 1 2	
	E CM-1	DELTA.E N 10-3CM-1	E CM-1	DELTA.E N 10-3CM-1	E CM-1	DELTA.E N 10-3CM-1	E CM-1	DELTA.E N 10-3CM-1	E CM-1	DELTA.E N 10-3CM-1	E CM-1	DELTA.E N 10-3CM-1
9 0 9			9174.6819	0 9 3	9277.2104	0 9 2	9844.4885	0 9 3	9892.2143	0 5 3	9887.8627	0 6 2
9 1 3			9175.8324	2 6 2	9277.4790	0 8 2	9844.8158	0 9 1	9892.8050	0 5 3	9887.7525	0 9 1
9 1 8					9487.8495	0 9 2	9814.7723	0 6 3	9881.8305	0 5 3	10058.7639	0 6 3
9 2 8					9494.6858	0 6 3			9884.4590	0 5 4	10058.4878	0 7 2
9 2 7									9992.9786	0 5 4	10187.4147	0 8 4
9 3 7					9578.3813	0 4 6			10005.0819	0 4 5	10201.0263	0 9 6
9 3 6									10074.8897	0 5 5	10274.9649	0 6 5
9 4 6									10138.8397	0 4 6		
9 4 5									10155.8777	0 5 4	10293.0279	0 9 3
9 5 5									10278.3743	0 4 5	10471.4889	0 6 3
10 5 4									10279.8585	0 5 4	10473.8579	0 6 5
9 6 4									10441.1774	0 4 4		
10 6 3									10449.8380	1 0 2		
9 7 3									10643.9177	0 8 5		
9 7 2									10843.9177	20 6 2		
9 8 2									10859.1277	0 9 1		
9 8 1									10859.1278	1 0 2		
10 0 10					9485.0015	0 8 2	9830.1664	0 9 1	9878.8037	0 5 3	10074.3484	1 0 1
10 1 10					9485.0855	2 1 2	9830.8472	0 9 2	9877.8128	0 6 3	10074.4620	0 9 1
10 1 9									10066.8806	0 5 3		
10 2 9							10024.7005	0 9 1	10088.0838	0 7 3		
10 2 8									10224.7898	0 4 4		
10 3 8			9884.1758	0 5 3	9872.6004	0 6 4	10217.8213	0 6 5	10229.0245	0 6 4		
10 3 7									10320.6870	0 6 4		
10 4 7							10338.2143	0 5 5	10371.1901	0 7 5		
10 4 6									10404.8788	0 4 5		
10 5 6									10516.2292	0 5 4		
10 5 5									10620.7173	0 6 3		
10 6 4									10678.4307	0 5 3		
10 7 4									10884.9586	29 1 1		
10 7 3									10884.9608	0 9 2		
10 8 3									11101.4425	29 1 1		
10 8 2									11101.4425	20 6 2		
11 0 11							10033.0471	2 9 1	10081.4474	0 11 2		
11 1 11					9870.0734	0 9 2	10032.4541	0 9 1	10081.4154	0 9 2		
11 1 10									10284.5872	0 7 3		
11 2 10									10292.3508	0 9 3		
11 2 9									10487.8118	0 7 4		
11 3 9									10471.3805	0 6 4		
11 4 9									10626.2574	0 6 5		
11 5 7									10776.7346	0 5 4		
11 6 6									10840.8073	0 6 3		
11 7 5									11146.8292	0 9 3		
11 8 4									11268.7878	2 9 1		
11 8 3									11388.7974	6 4 2		
12 0 12					9892.8682	0 9 2			10301.7403	0 6 2		
12 1 12									10301.4568	0 7 2		
12 1 11									10532.2580	0 9 3		
12 2 11									10533.7054	0 7 1		
12 2 10									10731.0789	2 9 3		
12 3 10									10731.5160	1 0 1		
12 3 9									10887.8179	0 9 2		
12 4 8									10981.4980	0 9 2		
12 5 7									11078.8883	0 9 2		
13 0 13									10635.7896	1 0 2		
13 1 13									10639.7908	0 7 2		
13 1 12									10791.4195	1 0 1		
13 2 12									10789.7827	0 9 1		
13 3 11									11009.0579	0 9 3		
13 8 8									11532.8729	0 9 1		
14 0 14									10784.8892	0 9 2		
14 1 14									10784.9025	6 2 2		
14 1 13									11067.0838	0 9 1		
14 2 12									11301.7008	2 9 1		
14 3 11									11485.1448	6 7 1		
15 0 15									11067.0750	3 0 1		
15 1 15									11067.0754	0 9 1		
15 2 14									11335.6861	2 9 1		
16 0 16									11358.2763	2 9 1		
16 1 16									11358.2766	29 1 1		
17 0 17									11889.4272	8 8 1		
17 1 17									11882.8274	2 9 1		

NOTES: E: the experimental energy in cm^{-1} . DELTA.E: the uncertainty in the energy value, equal to one standard deviation in units of 10^{-3}cm^{-1} . N: the number of observed lines arriving at the corresponding level. (Additional levels of the (111) state, obtained by Camy-Peyret *et al.* from flame spectra and corresponding to higher J values, can be found in ref. 4.) An additional level of the first decad, (060)(616) at $9400.6413\text{cm}^{-1} \pm 0.41 \times 10^{-3}\text{cm}^{-1}$, is known by seven lines.

TABLE 4. List of experimental assigned line positions and intensities of $H_2^{16}O$ at 300 K, between 8000 and 9500 cm^{-1}

SIGMA CM-1	VIB	J-KA"KC"	J-KA"KC"	E" CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	VIB	J-KA"KC"	J-KA"KC"	E" CM-1	INTENSITY CM-2 ATM-1 %
8057.8820	130	4 1 1	5 2 3	448.910	6.4 E-08 10	8722.0078 P	130	6 2 5	6 3 4	648.878	1.2 E-05 20
8080.1324	130	9 0 9	10 1 10	1114.948	1.17E-05 6	8722.0399 P	031	7 1 6	8 1 7	582.891	1.7 E-05 20
8081.2988 P	130	9 1 9	10 0 10	1114.933	4.3 E-08 10	8727.2989	130	2 1 2	3 0 3	138.781	1.25E-04 6
8073.4482 P	031	5 2 4	6 4 3	758.724	2.4 E-08 10	8729.1574	130	2 1 2	2 2 1	134.902	3.87E-05 6
8073.5305 P	110	5 2 4	6 3 3	661.548	4.0 E-08 10	8730.2541	031	9 3 7	10 3 8	1446.175	5.0 L-06 10
8082.8355	031	6 2 4	7 4 3	931.237	5.5 E-08 10	8731.0006	031	6 0 6	7 0 7	588.243	1.8 E-04 10
8084.4927	130	8 0 8	9 1 9	920.211	7.3 E-08 10	8731.1108	130	5 2 4	5 3 3	503.988	6.9 E-06 10
8085.8669	130	8 1 8	9 0 9	920.189	2.32E-05 6	8731.4920	031	2 0 2	3 1 2	212.158	2.0 E-05 10
8086.1942 P	031	12 0 12	13 0 13	1806.871	1.5 E-08 20	8731.8639	031	6 2 4	7 2 5	782.409	2.39E-05 6
8091.8173 P	130	7 2 5	8 3 6	1006.114	4.9 E-08 10	8733.1848	031	6 1 6	7 1 7	588.479	6.0 E-05 10
8099.2249 P	031	5 0 5	6 2 4	602.773	2.7 E-08 10	8734.4695 P	031	6 1 5	7 1 6	704.214	1.06E-04 6
8099.5885 P	130	9 0 9	9 1 8	1079.080	1.2 E-08 10	8734.6540	130	6 1 5	6 2 4	602.773	9.4 E-06 10
8099.3772	031	8 1 5	7 3 4	842.358	5.5 E-08 10	8736.2379	130	3 0 3	3 1 2	173.365	1.07E-04 6
8100.3958 P	130	6 2 4	7 3 5	818.894	3.4 E-08 10	8736.8388	130	0 0 0	1 1 1	37.138	3.1 E-05 10
8107.8913 B	130	7 0 7	8 1 8	744.183	4.4 E-05 20	8737.7487	130	4 2 3	4 3 2	382.518	2.3 E-05 10
8107.8913 B	130	7 4 3	8 5 4	1255.188	4.4 E-05 20	8737.8941 P	031	7 2 6	8 2 7	589.500	5.58E-05 6
8108.3108 P	130	8 1 7	9 2 8	1080.385	1.9 E-08 10	8738.6605	130	6 3 4	7 2 5	782.409	5.31E-05 6
8108.8281	130	3 1 3	4 2 2	315.779	7.1 E-05 10	8742.1018 P	130	3 2 2	3 3 1	285.219	8.9 E-06 10
8109.8198	130	7 1 7	8 0 8	744.084	1.5 E-05 10	8743.5963	130	5 1 4	5 2 3	446.910	5.4 E-05 10
8111.4517	130	4 2 3	5 3 2	508.812	2.29E-05 6	8743.8280 P	031	7 0 7	7 2 6	709.806	1.9 E-06 20
8112.2240	031	11 1 11	12 1 12	1557.849	3.7 E-06 10	8744.1980 P	031	7 1 4	8 3 5	1050.157	8.4 E-06 10
8112.8824	130	5 2 3	6 3 4	648.978	1.74E-05 6	8748.0790	130	2 1 1	2 2 0	138.183	1.9 E-05 10
8118.1438	130	7 1 6	8 2 7	885.800	1.75E-05 6	8748.7046	130	3 2 1	3 3 0	285.418	2.01E-05 6
8118.5872 P	130	5 3 3	6 4 2	757.780	3.4 E-08 10	8748.0059	130	2 0 2	2 1 1	45.175	4.8 E-05 10
8120.4350 P	130	6 1 9	5 2 7	885.800	2.4 E-08 10	8748.1063 B	031	5 1 4	6 1 5	542.905	7.5 E-05 20
8121.6612	130	5 3 2	5 4 3	758.724	1.2 E-05 10	8748.1063 B	130	4 1 3	4 2 2	315.779	7.5 E-05 20
8124.0357	130	8 2 7	3 1 8	1079.080	8.0 E-08 10	8749.2534	130	3 1 2	3 2 1	212.158	8.8 E-05 10
8127.8182	130	6 1 5	7 2 6	709.806	7.7 E-08 10	8749.4226	031	8 3 6	9 3 7	383.842	1.0 E-05 10
8129.1274	130	4 2 2	5 3 3	503.988	9.9 E-08 10	8750.9017	031	7 1 7	7 1 6	1216.232	5.0 E-06 10
8129.5008 P	130	6 0 6	7 1 7	588.479	2.3 E-08 10	8751.2992	031	5 0 5	6 0 6	446.897	9.87E-05 6
8132.8441 P	031	3 2 2	4 4 1	488.107	3.1 E-08 10	8751.8749	130	3 2 2	4 1 3	275.497	9.1 E-06 10
8133.1524 P	130	6 1 6	7 0 7	588.243	7.24E-05 6	8752.8489	130	5 2 3	5 3 2	508.812	2.8 E-05 10
8134.1751 P	250	5 6 1	7 5 2	1059.825	4.3 E-06 10	8753.2028	130	1 1 1	2 0 2	70.090	2.3 E-05 10
8137.1955	130	5 1 4	6 2 5	552.911	3.62E-05 6	8755.0034	130	1 0 1	1 1 0	42.371	1.17E-04 6
8137.8913	031	10 0 10	11 0 11	1327.109	1.0 E-05 10	8755.2306	031	5 1 5	6 1 6	447.252	2.81E-04 6
8137.9680 P	031	10 1 10	11 1 11	1327.119	3.1 E-06 10	8755.5755 B	130	7 2 5	7 3 4	942.358	1.2 E-05 20
8140.5916	031	3 1 3	4 3 2	382.518	7.4 E-06 10	8755.8271	031	5 2 3	6 2 4	602.773	4.19E-05 6
8143.4788	130	3 2 2	4 3 1	383.842	1.52E-05 6	8757.1833	031	6 2 5	7 2 6	709.806	3.53E-05 6
8146.1894	130	4 3 2	5 4 1	610.340	2.18E-05 6	8757.3486	031	6 2 4	6 4 3	758.724	5.3 E-06 10
8147.0268	130	4 3 1	5 4 2	610.113	8.0 E-06 10	8761.3183 P	031	1 0 1	2 2 0	138.183	3.7 E-06 10
8147.8413 P	130	7 0 7	7 1 6	704.214	7.1 E-08 20	8764.3332 B	031	6 0 6	6 2 5	552.911	1.5 E-05 20
8147.8885 P	130	4 1 3	5 2 4	418.208	1.7 E-05 10	8764.3332 B	130	6 3 4	6 4 3	758.724	1.5 E-05 20
8149.0759	031	4 0 4	5 2 3	448.910	1.1 E-05 10	8764.8478	031	4 1 3	5 1 4	399.497	2.92E-04 6
8149.8062 P	130	3 2 1	4 3 2	382.816	4.5 E-05 20	8768.2453	130	5 1 2	5 4 1	610.340	6.9 E-06 10
8149.8433 P	130	5 0 5	6 1 6	447.252	1.0 E-04 10	8768.4235	130	4 3 2	4 4 1	488.107	6.8 E-06 10
8151.9023	130	2 1 2	3 2 1	212.158	3.9 E-05 10	8768.0106 P	130	4 3 1	4 4 0	488.134	3.1 E-06 10
8155.2927	031	4 1 3	5 3 2	508.812	8.4 E-08 10	8769.9328	031	7 3 5	8 3 6	1006.118	3.35E-05 6
8156.0852	130	5 1 5	6 0 6	446.897	3.55E-05 6	8770.2391	031	4 0 4	5 0 5	325.347	3.98E-04 6
8160.4064	130	3 1 2	4 2 3	300.382	6.4 E-05 10	8773.5733	130	5 3 3	6 2 4	602.773	1.0 E-05 10
8162.8785	031	9 0 9	10 0 10	1114.933	8.4 E-06 10	8774.5245	031	6 3 3	7 3 4	942.358	5.3 E-05 10
8162.9289	031	9 1 9	10 1 10	1114.949	2.3 E-05 10	8776.7592 P	031	6 1 6	6 1 5	542.905	6.6 E-06 10
8166.4940	130	6 1 6	7 1 7	552.911	1.2 E-05 10	8778.8651	031	4 1 4	5 1 5	376.825	1.4 E-04 10
8168.7727	130	6 2 5	7 1 6	704.214	2.38E-05 6	8777.2620	031	5 2 4	5 2 5	552.911	1.82E-04 6
8168.0400	130	4 0 4	5 1 5	328.825	4.36E-05 6	8781.4515	031	8 4 4	9 4 5	1360.235	7.8 E-06 10
8171.5331 P	130	2 2 1	3 3 0	285.418	6.71E-05 6	8781.7888	031	5 0 5	5 2 4	416.208	7.2 E-06 10
8172.5114 P	130	3 3 1	4 4 0	488.134	1.2 E-05 20	8781.9829	031	4 2 2	5 2 3	446.910	2.10E-04 6
8172.5470 P	130	2 2 0	3 3 1	285.219	2.3 E-05 20	8783.1230 P	111	2 2 8	10 4 7	1581.338	3.4 E-06 20
8172.8293	130	3 3 0	4 4 1	488.107	3.8 E-05 10	8783.5861	130	2 2 1	3 1 2	173.365	1.5 E-05 10
8173.0757	130	6 0 6	6 1 5	542.905	5.2 E-06 10	8784.6475	031	3 1 2	4 1 3	275.497	1.48E-04 6
8175.9416	130	2 1 1	3 2 2	208.301	2.82E-05 6	8788.3223	031	3 0 3	4 0 4	222.052	1.88E-04 6
8178.3028 P	031	3 1 2	4 3 1	383.842	2.5 E-06 10	8791.8500	031	6 3 4	7 3 5	818.894	2.27E-05 6
8179.0233 P	130	4 1 4	5 0 5	375.347	1.36E-04 6	8795.2244	031	4 0 4	5 2 3	300.382	2.30E-05 6
8184.7851	130	3 0 3	4 1 4	224.838	1.47E-04 6	8796.2712 P	031	3 1 3	4 1 4	224.838	4.88E-04 6
8188.0388 P	130	6 5 2	7 6 1	1218.193	1.8 E-06 10	8798.4014 P	031	4 2 3	5 2 4	416.208	8.20E-05 20
8188.5397 P	031	8 0 8	9 0 9	920.189	5.0 E-05 10	8799.0249 B	130	7 4 3	7 5 2	1059.825	2.8 E-05 20
8188.5823 P	130	5 1 5	5 2 4	418.208	7.1 E-06 20	8799.0249 B	031	5 1 5	5 1 4	399.497	2.8 E-05 20
8187.0075	031	8 1 8	9 1 9	920.711	1.83E-05 6	8799.0735	031	6 3 3	7 3 2	208.301	6.9 E-06 10
8187.1298	130	1 1 1	2 2 0	138.183	2.34E-06 6	8799.4189 P	050	6 6 1	6 5 2	888.988	1.9 E-06 20
8187.3713 B	130	4 4 0	5 5 1	742.073	2.01E-05 6	8799.6722 B	130	1 1 0	1 0 1	23.794	1.5 E-04 20
8187.3713 B	130	4 4 1	5 5 0	742.076	2.01E-05 6	8799.6722 B	021	5 3 2	6 3 3	661.548	1.5 E-04 20
8192.1746	130	5 2 4	6 1 5	542.905	1.1 E-05 10	8799.9440	130	2 0 2	1 1 1	37.138	1.44E-05 6
8194.4656	130	1 1 0	2 2 1	134.902	8.44E-05 6	8799.9880	130	4 2 2	5 3 5	328.825	7.2 E-06 10
8194.5995	031	3 0 3	4 2 2	318.779	8.2 E-06 10	8799.8870	031	2 0 2	3 0 3	138.781	5.87E-04 6
8194.8304 P	031	9 1 8	10 1 9	1293.019	3.4 E-06 10	8797.2851 P	130	3 2 1	4 1 4	274.838	5.01E-05 6
8195.4218 P	031	2 1 1	3 3 0	285.418	2.8 E-06 20	8797.4742	021	2 1 1	3 1 2	173.365	4.68E-04 6
8198.9985 P	110	8 2 7	8 3 8	1006.118	3.1 E-06 20	8798.7479	021	2 0 2	2 2 1	134.902	8.8 E-06 10
8197.4381	130	5 0 5	5 1 4	399.497	3.51E-05 6	8798.0210 P	130	4 3 2	5 2 3	416.910	2.07E-05 6
8200.9037	130	2 0 2	3 1 3	142.278	4.73E-05 6	8798.2189	031	3 2 1	4 2 2	315.779	8.84E-06 10
8201.0510	031	9 2 8	10 2 9	1293.834	1.1 E-05 10	8798.7803 B	111	6 5 1	7 7 0	1386.813	5.4 E-06 20
8202.5548	130	3 1 3	4 0 4	222.052	4.9 E-06 10	8798.7803 B	130	2 1 1	2 0 2	1386.813	5.4 E-06 20
8202.7436	031	8 2 8	9 2 7	1201.921	1.4 E-06 10	8798.7803 B	130	2 1 1	2 0 2	70.090	5.48E-06 6
8204.0087	130	4 1 4	4 2 3	300.382	3.28E-06 6	8798.7803 B	031	7 4 3	8 4 4	1131.778	8.3 E-06 10
8208.1102	031	8 1 7	9 1 8	1079.080	2.88E-06 6	8798.7803 B	130	5 2 3	6 1 6	447.252	1.0 E-06 10
8208.3822	031	7 0 7	8 0 8	744.084	3.45E-06 6	8798.7803 B					

TABLE 4 (continued)

SIGMA CM-1	V* VIB	J KA'RC'	J KA'RC''	E' CM-1	INTENSITY CM-2 ATM-1	%	SIGMA CM-1	V* VIB	J KA'RC'	J KA'RC''	E' CM-1	INTENSITY CM-2 ATM-1	%
8328.9732 P	210	7 1 6	8 4 5	1122.709	3 8 E-06	10	8428.1112	031	4 2 2	4 2 3	300.382	1 7 E-04	10
8330.1072 P	130	3 0 3	2 1 2	79.488	7.28E-05	6	8430.5190 P	130	2 0 9	8 1 8	744.183	1 8 E-06	10
8332.1818	031	1 1 0	2 1 1	95.175	1.33E-04	6	8431.1884 B	210	7 5 2	8 6 3	1411.812	4 4 E-08	10
8335.2373	031	4 3 1	5 3 2	508.812	1.54E-04	6	8431.1884 B	130	4 3 2	5 0 5	375.347	4 4 E-08	10
8338.8879	031	2 2 0	3 2 1	212.156	2.88E-04	6	8431.7872 P	130	9 1 9	8 0 8	744.064	2 9 E-06	20
8339.2740	031	4 3 2	5 3 3	503.888	5.44E-05	6	8432.0785	130	5 3 2	5 2 3	448.510	4 7 E-05	15
8340.2841	130	2 1 2	1 0 1	23.784	1.19E-04	6	8432.1451	130	3 2 2	2 1 1	95.175	3 8 E-05	10
8340.8327	130	4 3 1	5 2 4	418.208	6 9 E-06	10	8433.8920	031	7 3 5	7 3 4	842.358	1.76E-05	6
8341.1849	031	7 2 8	7 2 5	782.409	1 0 E-05	10	8434.8257 P	130	6 3 4	7 0 7	538.243	5 7 E-06	10
8341.6888	031	1 1 1	2 1 2	79.488	3.94E-04	6	8435.4883 B	031	5 5 0	6 5 1	888.832	4.10E-05	6
8342.8108	031	6 4 2	7 4 3	931.237	4.07E-05	6	8435.4883 B	031	5 5 1	6 5 2	888.832	4.10E-05	6
8343.8840	031	2 2 1	3 2 2	208.301	9.80E-05	6	8435.9971 P	210	7 3 5	8 4 4	1131.778	4 5 E-06	20
8344.8708 P	130	3 3 1	4 2 2	315.779	3 8 E-06	10	8436.5997 B	111	14 1 14	15 1 15	2358.304	3 5 E-06	20
8345.8833 B	031	6 4 3	7 4 4	927.744	1 5 E-05	50	8436.5997 B	111	14 0 14	15 0 15	2358.304	3 5 E-06	20
8349.7438 P	031	3 1 3	3 1 2	173.385	7.58E-05	6	8438.4681	031	2 1 1	1 1 0	42.371	4 7 E-04	10
8350.0583	031	0 0 0	1 0 1	23.784	3.1E-04	6	8438.2671	031	4 1 3	4 1 4	224.828	5.53E-05	6
8351.5510	210	7 3 5	7 6 2	1218.189	6 7 E-06	10	8438.2672 P	031	8 4 4	9 2 7	1201.921	4 1 E-06	10
8351.8579	050	6 6 1	7 3 4	842.358	5 7 E-06	10	8440.7844	031	3 0 3	2 0 2	70.090	2.58E-04	6
8352.3871	130	4 0 4	3 1 3	142.278	2 7 E-05	10	8441.1715 P	130	7 5 3	8 4 4	1131.778	3 5 E-08	20
8353.7871 P	130	7 2 5	8 1 8	744.183	2 2 E-06	10	8441.3615	130	4 3 1	4 2 2	315.779	2 2 E-05	10
8354.8187	130	3 1 3	2 0 2	70.090	4.10E-05	6	8442.3820	031	5 2 3	5 2 4	418.208	2 0 E-05	10
8358.1358 P	031	8 5 3	9 5 4	1477.297	2 8 E-08	10	8443.8130 P	031	3 1 2	2 1 2	79.488	7.45E-04	6
8357.5985 B	130	4 2 2	4 1 3	275.487	4.08E-05	6	8448.9002	130	4 2 3	3 1 2	171.385	8.11E-05	6
8357.5985 B	130	4 1 3	3 2 2	208.301	4.08E-05	6	8448.9070	031	6 3 4	6 3 3	681.548	1 3 E-05	10
8358.7578	130	3 2 1	3 1 2	173.385	1.44E-04	6	8447.8019 P	111	7 1 6	8 3 5	1050.157	9 0 E-06	10
8360.3750	130	3 1 0	4 2 3	300.382	1 1 E-05	10	8448.5810	130	3 3 0	3 2 1	212.156	5.88E-05	6
8360.7824 P	111	7 3 5	5 5 4	1255.186	4 1 E-06	10	8450.8352	130	1 6 5	2 2 5	552.911	9 0 E-06	10
8362.2035	130	5 2 3	5 1 1	399.457	6 8 E-05	10	8451.5240 B	031	7 6 2	5 8 3	1411.812	7 4 E-06	20
8362.5889	130	2 2 0	2 1 1	95.175	1 3 E-05	10	8451.5240 B	031	7 6 2	5 8 3	1411.812	7 4 E-06	20
8362.8057	031	3 3 0	4 3 1	382.842	5.19E-05	6	8452.4547	111	4 1 1	5 5 0	742.078	1 2 E-05	10
8364.0120 B	031	6 2 5	6 2 4	602.773	1.55E-04	6	8452.4547	130	2 2 1	2 1 2	79.488	2 1 E-05	10
8364.0120 B	031	3 3 1	4 3 2	382.818	1.55E-04	6	8454.3447	130	3 3 1	3 2 2	208.301	2.13E-05	6
8364.7593	130	5 1 4	5 0 5	375.347	5 0 E-05	10	8455.2421	031	5 3 3	5 3 2	508.812	1.45E-04	6
8368.3480	111	7 3 5	5 5 4	1008.116	9 5 E-06	10	8455.9214	111	6 0 6	7 2 5	782.409	2.87E-05	6
8367.2878	031	2 1 2	2 1 1	95.175	8.88E-05	6	8456.1687	130	4 3 2	4 2 3	300.382	7.43E-05	6
8367.8095	130	4 1 4	3 0 3	138.781	1.08E-04	6	8458.8252 B	031	4 0 4	3 0 3	138.781	7 7 E-04	10
8369.2318	111	8 5 3	9 5 4	1477.297	6 8 E-06	10	8458.8481 B	130	8 2 7	8 1 8	744.183	8 0 E-06	50
8370.3123	031	5 4 1	6 4 2	757.780	2.18E-05	6	8459.3588	031	4 3 2	4 3 1	383.842	1.13E-04	6
8371.2332	031	5 4 2	6 4 3	758.724	6.65E-05	6	8459.3638	130	5 2 4	4 1 3	275.487	1.72E-05	6
8372.0589	130	5 0 5	4 1 4	274.828	6.81E-05	6	8460.1385 B	130	5 3 3	5 2 4	418.208	2 3 E-05	20
8374.1877	130	6 2 4	6 1 5	542.805	1 2 E-05	10	8461.1098 P	031	3 3 1	3 3 0	285.418	7 0 E-04	10
8377.4554 P	130	2 2 1	2 1 2	79.488	5.12E-05	6	8461.2123 P	031	4 1 4	3 1 3	142.278	2 8 E-04	10
8378.8138	031	1 1 1	1 1 0	42.371	4.75E-04	6	8461.3178 P	111	5 2 4	6 4 3	758.724	3 8 E-04	10
8380.5371 B	111	7 2 8	8 4 5	1122.709	1 2 E-05	20	8461.4283 P	031	3 3 0	3 3 1	285.219	2.31E-04	6
8380.7385	130	5 1 5	4 0 4	222.052	2 8 E-05	10	8461.5333 P	031	4 3 1	4 3 2	382.818	3.30E-04	6
8382.8629	031	5 2 4	5 2 3	448.510	6.09E-05	6	8462.2487 P	031	7 4 3	8 2 6	982.912	3 5 E-06	10
8385.0429 P	130	3 2 2	3 1 3	142.278	2.43E-05	6	8463.1294	031	5 3 2	5 3 3	503.888	5.29E-05	6
8385.3544	031	7 3 4	8 5 4	1255.186	1.50E-05	6	8463.7838	210	6 2 5	7 1 4	842.358	1 8 E-05	10
8388.3881 P	111	7 3 4	8 5 3	1255.186	8 3 E-06	10	8464.3825	031	5 1 4	5 1 5	328.625	1 5 E-05	10
8388.5287	111	8 1 7	9 3 8	1282.919	8 3 E-06	10	8464.8685	031	3 1 2	2 1 1	95.175	2.01E-04	6
8389.2540 P	210	9 0 9	8 5 4	1255.186	3 2 E-06	10	8466.2720 B	111	13 1 13	14 1 14	2073.518	1.79E-05	6
8389.3545	130	6 0 8	5 1 5	328.625	1 8 E-05	10	8466.2720 B	111	13 0 13	14 0 14	2073.518	1.79E-05	6
8389.7449	130	5 1 4	4 2 3	300.382	1 3 E-05	10	8467.9027	031	6 3 3	6 3 4	648.978	6.40E-05	6
8390.2311	031	1 1 0	1 1 1	37.138	1.84E-04	6	8468.1588	130	6 3 4	6 2 5	552.911	6 0 E-05	10
8390.7310	130	6 1 5	6 0 6	448.897	9 8 E-06	20	8468.7538	111	5 2 4	7 4 3	931.237	2 5 E-05	10
8393.7184 B	130	7 2 5	7 1 6	704.214	1 8 E-05	50	8469.4039	060	6 1 6	7 4 3	931.237	1.80E-05	6
8393.7184 B	210	8 3 8	9 4 5	1350.235	1 8 E-05	50	8470.9974 P	130	6 5 2	7 4 3	931.237	6 4 E-06	10
8394.0579 P	130	6 1 8	5 0 5	375.347	5.31E-05	6	8471.5293	130	8 2 5	5 1 4	399.457	3.01E-05	6
8395.4275 P	130	4 2 3	4 1 4	274.828	6.44E-05	6	8474.0541	111	5 1 5	6 3 4	648.978	2 9 E-05	10
8398.2620	031	4 4 0	5 4 1	610.340	6.80E-05	6	8475.9430	031	5 0 5	1 0 4	222.052	2 2 E-04	10
8398.4773	031	4 4 1	5 4 2	610.113	2.47E-05	6	8478.3084 B	031	6 8 1	7 8 2	1218.189	1 3 E-05	20
8397.4854	031	1 0 1	0 0 0	0.000	1.28E-04	6	8478.3084 B	031	6 8 0	7 8 1	1218.189	1 3 E-05	20
8398.8310 P	031	4 2 3	4 2 2	315.779	4.59E-05	6	8477.8446 B	031	5 1 5	4 1 4	224.828	8 8 E-04	20
8401.3437	031	2 1 1	2 1 2	79.488	2.23E-04	6	8479.8745	031	2 2 1	2 0 2	70.090	5 4 E-06	10
8403.1281	031	4 2 2	5 0 5	375.347	1 4 E-05	10	8484.1910 B	031	3 2 2	3 0 1	138.781	4 2 E-05	10
8403.9451	031	3 2 1	4 0 4	222.052	6 0 E-06	10	8484.1910 B	111	12 2 10	13 2 11	2248.887	4 2 E-05	10
8404.8017	130	7 2 7	8 1 8	447.282	2.18E-05	6	8484.4883 P	031	6 2 6	5 0 9	920.169	3 5 E-06	10
8407.1888 B	130	7 1 7	6 0 8	448.897	1 1 E-05	50	8488.0512	031	3 2 2	2 2 1	134.902	2.90E-04	6
8408.4552	130	5 2 4	5 1 5	328.625	1 8 E-05	10	8489.8343	031	3 2 1	2 2 0	138.183	1.57E-04	6
8408.7940	031	3 2 2	3 2 1	212.156	3 8 E-04	10	8489.9475 B	111	12 1 11	13 1 12	2042.311	1 4 E-06	20
8410.2284 P	210	8 1 8	7 2 5	782.409	4 1 E-06	10	8489.9475 B	031	8 7 1	9 7 2	1810.584	1 4 E-06	20
8410.5848	031	6 5 2	7 5 3	1059.847	9 3 E-06	10	8489.9475 B	031	8 7 2	9 7 3	1810.584	1 4 E-06	20
8410.8202	031	6 5 1	7 5 2	1059.847	3 0 E-06	10	8490.0611	031	7 2 5	7 2 8	709.808	8 7 E-06	10
8412.8888	031	6 3 3	7 1 8	704.214	1 0 E-05	10	8490.7391	031	4 1 3	3 1 2	173.385	8 0 E-04	10
8413.8020	031	2 2 1	2 2 0	138.183	2.45E-04	6	8490.8188 P	130	4 2 2	3 1 3	142.278	1 0 E-05	10
8414.2634	031	2 2 0	3 0 3	138.781	1 0 E-05	10	8491.3205	111	12 2 11	13 2 12	2042.311	5 1 E-06	10
8414.5801	130	2 2 1	1 1 0	42.371	1.38E-04	6	8491.4314 B	031	6 1 5	6 1 8	447.282	2 1 E-05	50
8416.1225	031	2 2 0	2 2 1	134.902	7.47E-04	6	8491.4627 B	111	5 2 3	6 4 2	757.780	2 1 E-05	50
8417.5081 B	130	7 1 8	7 0 7	588.243	1 8 E-05	50	8491.7354	031	6 4 2	7 2 5	782.409	6 4 E-06	10
8417.8888 P	031	3 1 2	3 1 3	142.278	4.14E-								

TABLE 4 (continued)

SIGMA CM-1	V* VIB	J*KA*RC*	J*KA*RC*	E* CM-1	INTENSITY CM-2 ATM-1	SIGMA CM-1	V* VIB	J*KA*RC*	J*KA*RC*	E* CM-1	INTENSITY CM-2 ATM-1
3507.4631 B	111	10 3 7	11 3 8	1813.223	3.6 E-04 20	8582.0292	031	7 1 8	8 1 5	542.905	7.3 F-05 10
3507.4631 B	031	7 1 7	8 1 6	447.252	3.6 E-04 20	8583.1484 P	111	3 1 3	4 3 2	382.518	9.2 E-05 10
3508.3059	031	4 2 3	3 2 2	208.301	1.68E-04 6	8583.6105	111	8 3 5	9 3 6	1282.919	2.34E-04 6
3508.8724	111	11 3 9	12 3 10	1987.508	1.5 E-05 10	8584.9988	031	5 3 3	5 1 4	339.457	2.08E-05 6
3511.1781	111	4 2 2	5 4 1	610.340	5.8 E-05 10	8585.3780 B	210	9 0 9	9 1 8	1079.080	5.8 E-06 50
3512.0191	210	5 2 4	6 3 3	561.548	1.3 E-05 10	8585.3780 B	111	9 6 3	10 6 4	1875.464	5.8 E-06 50
3512.1529	031	7 4 4	7 4 3	931.237	3.3 E-05 10	8585.6408 B	031	6 3 4	6 1 5	542.905	7.3 E-06 50
3515.5120 P	031	5 1 4	4 1 3	275.497	1.52E-04 6	8585.7588 P	031	12 0 12	11 0 11	1327.109	1.80E-05 6
3515.8462	031	6 4 3	6 4 2	757.780	3.1 E-05 10	8586.2044	111	9 6 4	10 6 5	1874.973	1.0 E-05 10
3516.3170	031	4 2 2	3 2 1	212.156	4.9 E-04 10	8587.5633	031	6 2 4	5 2 3	146.510	2.55E-04 6
3516.8042	031	5 3 3	6 1 6	447.252	4.8 E-06 10	8588.0041 P	1 121	5 4 2	7 4 3	2572.140	4.3 E-06 10
3517.4223 B	031	7 4 3	7 4 4	927.744	1.05E-04 6	8588.8115	111	9 1 8	10 1 9	1293.019	1.1 E-04 10
3517.4223 B	031	6 4 2	6 4 3	756.724	1.08E-04 6	8588.8198	111	5 3 3	5 5 0	742.076	8.8 E-08 10
3517.6159 B	111	11 2 10	12 2 11	1774.751	2.3 E-04 20	8589.8334	210	3 3 1	4 4 0	486.134	1.3 E-05 10
3517.6159 B	031	5 4 2	5 4 1	610.340	2.3 E-04 20	8589.8159	210	3 3 0	4 4 1	188.107	3.8 E-05 10
3517.9782	031	5 4 1	5 4 2	610.113	7.41E-05 6	8570.8833	021	7 2 8	6 2 5	552.911	2.2 E-04 10
3518.3547 P	210	5 3 2	6 4 3	756.724	1.9 E-05 10	8570.8247 P	111	9 2 8	10 2 9	1293.834	2.6 E-04 10
3518.4573 B	031	7 1 6	7 1 7	586.479	1.7 E-04 20	8570.9042 P	111	4 1 3	5 3 2	508.812	1.8 E-04 10
3518.4573 B	031	4 4 1	4 4 0	488.134	1.7 E-04 20	8571.8342	031	7 3 5	7 1 6	704.214	1.23E-05 6
3518.4549 P	031	4 4 0	4 4 1	488.107	4.8 E-04 10	8572.0088 P	111	7 2 6	7 4 3	931.237	9.8 E-06 10
3518.9747 B	111	5 0 5	6 2 4	602.773	3.9 E-06 20	8572.8570	111	8 4 4	9 4 5	1360.235	1.68E-04 6
3518.9747 B	031	8 4 4	8 4 5	1122.709	3.9 E-05 20	8573.1818	031	3 3 1	3 1 2	173.365	6.8 E-06 10
3519.0684 P	031	5 2 5	6 2 7	885.800	9.1 E-08 10	8573.3892 P	210	4 2 2	5 3 3	503.968	1.72E-05 6
3519.9613	111	11 1 10	12 1 11	1774.819	1.2 E-05 10	8573.7292 P	1 121	5 2 2	6 2 4	2211.192	3.0 E-06 20
3520.0373 P	210	7 1 6	7 4 3	931.237	4.9 E-06 20	8574.5137 P	031	9 2 8	9 0 9	920.189	8.1 E-06 20
3520.4649	031	5 0 8	7 0 7	586.243	2.12E-04 6	8574.5595 P	110	5 3 4	5 2 3	446.510	3.3 E-05 10
3520.7380	031	5 1 9	7 1 7	586.479	7.10E-05 6	8575.0471 P	031	5 4 2	5 2 5	552.911	5.8 E-06 10
3521.1179 P	111	4 3 3	7 6 2	1218.189	1.2 E-05 10	8575.8248	111	4 0 4	5 2 3	446.510	2.04E-04 6
3521.1833 P	111	4 1 4	5 3 3	503.968	2.4 E-05 10	8576.5073	111	6 3 3	5 5 2	588.598	3.2 E-05 10
3521.7210	111	10 5 5	11 5 6	1998.995	6.7 E-08 50	8577.2859	111	8 2 6	9 2 7	1201.921	3.98E-04 6
3523.5678 P	111	11 1 11	12 1 12	1557.849	1.2 E-04 10	8577.8806	111	5 0 9	10 0 10	1114.533	3.28E-04 6
3523.6006 B	111	11 0 11	12 0 12	1557.844	4.0 E-06 20	8578.0951 B	111	9 1 9	10 1 10	1114.549	7.8 E-04 20
3523.9783 P	130	3 3 0	3 3 3	138.761	4.8 E-06 10	8578.2680 B	031	8 4 3	8 5 4	1255.166	1.9 E-05 20
3524.4681 P	130	5 3 1	2 2 0	138.163	7.76E-05 6	8578.8108	031	7 5 2	7 5 3	1059.647	1.05E-05 6
3524.9904	210	10 4 7	11 3 8	1813.223	1.54E-05 6	8578.9873 P	031	10 2 8	10 2 9	1293.834	3.7 E-06 20
3525.8358 P	130	3 3 0	2 2 1	134.902	1.1 E-04 10	8580.8857	031	7 5 3	7 5 2	1059.835	3.97E-05 6
3525.9128 P	111	3 2 2	4 4 1	488.107	3.8 E-05 10	8581.0432 P	210	7 1 7	8 0 8	744.064	2.3 E-06 20
3526.1610 P	050	7 8 1	7 3 4	842.358	1.2 E-05 20	8581.2737 P	210	7 0 7	8 1 8	744.163	7.6 E-06 10
3527.1566 P	210	10 3 8	11 2 9	1690.865	1.9 E-05 10	8581.5372 P	031	5 3 3	4 3 2	382.518	2.9 E-04 10
3527.2308 P	021	2 2 0	1 0 1	23.794	5.8 E-08 10	8581.8787 P	031	6 5 2	6 5 1	688.832	3.7 E-05 20
3528.1593	111	10 4 7	11 4 8	1843.030	7.4 E-06 10	8581.8880 P	031	5 5 1	5 5 0	742.076	2.5 E-04 10
3528.8115	031	5 2 4	4 2 3	300.362	4.48E-04 6	8582.0406 B	031	6 5 1	6 5 2	888.598	9.7 E-05 10
3530.4434 P	111	10 5 6	11 5 7	1985.787	4.5 E-06 10	8582.0406 B	031	5 5 0	5 5 1	742.073	9.7 E-05 10
3531.8888 P	031	7 3 5	8 1 8	744.163	4.2 E-06 10	8583.2984 P	111	8 4 5	9 4 6	1340.885	6.2 E-05 20
3532.0402	111	3 2 1	4 4 0	488.134	1.3 E-05 10	8583.9757	031	8 1 7	7 1 6	704.214	1.2 E-04 10
3533.1463 B	031	9 0 9	8 0 8	744.064	6.2 E-05 10	8584.1886	111	8 3 6	7 3 7	1218.232	1.22E-04 6
3533.1463 B	210	4 1 4	5 2 3	446.510	6.2 E-05 10	8584.5901 P	012	9 3 7	10 4 6	1618.452	7.1 E-08 10
3533.2185	021	9 1 9	8 1 8	744.163	1.2 E-04 10	8584.7199 P	210	2 1 3	4 2 2	215.779	1.7 E-05 10
3533.9548 B	111	10 3 8	11 3 9	1695.071	1.84E-05 6	8584.7932 P	111	10 1 10	10 1 9	1293.019	6.8 E-06 10
3533.9548 B	111	5 2 3	5 4 2	2251.695	1.84E-05 6	8584.8602 P	210	7 3 5	8 2 6	982.912	2.7 E-05 10
3534.1248	111	10 2 8	11 2 9	1690.865	3.62E-05 6	8585.1690	111	10 0 10	10 2 9	1293.834	1.2 E-05 10
3535.5400	111	9 3 6	10 3 7	1538.150	2.59E-05 6	8585.3836 P	012	5 2 7	9 3 6	1282.919	5.2 E-06 20
3536.8225 P	130	5 2 3	4 1 4	224.638	1.3 E-05 10	8585.9171	210	3 2 2	4 3 1	383.842	4.7 E-05 10
3537.2147 P	210	10 1 10	10 2 9	1293.834	3.9 E-06 10	8586.9449	111	8 5 3	9 5 4	1477.297	6.08E-05 6
3537.3521	031	7 2 6	7 0 7	586.243	1.2 E-05 10	8586.9599	031	7 5 2	5 3 5	1050.157	8.28E-05 6
3538.2264 B	111	3 4 5	10 4 6	1618.452	3.40E-04 6	8586.9887	111	9 5 4	9 5 5	1474.981	2.78E-05 6
3538.2264 B	031	6 1 5	5 1 4	399.457	3.40E-04 6	8586.9726 P	111	9 7 3	10 7 4	2054.347	4.2 E-06 10
3539.4360 P	111	5 1 4	6 3 3	561.548	5.05E-05 6	8590.0379	130	7 5 3	8 2 6	932.912	7.3 E-05 10
3542.2612	210	4 3 2	5 4 1	610.340	2.4 E-05 10	8590.1717	031	6 2 7	7 2 6	709.608	4.2 E-05 10
3542.4482 P	111	6 2 7	8 4 4	1131.776	5.2 E-06 10	8590.9067 P	210	5 1 8	6 2 7	585.800	8.5 E-06 10
3542.8212	031	5 2 3	4 2 2	315.779	1.5 E-04 10	8592.3677	111	8 1 7	9 1 8	1079.080	8.1 E-04 10
3542.9488	111	10 2 9	11 2 10	1525.137	3.9 E-05 10	8593.1878	111	6 2 5	6 4 2	757.780	6.5 E-06 10
3543.5324	210	4 3 1	5 4 2	610.113	9.7 E-06 10	8593.4877 P	210	8 0 8	9 1 7	582.891	6.5 E-06 10
3544.0229 B	031	8 1 7	8 1 8	744.163	1.24E-04 6	8593.8356 P	111	8 2 7	9 2 8	1080.385	2.86E-04 6
3544.0325 B	111	10 1 9	11 1 10	1524.849	1.24E-04 6	8594.0327	210	3 2 1	4 3 2	382.518	5.90E-05 6
3544.3744	130	4 3 2	3 2 1	212.156	4.5 E-05 10	8594.1915	111	7 3 4	8 3 5	1050.157	1.60E-04 6
3545.8323 P	031	10 0 10	9 0 9	920.189	5.9 E-06 10	8595.6440	111	8 6 2	9 6 3	1631.384	2.2 E-09 10
3546.8748 P	031	10 1 10	9 1 9	920.211	2.1 E-05 20	8595.8324 P	111	3 1 2	4 3 1	383.842	4.2 E-05 10
3546.9048 P	050	8 8 1	6 3 4	648.978	2.3 E-05 10	8595.9002 P	111	8 8 3	9 8 4	1631.251	8.5 E-06 10
3546.9903 P	031	10 2 8	11 0 11	1327.109	6.7 E-05 10	8596.8958	031	7 2 5	6 2 4	502.773	4.9 E-05 10
3546.8121	120	4 4 0	4 3 1	383.842	1.1 E-05 10	8597.2998	031	9 3 7	9 1 8	1079.080	8.5 E-06 10
3546.9288 P	120	4 4 1	4 3 2	382.518	3.21E-05 6	8598.8845 B	012	9 5 4	10 5 5	1874.973	3.8 E-06 20
3547.8857 P	111	12 4 8	12 6 7	2433.803	1.2 E-06 20	8599.0881	111	2 1 2	3 3 1	285.219	2.99E-06 6
3550.5136 P	031	8 5 3	9 3 6	1282.919	3.3 E-06 10	8601.2481	210	5 1 4	6 2 5	552.911	4.18E-06 6
3550.5627 B	031	6 2 5	5 2 4	416.206	1.2 E-04 20	8601.2872	111	7 2 5	8 2 6	982.912	2.7 E-04 10
3550.6938 B	111	10 1 10	11 1 11	1327.119	1.1 E-04 20	8603.3087 P	111	8 0 8	9 0 9	920.189	1.8 E-03 10
3550.8388	130	4 3 1	3 2 2	208.301	2.0 E-05 10	8603.3988 P	111	8 1 8	9 1 9	920.211	6.1 E-04 10
3551.6937	111	10 0 10	11 0 11	1327.109	2.2 E-04 10	8604.0272	1 121	5 1 5	6 1 6	2042.754	1.0 E-05 10
3552.0088	210	8 3 6	9 2 7	1201.921	8.4 E-06 10	8604.5773 P	031	6 3 4	5 3 3	503.968	7.08E-06 6
3552.3411	210	4 2 3	5 3 2	508.812	8.50E-06 6	8604.9583	031	9 1 8	8 1 7	882.881	2.12E-06 6
3553.2398 P	130	5 3 2	5 0 5	325.347	8.8 E-06 10	8605.1849 P	210	6 0 6	7 1 7	586.479	4.2 E-06 20
3555.0075	111	9 2 7	10 2 8	1437.889	5.10E-06 6	8605.5340	111	7 4 3	8 4 4	1131.776	1.4 E-04 10
3555.1509	111	9 4 4	10 5 5	1724.707</							

TABLE 4 (continued)

SIGMA CM-1	V ^a VIB	J ^a KA ^a RC ^a	J ^a KB ^a RC ^a	E ^a CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	V ^a VIB	J ^a KA ^a RC ^a	J ^a KB ^a RC ^a	E ^a CM-1	INTENSITY CM-2 ATM-1 %
8615.8379 B	111	8 7 2	9 7 3	1810.584	1.1 E-05 20	8656.4993	111	8 2 6	8 4 5	1122.709	2.1 E-05 10
8616.8375 B	111	8 7 1	9 7 2	1810.588	1.1 E-05 20	8657.1444 B	111	7 2 5	7 4 4	927.744	2.78E-05 6
8618.8185	210	4 1 3	5 2 4	416.208	2.4 E-05 10	8657.1444 B	210	6 2 5	6 3 4	648.978	2.78E-05 6
8617.2958 P	111	4 2 3	4 4 0	488.134	4.9 E-08 10	8657.2900	031	8 3 5	7 3 4	842.358	6.89E-05 6
8617.3744 P	111	7 5 2	8 5 3	1255.912	5.8 E-05 10	8657.5298 P	210	6 3 4	6 4 3	758.724	5.8 E-06 10
8617.4771 P	210	2 2 0	3 3 1	285.219	2.4 E-05 10	8658.0794	111	5 1 4	6 1 5	542.906	2.2 E-03 10
8617.5413 P	111	6 2 4	7 2 5	782.409	7.2 E-04 10	8660.2447	111	3 1 3	3 3 0	285.418	4.18E-05 6
8617.6460 P	111	7 2 8	8 2 7	885.800	1.7 E-03 10	8660.8726 B	031	7 4 4	7 2 5	782.409	2.2 E-05 20
8618.0567 B	111	2 1 1	3 3 0	285.418	1.70E-04 6	8660.9728 B	210	5 1 5	5 2 4	416.208	2.2 E-05 20
8618.0587 B	111	7 5 3	8 5 4	1255.168	1.70E-04 6	8661.8958	210	4 2 3	5 1 4	399.457	1.5 E-04 10
8618.2309	060	4 1 6	7 2 5	782.409	5.30E-04 6	8662.0172 P	111	5 3 3	6 3 4	648.978	2.9 E-03 10
8618.7422 P	1 121	4 3 2	5 3 3	2128.407	1.7 E-06 20	8662.5973 P	111	7 0 7	7 2 6	709.806	8.3 E-05 10
8619.2129	031	4 3 1	4 1 4	224.838	5.5 E-06 10	8663.1525 P	111	2 0 2	3 2 1	212.158	5.58E-04 6
8619.6247 P	130	6 5 2	7 2 5	782.409	6.14E-04 6	8663.4778 P	210	1 1 1	2 2 0	138.163	3.7 E-05 20
8621.2248	210	7 0 7	7 1 8	704.214	1.8 E-05 10	8663.5126 P	031	6 4 3	5 4 2	610.113	4.7 E-05 20
8622.2559	031	8 2 8	7 2 9	782.409	7.9 E-05 10	8663.6085	031	6 4 2	5 4 1	610.340	1.32E-04 6
8622.7502	111	6 3 3	7 3 4	842.358	1.5 E-03 10	8665.1211	111	5 2 4	6 2 5	552.911	5.7 E-03 10
8623.0374 B	012	7 6 1	8 7 2	1590.890	8.8 E-06 20	8665.3293 P	111	8 1 7	8 3 6	1006.118	1.0 E-04 10
8623.0374 B	012	7 6 2	8 7 1	1590.890	8.8 E-06 20	8665.6890 P	210	8 3 3	6 4 2	757.780	1.3 E-05 10
8623.0374 B	012	8 5 4	9 6 3	1631.384	8.8 E-06 20	8666.7848	111	5 4 1	6 4 2	757.780	4.37E-04 6
8623.9540 P	012	8 5 3	9 6 4	1631.251	2.8 E-06 10	8667.2125 P	012	5 0 5	6 3 4	648.978	2.8 E-04 10
8624.1841 B	1 121	4 0 4	5 0 5	1920.789	1.5 E-04 20	8667.8458	111	5 4 2	6 4 3	758.724	1.3 E-03 10
8624.1841 B	1 121	3 0 3	4 2 2	315.779	1.5 E-04 20	8668.2805	111	7 1 7	7 1 8	704.214	2.5 E-04 10
8625.4630 B	111	7 5 1	8 6 2	1411.648	1.5 E-05 20	8668.9228	210	5 3 3	6 2 1	502.773	1.4 E-04 10
8625.5191 B	111	7 6 2	8 6 3	1411.612	4.8 E-05 20	8669.1983	210	3 0 3	4 1 4	224.838	1.1 E-04 10
8626.5705 P	1 121	4 1 4	5 1 5	1922.830	5.2 E-06 20	8669.5990 B	210	5 2 4	5 3 3	503.988	1.2 E-05 20
8627.0702 P	031	7 3 5	6 3 4	648.978	1.37E-04 6	8670.2581 B	210	1 1 0	2 2 1	134.902	1.5 E-04 20
8628.1416	111	7 0 7	8 0 8	744.064	1.2 E-03 10	8670.2581 B	031	9 3 7	8 3 6	1006.118	1.5 E-04 20
8628.3111 B	111	7 1 7	8 1 8	744.183	3.8 E-03 10	8670.6790 B	031	10 2 8	9 2 7	1201.921	1.4 E-05 20
8628.3114 B	031	6 5 1	7 3 4	842.358	3.8 E-03 10	8670.6790 B	031	4 3 1	3 1 2	173.385	1.4 E-05 20
8628.5928 B	1 121	3 1 2	4 1 3	1875.473	9.3 E-06 50	8670.6790 B	1 121	2 1 2	3 1 1	173.484	1.4 E-05 20
8630.1144 P	111	10 2 9	10 2 8	1437.989	9.2 E-06 20	8672.4502	012	7 4 3	8 5 4	1255.168	1.43E-05 6
8630.4807	210	5 1 5	6 0 6	448.897	6.5 E-06 10	8675.0092 P	111	4 2 2	5 2 3	448.810	7.0 E-03 20
8630.8538	210	5 2 4	6 1 5	542.906	7.5 E-06 10	8675.0495 P	111	5 0 5	6 0 6	448.897	3.3 E-03 20
8631.8451	210	6 3 4	7 2 5	782.409	6.44E-04 6	8675.3619 B	111	5 0 5	6 0 6	888.832	4.8 E-04 20
8632.8041 P	1 121	3 2 1	4 2 2	1922.901	4.9 E-05 20	8675.3973 B	111	5 0 5	6 0 6	888.898	6.0 E-04 20
8632.8432 B	210	3 1 2	4 2 3	300.382	1.0 E-04 10	8675.7803	111	5 1 5	6 1 6	447.252	1.1 E-02 10
8632.8432 B	031	7 3 4	8 3 3	661.548	1.0 E-04 10	8676.1470	210	5 0 5	5 1 4	399.457	3.97E-05 6
8633.4115	111	4 2 2	1 4 1	488.107	1.92E-05 6	8678.0381	012	7 3 5	8 4 4	1131.778	5.8 E-05 10
8634.4055	031	7 5 3	8 3 6	1006.118	1.0 E-05 10	8678.4480	210	3 1 3	4 0 4	222.092	1.3 E-05 10
8635.1358 P	012	8 3 6	9 4 5	1380.235	4.6 E-06 10	8678.6388	210	4 2 3	4 3 2	382.518	4.0 E-05 10
8636.0383	111	6 3 4	7 3 5	618.694	6.1 E-04 10	8679.2984	210	4 1 4	4 2 3	300.382	5.74E-06 6
8636.4630 B	210	10 3 8	10 4 7	1581.336	6.2 E-06 20	8680.2591	111	4 1 3	5 1 4	399.457	1.0 E-02 10
8636.7581	111	6 1 5	7 1 6	704.214	3.7 E-03 10	8681.2655	111	7 1 6	7 3 5	818.894	6.1 E-05 10
8636.9721	111	6 4 2	7 4 3	931.237	8.3 E-04 10	8681.9480 P	1 121	1 1 0	2 1 1	1692.852	5.9 E-06 10
8637.8778	111	8 0 8	8 2 7	885.800	1.08E-04 6	8682.2527 P	130	10 3 8	9 2 7	1201.921	3.0 E-06 10
8638.1274 P	111	5 2 3	5 4 2	610.113	1.1 E-05 10	8684.5382	210	3 2 2	3 3 1	285.219	1.2 E-05 10
8638.5683	111	6 4 3	7 4 4	927.744	2.8 E-04 10	8685.2032	050	6 6 1	5 3 2	508.812	1.2 E-05 10
8639.7290 P	210	6 1 6	6 2 5	552.911	3.0 E-05 50	8685.4189 P	111	6 0 6	6 2 5	552.911	4.47E-04 6
8639.8502	031	5 4 2	4 4 1	488.107	1.10E-04 6	8685.7190	111	4 3 1	5 3 2	508.812	4.4 E-03 10
8639.9578	031	5 4 1	4 4 0	488.134	4.3 E-05 10	8686.9727 B	130	6 4 3	5 3 2	508.812	2.4 E-05 50
8640.7199	111	6 1 8	8 1 7	882.891	3.99E-05 6	8688.8452	031	7 4 4	6 4 3	758.724	9.1 E-05 10
8641.3413	111	6 2 5	7 2 6	705.908	1.1 E-03 10	8687.0245	1 121	1 0 1	2 0 2	1584.870	8.2 E-06 10
8641.6053 B	111	7 0 8	8 7 1	1590.890	1.8 E-05 20	8687.2511	210	2 0 2	3 1 3	142.378	5.1 E-05 10
8641.6053 B	111	7 1 1	8 7 2	1590.890	1.8 E-05 20	8687.3834 B	031	7 4 3	6 1 2	757.780	3.4 E-05 20
8641.9255	1 121	3 2 2	4 2 3	1908.017	1.2 E-05 10	8689.1555 P	111	4 3 2	5 3 3	503.988	1.5 E-03 10
8643.2684	111	6 2 4	6 4 3	758.724	8.9 E-06 10	8689.2229 P	111	4 2 3	5 2 4	416.208	3.0 E-03 10
8643.8179 B	060	6 1 6	6 4 3	758.724	6.2 E-06 20	8691.3098	111	8 2 7	8 2 6	982.912	3.7 E-05 10
8644.0273	130	4 4 1	3 3 0	285.418	6.98E-05 6	8691.9937	111	6 1 5	6 3 4	648.978	2.57E-04 6
8644.2343 B	130	4 4 0	3 3 1	285.219	2.6 E-05 20	8692.8552	1 121	1 1 1	2 1 2	1677.082	1.7 E-05 10
8644.7648 P	1 121	3 0 3	4 0 4	1817.450	6.2 E-06 10	8693.5152	210	4 2 2	4 3 1	382.842	5.8 E-06 10
8645.2226 B	130	7 5 3	7 4 4	927.744	1.9 E-05 50	8694.0678	111	1 0 1	2 2 0	138.163	1.1 E-04 10
8645.2226 B	1 121	3 1 1	4 3 2	2004.818	1.9 E-05 50	8694.1974 P	210	3 1 3	3 2 2	208.301	2.3 E-05 20
8645.3876	111	9 1 6	9 3 7	1216.232	1.3 E-05 10	8694.2627 P	210	3 2 2	4 1 3	275.497	2.9 E-04 10
8645.5092 P	130	6 5 2	6 4 3	758.724	4.12E-05 6	8694.4552 P	111	3 1 2	3 3 1	285.219	2.48E-06 6
8646.0248 P	031	8 6 2	8 6 3	1411.612	1.7 E-05 10	8695.1818	111	4 4 0	5 4 1	610.340	1.43E-03 6
8646.4695	111	5 2 3	6 2 4	602.773	1.5 E-03 10	8695.3895	111	4 4 1	5 4 2	610.113	4.78E-04 6
8646.7717 P	111	6 5 1	7 5 2	1059.835	3.02E-04 6	8695.8388	210	5 2 3	5 3 2	508.812	1.9 E-05 10
8646.8882 P	130	5 5 0	5 4 1	610.340	2.2 E-05 20	8696.8763 P	111	6 1 5	6 1 5	542.906	1.8 E-04 10
8646.9514 B	031	7 8 2	7 8 1	1218.193	1.5 E-04 20	8696.8737	012	6 4 3	7 5 2	1059.835	2.7 E-06 10
8646.9514 B	111	6 5 2	7 5 3	1059.847	1.5 E-04 20	8696.9877	111	4 0 4	5 0 5	375.347	1.5 E-02 10
8646.9514 B	031	7 8 1	7 8 2	1218.189	1.5 E-04 20	8697.1895 P	111	4 1 3	4 3 2	382.816	2.1 E-04 10
8647.1057 P	130	5 5 1	5 4 2	610.113	9.5 E-06 20	8697.9049 B	012	6 4 2	7 5 3	1059.847	9.8 E-06 50
8647.4431 B	031	6 6 1	6 6 0	1049.058	1.5 E-04 20	8697.9049 B	1 121	3 1 3	3 1 2	1772.413	9.8 E-06 50
8647.4431 B	031	6 6 0	6 6 1	1049.057	1.5 E-04 20	8698.5298	111	4 1 4	5 1 5	328.625	5.1 E-03 10
8648.7508 B	1 121	3 1 3	4 1 4	1821.598	2.7 E-06 20	8700.1411 B	012	5 5 1	6 6 0	1049.058	1.55E-06 6
8648.7508 B	210	6 0 6	6 1 5	542.906	2.7 E-06 20	8700.1411 B	012	5 5 0	6 6 1	1049.057	1.55E-06 6
8648.9573	031	8 3 6	7 3 5	618.694	2.9 E-05 10	8700.6020 B	210	4 0 4	4 1 3	275.497	6.5 E-05 50
8649.2715 B	012	7 5 3	8 6 2	1411.648	5.8 E-06 50	8703.0132	012	6 2 5	7 3 4	138.761	3.0 E-06 10
8649.2715 B	050	6 6 0	6 1 5	542.906	9.8 E-06 50	8703.6140	210	2 1 2	3 0 3	275.497	4.8 E-03 10
8649.5095	012	7 5 2	8 6 3	1411.612	1.7 E-06 10	8704.1781 P	111	3 1 2	4 1 3	315.779	3.9 E-03 10
8649.6772	210	4 0 4	5 1 5	328.625	2.3 E-06 10	8704.2061 P	111	3 2 1	4 2 2	315.779	1.5 E-04 10
8650.1898	012	7 2 8	8 3 5	1050.187	1.4 E-06 10	8705.1832	210	1 0 1	2 1 2		

TABLE 4 (continued)

SIGMA CM-1	J" VIB	J'KA"RC"	J"KA"RC"	E" CM-1	INTENSITY CM-2 AIM-1 Z	SIGMA CM-1	J" VIB	J'KA"RC"	J"KA"RC"	E" CM-1	INTENSITY CM-2 AIM-1 Z
8713.6592	111	3 2 2	4 2 3	300.362	1.0 E-02 10	8772.2975	111	3 1 3	3 1 2	173.365	3.9 E-03 10
8713.8958 P	130	7 4 3	6 3 4	648.978	1.3 E-05 20	8772.7785	012	4 3 2	5 4 1	610.340	8.32E-05 6
8714.0093 B	012	5 3 4	7 4 3	931.237	3.0 E-05 10	8773.1125	012	9 0 9	10 1 10	1114.548	5.31E-05 6
8714.0093 B	111	10 4 8	11 2 9	1690.669	3.0 E-05 10	8773.2188	012	9 1 9	10 0 10	1114.533	1.86E-05 6
8714.3119 P	012	5 1 5	8 2 4	602.773	7.8 E-06 10	8773.4880 P	111	5 3 2	6 1 5	542.906	1.4 E-05 10
8714.7684	111	3 3 0	4 3 1	383.842	1.5 E-03 10	8773.5912	111	7 3 5	7 3 4	842.356	4.9 E-04 10
8715.8813 B	111	3 3 1	4 3 2	382.518	4.5 E-03 50	8774.5355	012	4 3 1	5 4 2	610.113	3.0 E-05 10
8717.2475	210	4 1 3	4 2 2	319.779	3.44E-05 6	8775.1943 P	1 121	2 1 2	1 1 1	1634.969	1.8 E-05 10
8717.9110	111	3 0 3	4 0 4	222.052	6.5 E-03 10	8776.5044	111	9 4 6	9 4 5	1360.235	5.7 E-05 10
8720.1000 P	210	7 5 2	8 4 5	1122.709	2.2 E-05 50	8777.8443 P	012	6 1 5	6 4 2	757.780	5.0 E-06 10
8720.8148 P	210	2 1 1	2 2 0	138.163	2.8 E-05 20	8777.7393	111	11 5 7	11 5 6	1998.995	6.3 E-06 10
8720.8685 P	210	3 0 3	3 1 2	173.385	1.8 E-04 10	8778.9577	1 121	2 0 2	1 0 1	1618.558	3.01E-05 6
8720.8251 B	111	7 2 6	7 2 5	782.408	1.9 E-02 20	8781.3634	210	1 1 0	1 0 1	23.794	1.9 E-04 10
8720.8251 B	111	3 1 3	4 1 4	224.836	1.9 E-02 10	8782.4875	012	6 2 4	7 3 5	818.894	1.8 E-05 10
8721.0492 P	210	3 1 2	3 2 1	212.156	1.1 E-04 10	8783.2060 P	111	0 0 0	1 0 1	23.794	1.3 E-02 10
8721.9733 P	111	4 0 4	4 2 3	300.362	1.09E-03 6	8784.8362 P	012	5 1 4	5 4 1	610.340	5.4 E-06 10
8722.1684	111	9 3 7	9 3 6	1282.919	1.4 E-04 10	8785.1077 P	012	4 1 3	4 4 0	488.134	1.2 E-06 20
8722.9047	012	5 4 2	6 5 1	888.632	1.3 E-05 10	8785.7992 P	111	6 4 2	7 2 5	782.409	3.6 E-06 10
8723.0299	111	6 3 3	5 5 0	742.078	8.8 E-06 10	8786.5875 P	210	2 1 1	2 0 2	70.090	7.6 E-05 10
8723.2103	012	5 4 1	6 5 2	888.698	3.82E-05 6	8786.8734 P	210	5 3 2	4 4 1	488.107	1.8 E-06 10
8723.5792	111	5 1 5	5 1 4	399.457	1.03E-03 6	8787.1787 B	130	4 4 0	3 1 3	142.278	2.0 E-05 10
8724.4451	210	0 0 0	1 1 1	37.136	4.1 E-05 10	8787.1787 B	1 121	2 1 1	1 1 0	1640.508	2.0 E-05 10
8726.4711	210	2 2 1	3 1 2	173.385	6.2 E-03 10	8788.2228	012	8 2 7	9 1 8	1079.080	2.72E-05 6
8727.2448 P	111	11 4 8	11 4 7	1699.008	3.9 E-06 20	8789.4002 P	012	4 2 3	5 3 2	508.812	9.17E-05 6
8727.3506 P	111	7 3 5	8 5 2	888.598	1.6 E-06 10	8789.8524 P	111	4 2 3	4 2 2	315.779	1.7 E-03 10
8728.1404	031	6 5 2	5 5 1	742.073	2.63E-05 6	8790.0315 P	111	2 1 2	2 1 1	95.175	2.8 E-03 10
8728.5793 B	331	6 5 1	5 5 0	742.076	4.5 E-05 20	8790.2997 P	060	6 1 6	5 4 1	610.340	6.3 E-06 10
8729.2107	1 121	1 1 1	1 1 0	1640.908	2.00E-05 6	8791.1836	111	6 3 4	6 3 3	581.548	4.7 E-04 10
8729.5492	210	1 1 1	2 0 2	70.090	8.3 E-06 10	8791.5213 P	111	10 5 8	10 5 5	1724.707	7.0 E-06 20
8730.1318	111	2 1 1	3 1 2	173.385	1.1 E-02 10	8791.8268	111	6 0 8	5 2 3	448.510	7.73E-05 6
8733.6821 P	111	3 0 3	3 2 2	206.301	3.8 E-03 10	8791.8933 P	130	6 5 2	5 4 1	610.340	4.7 E-06 20
8733.8083	111	2 2 0	3 2 1	212.156	8.9 E-04 10	8792.4039 B	111	8 4 5	8 4 4	1131.776	8.5 E-05 20
8734.3537	210	2 0 2	2 1 1	95.175	6.71E-05 6	8792.4039 B	210	2 0 2	1 1 1	37.136	8.5 E-05 20
8736.8359	1 121	2 2 1	2 2 0	1743.492	8.9 E-06 10	8793.2832	1 121	3 1 3	2 1 2	1677.082	2.9 E-05 10
8737.4381 P	210	4 3 1	5 2 4	416.206	5.0 E-05 10	8793.4512	012	6 3 6	9 2 7	1201.921	1.2 E-05 10
8738.2489 P	1 121	3 2 1	4 0 4	1817.450	5.8 E-05 20	8794.3001 B	111	4 1 3	3 3 0	285.418	2.8 E-05 20
8738.3315 P	111	2 2 1	3 2 2	206.301	2.8 E-03 20	8795.0727	111	4 3 1	5 1 4	399.457	4.12E-05 6
8738.5470 P	111	2 0 2	3 0 3	136.761	2.2 E-02 10	8795.4322 B	031	8 3 5	7 1 6	704.214	1.8 E-06 50
8739.2476 B	1 121	4 3 2	4 3 1	2006.917	2.5 E-05 20	8795.7116	012	5 2 3	6 3 4	648.978	7.87E-05 6
8739.2476 B	1 121	2 2 0	2 2 1	1742.306	2.5 E-05 20	8796.1715	111	4 2 2	5 0 5	325.347	5.4 E-05 10
8740.4073 P	111	2 0 2	2 2 1	134.902	4.97E-04 6	8796.4440	210	3 1 2	3 0 3	136.761	1.8 E-04 10
8741.2896 P	012	9 2 7	10 3 8	1446.128	6.9 E-06 20	8796.7585 P	111	11 6 6	11 6 5	2144.047	1.4 E-06 10
8741.3330 P	1 121	4 3 1	4 3 2	2004.816	1.0 E-05 10	8797.2549	1 121	3 0 3	2 0 2	1664.870	1.1 E-06 10
8741.7538 P	1 121	6 4 2	6 4 3	3398.362	2.5 E-06 10	8797.9924	012	8 0 8	9 1 3	920.211	3.80E-05 6
8741.9373 P	1 121	3 2 1	3 2 2	1813.788	5.3 E-06 20	8798.1221 P	111	3 2 1	4 0 4	222.052	4.2 E-05 10
8741.9880 P	210	3 1 1	4 2 2	319.779	4.3 E-05 10	8798.3029 P	210	3 1 2	2 2 1	134.902	9.0 E-06 20
8742.2883	210	1 0 1	1 1 0	42.371	1.81E-04 6	8798.3881 P	012	8 1 8	9 0 9	920.169	9.8 E-05 10
8742.4159	1 121	3 3 1	3 3 0	1907.816	1.71E-05 6	8799.0719	012	3 3 1	4 4 0	488.134	3.4 E-05 10
8742.9292	111	2 1 2	3 1 3	142.278	6.4 E-03 10	8799.3302	012	3 3 0	4 4 1	488.107	9.7 E-05 10
8743.8568 P	1 121	5 2 3	6 0 8	2041.783	4.0 E-06 20	8799.8422	210	1 1 1	0 0 0	0.000	7.98E-06 6
8744.4460 B	1 121	5 4 2	5 4 1	2291.883	4.9 E-06 50	8801.0765 P	111	9 5 5	9 5 4	1477.297	6.42E-06 6
8746.9211 P	012	5 3 3	6 4 2	757.780	1.9 E-05 10	8801.8551 P	111	3 2 3	3 2 1	212.156	1.1 E-02 10
8746.4638 P	111	8 2 7	7 4 4	927.744	8.3 E-06 10	8802.1664 B	111	5 3 3	5 3 2	508.812	1.9 E-02 20
8747.2293	012	10 0 10	11 1 11	1327.119	8.8 E-06 10	8802.1664 B	111	1 1 1	1 1 0	42.371	1.9 E-02 20
8747.3524	012	10 1 10	11 0 11	1327.109	2.35E-05 6	8802.9530 P	111	7 4 4	7 4 3	931.237	6.3 E-04 20
8747.7700 B	1 121	4 4 1	4 4 0	2129.818	8.8 E-06 20	8803.1838	210	3 2 1	3 1 2	173.365	3.15E-04 6
8747.7700 B	1 121	4 4 0	4 4 1	2129.800	8.6 E-06 20	8803.4558 P	111	10 8 4	10 8 5	1874.973	8.4 E-06 10
8748.1763	111	6 2 5	8 2 4	602.773	2.57E-04 6	8803.7999 P	111	3 0 3	2 2 0	136.163	4.08E-05 6
8748.6789 P	012	4 4 1	5 5 0	742.078	3.9 E-05 10	8803.8152	210	6 3 4	5 4 1	610.340	1.0 E-05 10
8748.9097 P	012	4 4 0	5 5 1	742.073	1.0 E-05 50	8804.8758	111	5 5 4	5 5 5	1474.981	2.14E-05 6
8749.8544	111	4 1 4	4 1 3	275.497	6.81E-04 6	8805.1907	210	5 3 3	5 1 4	399.457	1.30E-04 6
8749.8257 P	031	7 5 2	8 5 1	888.632	1.3 E-05 10	8805.9591	111	5 0 5	4 2 2	315.779	4.75E-05 6
8750.0683	012	5 2 4	6 3 3	681.548	1.8 E-06 10	8806.6735 P	012	7 1 6	8 2 7	885.600	6.3 E-05 10
8750.2476	111	8 3 6	8 3 5	1069.167	4.95E-06 6	8807.3806 P	012	5 0 5	5 3 2	508.812	3.83E-04 6
8750.8302 B	1 121	2 1 1	2 1 2	1677.082	1.3 E-06 20	8807.5232	210	2 2 0	2 1 1	95.175	1.21E-04 6
8750.7319 P	210	4 2 2	5 1 5	326.825	3.0 E-05 10	8807.9875 P	111	8 5 4	8 5 3	1259.912	7.10E-05 6
8751.0658 P	012	3 0 3	4 3 2	382.518	6.8 E-06 10	8808.4886 P	111	2 2 1	2 2 0	136.163	8.2 E-03 10
8751.5023	012	5 3 2	6 4 3	756.724	5.42E-05 6	8808.6766 P	111	8 5 3	8 5 4	1259.166	1.85E-04 6
8751.7108	210	3 2 1	4 1 4	224.838	2.09E-04 6	8808.7020 P	111	2 2 0	3 0 3	136.761	1.2 E-04 10
8751.9233	031	7 5 3	8 5 2	888.598	4.9 E-06 10	8808.7806	111	4 3 2	4 3 1	383.842	3.1 E-03 10
8752.2578 B	1 121	5 5 0	5 5 1	2408.141	4.8 E-06 20	8808.8318 B	111	6 4 3	6 4 2	757.780	3.7 E-04 50
8752.2676 B	1 121	5 5 1	5 5 0	2408.143	4.8 E-06 20	8808.8800 P	111	7 4 3	7 4 4	927.744	2.2 E-04 50
8754.7418 P	111	10 4 7	10 4 6	1818.452	6.3 E-06 20	8809.7930 P	111	9 8 4	9 8 3	1631.384	3.96E-06 6
8754.8302	111	1 1 0	2 1 1	95.175	4.8 E-03 10	8809.9169	1 121	4 1 4	3 1 3	1735.484	1.0 E-06 10
8755.8714 B	111	7 3 4	8 5 1	888.632	3.2 E-06 20	8810.1821 B	111	8 4 4	8 4 5	1122.709	3.35E-04 6
8756.0882 B	031	8 4 4	8 2 7	889.600	2.3 E-06 10	8810.1821 B	111	4 0 4	3 2 1	212.156	3.33E-04 6
8756.0882 B	130	4 4 1	3 1 2	173.385	2.3 E-06 10	8810.2634 P	1 121	3 1 2	2 1 1	1693.652	9.0 E-06 20
8756.8841 P	012	8 2 6	9 3 7	1218.232	2.8 E-06 10	8811.0630	111	2 2 0	2 2 1	134.902	2.5 E-02 10
8757.2441	1 121	1 0 1	0 0 0	1594.747	8.6 E-06 10	8811.4844	111	6 4 2	6 4 3	756.724	1.8 E-03 10
8757.3966	210	5 2 3	6 1 6	447.752	2.69E-06 6	8812.0143	111	4 3 1	4 3 2	382.518	9.1 E-03 10
8757.5620	210	3 3 0	4 2 3	300.362	1.07E-04 10	8812.4040 P	111	5 3 2	5 3 3	503.968	1.29E-03 6
8760.1410	111	1 0 1	2 0 2	70.090	6.8 E-03 10	8812.8772 B	111	3 3 1	3 3 0	285.418	2.4 E-02 20
8760.4201	210	2 2 0	3 1 3	142.278	1.1 E-04 10	8813.9772 B	111	1 1 0	1 1 1	37.136	2.4 E-02 20
8760.8826 P	111	6 3 3	7 1								

TABLE 4 (continued)

SIGMA CM-1	V* VIB	J*KA*RC*	J*KA*RC*	E* CM-1	INTENSITY CM-2 ATM-1	%	SIGMA CM-1	V* VIB	J*KA*RC*	J*KA*RC*	E* CM-1	INTENSITY CM-2 ATM-1	%
8818.1281	111	6 1 3	6 3 4	648.978	1.3 E-03	10	8850.7656	210	5 0 5	4 1 4	224.838	3.9 E-04	10
8818.4818	210	2 1 2	1 0 1	23.794	3.92E-04	8	8851.0159	111	8 8 1	8 8 0	1789.041	3.1 E-05	20
8817.1429 P	111	5 1 4	4 3 1	383.842	2.2 E-05	10	8851.0159	111	8 8 0	8 8 1	1789.041	3.1 E-05	20
8817.3711 P	111	4 4 1	4 4 0	488.134	3.4 E-03	20	8851.5144 P	111	2 0 2	1 0 1	23.794	2.5 E-02	10
8817.4146 P	111	4 4 0	4 4 1	488.107	1.1 E-02	10	8852.0347	012	2 2 0	3 3 1	285.219	6.2 E-05	50
8817.9704 P	111	6 5 2	6 5 1	888.832	5.6 E-04	20	8852.2407	210	4 3 2	4 2 3	300.382	3.52E-04	8
8818.0060 P	111	6 5 1	6 5 2	888.888	1.5 E-03	10	8853.7271	210	5 1 4	4 2 3	300.382	3.58E-05	8
8818.4215 P	031	8 2 6	7 0 7	588.243	3.8 E-06	10	8854.8782	111	4 1 3	4 1 4	224.838	2.5 E-03	10
8818.7718 P	111	9 3 6	8 5 3	1255.812	8.3 E-08	20	8855.0876 P	210	5 3 3	5 2 4	418.208	9.5 E-05	20
8818.9105	012	7 8 2	7 7 1	1394.813	4.18E-06	8	8855.1245 P	210	5 1 5	4 0 4	222.052	1.2 E-04	20
8818.9105	012	7 8 1	7 7 0	1394.813	4.18E-06	8	8856.8941 P	012	7 1 7	7 2 8	709.808	6.8 E-06	50
8820.1372 P	031	5 5 0	5 3 3	503.988	1.7 E-05	10	8857.0275	012	4 1 3	5 2 4	418.208	6.7 E-05	10
8820.3403 P	210	2 2 1	2 1 2	79.495	2.6 E-03	10	8857.4650 P	210	2 2 1	1 1 0	42.371	8.4 E-03	10
8820.9363	111	7 8 2	7 8 1	1218.183	3.5 E-04	20	8858.1678	210	7 3 5	7 2 8	709.808	6.7 E-06	20
8820.9363	111	7 8 1	7 8 2	1218.183	3.5 E-04	20	8858.4585 P	111	9 3 8	9 3 7	1218.232	9.8 E-08	10
8821.1573 P	111	4 2 2	4 2 3	300.382	5.0 E-03	10	8858.8625	1 121	5 3 3	4 3 2	2004.818	1.2 E-05	50
8821.6774 P	031	6 5 1	6 3 4	648.978	1.40E-04	8	8859.0825	210	6 2 5	6 1 8	447.252	1.2 E-05	50
8821.7638	031	7 5 2	7 3 5	818.894	6.3 E-05	10	8859.2768 P	031	8 4 4	7 2 5	782.409	3.0 E-08	20
8821.9198	111	5 5 1	5 5 0	742.078	5.0 E-03	20	8861.1259 P	111	2 1 1	1 1 0	42.371	9.1 E-03	10
8821.9198	111	5 5 0	5 5 1	742.078	5.0 E-03	20	8861.3433 P	210	6 3 4	6 2 5	552.911	4.3 E-04	10
8822.1268	210	5 2 3	4 3 2	382.816	4.8 E-05	10	8862.1920 P	012	8 2 7	8 3 8	1008.118	1.8 E-06	10
8822.1268	012	3 2 2	4 3 1	383.842	4.8 E-05	10	8862.8848 P	012	7 0 7	7 1 8	704.214	1.0 E-05	10
8822.4378	012	7 1 7	8 0 8	744.064	4.7 E-06	20	8862.7477 P	1 121	5 2 3	4 2 2	1922.901	3.3 E-08	20
8822.7370	012	7 0 7	8 1 8	744.163	1.83E-04	8	8862.8369 P	012	6 3 4	7 2 5	782.409	2.50E-05	8
8823.1144 P	111	3 3 0	4 1 3	275.497	5.3 E-06	10	8862.9555 P	012	9 3 8	8 6 3	1411.812	1.1 E-06	20
8823.2909 P	012	3 1 3	4 2 2	315.779	2.3 E-05	10	8863.3414	130	7 5 3	7 2 8	709.808	1.97E-05	8
8823.3405 P	111	10 4 6	10 4 7	1581.336	1.5 E-05	10	8863.7441	111	5 3 3	5 1 6	447.252	1.49E-05	8
8823.7076 P	210	7 3 5	8 0 8	744.064	1.1 E-05	10	8864.7494	1 121	8 0 8	7 0 7	2180.643	8.1 E-06	20
8824.0009 P	111	2 1 1	2 1 2	79.495	5.7 E-03	10	8865.0360	210	6 0 8	5 1 5	328.825	1.1 E-04	20
8824.8013 P	210	5 3 3	6 0 8	448.897	2.9 E-08	50	8865.0360	210	7 1 6	7 0 7	588.243	1.1 E-04	20
8825.1842	1 121	5 1 5	4 1 4	1821.598	2.52E-05	8	8865.5663	050	8 0 0	5 1 5	328.825	5.0 E-06	20
8825.8209	012	5 1 5	7 2 6	709.808	3.0 E-05	10	8865.5663	210	2 2 0	1 1 1	37.138	5.0 E-08	20
8826.1084	111	6 8 1	6 8 0	1045.058	1.21E-03	8	8866.1871	111	3 1 3	2 1 2	79.495	2.6 E-02	10
8826.1084	111	6 8 0	6 8 1	1045.057	1.21E-03	8	8866.7065	1 121	5 4 2	4 4 1	2129.800	6.8 E-06	50
8826.7242 P	210	4 1 3	3 2 2	206.301	7.3 E-06	20	8867.2942	210	6 1 6	5 0 5	325.347	3.91E-04	8
8826.8979 P	012	7 3 5	8 2 6	982.912	7.3 E-06	20	8867.7081 P	012	6 4 3	6 5 2	888.596	7.7 E-06	20
8826.9337 P	111	11 7 5	11 7 4	2321.904	9.7 E-07	50	8868.7323	012	5 2 4	6 1 5	542.906	4.81E-05	8
8827.1203 P	111	7 2 5	6 4 2	757.780	2.8 E-06	20	8868.9388 P	012	5 0 5	6 1 6	447.252	3.9 E-04	10
8827.1668	1 121	5 0 5	4 0 4	1817.450	8.7 E-06	70	8869.1830 P	012	7 4 3	7 5 2	1059.835	4.3 E-06	50
8827.2556 P	210	4 3 2	5 0 5	325.347	1.0 E-05	20	8869.8731	111	3 0 3	2 0 2	70.090	9.8 E-03	10
8827.3173 P	031	8 5 3	8 3 6	1006.118	2.2 E-05	20	8870.3901	012	5 1 5	6 0 6	448.897	1.4 E-04	10
8827.4812 P	210	3 2 2	3 1 3	142.278	3.15E-05	8	8871.4886	1 121	6 1 5	5 1 4	2000.865	1.4 E-05	50
8827.6147	111	7 3 4	7 3 5	818.894	1.1 E-04	10	8871.4886	111	5 4 7	6 2 5	552.911	1.4 E-05	50
8827.8889	1 121	4 2 3	3 2 2	1813.788	8.0 E-06	20	8871.4886	210	7 2 6	7 1 7	588.479	1.4 E-05	50
8828.5892	210	5 3 3	5 2 3	448.910	1.50E-04	8	8872.1470	012	3 1 2	1 2 3	300.382	2.2 E-04	10
8828.8108	210	5 1 4	5 0 5	325.347	8.4 E-05	20	8872.5578 P	111	3 3 1	4 1 4	224.838	5.4 E-08	10
8828.8108	031	7 3 5	6 1 6	447.252	6.4 E-05	20	8874.3598 P	111	5 1 4	5 1 5	328.825	4.75E-04	8
8829.0937 P	111	8 1 7	7 3 4	842.356	6.0 E-06	10	8874.9447	111	2 2 1	2 0 2	70.090	2.5 E-04	20
8829.9536 P	012	3 2 1	4 3 2	382.816	1.5 E-04	10	8874.9447 P	111	10 3 7	10 3 8	1418.128	2.5 E-04	20
8830.2319	111	1 0 1	0 0 0	0.000	4.8 E-03	10	8875.5840	210	3 2 2	2 1 1	95.175	1.0 E-03	10
8830.4687 P	210	3 1 3	2 0 2	70.090	1.8 E-04	10	8875.2909	111	7 2 5	7 2 6	709.808	1.2 E-04	10
8832.1800	111	6 1 5	5 3 2	508.812	8.06E-05	8	8877.2598	111	3 2 2	3 0 3	138.761	1.3 E-03	10
8832.3105 P	012	4 0 4	4 3 1	383.842	2.4 E-06	10	8878.1862	210	7 0 7	6 1 6	447.252	2.58E-04	8
8833.0341	111	5 2 3	5 2 4	418.208	6.78E-04	8	8878.4173	210	7 1 7	6 0 6	448.897	1.3 E-04	10
8833.3288	111	9 7 2	9 7 3	1810.584	1.6 E-05	50	8879.1193 P	111	3 2 2	2 2 1	134.902	1.3 E-02	10
8833.3288	111	9 7 3	9 7 2	1810.588	1.6 E-05	50	8880.0339 P	1 121	7 2 6	6 2 5	2161.288	6.0 E-06	10
8833.7635 P	210	8 3 8	9 0 9	920.189	2.7 E-06	20	8882.8728	111	4 1 4	3 1 3	142.278	9.1 E-03	10
8834.0239	210	4 0 4	3 1 3	142.278	1.09E-04	8	8883.3792	111	4 2 3	4 0 4	222.052	4.79E-04	8
8835.2598	1 121	4 1 3	3 1 2	1772.413	1.98E-05	8	8883.8326 P	012	7 2 6	7 3 5	618.894	9.7 E-06	50
8835.7382	111	8 7 2	8 7 1	1590.880	7.58E-05	8	8884.0110 P	111	3 2 1	2 2 0	138.163	4.2 E-03	10
8835.7382	111	8 7 1	8 7 2	1590.880	7.58E-05	8	8884.2217	210	8 2 7	8 1 8	744.163	4.4 E-06	50
8836.4121	111	7 1 6	6 3 3	681.548	1.1 E-05	10	8884.4988 P	111	3 1 2	2 1 1	95.175	7.1 E-03	10
8837.3981 P	111	3 1 2	3 1 3	142.278	1.8 E-03	10	8885.5740 P	111	4 0 4	3 0 3	138.761	2.8 E-02	10
8837.4808	111	7 7 0	7 7 1	1394.813	2.2 E-04	20	8887.7878 P	210	4 2 3	3 1 2	177.368	1.4 E-03	10
8837.4808	111	7 7 1	7 7 0	1394.813	2.2 E-04	20	8888.2782 P	1 121	6 4 2	5 4 1	2281.863	2.5 E-06	10
8837.8909 P	1 121	4 3 2	3 3 1	1907.452	4.4 E-06	20	8888.5178 P	012	6 3 4	6 4 3	758.724	1.7 E-06	50
8837.8872	210	4 3 1	4 2 2	315.779	8.2 E-05	50	8888.8625	012	2 1 1	3 2 2	206.301	8.11E-05	8
8839.2172	1 121	6 1 6	5 1 5	1922.830	7.4 E-08	10	8889.5274	012	4 0 4	5 1 5	328.825	1.7 E-04	10
8840.2779	1 121	6 0 8	5 0 5	1920.789	1.8 E-05	10	8889.6063 P	012	8 0 6	6 1 5	542.906	1.2 E-05	10
8840.4133	111	8 3 5	8 3 6	1006.118	1.4 E-04	10	8889.8895	210	8 0 8	7 1 7	588.479	6.1 E-05	10
8840.8231	111	7 2 5	8 0 8	744.064	2.8 E-08	10	8890.2628 P	210	8 1 6	7 0 7	588.243	2.0 E-04	10
8841.0174 P	130	5 5 1	5 2 4	418.208	5.3 E-06	20	8890.4783 P	031	7 4 4	6 2 5	552.911	1.57E-05	8
8841.1560	012	6 2 5	7 1 6	704.214	1.05E-04	8	8892.0884	210	10 4 7	10 3 8	1448.128	1.3 E-05	10
8841.4504	031	8 6 2	7 8 1	1218.183	2.22E-06	8	8892.8547	111	5 7 4	5 0 5	325.347	1.1 E-03	10
8842.0848	012	5 1 4	6 2 5	552.911	1.5 E-04	10	8893.8120 P	012	4 1 4	5 0 5	325.347	5.0 E-04	10
8842.4611 P	012	9 5 4	9 8 3	1831.384	1.4 E-05	20	8893.8068 P	111	8 7 6	8 2 7	888.600	1.7 E-04	10
8842.8103 P	012	8 5 4	8 8 3	1411.812	1.5 E-06	10	8893.7203 P	111	8 1 5	8 1 6	447.252	7.9 E-04	10
8842.8865	210	4 1 4	3 0 3	138.761	5.3 E-04	10	8894.1777	012	8 5 4	9 4 5	1380.235	1.4 E-05	50
8842.9583 P	012	8 5 3	8 8 2	1411.848	5.3 E-06	20	8894.8000	210	9 1 8	9 0 9	920.189	4.7 E-06	20
8844.7248 P	012	7											

TABLE 4 (continued)

SIGMA CM-1	V ⁺ VIB	J ⁺ KA ⁺ RC ⁺	J ⁺ KA ⁺ RC ⁺	E ⁺ CM-1	INTENSITY CM-2 ATN-1	Σ	SIGMA CM-1	V ⁺ VIB	J ⁺ KA ⁺ RC ⁺	J ⁺ KA ⁺ RC ⁺	E ⁺ CM-1	INTENSITY CM-2 ATN-1	Σ
8905.7258 B	031	5 7 2	7 7 1	1394.813	9.1 E-06	20	8948.7848 P	111	6 3 4	5 3 3	503.988	1.9 E-03	10
8905.7258 B	031	5 7 1	7 7 0	1394.813	9.1 E-06	20	8948.7319	210	5 3 2	5 0 5	325.347	2.4 E-05	10
8906.3510 P	111	4 1 3	3 1 2	173.385	2.1 E-02	10	8948.8957 P	012	5 4 2	6 3 3	681.848	1.0 E-05	50
8906.8636 P	210	6 2 5	5 1 4	399.457	3.6 E-04	10	8950.0638 P	111	3 2 1	2 0 2	70.090	3.3 E-04	10
8907.8751 P	012	5 2 4	5 3 3	503.888	7.5 E-06	50	8950.3347 P	111	7 2 6	6 2 5	552.911	6.6 E-03	10
8907.9040 B	012	1 1 0	2 2 1	134.902	2.2 E-03	50	8951.8807 P	111	7 4 4	7 2 5	782.408	5.30E-05	6
8907.9040 B	111	4 3 2	3 3 1	285.219	2.2 E-03	50	8952.4318	031	10 2 8	9 0 9	920.169	1.4 E-04	10
8908.7440 B	012	3 0 3	4 1 4	224.838	5.3 E-04	20	8953.4804	111	6 2 4	5 2 3	446.910	3.0 E-03	10
8908.1125 P	111	4 3 1	3 3 0	285.418	6.8 E-03	10	8954.1310 P	060	6 1 6	5 2 3	446.910	2.1 E-03	10
8908.3821 P	111	4 2 2	3 2 1	212.156	1.8 E-02	10	8954.3288 P	111	10 1 9	10 1 10	1114.549	2.0 E-05	10
8908.8268 P	111	6 3 4	8 1 5	542.895	1.2 E-04	10	8955.0548	111	7 1 8	6 1 5	542.905	2.3 E-03	10
8908.9552 P	210	10 0 10	9 1 9	920.211	2.1 E-05	10	8955.3182 P	012	5 3 2	6 2 5	552.911	1.3 E-05	10
8910.8779	210	10 1 10	9 0 9	920.169	6.6 E-05	10	8955.5189	210	5 3 3	4 2 2	315.779	1.8 E-04	10
8911.4816 P	111	7 1 6	7 1 7	588.479	1.4 E-04	20	8955.7238 P	130	6 3 2	5 2 3	446.910	2.4 E-03	10
8911.5379 P	111	5 3 3	5 1 4	399.457	4.8 E-04	10	8956.2948	111	6 3 3	5 3 2	508.812	4.9 E-03	10
8911.7334	111	7 3 5	7 1 6	704.214	2.5 E-04	10	8957.1810 P	111	6 4 3	5 4 2	610.113	3.3 E-03	10
8912.2588	111	6 1 8	5 1 5	328.625	6.0 E-03	10	8957.4589	012	4 1 3	4 2 2	315.779	5.3 E-05	10
8912.5905	111	9 2 7	9 2 8	1080.385	2.3 E-05	10	8957.8015	111	10 1 10	9 1 9	920.211	6.1 E-04	10
8912.9834	111	6 0 8	5 0 9	225.247	1.8 E-02	10	8957.8679	111	6 4 2	5 4 1	610.340	2.6 E-03	10
8913.9502 B	012	6 4 3	7 3 4	842.358	5.5 E-06	50	8958.8354	111	10 0 10	9 0 9	920.169	1.3 E-03	10
8914.3202 B	012	9 3 6	9 4 5	1380.235	1.5 E-08	20	8959.0003	012	2 1 1	2 2 0	138.183	3.97E-05	6
8914.3202 B	012	5 3 2	9 4 8	1340.885	1.5 E-08	20	8959.9223 P	012	6 5 2	7 4 3	921.237	1.7 E-06	10
8915.0512 P	210	7 2 8	6 1 5	542.905	6.2 E-05	10	8960.2168 P	012	3 0 3	3 1 2	173.385	1.9 E-04	10
8915.9559 B	012	4 2 3	4 3 2	382.516	1.5 E-05	50	8960.3528 P	012	3 1 2	3 2 1	212.156	1.8 E-04	10
8917.0060 B	012	3 1 3	4 0 4	222.052	4.8 E-04	20	8961.8440	031	6 5 1	5 3 2	508.812	7.05E-04	6
8917.0060 B	111	7 2 8	7 0 7	588.243	4.8 E-04	20	8962.4778 P	012	2 2 1	3 1 2	173.385	5.88E-05	50
8917.5102 P	111	5 3 6	8 1 7	882.891	5.0 E-05	10	8962.8795 B	012	5 4 1	6 3 4	648.978	9.2 E-06	20
8917.8803	111	5 2 4	4 2 3	300.362	1.4 E-02	10	8962.9996	012	2 0 0	1 1 1	37.138	8.42E-05	6
8917.9202 P	210	11 1 11	10 0 10	1114.533	1.1 E-05	10	8964.0081	130	10 3 0	9 0 9	920.169	1.82E-04	6
8918.4975 B	210	11 0 11	10 1 10	1114.549	4.2 E-05	20	8964.6301 B	111	6 5 2	5 5 1	742.073	9.8 E-04	20
8918.4975 B	012	4 1 4	4 2 3	300.362	4.2 E-05	20	8964.6301 B	111	6 5 1	5 5 0	742.078	9.8 E-04	20
8920.7570 P	012	3 2 2	3 3 1	285.219	5.3 E-06	50	8964.6136 P	111	6 2 7	7 2 6	709.808	1.2 E-03	10
8921.1624	210	3 3 0	3 0 3	136.761	1.51E-05	6	8964.9990	210	7 3 5	6 2 4	602.773	2.31E-04	6
8921.6014 P	210	3 3 1	2 2 0	136.183	9.5 E-07	10	8965.2408 B	111	11 2 10	11 0 11	1327.109	1.4 E-05	20
8922.1704 P	111	2 2 0	1 0 1	23.794	4.81E-04	6	8966.2431	031	6 5 2	5 3 3	503.988	2.76E-05	6
8922.8896 B	012	7 4 3	8 3 8	1008.118	1.9 E-06	20	8966.8856 P	111	11 1 11	10 1 10	1114.549	7.2 E-04	10
8922.9708 P	012	8 2 6	5 3 3	1090.157	1.7 E-06	20	8966.9135 P	111	11 0 11	10 0 10	1114.533	1.7 E-04	20
8923.0220 P	210	3 3 0	2 2 1	134.902	6.4 E-06	10	8966.9688 P	111	7 3 5	6 3 4	648.978	3.7 E-03	10
8924.1756 B	210	10 3 8	10 2 9	1293.834	1.0 E-04	10	8967.1090 P	012	1 1 1	2 0 2	70.090	5.4 E-06	20
8924.1756 B	210	8 2 7	7 1 6	704.214	1.0 E-04	10	8967.2333 P	111	8 1 7	7 1 6	704.214	3.8 E-03	10
8925.0319 P	111	3 3 1	3 1 2	173.385	1.5 E-04	10	8967.4548 P	111	11 1 10	11 1 11	1327.119	1.1 E-05	50
8925.2222 P	111	7 1 7	6 1 6	447.252	1.2 E-02	10	8967.7443	210	6 3 4	5 2 3	446.910	1.75E-03	6
8925.4936 B	111	5 1 4	4 1 3	275.497	7.9 E-03	20	8968.1924 P	1 121	5 2 3	4 0 4	1817.450	1.7 E-06	10
8925.4936 B	111	7 0 7	6 0 6	446.897	7.9 E-03	20	8968.4384 P	012	4 3 1	5 2 4	416.208	9.2 E-06	20
8926.0008	111	5 3 7	9 1 8	1079.080	6.14E-05	6	8968.6937	111	4 3 1	4 1 4	224.838	6.43E-05	6
8926.4729	012	2 0 2	3 1 3	142.278	1.7 E-04	10	8969.1763	130	7 5 3	6 2 4	602.773	3.94E-04	6
8927.0814	012	1 2 1	2 3 0	285.418	2.5 E-05	10	8971.4233 P	012	3 3 1	4 2 2	315.779	7.5 E-06	10
8927.2850	111	8 1 7	8 1 8	744.163	1.89E-04	6	8971.5190	210	8 3 6	7 2 5	782.408	1.8 E-04	10
8928.4787 P	111	5 3 3	4 3 2	382.516	6.7 E-03	10	8972.5755	012	2 0 2	2 1 1	35.175	9.27E-05	6
8929.1744	210	9 1 8	8 2 7	885.800	3.7 E-05	10	8974.3375	111	12 1 12	11 1 11	1327.119	1.00E-04	6
8930.1588 B	111	8 2 7	8 0 8	744.064	7.4 E-05	50	8974.4052 P	111	12 1 11	12 1 12	1557.848	4.0 E-06	20
8930.4731 P	012	3 2 2	4 1 3	275.497	4.2 E-05	10	8974.6297 P	111	12 0 12	11 0 11	1327.109	3.0 E-04	10
8930.9338 P	012	4 0 4	3 3 1	285.219	4.0 E-06	10	8974.7171 P	210	5 3 2	4 2 3	300.362	3.8 E-05	10
8931.1546	111	10 2 8	10 2 9	1293.834	1.7 E-05	10	8975.8804 P	111	12 2 11	12 0 12	1557.844	9.3 E-07	10
8931.3420	012	4 2 2	4 3 1	383.842	1.2 E-05	10	8976.9087 P	031	7 5 2	6 3 3	681.848	3.41E-04	6
8931.5937 P	210	4 3 1	4 0 4	222.052	1.1 E-05	20	8977.3858	111	7 4 4	6 4 3	758.724	1.8 E-03	10
8932.2188	031	9 3 7	8 1 8	744.183	1.08E-04	6	8977.8801	111	5 4 2	5 2 3	446.910	4.43E-05	6
8932.5303	111	5 3 2	4 3 1	383.842	2.5 E-03	10	8978.7395	111	9 1 8	8 1 7	882.891	5.9 E-04	10
8932.6513 P	012	6 1 5	6 2 4	602.773	1.5 E-05	10	8978.8583 P	111	9 2 8	8 2 7	885.600	1.5 E-03	10
8932.7680	012	3 1 3	3 2 2	206.301	2.3 E-05	10	8979.5297	111	7 4 3	6 4 2	757.800	5.87E-04	6
8932.2212 P	111	10 4 7	10 2 8	1437.989	5.1 E-06	20	8979.8131 P	210	5 2 3	4 1 4	224.838	8.9 E-06	10
8932.4633	111	5 2 3	4 2 2	315.779	4.2 E-03	10	8980.9284	012	9 3 6	10 2 9	1293.834	1.5 E-05	10
8932.8742	012	5 0 5	4 3 2	382.516	5.8 E-04	10	8981.1188 P	012	1 0 1	1 1 0	42.371	2.73E-04	6
8932.8834	012	7 2 5	7 3 4	842.358	1.5 E-05	10	8981.9410 B	111	13 0 13	12 0 12	1557.844	1.4 E-04	20
8934.0687 P	012	9 1 8	8 4 5	1122.709	3.2 E-06	50	8981.9410 B	111	13 1 13	12 1 12	1557.849	1.4 E-04	20
8934.7405	111	6 2 5	5 2 4	416.208	3.5 E-03	10	8982.1258	111	7 2 5	6 2 4	602.773	1.1 E-03	10
8934.9174 P	111	9 4 6	9 2 7	1201.921	2.4 E-05	10	8982.5949 P	210	4 4 1	3 3 0	285.418	1.81E-04	6
8935.0758 P	210	4 2 2	3 1 3	142.278	7.1 E-06	10	8982.7803 P	111	7 3 4	6 3 3	661.848	8.1 E-04	10
8935.5501 P	111	13 3 11	14 1 14	2073.518	8.5 E-06	20	8983.7057	111	8 3 6	7 3 5	816.694	6.4 E-04	10
8935.5922 P	111	11 4 8	11 2 9	1890.685	4.2 E-06	50	8984.6285 B	111	7 5 2	6 5 1	884.632	6.3 E-04	20
8935.8781	012	5 2 3	5 3 2	508.812	3.7 E-06	10	8984.6285 B	111	7 5 3	6 5 2	884.632	6.3 E-04	20
8936.0065 P	111	10 3 8	10 1 9	1293.834	9.2 E-06	10	8984.7680 P	111	4 2 2	3 0 3	136.781	1.2 E-03	10
8936.1328 P	012	8 1 8	7 2 5	782.408	8.3 E-03	20	8986.0834 P	012	6 1 6	5 2 3	446.910	6.8 E-06	10
8936.2675 P	111	5 4 2	4 4 1	488.107	2.5 E-03	10	8987.0784 P	012	3 3 0	4 2 3	300.362	1.7 E-06	10
8936.4102 P	111	5 4 1	4 4 0	488.134	8.4 E-04	10	8987.8306 P	012	3 2 1	4 1 4	224.838	2.3 E-05	10
8936.6061	012	4 3 2	5 2 3	446.910	3.0 E-05	10	8987.8977 P	111	10 2 3	9 2 8	1080.385	2.5 E-04	10
8937.1317 P	111	8 1 8	7 1 7	588.479	2.3 E-03	20	8988.2273 B	111	14 0 14	13 0 13	1808.671	3.8 E-05	20
8937.2339 P	111	8 0 8	7 0 7	588.243	7.5 E-03	10	8988.2273 B	111	14 1 14	13 1 13	1808.673	3.8 E-05	20
8937.6322	012												

TABLE 4 (continued)

SIGMA CM-1	V ^a VIB	J ^a KA ^a RC ^a	J ^a KA ^a RC ^a	E ^a CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	V ^a VIB	J ^a KA ^a RC ^a	J ^a KA ^a RC ^a	E ^a CM-1	INTENSITY CM-2 ATM-1 %
8998.9648	111	9 3 7	8 3 8	1008.116	8.88E-04 8	9058.3469 P	012	2 2 1	7 1 2	79.485	2.0 E-04 10
9001.4775 B	111	17 1 17	18 1 18	2580.949	4.0 E-08 20	9058.5879 P	111	7 5 2	7 3 5	818.884	1.9 E-08 50
9001.4775 B	111	17 0 17	18 0 18	2580.949	4.0 E-08 20	9057.1893 P	012	8 4 5	7 5 2	1059.835	9.3 E-08 10
9001.5604 P	111	11 1 10	10 1 9	1293.019	9.4 E-06 10	9057.8755 P	111	6 5 1	6 3 4	648.978	7.5 E-06 10
9001.8555 P	111	8 4 4	7 4 3	931.237	9.8 E-04 10	9058.0138	111	11 5 7	10 5 6	1718.718	3.3 E-05 10
9003.4336	111	3 3 0	2 1 1	99.175	6.32E-05 6	9058.1258 P	111	8 5 3	8 3 6	1006.116	2.1 E-06 20
9004.1727 P	111	8 3 5	7 3 4	842.358	1.8 E-03 10	9059.8451	012	9 5 5	8 8 2	1411.846	2.1 E-08 10
9004.2314 P	111	8 5 4	7 5 3	1059.847	1.5 E-04 20	9060.3988 P	210	7 5 2	7 2 5	782.408	3.0 E-05 10
9004.4070 P	111	8 5 3	7 5 2	1059.835	3.88E-04 8	9061.7188	012	5 3 2	5 2 3	448.910	1.5 E-04 10
9005.1607 P	111	4 4 0	4 2 3	300.382	2.10E-05 6	9062.2452	012	5 5 4	5 6 3	1411.812	9.3 E-06 10
9006.3305	012	9 2 8	8 3 5	1050.187	8.9 E-08 10	9062.3885	012	8 3 5	8 2 6	982.812	8.9 E-08 10
9007.4088	111	12 1 11	11 1 10	1524.849	1.07E-04 8	9063.6910	012	3 2 2	3 1 3	142.278	8.22E-05 6
9008.3358	111	5 4 1	5 2 4	418.208	1.2 E-05 10	9064.1345 P	012	8 3 6	7 4 3	931.237	7.9 E-06 20
9008.5684	111	12 2 11	11 2 10	1525.137	3.7 E-05 10	9065.6494	111	6 3 3	5 1 4	399.457	3.68E-04 6
9009.2888 P	012	8 6 3	7 7 0	1394.813	8.5 E-06 20	9065.8332	111	11 6 6	10 6 5	1874.973	1.1 E-05 10
9010.0647 P	111	9 2 7	8 2 6	982.912	3.23E-04 8	9068.9345 P	012	4 1 3	3 2 2	206.301	7.5 E-08 10
9010.8330	111	8 6 2	7 6 1	1218.193	1.1 E-04 10	9068.8712 P	012	4 3 1	4 2 2	131.778	6.17E-05 6
9010.9558	111	8 6 3	7 6 2	1218.189	4.0 E-05 10	9068.9795 P	012	3 1 3	2 0 2	70.090	9.06E-05 6
9012.7925	111	10 3 8	9 3 7	1218.232	1.24E-04 6	9069.2502	012	9 3 7	8 4 4	1131.778	2.0 E-06 10
9013.7219 P	111	8 5 4	8 3 5	1050.187	1.1 E-06 10	9069.8283 P	012	5 1 4	5 0 5	325.347	1.50E-04 6
9014.1311 P	111	9 4 6	8 4 5	1122.709	4.63E-04 8	9070.1104 P	012	9 4 5	9 3 8	1282.919	5.8 E-08 20
9014.2299 P	012	6 4 3	5 5 0	742.078	8.7 E-08 50	9071.1983	031	6 5 1	5 1 4	399.457	4.08E-05 6
9015.5647	012	5 3 3	4 4 0	488.134	1.2 E-06 20	9072.0288	012	7 2 5	7 1 6	704.214	5.94E-05 6
9015.0110 P	111	13 2 12	12 2 11	1774.751	3.0 E-05 10	9072.6460 P	012	9 3 6	9 2 7	1201.921	8.6 E-08 10
9015.2978	111	6 4 2	6 2 5	552.911	2.58E-05 6	9073.3743	012	4 2 3	4 1 4	224.838	2.1 E-04 10
9015.4788	012	6 4 2	5 5 1	742.073	2.0 E-08 10	9073.8745 P	012	4 0 4	3 1 3	142.278	5.32E-05 6
9015.8452 P	210	4 3 2	3 0 3	136.781	1.9 E-05 20	9073.9728 B	111	10 7 3	9 7 2	1810.588	6.2 E-06 20
9015.8989 P	210	10 3 8	9 2 7	1201.921	1.4 E-04 10	9073.9728 B	111	10 7 4	9 7 3	1810.584	6.2 E-06 20
9016.0625	012	7 5 2	6 6 1	1045.057	1.79E-05 8	9074.3943	111	12 3 9	11 3 8	1812.223	2.39E-05 6
9016.7314	111	13 1 12	12 1 11	1774.619	1.1 E-05 10	9074.6434	111	6 2 4	5 0 5	325.347	7.60E-05 6
9017.8538 P	111	5 3 3	6 1 6	447.252	1.4 E-05 10	9075.2841 B	012	3 3 0	3 2 1	212.158	1.80E-04 6
9018.9020 P	111	3 3 1	2 1 2	79.495	1.17E-04 6	9075.2841 B	050	6 1 6	5 0 5	325.347	1.80E-04 6
9019.0414 P	012	1 1 0	1 0 1	23.794	3.80E-04 6	9076.8871	130	6 5 2	5 0 5	325.347	6.31E-05 6
9020.1177 P	012	5 3 2	4 4 1	488.107	2.0 E-06 10	9078.8909 P	111	12 5 7	11 5 6	1998.895	9.3 E-06 10
9021.1655	111	4 3 1	3 1 2	173.365	3.90E-04 6	9080.4193 P	111	14 3 11	13 3 10	2414.725	1.1 E-06 20
9022.8678 P	111	10 2 8	9 2 7	1201.921	2.85E-04 6	9080.9042	012	3 3 1	3 2 2	206.301	5.24E-05 6
9023.2075	111	9 5 5	8 5 4	1255.166	2.0 E-04 10	9082.0882	012	4 1 4	3 0 3	136.781	1.9 E-04 10
9023.4064 P	031	6 5 1	6 1 6	447.252	1.8 E-06 10	9082.4900	111	12 4 8	11 4 7	1899.008	1.5 E-05 10
9023.5012 P	111	9 4 5	8 4 4	1131.778	1.5 E-04 10	9082.7581	012	4 3 2	4 2 3	300.382	1.59E-04 6
9023.9444 P	111	9 5 4	8 5 3	1255.912	5.1 E-05 20	9085.0126	012	5 2 4	5 1 5	328.625	5.10E-05 6
9024.3315	111	9 3 8	8 3 5	1050.187	1.97E-04 6	9086.0842 P	210	7 5 2	6 4 3	758.724	9.3 E-06 10
9024.7718	111	14 1 12	13 1 12	2042.311	1.2 E-05 10	9086.1871 P	111	5 3 3	4 1 4	224.838	9.8 E-05 10
9025.0732	012	2 1 1	2 0 2	70.090	1.68E-04 6	9086.4920	012	5 3 3	5 2 4	416.208	4.7 E-05 10
9025.2518	111	11 3 9	10 3 8	1448.128	1.50E-04 6	9086.8801	012	7 4 3	7 3 4	842.358	3.1 E-05 10
9025.9457	012	8 2 7	7 3 4	842.358	2.39E-05 6	9088.7328 B	012	6 1 5	6 0 6	448.897	2.9 E-05 10
9027.1901	111	5 2 3	4 0 4	222.052	1.8 E-04 10	9088.8061	210	6 3 4	5 0 5	325.347	2.9 E-05 10
9027.7033 P	111	7 4 3	7 2 8	709.808	8.2 E-06 10	9090.2228	012	8 2 6	8 1 7	882.891	9.7 E-06 10
9029.1892	111	9 6 3	8 6 2	1411.846	2.2 E-05 10	9091.3529	012	5 0 5	4 1 4	224.838	1.84E-04 6
9029.5851 P	111	9 6 4	8 6 3	1411.812	6.5 E-05 10	9091.6399 B	111	10 8 3	9 8 2	2009.804	3.1 E-06 20
9029.6422 P	111	11 2 9	10 2 8	1437.869	4.7 E-05 10	9091.6399 B	111	10 8 2	9 8 1	2009.804	3.1 E-06 20
9030.3048	111	10 4 7	9 4 6	1340.885	6.3 E-05 10	9092.3352	012	6 3 4	6 2 5	552.911	8.74E-05 6
9030.8899	111	7 5 3	7 3 4	842.358	3.4 E-06 10	9093.3668	111	4 4 0	3 2 1	212.158	7.28E-05 6
9031.6137 B	012	2 0 2	1 1 1	37.138	6.17E-05 6	9093.4720	012	2 2 1	1 1 0	42.371	3.04E-04 6
9031.6137 B	111	8 7 1	7 7 0	1394.813	8.17E-05 6	9094.4887 P	111	11 7 5	10 7 4	2054.347	2.8 E-06 20
9031.6137 B	111	8 7 2	7 7 1	1394.813	8.17E-05 6	9094.6143	012	5 1 4	4 2 3	300.382	2.13E-05 6
9031.7720 P	111	15 2 14	14 2 13	2327.914	2.8 E-06 20	9095.0336	012	5 1 5	4 0 4	222.052	4.11E-05 6
9034.9041 P	012	6 3 4	5 4 1	610.340	7.2 E-06 10	9095.5520	031	7 5 2	6 1 5	542.905	3.19E-05 6
9035.7479	012	3 1 2	3 0 3	136.781	3.63E-04 6	9096.0003	012	6 4 2	6 3 3	681.848	1.83E-05 6
9036.4447	111	12 3 10	11 3 9	1895.071	1.8 E-06 10	9097.8612 P	012	9 4 5	8 5 4	1255.188	1.1 E-06 10
9036.5589	012	6 2 5	5 3 2	508.812	1.3 E-05 10	9098.1176	012	6 2 5	6 1 6	447.252	9.32E-05 6
9037.1981 B	012	1 1 1	0 0 0	0.000	6.8 E-06 20	9098.8699	111	13 8 8	12 8 7	2433.803	1.0 E-06 10
9037.8092	012	3 1 2	2 2 1	134.902	1.3 E-05 10	9099.0216	111	5 4 2	5 0 5	325.347	1.9 E-05 10
9037.7868	111	10 3 7	9 3 6	1282.919	1.5 E-04 10	9099.2023 P	111	4 4 1	3 2 2	206.301	2.9 E-05 10
9038.2280	012	8 5 4	7 6 1	1218.193	1.59E-06 6	9100.1177 P	012	2 2 0	1 1 1	37.138	1.0 E-04 10
9038.7791 P	012	7 2 8	6 3 3	881.848	1.98E-05 6	9100.2034 P	012	7 3 5	7 2 8	709.808	1.6 E-06 10
9039.0175 P	012	8 5 3	7 6 2	1218.189	8.3 E-06 50	9101.4038	111	7 3 4	6 1 5	542.905	4.89E-05 6
9039.1080	012	3 2 1	3 1 2	173.385	3.59E-04 6	9102.9972	012	5 4 1	5 3 2	508.812	7.55E-06 6
9039.8688	012	4 2 2	4 1 3	275.497	1.1 E-04 10	9105.8893	012	6 0 8	5 1 5	328.625	1.4 E-05 10
9040.4142 B	012	7 4 3	6 5 2	888.598	5.3 E-05 10	9106.0300	012	7 1 6	7 0 7	588.243	5.37E-05 6
9040.4142 B	111	12 2 10	11 2 9	1890.885	5.3 E-05 10	9106.4119	031	7 8 2	6 4 3	758.724	1.8 E-06 10
9040.8757	111	9 3 2	4 1 3	275.497	1.60E-04 6	9107.1432 P	012	4 4 0	4 3 1	282.842	2.23E-06 6
9041.2488 B	111	10 5 6	9 5 5	1474.981	2.9 E-05 20	9107.3308 P	012	6 4 3	6 3 3	648.978	5.88E-05 6
9042.0784	012	2 2 0	2 1 1	99.175	8.60E-05 6	9107.5892	012	5 4 2	5 3 3	503.888	2.58E-05 6
9043.4203	111	10 5 5	9 5 4	1477.287	9.00E-05 6	9108.1580	012	6 1 6	5 0 5	325.347	7.38E-05 6
9044.4418 P	111	10 4 8	9 4 5	1380.235	1.57E-04 6	9108.2838 P	012	7 4 4	7 3 5	818.884	1.8 E-05 20
9044.8208	111	17 4 8	10 4 7	1581.326	8.78E-06 8	9108.2328 P	012	9 2 7	9 1 8	1079.880	1.2 E-05 20
9045.0551	111	6 5 2	6 3 3	681.848	6.08E-05 6	9108.4388 P	012	4 4 1	4 3 2	382.918	6.91E-05 6
9045.2323	012	5 2 3	5 1 4	399.457	2.28E-04 6	9108.7651	111	5 4 1	4 2 2	315.779	4.18E-05 6
9045.8498	111	13 3 11	12 3 10	1982.508	1.50E-06 10	9108.7742	012	8 3 8	8 2 7	885.600	2.23E-05 6
9047.0485 P	111	10 6 4	9 6 3	1831.384	2.9 E-05 10	9110.7933 P	012	3 2 2	2 1 1	99.175	7.53E-05 6
9047.2933 P	111	8 4 4	8 2 7	885.600	5.5 E-06 20	9110.8897 P	012	8 6 5	8 3 6	1006.116	1.8 E-05 10
9048.6102 P	031	5 5 0	4 1 3	275.497	1.2 E-06 10	9112.5044 B	111	11 8 3	10 8 2	2254.283	7.1 E-07 20
9049.2480 P	210	5 3 3	4 0 4	222.052	8.2 E-06 10	91					

TABLE 4 (concluded)

SIGMA CM-1	V' VIB	J' KA' KC'	J' KA' KC''	E' CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	V' VIB	J' KA' KC'	J' KA' KC''	E' CM-1	INTENSITY CM-2 ATM-1 %
9126.8483	012	4 2 3	3 1 2	173.385	1.59E-04 6	9246.3544 P	012	4 3 2	3 0 3	176.781	9.1 E-06 10
9126.1075	111	6 3 4	5 1 5	329.825	4.37E-05 6	9247.1844 P	111	8 5 4	7 3 5	816.894	7.7 E-06 10
9126.2491	130	7 3 2	6 0 8	448.897	1.2 E-05 10	9247.4989	012	6 4 3	5 3 2	508.872	7.72E-05 6
9126.4187 P	031	8 8 2	7 4 3	931.237	5.2 E-06 20	9248.9119	111	9 2 7	8 0 8	744.064	3.1 E-06 10
9129.2184	031	8 5 3	7 1 6	704.214	1.48E-05 6	9251.2391	111	9 4 8	8 2 7	889.800	2.00E-05 6
9129.8838	012	7 5 2	7 4 3	931.237	1.71E-05 6	9253.5825	012	6 4 2	5 3 3	593.968	2.74E-05 6
9130.6027	012	9 5 5	9 4 8	1340.885	8.9 E-07 10	9258.5836 P	210	7 5 2	7 0 7	588.243	5.1 E-07 50
9131.7134 B	012	8 0 8	7 1 7	588.479	1.1 E-05 20	9257.0917 B	012	5 5 1	4 4 0	488.134	1.3 E-04 50
9131.7134 B	012	8 5 4	5 4 5	1122.709	1.1 E-05 20	9257.0917 B	012	5 5 0	4 4 1	488.107	1.3 E-04 50
9132.2959 P	012	8 1 8	7 0 7	588.243	7.3 E-06 10	9259.1344 P	210	10 4 7	9 1 8	1079.080	3.9 E-06 10
9132.9742 P	012	3 2 1	2 1 2	79.498	1.7 E-04 10	9260.8246 P	111	8 6 0	5 4 1	610.340	1.1 E-06 20
9133.1711 P	012	7 5 3	7 4 4	927.744	5.5 E-06 10	9260.9181	111	9 3 7	8 1 8	744.183	1.53E-05 6
9133.4170	012	6 5 1	6 4 2	757.780	9.7 E-06 10	9261.0463 P	111	8 6 1	5 4 2	610.113	5.7 E-07 20
9134.4330	012	6 5 2	6 4 3	758.724	2.8 E-05 10	9263.4351	012	7 4 4	6 3 3	661.948	1.30E-05 6
9134.5359	111	7 4 3	6 2 4	602.773	4.3 E-05 10	9268.6607 P	111	12 5 7	11 3 8	1813.222	6.0 E-07 10
9134.8586	012	5 5 0	5 4 1	610.340	2.36E-05 6	9272.2582	111	9 5 5	8 3 6	1006.116	1.27E-05 6
9139.0787 P	012	5 5 1	5 4 2	610.113	8.7 E-06 20	9272.5579 P	012	8 2 4	5 1 5	328.825	7.7 E-06 20
9138.1412	012	5 2 4	4 1 3	275.497	3.49E-05 6	9274.8482	012	8 4 5	7 3 4	842.358	1.49E-05 6
9138.2730 P	012	9 2 8	9 1 9	920.211	8.8 E-06 20	9280.0388	012	7 4 3	6 3 4	648.978	3.80E-05 6
9138.5950	012	9 1 8	9 0 9	920.189	1.18E-05 6	9280.4074	111	7 6 2	6 4 3	758.724	2.0 E-06 10
9138.2022	111	7 2 5	6 0 8	448.897	2.24E-05 6	9280.8487 P	012	5 3 3	4 0 4	222.052	2.7 E-06 10
9139.3803 P	012	7 1 6	6 2 5	552.911	6.8 E-06 10	9280.9187	012	6 5 2	5 4 1	610.340	7.20E-06 6
9142.3155	111	8 3 5	7 1 6	704.214	7.92E-05 6	9281.0825	012	6 5 1	5 4 2	610.113	2.51E-05 6
9143.5003	012	9 0 9	8 1 8	744.183	7.7 E-07 10	9283.8961 P	012	7 3 4	6 2 5	552.911	1.06E-05 6
9146.9126	012	6 2 5	5 1 4	399.457	5.78E-05 6	9289.8957	210	7 5 2	6 2 5	552.911	1.14E-05 6
9147.8475	111	7 4 4	7 0 7	588.243	1.2 E-06 10	9290.6141	111	7 4 3	6 0 6	448.897	8.1 E-07 10
9148.9306 P	012	8 6 3	6 5 4	1255.166	1.4 E-06 10	9290.8074 B	111	10 4 7	9 2 8	1080.385	2.2 E-06 50
9150.4806	111	8 4 4	7 2 5	782.408	1.12E-04 6	9295.7909	111	8 6 2	7 4 3	931.237	2.1 E-06 10
9150.8785 P	012	3 3 0	3 0 3	136.781	5.9 E-06 20	9297.6554 P	210	10 3 8	9 0 9	920.189	2.8 E-06 10
9151.0420 P	012	3 3 1	2 2 0	138.183	1.2 E-04 10	9299.4001 P	111	8 6 3	7 4 4	927.744	6.9 E-07 20
9151.1034 P	111	6 4 3	5 2 4	418.208	3.6 E-05 10	9299.9984	111	10 5 6	9 3 7	1216.232	1.4 E-06 10
9152.5168	012	3 3 0	2 2 1	134.802	3.4 E-04 10	9303.1347 P	012	7 5 3	6 4 2	757.780	1.28E-05 6
9153.8898 P	012	7 8 1	7 5 2	1059.835	3.0 E-06 10	9304.3562	012	7 5 2	6 4 3	758.724	3.92E-05 6
9154.0742 P	012	7 6 2	7 5 3	1059.847	1.1 E-06 10	9304.6209 P	111	10 2 8	9 0 9	920.189	2.8 E-06 10
9157.4233 P	012	7 2 6	6 1 5	542.805	9.7 E-06 10	9306.4429 B	012	6 6 1	5 5 0	742.078	5.97E-05 6
9158.8859 B	012	6 6 0	6 5 1	888.822	2.2 E-06 50	9306.4429 B	012	6 6 0	5 5 1	742.073	5.97E-05 6
9158.9220 P	012	6 6 1	6 5 2	888.588	5.9 E-06 10	9307.1484 P	111	6 5 1	5 4 1	399.457	8.8 E-07 10
9161.1407 P	111	11 8 3	12 4 8	2205.852	6.2 E-07 10	9308.8122	111	10 3 8	9 1 9	920.211	1.6 E-06 10
9162.5987 P	012	4 3 1	4 0 4	222.052	1.5 E-06 10	9308.0481	012	6 4 3	5 1 6	447.252	1.1 E-06 10
9164.0691 B	012	8 2 7	7 1 6	704.214	1.3 E-05 20	9318.1983	111	10 8 4	9 4 5	1350.235	9.8 E-07 10
9168.8228 P	111	9 7 3	9 4 4	1477.297	8.9 E-07 20	9318.8881	111	9 8 4	8 4 5	1122.709	1.9 E-06 10
9167.6842 P	210	8 3 8	7 0 7	588.243	5.2 E-06 20	9318.8980	012	6 3 4	5 0 5	325.247	9.63E-06 6
9168.9951	111	7 3 5	6 1 6	447.252	7.2 E-05 10	9325.1833	012	8 5 4	7 4 3	931.237	1.80E-06 6
9169.0136 P	111	7 5 3	7 1 6	704.214	1.3 E-06 10	9326.0820 P	012	7 6 2	6 5 1	888.822	6.0 E-06 20
9170.9812	012	4 3 2	3 2 1	212.158	2.12E-04 6	9326.1258 P	012	7 6 1	6 5 2	888.588	1.2 E-05 20
9171.2565 P	111	8 7 1	8 5 4	1255.166	1.4 E-06 10	9327.4567 P	012	8 5 3	7 4 4	927.744	6.69E-06 6
9172.4802	111	7 7 1	7 5 2	1059.835	1.4 E-06 10	9328.9881	012	7 2 5	6 1 6	447.252	7.98E-06 6
9172.7685 P	111	9 4 5	8 2 6	987.912	1.4 E-05 10	9330.8082 P	111	11 5 7	10 3 8	1448.128	2.8 E-06 10
9172.9061	012	4 2 2	3 1 3	142.278	2.88E-05 6	9332.8234 P	111	11 4 8	10 2 9	1293.824	3.6 E-06 10
9176.3425	012	8 7 2	8 6 3	1411.812	9.7 E-07 10	9335.8898 P	012	8 3 5	7 2 6	703.808	1.8 E-06 10
9178.3488	012	4 3 1	3 2 2	206.301	6.92E-05 6	9336.0400	012	5 4 2	4 1 3	275.497	8.3 E-07 10
9179.2626 B	012	7 7 1	7 6 2	1218.189	1.5 E-06 50	9337.7108 P	012	9 5 5	8 4 4	1131.776	1.7 E-06 10
9179.2626 B	012	7 7 0	7 6 1	1218.192	1.5 E-06 50	9343.8838 P	111	7 7 0	6 5 1	888.822	4.8 E-06 20
9180.1521 P	111	5 5 0	4 3 1	383.842	8.0 E-06 20	9343.8973 P	111	7 7 1	6 5 2	888.588	1.2 E-05 20
9181.1789	111	7 4 4	6 2 5	552.911	7.21E-05 6	9344.2830 P	012	8 6 3	7 5 2	1059.835	4.3 E-06 10
9181.4791	111	5 5 1	4 3 2	382.518	2.31E-05 6	9348.8501 P	111	8 4 4	7 0 7	588.243	1.1 E-06 20
9182.8802 P	012	5 3 2	5 0 5	325.347	6.2 E-06 20	9348.9098 P	012	9 4 5	8 3 6	1006.116	6.0 E-06 20
9188.9218	012	5 3 3	4 2 2	315.779	4.2 E-05 10	9350.3888 B	012	7 7 0	6 6 1	1048.087	1.82E-05 6
9191.7985	111	9 3 6	8 1 7	882.891	6.0 E-06 10	9350.3988 B	012	7 7 1	6 6 0	1048.058	1.82E-05 6
9192.9829	111	8 2 8	7 0 7	588.243	3.5 E-05 10	9351.1454	012	9 5 4	8 4 5	1127.709	7.81E-06 6
9197.7547	111	6 5 1	5 3 2	508.812	3.40E-05 6	9353.0820 P	111	11 2 9	10 0 10	1114.532	8.7 E-07 20
9198.7363	012	6 3 4	5 2 3	448.910	6.27E-05 6	9358.8506 B	012	6 4 3	5 1 4	399.457	4.7 E-06 20
9202.4914	111	5 4 1	4 0 4	222.052	1.2 E-06 10	9358.8506 B	111	11 3 9	10 1 10	1114.549	4.7 E-06 50
9202.8335	111	6 5 2	5 3 3	502.888	1.17E-05 6	9358.4718	111	11 6 8	10 4 7	1581.338	6.7 E-07 10
9202.7897	111	10 4 8	9 2 7	1201.927	1.25E-06 6	9360.0271	111	8 5 3	7 3 8	704.214	1.0 E-06 20
9205.5252	012	4 4 1	3 3 0	285.418	2.35E-04 6	9362.7706 P	111	12 3 9	11 1 10	1524.849	6.7 E-07 20
9205.7684	012	4 4 0	3 3 1	285.219	8.44E-05 6	9363.1152	012	7 3 5	6 0 6	448.897	1.4 E-06 10
9207.0382 B	012	7 3 5	6 2 4	802.773	1.0 E-06 20	9365.5925	111	8 7 1	7 5 2	1059.835	8.80E-06 6
9207.8854	012	5 3 2	4 2 3	300.382	1.18E-04 6	9366.7887	111	8 7 2	7 5 3	1059.847	2.2 E-06 10
9211.7348	111	7 5 2	6 3 3	661.548	1.0 E-05 10	9371.7630 B	012	6 7 1	7 6 2	1218.189	7.14E-06 6
9212.7503	012	5 4 1	5 1 4	399.457	1.2 E-06 10	9371.7630 B	012	8 7 2	7 6 1	1218.193	7.14E-06 6
9212.9864 P	012	8 3 6	7 2 5	782.408	1.2 E-06 10	9382.0790 B	012	7 4 4	6 1 5	542.908	1.1 E-06 20
9213.9208	111	8 3 6	7 1 7	588.479	1.22E-05 6	9388.8908 P	012	8 2 6	7 1 7	588.479	9.1 E-07 20
9214.9756	111	8 4 5	7 2 8	709.808	1.53E-05 6	9388.7507	111	9 7 3	8 5 4	1253.168	3.2 E-06 10
9216.8710 B	111	9 4 8	9 0 9	920.189	4.8 E-07 20	9388.9406	012	9 3 6	8 2 7	889.800	1.8 E-06 10
9217.1175 P	012	3 3 1	2 0 2	70.089	7.7 E-07 20	9388.9406 P	111	12 2 10	11 0 11	1327.108	7.3 E-07 10
9218.1137 P	012	9 3 7	8 2 6	982.612	1.1 E-06 10	9407.2632	111	10 7 3	9 5 4	1477.297	1.3 E-06 10
9219.8620	012	5 2 3	4 1 4	224.838	3.85E-06 6	9408.1789 P	012	8 3 6	7 0 7	588.243	3.2 E-06 10
9221.8859	111	8 5 3	7 3 4	842.358	2.15E-05 6	9412.7998 P	012	8 4 5	7 1 8	704.214	4.0 E-06 10
9223.2618 P	210	10 4 7	10 1 10	1114.549	3.9 E-07 20	9423.8950 B	111	8 8 1	7 6 2	1218.189	1.0 E-06 20
9224.2485	012	7 5 3	6 3 4	848.878	3.12E-06 6	9423.8950 B	111	8 8 0	7 6 1	1218.193	1.0 E-06 20
9224.8032 P	012	7 4 3	7 1 6	704.214	1.4 E-06 10	9430.1107 P	111	11 7 5	10 5 6	1718.718	5.6 E-07 20
9227.6992	012	5 4 2	4 3 1	383.842	4.93E-06 6	9443.3513 P	012	9 2 7	8 1 8	744.183	1.0 E-06 10
9227.7823	012	5 4 1	4 3 2	382.518	1.48E-04 6	94					

TABLE 5. Comparison of the line intensities measured in this work with those of other authors (intensities have been converted to $10^{-5} \text{ cm}^{-2} \cdot \text{atm}^{-1}$ at 300 K)

Line center (cm^{-1}) (this work)	Intensity calculated by Benedict (refs. 1, 2)	S_1^0 Measured intensity $\pm 6\%$ (this work)	S_2^0 Measured intensity $\pm 10\%$ (see refs. 6 and 7)	$R = S_1^0/S_2^0$ ($\bar{R} = 1.030 \pm 0.078$)
9207.8654	35.4	11.8	$\begin{cases} 11.8^a \\ 12.3^b \end{cases}$	$\begin{cases} 1.000 \\ 0.959 \end{cases}$
9219.8520	14.4	3.85	3.53 ^c	1.091
9221.8855	3.87	2.16	2.02 ^c	1.069
9224.2465	5.53	3.13	2.82 ^c	1.110
9227.6952	13.0	4.93	4.82 ^c	1.023
9229.2923	40.3	14.6	12.8 ^c	1.141
9237.7975	1.17	0.661	0.696 ^c	0.950
9241.6079	1.32	0.783	0.689 ^c	1.136
9242.8597	0.874	0.443	0.500 ^c	0.886
9243.0742	6.11	1.67	1.60 ^c	1.044
9251.2391	2.74	2.00	2.01 ^c	0.995
9253.5825	7.09	2.74	2.69 ^c	1.019
9260.9181	2.01	1.53	1.48 ^c	1.034
9263.4351	2.40	1.30	1.31 ^c	0.992
9272.2582	1.88	1.27	1.21 ^c	1.050
9274.6482	2.30	1.49	1.50 ^c	0.993
9280.0388	10.2	3.80	3.90 ^c	0.974
9280.8167	18.8	7.20	8.27 ^c	0.871
9281.0825	6.31	2.51	2.38 ^c	1.055
9283.5661	8.40	1.06	1.04 ^c	1.019
9289.8957		1.14	1.05 ^c	1.086
9303.1347	2.82	1.28	1.30 ^c	0.985
9304.3962	8.81	3.92	3.94 ^c	0.995
9305.4429	18.9	5.97	6.35 ^c	0.940
9319.8980	3.40	0.963	1.08 ^c	0.892
9323.1833	3.21	1.80	1.82 ^c	0.989
9327.4567	1.22	0.669	0.586 ^c	1.142
9328.9881	3.63	0.796	0.785 ^c	1.014
9350.3986	5.63	1.83	1.61 ^c	1.137
9351.1494	1.40	0.781	0.730 ^c	1.070
9366.5925	0.434	0.880	0.778 ^c	1.131
9371.7630	2.35	0.714	0.597 ^c	1.196

^aValue obtained by Brault *et al.* (6) from a measurement performed at 296 K.^bValue obtained by Brault *et al.* (6) from a measurement performed at 297 K.^cValue measured by Cherepanov *et al.* (7).

To assess the validity of such a method, we have made several tests (12).

(i) Equation [1] is valid only for infinite resolution, but taking into account the range of values of γ^D , γ^L , and the resolution limit, we have checked that it was always possible to use an effective constant α with very good accuracy (standard deviations from 2 to 4.5% depending on the spectrum). In particular, it should be noted that we did not detect any systematic deviation related to either the line depth or the wavenumber.

(ii) From [1], α can be related to known quantities

$$[4] \quad \alpha = \beta(\sigma_0 xPl/\gamma^D) (\log 2/\pi)^{1/2} k[0, (\log 2)^{1/2} \gamma^L/\gamma^D]$$

the constant β (slightly less than unity) being introduced to take into account the effect of the apparatus function. For similar resolutions, the value of β should not depend upon the quantities appearing in [4]. We have checked that this is true for a wide variety of spectra, since we find the value of β to be remarkably constant: $\beta = 0.96 \pm 0.02$.

(iii) As already mentioned, several precautions have to be taken to measure the H_2^{16}O line intensities, especially because of traces of atmospheric water vapor along the optical path.

Indeed, intensity measurements of very strong lines need low optical-thickness spectra, where the atmospheric absorption is not negligible. Then, the atmospheric Lorentzian part of the absorption profile may become important so that [1], which describes the absorption caused by just the gas being present in the cell, is no longer valid. In fact, using as tests similar spectra of the second triad of H_2^{16}O for which an extensive set of accurately calculated intensities is available (13), we have found that the method could still be used for the range of line depth and optical-thickness values we encountered in this work. (However, once the Lorentzian contribution has been removed, we have effectively found the same value of β that was mentioned above. This is additional proof of the significance of the method.)

(iv) Finally, the comparison of the deduced intensity values for the same line, from various records, shows a good agreement.

To conclude, this method appears to be significant and easy to use. The uncertainty in the obtained intensities is mainly due to the uncertainty in the depth of the lines concerned, which are all, more or less, perturbed by neighbouring lines (this is why the equivalent-width method could not be used for these lines).

These intensities are listed in Table 4. The reported uncertainties are estimated as follows. For "good" lines, the uncertainty can be between 6 and 15%, and a mean value 10% is mentioned. For perturbed lines, the uncertainty is in the range 15–25%, and a mean value of 20% is given. For strong overlappings, a mean uncertainty of 50% is given. (When blending occurs, only the total intensity can be measured and this is repeated for each line located at the same wavenumber; in this case, the stated uncertainty concerns the whole intensity, and is not the uncertainty of each blended line.)

4. Conclusions

Using Fourier-transform spectra of water between 8000 and 9500 cm^{-1} , we have obtained an extensive set of accurate rotational energy levels for the second hexad of interacting states of H_2^{16}O . We have measured the intensities of all the observable lines; their uncertainty varies from 6 to 50%, depending upon the line, with a mean value of 10%. This extensive set of line positions and intensities gives a quasi-complete picture of the absorption of H_2^{16}O at room temperature in the studied spectral region.

Acknowledgements

The authors express their gratitude to Dr. J. W. Brault, who gave them the opportunity of recording the spectra on his Fourier-transform apparatus at the National Solar Observatory, Kitt Peak, AZ.

Financial support from the United States Air Force Geophysical Laboratory, under contract No AFOSR-86-0190, is also acknowledged.

1. W. S. BENEDICT. *Phys. Rev.* **74**, 1246 (1948).
2. J. S. GARING and R. A. McCLATCHEY. *Appl. Opt.* **12**, 2545

- (1973); R. A. McCLATCHEY, W. S. BENEDICT, S. A. CLOUGH, D. E. BURCH, R. F. CALFEE, K. FOX, L. S. ROTHMAN, and J. S. GARING. *AFCRL Atmospheric Absorption Line Parameters Compilation*. Report AFCRL-TR-0096. Environmental Paper 434. Air Force Cambridge Research Laboratories, Bedford, MA, 1973; L. S. ROTHMAN, R. R. GAMACHE, A. BARBE, A. GOLDMAN, J. R. GILLIS, L. A. BROWN, R. A. TOTH, J.-M. FLAUD, and C. CAMY-PEYRET. *Appl. Opt.* **22**, 2247 (1983).
3. J.-M. FLAUD, C. CAMY-PEYRET, K. N. RAO, D.-W. CHEN, Y.-S. HOH, and J.-P. MAILLARD. *J. Mol. Spectrosc.* **75**, 339 (1979).
4. C. CAMY-PEYRET, J.-M. FLAUD, J.-P. MAILLARD, and G. GUELACHVILI. *Mol. Phys.* **33**, 1641 (1977).
5. J. W. BRAULT. *Proceedings of the Joint Organization for Solar Observations Workshop*, 1978. *Osservatori e Memorie dell'Osservatorio Astrofisico di Arcetri*, **106**, 33 (1979).
6. J. W. BRAULT, J. S. FENDER, and D. N. B. HALL. *J. Quant. Spectrosc. Radiat. Transfer*, **15**, 549 (1975).
7. V. N. CHEREPANOV, V. P. KOCHANOV, Y. S. MAKUSHKIN, L. N. SINITSIN, A. M. SOLODOV, O. N. SULAKSHINA, and O. K. VORTSEKHOVSKAYA. *J. Mol. Spectrosc.* **111**, 173 (1985); A. D. BYKOV, O. N. ULENIKOV, and A. S. ZHILYAKOV. *J. Mol. Spectrosc.* **123**, 247 (1987).
8. O. N. ULENIKOV and G. A. USHAKOVA. *J. Mol. Spectrosc.* **117**, 195 (1986).
9. J.-M. FLAUD, C. CAMY-PEYRET, and R. A. TOTH. *Parametres des raies de la vapeur d'eau des micro-ondes à l'infrarouge moyen*. Pergamon Press Ltd., London, England, 1981.
10. J.-Y. MANDIN, J.-P. CHEVILLARD, C. CAMY-PEYRET, and J.-M. FLAUD. *J. Mol. Spectrosc.* **118**, 96 (1986).
11. J.-P. CHEVILLARD, J.-Y. MANDIN, J.-M. FLAUD, and C. CAMY-PEYRET. *Can. J. Phys.* **63**, 1112 (1985).
12. J.-P. CHEVILLARD. *Thèse d'Etat*. Université Paris-Sud, Orsay, France, 1988.
13. C. CAMY-PEYRET, J.-M. FLAUD, and R. A. TOTH. *J. Mol. Spectrosc.* **67**, 117 (1977).

H_2^{16}O : Line positions and intensities between 9500 and 11500 cm^{-1} . The interacting vibrational states (041), (220), (121), (022), (300), (201), (102), and (003)

J.-P. CHEVILLARD, J.-Y. MANDIN, J.-M. FLAUD, AND C. CAMY-PEYRET

Laboratoire de Physique Moléculaire et Atmosphérique,
Université Pierre-et-Marie-Curie et Centre National de la Recherche
Scientifique (CNRS),
Tour 13, 4, place Jussieu,
75252 Paris CEDEX 05, France

SUBJECT CLASSIFICATION:

33.00 Molecular spectra and interactions with photons:

- 33.10 : Calculation of molecular spectra
- 33.20 E : Infrared spectra
- 33.70 : Intensities and shapes of molecular spectral
lines and bands

Résumé

Des spectres par transformée de Fourier de la vapeur d'eau (résolution: 0.015 cm^{-1}) ont été analysés entre 9500 et 11500 cm^{-1} . Les valeurs précises de 557 niveaux d'énergie rotationnels appartenant aux états vibrationnels interagissants (041), (220), (121), (022), (300), (201), (102), et (003) de la première décade d' H_2^{16}O , ont été déterminées. De plus, on a mesuré avec précision les intensités de 718 raies (incertitude: 7%). Dans le but d'augmenter le nombre d'intensités expérimentales (nécessaires pour les applications atmosphériques), une méthode plus rapide utilisant les profondeurs mesurées des raies, a permis d'obtenir 1695 intensités supplémentaires, avec une incertitude moyenne d'environ 15%.

Abstract

Water vapor Fourier-transform spectra (resolution: 0.015 cm^{-1}) have been analyzed between 9500 and 11500 cm^{-1} . Accurate values of 557 rotational energy levels, belonging to the interacting vibrational states (041), (220), (121), (022), (300), (201), (102), and (003) of the first decad of H_2^{16}O , have been determined. Moreover, 718 line intensities have been accurately measured (uncertainty: 7%). In order to increase the number of experimental intensities (needed by atmospheric applications), a faster method, using the measured line depths, has led to the obtention of 1695 additional intensities, with an average uncertainty of about 15%.

1. Introduction

This paper is the continuation of our previous works about the water molecule (1,2), the absorption of which plays a major role in atmospheric applications or in radiative transfer studies. After the analysis of the H_2^{16}O spectrum between 8000 and 9500 cm^{-1} (1), we present here the 9500- to 11500 cm^{-1} spectral region for the same molecule. This region was first studied by Benedict (3) working on the solar spectra of Delbouille and Roland (3) (resolution: between 0.10 and 0.05 cm^{-1} depending upon the wavelength); later on, these results were introduced in the atmospheric compilation (4), with some modifications.

We had already studied this spectral region, but for the H_2^{18}O isotopic species (2). So, in order to have a more complete picture of the water vapor absorption in this region and to improve the accuracy of the previous results, we have studied several spectra (resolution: 0.015 cm^{-1}) recorded with the Fourier-transform spectrometer built by Brault (5). The analysis of these spectra has led to the determination of 557 accurate rotational energy levels for the interacting vibrational states (041), (220), (121), (022), (300), (201), (102), and (003), which belong to the first decad of H_2O .

In the spectral region we dealt with, the knowledge of experimental intensities is very incomplete. The atmospheric data base (4) gives some values, but they were obtained by Benedict from the equivalent widths measured in solar spectra, so, most of them are known with large uncertainties. Latter on, Giver et al. (6) measured accurate intensities for 97 lines between 10400 and 10750 cm^{-1} . To extend this set of data, we used the equivalent width method to measure 718 intensities of well isolated lines (uncertainty: 7%). Besides, in order to provide a complete list of reliable individual line intensities, we used the faster central depth method already described (1), to obtain the intensities of all the remaining lines: thus, 1695 additional intensities have been measured with an average uncertainty of about 15%.

2. Experimental details and analysis

The experimental details and the data reduction procedure have already been discussed (1,2,) so, we give here only the details relevant to the present study. The ^{18}O -enriched, ^{17}O -enriched, and natural water vapor spectra were recorded at the National Solar Observatory (Kitt Peak, AZ), with the Brault's Fourier-transform apparatus (5). The experimental conditions and the characteristics of these spectra are gathered in Table 1. Figure 1 is a representative portion of the spectrum which shows clearly the quality of the signal-to-noise-ratio.

As already said in the case of H_2^{18}O (2), 10 resonating vibrational states are involved in the studied spectral region: they form the so-called first decad of the water molecule, i.e., the polyad of interacting states $\{(060), (140), (041), (220), (121), (022), (300), (201), (102), (003)\}$. Among the 10 corresponding cold bands, the $\nu_1+4\nu_2$ band is so weak that it could not be observed, even in our long absorption path spectra. Also, it is interesting to notice that, owing to a few resonant levels, we could observe the very weak $2\nu_2+2\nu_3$ band, whereas it was unobservable for H_2^{18}O (2), because the optical thickness of H_2^{18}O was too small. Let us recall also that the $6\nu_2$ band absorbs around 8600 cm^{-1} , and is visible only through the resonating level $(060)[616]$ (1,7). On the whole, the 8 following bands were analyzed: $4\nu_2+\nu_3$, $2\nu_1+2\nu_2$, $\nu_1+2\nu_2+\nu_3$, $2\nu_2+2\nu_3$, $3\nu_1$, $2\nu_1+\nu_3$, $\nu_1+2\nu_3$, and $3\nu_3$.

Accurate energy values were known only for a few levels of the (121) vibrational state, from some lines of the $\nu_1+2\nu_2+\nu_3-\nu_2$ hot band observed in the $8000\text{--}9500\text{ cm}^{-1}$ region (1). Nevertheless, a good starting point for the analysis of the spectra was provided by the energy levels of Benedict (3); and, except for a few cases, our values confirm and improve the energy levels that Benedict primarily observed or predicted, despite the low resolution of the spectra he had at his disposal.

The resonances are numerous, some of them involving simultaneously more than two levels. In particular, almost half of the very close (300) and (201)

*J: small
me*

(060)[616]

rotational levels interact with each other, or with levels of other vibrational states. A typical example is given by the levels (201)|808| at $11317.2562\text{ cm}^{-1}$, and (121)|826| at $11322.4512\text{ cm}^{-1}$. We had already pointed out this resonance in the case of H_2^{16}O (2), and it is particularly interesting to note the differences that appear between the two isotopic molecules H_2^{16}O and H_2^{18}O . As one can see on Fig. 2, the relative positions of the resonant levels are different for the two molecules: for H_2^{16}O , (201)|808| is about 5.2 cm^{-1} below (121)|826|, whereas it is only about 3.6 cm^{-1} above for H_2^{18}O . This means a stronger interaction for H_2^{18}O than for H_2^{16}O . Indeed, the two levels (201)|808| and (201)|818|, which should be quasi-degenerated in the unperturbed scheme because they form a doublet, are actually well separated, i.e., by about 1.2 cm^{-1} for H_2^{16}O , but only by 0.6 cm^{-1} for H_2^{18}O . Furthermore, as (121)|826| is above (201)|808| for H_2^{16}O , this level is shifted downwards with respect to (201)|818|, whereas it is shifted upwards for H_2^{18}O . Such differences in the positions of the levels give rise to different spectra: see Fig. 1, which should be compared with Fig. 1 of ref. 2. This discussion shows that the effect of the interactions cannot be simply transposed from one isotope to another (see also ref. 8).

Another interesting example of strong difference between the spectra of the two isotopes concerns the K_c doublet-levels (121)|909| and (121)|919|, which are separated by more than 1.8 cm^{-1} for H_2^{16}O , but which are very close to each other for H_2^{18}O . This is because of a strong Fermi-interaction between the levels (121)|919| and (041)|937| of H_2^{16}O , whereas this resonance does not exist in the case of the H_2^{18}O molecule (see Table 3 of ref. 2): indeed, the level (041)|937| of H_2^{18}O is located so that no strong interaction occurs, and it cannot be observed for this reason. Such a fact is not surprising since the structure of the rotational levels of the (041) vibrational state is subject to a noticeable change with the isotopic substitution, because of the large value of the v_2 -quantum number.

A comment can be made about the (000) rotational levels which, of course, are obtained by only one transition. Though this transition generally gives rise to a weak line, it can be easily identified using sum rules (9,10). For example, the following relation gives an approximate value of the energy $E[000]$ without any diagonalisation of the hamiltonian matrix:

$$[1] \quad E[000] = (9/5) E[101] + \{ E[221] - E[202] - E[220] \} + \dots \\ \dots + (1/5) \{ E[303] + E[321] - E[322] \} .$$

This very simple formula is interesting. First, it only needs to know the energy of 7 levels. And second, when these levels are non resonant, it provides a very good approximation of $E[000]$: indeed, the predicted value is correct (10) within an error of 144 times the H_f constant of the Watson-Hamiltonian (11,12) and with an uncertainty of 5.4 times the mean uncertainty on the experimental energy levels; this leads to an overall error on the estimation of the $E[000]$ of about $3 \times 10^{-3} \text{ cm}^{-1}$. This formula allowed to search the corresponding line and to find it without ambiguity. This is even possible when some of the levels involved in [1] are resonant, [as for the (220) and (201) states].

A similar problem of assignment arises for some doublet-levels of high J -value with K_a equal 0 or 1. Usually, these levels are obtained from only one doublet-line but, since such lines appear as series (12,10), it is rather easy to perform the assignment. Furthermore, they are recognizable in N_2 -broadened spectra (not mentioned in Table 1), since this type of transitions give rise to very narrow lines, as it was already observed between 8500 and 9500 cm^{-1} (15). (The measurement of N_2 -broadening coefficients of lines between 9500 and 11500 cm^{-1} is in progress.)

3. Results

3.1. Line positions and energy levels

The experimental positions of the 2413 assigned lines, between 9500 and 11500 cm^{-1} , are listed in Table 2. From them, 557 rotational energy levels have been determined. These energy levels are reported in Table 3, together with their uncertainty and with the number of observed transitions involving each level.

The absolute wavenumbers of Tables 2 and 3 have been obtained through a careful calibration procedure (10,14), and their comparison with previous values (3) deserves some discussion. First, it is important to recall that the results of Benedict (3), which have been reported in the 1986 HITRAN data base (4), come from solar spectra and are therefore air-shifted wavenumbers. The few experimental values of air-shift coefficients of H_2O lines which have been published (see, e.g., refs. 6,16,17, and references therein), show that this air-shift is not negligible since it ranges between -3×10^{-3} and $-40 \times 10^{-3} \text{ cm}^{-1} \cdot \text{atm}^{-1}$. Thus, the HITRAN wavenumbers for the concerned spectral regions can be underestimated by a similar amount. In fact, we have noted that the HITRAN wavenumbers are on the average lower than ours, which are free from air-shift since they are measured on pure H_2O spectra. The self-shift could play a role but, although only two measured values of the self-shift have been published (18,19) to our knowledge, one can reasonably think that this shift is negligible in our spectra, because of their low H_2O pressure (see Table 1).

For the same reason, we have also observed a discrepancy between the wavenumbers of refs. 20,21 and those of the HITRAN data base. Such differences could have troublesome consequences, especially for lidar applications. To cope with this problem, N_2 -shift measurements are in progress (10), using some other spectra we had recorded at the National Solar Observatory, with half an atmosphere of N_2 .

3.2. Line intensities

Using the curve of growth method, we have measured the intensities of 718 well isolated lines. They are reported in Table 2 and their average uncertainty is 6% (as far as absolute values of intensities are concerned, the uncertainty to take into account is 7% : see refs. 14, 22, 23).

Since 53 of these intensities had already been measured by Giver et al. (6) (resolution: 0.045 cm^{-1} , and average uncertainty: 3.3% for the concerned lines), comparisons were made between their results and ours (see Table 4). The average ratio of the two intensities is: $\bar{R} = 0.960 \pm 0.077$; this good agreement proves the consistency of these two independant sets of results.

To complete the list of intensities obtained above, we have used the central depth method detailed in ref. 1. The additional intensities thus measured are listed in Table 2. For not too perturbed lines, the uncertainty lies between 6 and 15% . For perturbed lines, the uncertainty ranges from 15 to 25% ,and a value of 20% is given. For strong overlappings, or for very weak lines, the uncertainty can be more important and a mean value 50% is reported. When close blendings occur, only the total intensity can be measured and is repeated for each line located at the same wavenumber.

Since we wanted to make precise comparisons between the intensities measured by different authors, Table 4 contains only our most accurate intensities, i.e., those having a 6% uncertainty. But it is interesting to notice that the comparison of the intensities of 41 other less precise lines, that we obtained by the central depth method, with the corresponding intensities of Giver et al. (6) gives rise to the same value of the average ratio $\bar{R}$. This shows again the coherence of the method and of its results. ✓

4. Conclusion

Using water vapor Fourier-transform spectra recorded between 9500 and 11500 cm^{-1} , we have obtained an extensive set of accurate rotational energy levels for eight interacting vibrational states belonging to the first decad of H_2^{16}O . We have measured the intensities of all the observable lines, their uncertainty ranging from 6 to 50% depending upon the line, with an average value of 15%. This extensive set of line positions and intensities greatly improve upon the previous results, as far as the accuracy and the coverage are concerned.

5. Acknowledgements

The authors express their gratitude to Dr. J.W. Brault, who gave them the opportunity of recording the spectra on his Fourier-transform apparatus, at the National Solar Observatory, Kitt Peak, AZ.

Financial support from United States Air Force Geophysical Laboratory, under contract No AFOSR-86-0190, is also acknowledged.

References

1. J.-Y. MANDIN, J.-P. CHEVILLARD, J.-M. FLAUD, and C. CAMY-PEYRET. *Can. J. Phys.* 66, 997 (1988).
2. J.-P. CHEVILLARD, J.-Y. MANDIN, J.-M. FLAUD, and C. CAMY-PEYRET. *Can. J. Phys.* 65, 777 (1987).
3. J.W. SWENSSON, W.S.BENEDICT, L. DELBOUILLE, and G.ROLAND. The solar spectrum from 7498 to 12016 Å. *Mem. Soc. R. Sci. Liège. Special volume No 5.* Liège, Belgium. 1970.
4. L.S. ROTHMAN, R.R. GAMACHE, A. GOLDMAN, L.R. BROWN, R.A. TOTH, H.M. PICKETT, R.L. POYNTER, J.-M. FLAUD, C. CAMY-PEYRET, A. BARBE, N. HUSSON, C.P. RINSLAND, and M.A.H. SMITH. *Appl. Opt.* 26, 4058 (1987).
5. J.W. BRAULT. *Proceedings of the Joint Organization for Solar Observations Workshop, 1978. Osservatori e Memorie dell'Osservatorio Astrofisico di Arcetri* 106, 33 (1979).
6. L.P. GIVER, B. GENTRY, G. SCHWEMMER, and T.D. WILKERSON. *J. Quant. Spectrosc. Radiat. Transfer.* 27, 423 (1982).
7. J.-M. FLAUD, C. CAMY-PEYRET, K.N. RAO, DA-WU CHEN, YAN-SHEK HOH, and J.-P. MAILLARD. *J. Mol. Spectrosc.* 75, 339 (1979).
8. C. CAMY-PEYRET, J.-M. FLAUD, and R.A. TOTH. *J. Mol. Spectrosc.* 87, 233 (1981).
9. C. CAMY-PEYRET and J.-M. FLAUD. *C. R. Acad. Sc. Paris B274*, 974 (1972).
10. J.-P. CHEVILLARD. *Thèse d'Etat, Université Paris-Sud, Orsay.* 1988.
11. J.K.G. WATSON. *Mol. Phys.* 15, 479 (1968).

12. C. CAMY-PEYRET and J.-M. FLAUD. Thèses d'Etat, Université Pierre-et-Marie-Curie, Paris. 1975.

13. J.-M. FLAUD, C. CAMY-PEYRET, and R.A. TOTH. Paramètres des raies de la vapeur d'eau des micro-ondes à l'infrarouge moyen. Pergamon Press Ltd., London, England. 1981.

14. J.-P. CHEVILLARD, J.-Y. MANDIN, J.-M. FLAUD, and C. CAMY-PEYRET. Can. J. Phys. 63, 1112 (1985).

15. J.-Y. MANDIN, J.-P. CHEVILLARD, J.-M. FLAUD, and C. CAMY-PEYRET. J. Mol. Spectrosc. 132, 352 (1988).

16. J. BÖSENBERG. Appl. Opt. 24, 3531 (1985).

17. A.D. BYKOV, E.A. KOROTCHENKO, Y.S. MAKUSHKIN, Y.N. PONOMAREV, L.N. SINITSIA, A.M. SOLODOV, V.N. STROINOVA, and B.A. TICHOMIROV. Optika Atmosferi (USSR) 1 (Volume 1), 40 (1988); A.D. BYKOV, Y.N. PONOMAREV, and L.N. SINITSIA. Optika Atmosferi (USSR) 1 (Volume 2), 3 (1988) (papers in Russian); L.N. SINITSIA. Xth International Conference on High Resolution Infrared Spectroscopy. Paper PT Prague, Czechoslovakia. 5-9 September 1988.

DTL2

18. D. MROWINSKI. Z. Angew. Phys. 29, 323 (1970).

19. A. BAUER, M. GODON, M. KHEDDAR, J.-M. HARTMANN, J. BONAMY, and D. ROBERT. J. Quant. Spectrosc. Radiat. Transfer 37, 531 (1987).

20. C. CAMY-PEYRET, J.-M. FLAUD, J.-Y. MANDIN, J.-P. CHEVILLARD, J.W. BRAULT, D.A. RAMSAY, M. VERVLOET, and J. CHAUVILLE. J. Mol. Spectrosc. 113, 208 (1985).

21. J.-Y. MANDIN, J.-P. CHEVILLARD, C. CAMY-PEYRET, J.-M. FLAUD, and J.W. BRAULT. J. Mol. Spectrosc. 116, 167 (1986).

22. J.-P. CHEVILLARD, J.-Y. MANDIN, C. CAMY-PEYRET, and J.-M. FLAUD.
Can. J. Phys. 64, 746 (1986).

23. J.-Y. MANDIN, J.-P. CHEVILLARD, C. CAMY-PEYRET, and J.-M. FLAUD.
J. Mol. Spectrosc. 118, 96 (1986).

FIG. 1. Portion of a ^{17}O -enriched spectrum used in this work. The plotted spectrum is a part of the spectrum number 5 (see Table 1), which has been apodized. The lines marked with a triangle are due to H_2^{16}O (see Table 2). Those marked with a black circle are due to H_2^{18}O (see ref. 2). The line marked with a diamond belongs to H_2^{17}O . The H_2^{16}O transitions, the assignment of which is mentioned, illustrate the strong Fermi-resonance between the levels (121)[826] and (201)[808]. This interaction has the same qualitative effects as for H_2^{18}O (see Fig. 1 of ref. 2), except that the relative line positions are reversed, because of the differences in the structure of the H_2^{16}O and H_2^{18}O levels (see Fig. 2).

FIG. 2. Comparison of the relative positions of the energy levels of H_2^{16}O and H_2^{18}O , in the case of the Fermi-resonance between $(121)[826]$ and $(201)[808]$. The level $(201)[818]$ is not perturbed. The approximate position of the level $(201)[808]$ in the absence of interaction is indicated by dots. The mentioned energies are in cm^{-1} . (See Sect. 2 for discussion.)

TABLE 1. Experimental conditions and characteristics of the absorption spectra (1 atm = 1013 hPa). Common characteristics: studied spectral region, 9500–11500 cm^{-1} ; signal-to-noise ratio, 500–1000; cell temperature, 300 ± 0.5 K; average Doppler half-width, 0.015 cm^{-1} .

TABLE 2. List of experimental line positions and intensities for the bands of H_2^{16}O observed between 9500 and 11500 cm^{-1} at 300 K

NOTES: SIGMA: observed position of the line in cm^{-1} . P: the line is perturbed by neighbouring lines or by the noise. B: the line is blended with another line (of H_2^{16}O or of another isotope); however, a line blended with another one stronger by a factor larger than 10 is not mentioned; note that, when a blending occurs, the total measured intensity is repeated for each line blended at the same wavenumber. An asterisk indicates a poor quality line which has not been used in the calculation of the energy levels. VIB: vibrational quantum numbers v_1' , v_2' , v_3' of the upper level. The lower vibrational level is the fundamental (000). J' KA' KC' J'' KA'' KC'': rotational quantum numbers of the upper and lower levels respectively. E'': energy of the lower level in cm^{-1} . INTENSITY: measured line intensity at 300 K expressed in $\text{cm}^{-2}\text{atm}^{-1}$. % : uncertainty in the measured intensity (see text, Sect. 3.2).

TABLE 3. Experimental rotational energy levels for the observed vibrational states of the first decad of H_2^{16}O

NOTES: E: experimental energy in cm^{-1} . DELTA.E: uncertainty in the energy value, equal to one standard deviation in units of 10^{-3} cm^{-1} . N: number of observed lines arriving at the corresponding level. Let us recall that the resonant level (060)(616) at $9400.6413 \text{ cm}^{-1} \pm 0.41 \times 10^{-3} \text{ cm}^{-1}$, has been observed by 7 lines in the second hexad region (1,7).

TABLE 4. Comparison of line intensities measured in this work with those of Giver et. al. (6)

NOTES: SIGMA: line center in cm^{-1} , from this work. S01: intensity measured by Giver et. al. (6), converted to $\text{cm}^{-2}\text{atm}^{-1}$ at 300 K (average uncertainty: 3.3% ; but, as far as absolute intensities are concerned, this uncertainty should be slightly increased: see ref. 15). S02: intensity measured in this work (uncertainty: 7%). R: ratio S02/S01, with $\bar{R} = 0.960 \pm 0.077$ for the 53 lines. See Table 2 for the other notations.

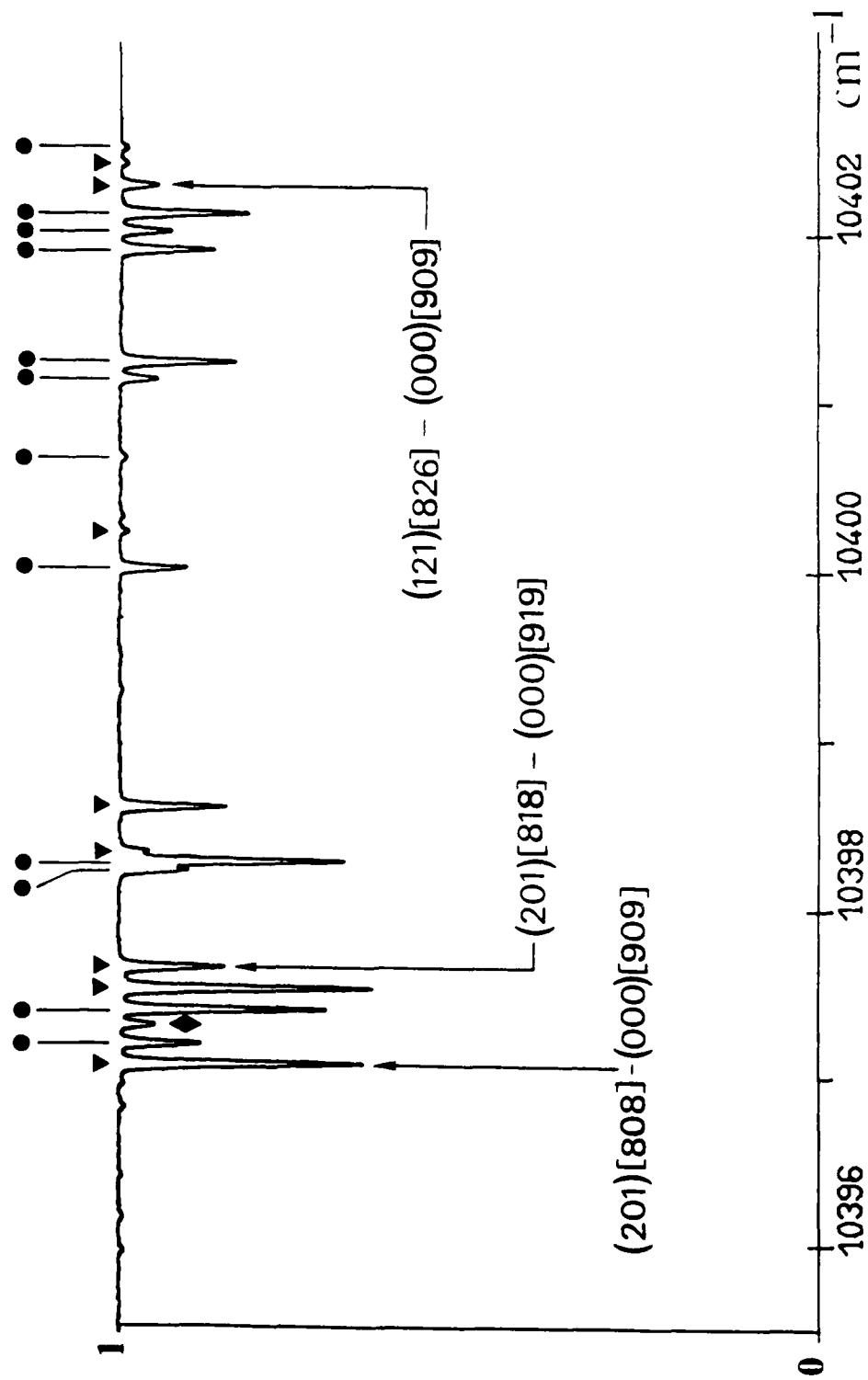


FIG. 1 *Can. J. Phys.* J.-P. CHEVILLARD ET AL.

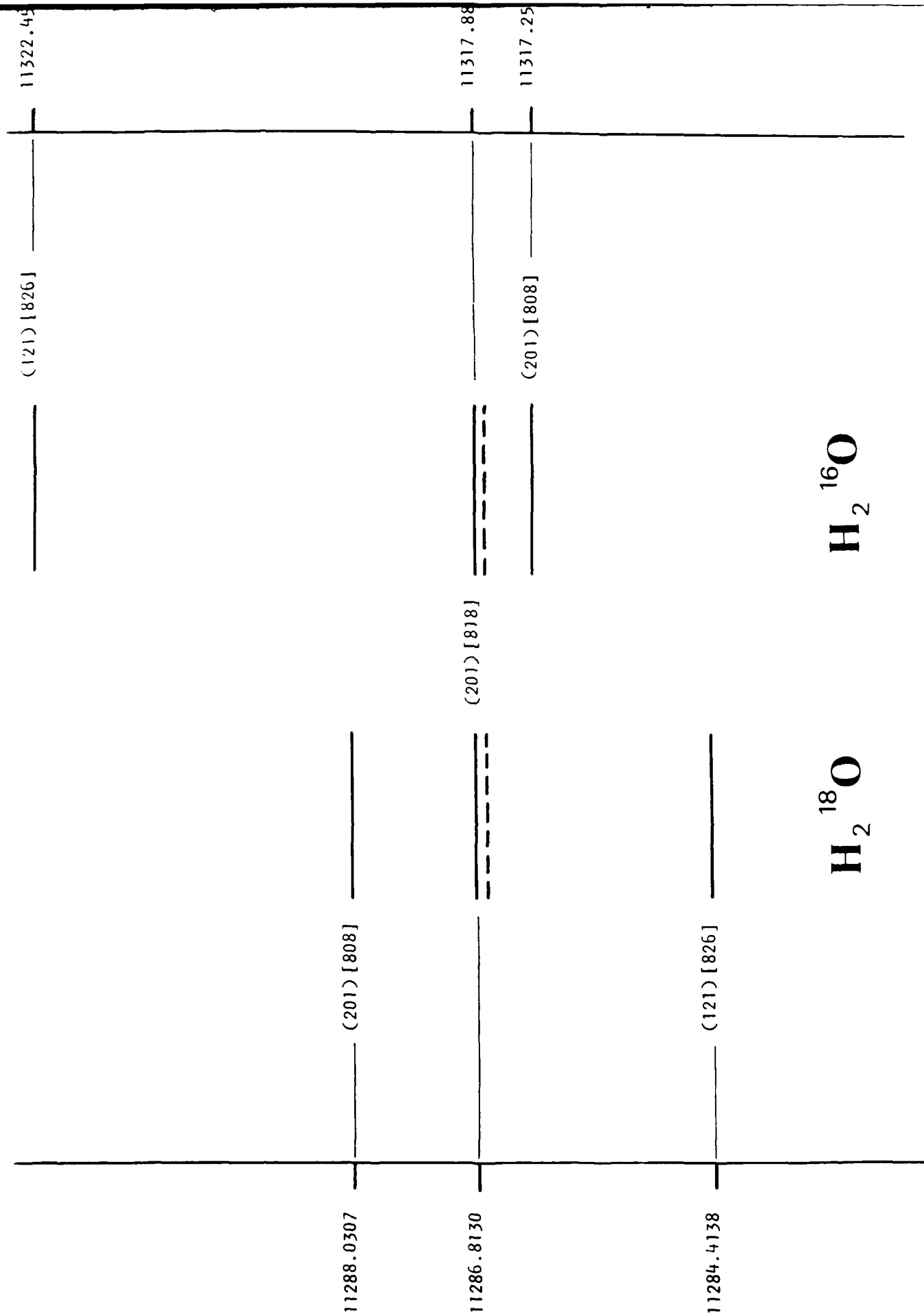


FIG. 2 Cam. J. Phys. CHEVILLARD et AL.

Type of spectrum	Spectrum number	Unapodized		Total pressure		Average		¹⁶ H ₂ O		¹⁶ H ₂ O	
		resolution (10 ⁻³ cm ⁻¹)	P ± 1% (10 ⁻³ atm)	Lorentz half-width (10 ⁻³ cm ⁻¹)	Absorption path ℓ (cm)	Concentration x	Optical thickness x ℓ (cm.atm)				
Natural	1	17	1.97	0.7	43 396	0.997	85.2				
	2	17	22.8	8.0	43 396	0.997	986				
	3	13	3.68	1.3	4 900	0.27 ± 0.01	4.87				
¹⁸ O enriched	4	13	3.58	1.3	43 396	0.27 ± 0.01	42.0				
	5	13	6.25	2.2	4 900	0.79 ± 0.03	24.2				
	6	13	6.25	2.2	43 396	0.79 ± 0.03	214				

TABLE I Can. J. Phys. J.-P. CHEVILLARD ET AL.

9803.7498 P	041	10	0	10	11	0	11	1327.108	5.7 E-07	50	9824.8298	121	8	1	7	9	3	6	1282.819	9.1 E-07	20
9810.4802 P	041	4	0	4	5	2	3	448.510	4.8 E-07	20	9828.1188	041	4	1	4	3	1	3	142.278	6.4 E-06	15
9828.2774 P	041	9	0	9	10	0	10	1114.533	3.5 E-07	50	9828.7020 P	041	5	2	3	5	2	4	416.208	9.1 E-07	20
9829.1021 P	041	9	1	9	10	1	10	1114.548	8.8 E-07	20	9829.7827 P	041	6	3	3	7	1	6	704.214	8.8 E-07	50
9851.7870	041	6	0	6	9	0	8	920.188	1.7 E-06	15	9833.8412	041	3	1	2	2	1	1	95.175	5.5 E-06	15
9853.3891 P	041	8	1	8	9	1	9	920.211	7.0 E-07	50	9833.9007 P	220	6	1	6	7	2	5	782.409	4.1 E-07	50
9854.9752 P	041	3	0	3	4	2	2	318.779	3.1 E-07	20	9835.5638 P	041	5	1	4	5	1	5	326.825	4.1 E-07	50
9874.0387 B	041	7	0	7	8	0	8	744.064	1.1 E-06	50	9836.2137 P	121	7	3	4	8	5	3	1259.812	3.8 E-07	50
9878.8808 B	041	7	1	7	8	1	8	744.183	3.5 E-06	20	9838.8035	041	5	0	5	4	0	4	722.052	5.4 E-06	15
9891.3380 B	041	2	0	2	3	2	1	212.158	5.7 E-07	50	9842.6918 B	300	6	1	8	9	4	5	1380.235	3.2 E-07	50
9891.6840 P	041	8	1	7	9	1	8	1079.080	8.9 E-07	20	9844.2207	041	5	1	5	4	1	4	224.838	1.78E-05	6
9894.8138	041	8	0	6	7	0	7	586.243	6.4 E-06	15	9845.3511 P	121	8	1	8	7	3	5	816.894	8.3 E-07	20
9899.8583	041	8	1	8	7	1	7	586.478	2.0 E-06	15	9846.6117 P	121	8	3	4	7	5	3	1089.647	4.1 E-07	50
9899.8837 P	041	7	1	8	8	1	7	882.891	5.7 E-07	50	9848.2178	041	4	4	0	5	4	1	810.340	3.8 E-06	15
9702.4804 P	041	7	2	5	8	2	6	982.812	6.2 E-07	20	9849.4248	041	4	4	1	5	4	2	810.113	1.3 E-06	20
9706.3898	041	8	1	5	7	1	6	704.214	2.9 E-06	15	9849.7781 P	041	6	2	4	8	2	5	552.911	1.1 E-06	20
9712.8271 P	041	8	2	7	9	2	8	1080.385	3.9 E-07	50	9849.8298 P	220	8	3	8	9	4	5	1380.235	1.1 E-06	20
9713.9592	041	5	0	5	6	0	8	448.597	2.8 E-06	15	9850.2572 P	220	5	0	5	6	3	4	648.978	2.7 E-07	50
9716.8331 P	041	7	1	7	7	1	6	704.214	3.1 E-07	50	9851.2509 P	121	5	4	2	6	8	1	1048.057	5.9 E-07	20
9719.2829	041	5	1	4	6	1	5	542.905	1.7 E-06	15	9855.7068	041	6	0	8	5	0	5	325.347	1.30E-05	6
9720.2781	041	6	2	4	7	2	5	782.409	2.1 E-06	15	9858.3994 B	121	6	3	3	7	5	2	1058.635	1.2 E-06	50
9721.8073	041	5	1	5	6	1	6	447.252	8.52E-06	6	9859.5085	041	6	1	8	5	1	5	326.825	4.2 E-06	15
9728.1378 P	041	8	0	6	6	2	5	552.911	2.8 E-07	50	9860.2953	041	4	1	3	3	1	2	173.385	1.75E-05	6
9730.9242	041	7	2	6	8	2	7	885.600	2.1 E-06	15	9860.5661 B	121	8	2	5	7	4	4	927.744	1.0 E-06	50
9731.6404	041	4	0	4	5	0	5	325.347	1.32E-05	6	9862.8894 P	041	4	3	1	5	1	4	399.457	5.9 E-07	20
9734.2030	041	4	1	3	5	1	4	399.457	8.4 E-06	15	9865.3195 P	041	8	1	5	6	1	6	447.252	5.9 E-07	50
9743.1342	041	5	2	3	6	2	4	602.773	1.4 E-06	15	9871.4052	041	7	0	7	6	0	6	446.687	3.0 E-06	15
9743.7707	041	4	1	4	5	1	5	326.825	4.2 E-06	15	9873.7913	041	7	1	7	8	1	6	447.252	1.03E-05	6
9748.4542 P	041	6	2	5	7	2	6	708.608	1.4 E-06	15	9874.6155	041	5	3	3	5	3	2	508.812	5.8 E-06	15
9748.7008	041	3	0	3	4	0	4	222.052	4.8 E-06	15	9878.0726 B	121	5	3	3	6	5	2	888.598	1.7 E-06	50
9753.3199	041	3	1	2	4	1	3	275.497	3.7 E-06	15	9879.1181 P	201	8	5	3	9	7	2	1810.588	5.4 E-07	50
9756.6244	041	4	0	4	4	2	3	300.382	1.5 E-06	15	9879.6390	041	3	2	2	2	2	1	134.902	1.1 E-05	15
9764.4582 P	041	3	0	3	3	2	2	206.301	2.2 E-07	50	9878.6380 B	041	3	2	1	2	2	0	138.183	8.4 E-06	15
9765.5615	041	3	1	3	4	1	4	224.838	1.54E-05	6	9878.6380 B	121	6	0	6	7	2	5	782.409	8.4 E-06	15
9766.7300	041	2	0	2	3	0	3	138.781	1.60E-05	6	9878.7267 P	041	4	3	2	4	3	1	383.842	4.6 E-06	15
9767.6775	041	5	2	4	6	2	5	552.911	6.2 E-06	15	9879.1144	121	5	3	2	6	5	1	888.632	6.8 E-07	20
9767.7241 B	121	9	1	9	10	3	8	1448.128	7.1 E-07	50	9880.4018	041	3	3	1	3	3	0	285.418	2.89E-05	6
9769.6071 B	041	5	1	5	5	1	4	399.457	9.4 E-07	50	9880.8082 P	041	4	3	1	4	3	2	382.516	1.4 E-05	10
9769.9511	041	4	2	2	5	2	3	448.510	7.7 E-06	15	9880.6829 P	041	3	3	0	3	3	1	285.219	9.1 E-06	10
9775.7117	041	2	1	1	3	1	2	173.385	1.44E-05	6	9881.5787	041	5	3	2	5	3	3	503.968	2.1 E-06	15
9787.1073 P	041	1	0	1	2	0	2	70.090	5.0 E-06	15	9882.4384	041	4	2	3	4	0	4	222.052	4.5 E-07	20
9787.4339	041	2	1	2	3	1	3	142.278	5.2 E-06	15	9884.7190	121	7	2	5	8	4	4	1131.776	1.2 E-06	15
9788.2834	041	4	2	3	5	2	4	418.208	3.0 E-06	15	9884.9984 P	041	6	3	3	6	3	4	648.978	2.7 E-06	15
9791.8212 B	041	6	3	3	7	3	4	842.358	1.9 E-06	20	9885.7119	041	8	0	8	7	0	7	586.243	5.6 E-06	15
9794.8994 P	041	4	1	4	4	1	3	275.497	5.8 E-07	20	9886.6927	041	5	1	4	4	1	3	275.497	4.1 E-06	15
9799.0192	041	3	2	1	4	2	2	315.779	3.2 E-06	15	9887.1214	041	8	1	8	7	1	7	586.479	1.9 E-06	15
9800.1545	041	1	1	0	2	1	1	95.175	4.2 E-06	15	9895.2420	041	5	2	4	5	0	5	325.347	1.0 E-06	15
9809.3989	041	1	1	1	2	1	2	79.495	1.18E-05	6	9897.6021	121	5	1	5	6	3	4	648.978	3.8 E-06	15
9809.7902	041	0	0	0	1	0	1	23.794	9.82E-06	6	9898.0308	121	5	2	4	6	4	3	758.724	4.9 E-06	15
9810.1778	041	3	2	2	4	2	3	300.382	1.14E-05	6	9898.1913	041	4	2	3	3	2	2	208.301	5.2 E-06	15
9817.0344	041	3	1	3	3	1	2	173.385	2.8 E-06	15	9898.4842 P	220	5	1	5	6	2	4	602.773	3.2 E-07	50
9823.9982	041	5	3	2	6	3	3	881.548	1.4 E-06	15	9898.7441 P	041	9	0	9	8	0	8	744.064	1.1 E-06	20
9828.1462	041	2	2	0	3	2	1	212.158	8.5 E-06	15	9899.4900	041	9	1	9	8	1	8	744.163	3.3 E-06	15
9828.9077 P	121	8	1	8	9	3	7	1216.232	3.1 E-07	50	10007.8888 P	201	10	4	8	11	8	5	2144.047	2.3 E-07	50
9833.1184	041	2	2	1	3	2	2	206.301	3.2 E-06	15	10003.0685	121	4	3	2	5	5	1	742.073	5.5 E-07	15
9833.7115 P	041	7	2	6	7	2	5	782.409	3.1 E-07	50	10004.0704	121	4	3	1	5	5	0	742.076	1.5 E-06	15
9834.4495 P	041	5	3	3	6	3	4	648.978	4.5 E-06	15	10004.3061	041	4	2	2	3	2	1	212.158	1.40E-05	6
9834.5371 P	041	2	1	2	2	1	1	95.175	2.1 E-06	15	10006.6528 P	201	7	5	3	8	7	2	1590.690	7.8 E-07	20
9843.4861 P	121	8	0	8	9	2	7	1201.921	3.6 E-07	50	10007.0171 P	201	7	5	2	8	7	1	1590.690	2.7 E-07	50
9846.5215	041	1	1	1	1	1	0	42.371	1.45E-05	6	10008.3107	121	6	2	4	7	4	3	931.237	4.9 E-06	15
9854.3125	041	4	3	1	5	3	2	508.812	6.0 E-06	15	10010.6875	041	10	0	10	9	0	9	920.189	1.7 E-06	15
9855.2870 P	041	6	2	5	6	2	4	602.773	3.1 E-07	50	10013.1167	041	6	1	5	5	1	4	399.457	8.2 E-06	15
9857.1978	041	1	0	1	0	0	0	0.000	3.2 E-06	15	10020.2270	041	5	2	4	4	2	3	300.382	1.38E-05	6
9858.1924	041	1	1	0	1	1	1	37.136	4.4 E-06	15	10022.6863 B	041	5	5	0	6	5	1	888.632	2.2 E-06	50
9858.8017	041	4	3	2	5	3	3	503.968	2.2 E-06	15	10022.6863 B	041	5	5	1	6	5	2	888.598	2.2 E-06	50
9859.5804	041	2	1	1	2	1	2	79.495	8.0 E-06	15	10028.8006 P	041	8	1	7	8	1	8	744.163	2.3 E-07	50
9873.0152 P	121	8	2	7	9	4	6	1340.885	2.2 E-07	50	10027.8737	121	5	2	3	6	4	2	757.780	2.0 E-06	15

SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %
10068.7497 P	041	8 1 7	7 1 6	704.214	3.4 E-06 15	10144.2370 B*	220	7 0 7	7 1 6	704.214	1.3 E-06 50
10067.1937	220	5 3 3	6 4 2	757.780	1.5 E-06 15	10144.2738 B	300	7 1 6	8 4 5	1122.709	2.9 E-06 50
10067.5873	121	3 2 1	4 4 0	488.134	1.1 E-06 20	10144.4104	121	5 2 4	5 4 1	610.340	1.9 E-06 15
10068.8541	121	5 1 4	6 3 3	661.548	3.9 E-06 15	10144.8226	220	4 1 3	5 2 4	416.208	4.9 E-06 15
10068.8985 B	201	7 4 4	8 6 3	1411.612	8.2 E-06 20	10146.4401	121	3 0 3	4 2 2	315.779	1.22E-05 6
10068.8985 B	300	10 3 8	11 4 7	1899.008	8.2 E-06 20	10148.0919 B	300	7 0 7	8 3 6	1006.116	3.4 E-06 50
10070.3018	041	8 4 2	6 4 3	756.724	5.0 E-06 15	10148.1271 B	220	7 3 5	8 2 8	982.912	8.3 E-06 50
10070.8487	041	5 4 2	5 4 1	610.340	1.05E-05 6	10148.9734	121	7 1 6	8 1 7	882.891	3.57E-05 6
10071.0133 B	121	10 1 10	11 1 11	1327.119	1.79E-05 6	10150.4208	121	7 0 7	8 0 8	744.064	6.22E-05 6
10071.0133 B	121	10 0 10	11 0 11	1327.109	1.79E-05 6	10150.8591 P	121	7 1 7	8 1 8	744.163	1.9 E-04 10
10071.4083 P	041	4 4 1	4 4 0	488.134	8.6 E-06 20	10151.9881 B	102	7 4 3	8 7 2	1590.690	2.2 E-05 10
10071.4523 P	041	4 4 0	4 4 1	488.107	2.4 E-05 10	10151.9881 B	220	5 0 5	6 1 6	447.252	2.2 E-05 10
10072.8777 P	201	10 3 7	11 5 6	1998.995	3.7 E-07 50	10153.0207 B	220	2 1 2	3 2 1	212.156	9.7 E-06 20
10073.4467 P	121	11 1 11	11 1 10	1524.849	6.4 E-07 20	10153.5283 P	300	8 2 7	9 3 6	1282.919	6.2 E-06 15
10073.7032 P	201	7 4 3	8 6 2	1411.848	8.3 E-07 20	10153.8811 P	220	2 2 1	3 3 0	285.418	2.2 E-05 10
10077.3492	041	4 3 2	3 3 1	285.219	3.1 E-06 15	10154.5702 P	220	5 1 5	6 0 6	446.697	6.5 E-06 15
10077.7061	041	4 3 1	3 3 0	285.418	9.0 E-06 15	10154.6547 P	201	7 3 4	8 5 3	1255.912	1.8 E-06 50
10078.6012	121	10 2 8	11 2 9	1690.665	5.0 E-06 50	10154.7693 P	121	9 5 5	10 5 6	1718.718	3.7 E-06 15
10081.5552 P	201	10 2 8	11 4 7	1899.008	1.3 E-06 15	10154.8860 P	220	2 2 0	3 3 1	285.219	4.7 E-06 15
10082.6174	041	7 2 5	6 2 4	602.773	6.3 E-06 15	10155.7207	121	7 2 6	8 2 7	885.600	9.80E-05 6
10083.9696	041	5 3 3	5 1 4	399.457	9.7 E-07 15	10156.2788	121	8 4 5	9 4 6	1340.885	5.2 E-06 15
10084.4146	041	8 2 7	7 2 6	709.608	1.4 E-06 15	10157.1385	121	6 2 4	7 2 5	782.409	1.34E-04 6
10086.1573 P	201	8 3 6	9 5 5	1474.981	7.8 E-07 20	10159.6938 P	220	3 1 2	4 2 3	300.362	1.7 E-05 10
10086.3288	121	10 1 9	11 1 10	1524.849	3.9 E-06 15	10159.7906 P	121	8 0 8	8 2 7	885.600	7.9 E-06 10
10087.2914 P	300	8 0 8	9 3 7	1216.232	6.0 E-07 20	10160.4319	201	7 2 5	8 4 5	1122.709	2.8 E-06 15
10087.8262	121	3 1 3	4 3 2	382.516	7.5 E-06 15	10161.3632	201	7 1 7	8 3 6	1006.116	1.91E-05 6
10088.6520 P	300	7 2 5	8 5 4	1255.166	1.8 E-07 50	10161.9496	201	6 3 4	7 5 3	1059.647	2.9 E-06 15
10089.7278	220	4 2 3	5 3 2	508.812	1.67E-05 6	10162.2561	121	8 1 8	8 1 7	882.891	3.0 E-06 15
10090.5885 P	121	7 4 4	7 6 1	1216.193	2.7 E-07 50	10163.3981	220	6 1 6	6 2 5	552.911	1.7 E-06 15
10091.3566 P	121	8 4 4	8 6 3	1411.612	3.7 E-07 50	10164.2029	121	7 3 5	8 3 6	1006.116	4.93E-05 6
10092.4565 P	041	3 3 1	3 1 2	173.365	3.2 E-07 50	10165.5564 P	121	4 1 4	4 3 1	353.842	1.1 E-06 50
10093.0713 P	220	5 2 3	6 3 4	648.976	6.5 E-06 15	10166.5936 P	201	8 1 7	9 3 6	1282.919	1.1 E-06 20
10094.5778 P	300	8 1 7	9 4 6	1340.685	5.1 E-07 50	10167.8582 P	300	9 4 5	10 5 6	1718.718	3.0 E-06 20
10095.0896 P*	121	6 4 2	6 6 1	1045.057	3.2 E-07 50	10168.1381	121	6 1 5	7 1 6	704.214	2.21E-04 6
10096.8348 P	201	9 1 8	10 3 7	1538.150	3.2 E-07 50	10169.0614 B	121	4 2 2	4 4 1	488.107	1.5 E-06 50
10097.4994	121	9 0 9	10 0 10	1114.533	1.4 E-05 15	10169.2130 B	041	5 5 1	5 5 0	742.076	2.4 E-05 10
10098.4817	121	4 0 4	5 2 3	446.510	1.90E-05 6	10169.2130 B	220	5 2 4	6 1 5	542.905	2.4 E-05 10
10098.8607	121	4 1 3	5 3 2	508.812	1.06E-05 6	10170.8934 B	300	6 6 0	7 1 1	1394.813	6.9 E-06 50
10099.3063	121	9 1 9	10 1 10	1114.549	3.66E-05 6	10170.8534 B	300	6 6 1	7 1 0	1394.813	6.9 E-06 50
10100.0070	121	9 2 7	10 2 8	1437.969	3.5 E-06 15	10171.4859	300	7 1 7	8 2 6	982.912	2.0 E-06 15
10100.2702	220	7 1 6	8 2 7	885.600	4.2 E-06 15	10172.5266 P	220	6 0 6	6 1 5	542.905	7.4 E-07 15
10100.4968 P	121	6 1 6	6 3 3	661.548	2.7 E-07 50	10173.2494	220	4 0 4	5 1 5	326.625	8.69E-06 6
10100.8563 P	201	6 4 3	7 6 2	1216.189	1.5 E-06 50	10173.8790	121	6 3 3	7 3 4	842.356	1.04E-04 6
10100.9110 P	041	5 3 3	4 3 2	382.516	1.0 E-05 15	10174.8029	121	6 0 6	7 0 7	586.243	3.46E-04 6
10101.7013	041	5 3 2	4 3 1	383.842	3.3 E-06 15	10175.5668	121	6 1 6	7 1 7	586.479	1.14E-04 6
10102.3501 P	201	6 4 2	7 6 1	1216.193	3.6 E-06 15	10176.0750 P	300	7 5 3	8 6 2	1411.646	3.1 E-06 15
10104.2901	220	7 0 7	8 1 8	744.163	8.6 E-06 15	10176.5458 B	300	7 5 2	8 6 3	1411.612	1.45E-05 6
10104.4909 P	121	10 0 10	10 2 9	1293.634	1.5 E-06 15	10176.5458 B	220	2 1 1	3 2 2	206.301	1.45E-05 6
10104.8020 B	300	8 6 3	9 7 2	1810.588	3.9 E-06 15	10176.7460	201	6 3 3	7 5 2	1059.835	9.80E-06 6
10104.8020 B	220	7 1 7	8 0 8	744.064	3.9 E-06 15	10176.9202	121	7 4 3	8 4 4	1131.776	1.08E-05 6
10106.2647 P	201	9 3 6	10 5 5	1724.707	3.7 E-07 50	10178.5482 P	300	8 4 5	9 5 4	1477.297	1.1 E-05 10
10106.9804 P	121	9 1 8	10 1 9	1293.019	7.3 E-06 20	10178.7009 B*	220	4 1 4	5 0 5	325.347	8.90E-05 6
10108.1545	220	9 3 6	9 2 7	1201.921	3.5 E-06 15	10178.7009 B	121	6 2 5	7 2 6	709.608	6.90E-05 6
10109.3440	220	3 1 3	4 2 2	315.779	2.4 E-06 15	10179.1456 P	102	6 4 3	7 7 0	1394.813	5.6 E-07 50
10110.0821	121	7 2 6	7 4 3	931.237	8.3 E-07 15	10181.9516 B	201	8 2 6	9 4 5	1360.235	1.0 E-05 20
10110.4343 P	220	4 2 2	5 3 3	503.968	3.5 E-06 20	10181.9874 P	121	8 5 3	9 5 4	1477.297	4.8 E-06 50
10112.5703	121	8 3 5	9 3 6	1282.919	4.3 E-06 15	10182.8207 P	121	6 2 4	6 4 3	756.724	5.5 E-06 50
10113.9985	300	9 5 4	10 6 5	1874.973	1.6 E-06 15	10182.8815 P	121	5 2 3	6 2 4	602.773	9.1 E-05 20
10114.0722	121	9 3 7	10 3 8	1446.128	9.79E-06 6	10183.7696 P	121	9 1 8	9 3 7	1216.232	1.3 E-06 50
10115.3340 P	201	8 0 8	9 2 7	1201.921	1.1 E-06 20	10184.0780	121	7 4 4	8 4 5	1122.709	3.93E-05 6
10120.2033	121	3 1 2	4 3 1	383.842	8.5 E-06 15	10184.8769 P	121	7 0 7	7 2 6	709.608	6.3 E-06 20
10120.5295	121	8 2 6	9 2 7	1201.921	2.54E-05 6	10184.9243 P	121	3 1 3	3 3 0	285.418	3.2 E-06 50
10121.5977 P	121	5 3 3	5 5 0	742.076	6.0 E-07 50	10185.0588 B	121	2 0 2	3 2 1	212.156	4.01E-05 6
10124.1054 B	220	3 3 1	4 4 0	488.134	5.0 E-06 50	10185.0588 B	220	5 1 5	5 2 4	416.208	4.01E-05 6
10124.2785	220	3 3 0	4 4 1	488.107	1.0 E-05 15	10185.6404	201	7 0 7	8 2 6	982.912	9.8 E-07 20
10124.9368	121	8 1 8	9 1 9	920.211	2.90E-05 6	10186.7232 P	041	6 3 3	6 1 6	447.252	3.7 E-07 50
10125.0109 P	121	2 1 2	3 3 1	285.219	2.6 E-06 50	10187.1594 P	300	6 1 5	7 4 4	927.744	2.3 E-06 50
10125.1660 P	041	6 3 3	5 3 2	508.812	8.1 E-06 50	10187.2983 P	121	5 1 4	6 1 5	542.905	1.3 E-04 10
10125.2214 P	121	8 0 8	9 0 9	920.169	8.3 E-05 10	10187.6075	022	6 3 6	9 4 5	1360.235	2.1 E-06 15
10125.6912 B	220	3 2 2	4 3 1	383.842	9.3 E-07 50	10187.8919 P	201	9 5 4	9 7 3	1810.584	2.8 E-07 50
10126.0658	201	7 3 5	8 5 4	1255.166	4.4 E-06 15	10188.5840 P	121	6 3 4	7 3 5	816.694	3.8 E-05 10
10127.6385 P	121	6 3 3	6 5 2	888.598	1.1 E-06 50	10188.6436 P	220	1 1 1	2 2 0	136.163	5.0 E-06 20
10128.6691	121	8 1 7	9 1 8	1079.080	4.75E-05 6	10188.7519 P	121	7 2 5	7 4 4	927.744	1.1 E-06 50
10128.9591 B	121	9 4 6	10 4 7	1581.336	1.02E-05 6	10190.6075	121	7 1 7	7 1 6	704.214	1.8 E-05 10
10128.9591 B	220	8 0 6	7 1 7	586.479	1.02E-05 6	10191.9226	300	8 4 4	9 5 5	1474.981	2.0 E-06 15
10130.0656	220	6 1 6	7 0 7	568.243	1.43E-05 6	10192.3888	220	3 0 3	4 1 4	224.838	3.2 E-05 10
10130.5354 P	121	6 2 5	6 4 2	757.780	6.0 E-07 50	10192.8825	041	5 4 2	4 4 1	488.107	5.7 E-06 10
10131.2303	220	3 2 1	4 3 2	382.516	1.22E-05 6	10192.9888 P	041	5 4 1	4 4 0	488.134	2.1 E-06 15
10131.6469	121	9 0 9	9 2 8	1080.385	1.4 E-06 20	10194.7806	201	5 3 3	6 5 2	888.598	1.3 E-05 10
10131.8217	201	5 4 2	6 6 1	1045.057	3.7 E-06 15	10194.8855 P	300	8 3 5	9 4 5	1360.235	1.9 E-06 15
10132.0720	201	5 4 1	6 6 0	1045.058	1.3 E-06 20	10195.0221 P	201	8 5 3	8 7 2	1590.690	3.2 E-07 50
10132.2647	201	8 3 5	9 5 4	1477.297	2.3 E-06 15	10195.8298 B	220	1 1 0	2 2 1	134.902	1.5 E-05 50
10132.4786 P	121	7 3 4	7 5 3	1059.647	4.1 E-07 50	10197.9224	121	5 0 5	6 0 6	446.697	

SIGMA CM-1	VIB	J'K'A'K'C'	J''K''A''K''C''	E' CM-1	INTENSITY CM-2 ATN-1	%	SIGMA CM-1	VIB	J'K'A'K'C'	J''K''A''K''C''	E' CM-1	INTENSITY CM-2 ATN-1	%
10206.1980	121	5 3 2	6 3 3	661.548	6.83E-05	6	10254.3207	121	2 1 1	3 1 2	173.365	1.07E-03	6
10206.2828 B	201	6 2 5	7 4 4	927.744	1.9 E-06	50	10254.4908 P	201	11 3 9	12 3 10	1962.508	7.4 E-06	10
10207.7358 B	121	9 1 9	8 3 6	1006.116	1.9 E-05	15	10254.7144 P	220	1 1 1	2 0 2	70.090	3.6 E-06	20
10207.7358 B	300	6 5 2	7 6 1	1216.193	1.8 E-05	15	10255.0147 P	201	8 4 5	8 6 2	1411.646	7.5 E-07	50
10207.8420 P	300	6 5 1	7 6 2	1216.189	7.0 E-06	20	10255.1453 P	201	10 3 8	10 5 5	1724.707	5.1 E-07	50
10208.1359 P	121	6 0 6	6 2 5	552.911	3.7 E-05	20	10255.8181 P	121	3 0 3	3 2 2	206.301	1.8 E-05	15
10208.2159	121	4 1 3	5 1 4	399.457	6.18E-04	6	10257.2481 P	220	2 0 2	2 1 1	95.175	7.2 E-06	15
10208.9036	121	6 4 2	7 4 3	931.237	6.22E-05	6	10258.3408	300	8 3 5	9 4 6	1340.885	4.3 E-06	15
10210.1448	220	2 0 2	3 1 3	142.278	1.16E-05	6	10258.6480 P	201	10 3 7	11 3 8	1813.223	8.5 E-06	20
10210.6619	121	4 2 2	5 2 3	446.510	5.05E-04	6	10258.7078 P	300	5 0 5	6 3 4	648.978	1.4 E-05	20
10211.7233 P	121	7 5 2	8 5 3	1255.912	1.0 E-05	15	10258.9112	121	7 2 6	7 2 5	782.409	2.15E-05	6
10212.3315	121	6 4 3	7 4 4	927.744	2.53E-05	6	10260.4531	121	2 0 2	3 0 3	136.761	1.28E-03	6
10212.8053 P	121	7 5 3	8 5 4	1255.166	2.3 E-05	20	10262.1500 P	201	9 6 3	10 6 4	1875.464	1.3 E-06	15
10213.7802	201	4 0 4	5 4 1	610.340	1.6 E-06	15	10262.2139 B	041	5 5 1	6 3 4	648.978	2.74E-05	6
10214.2460	300	7 4 4	8 5 3	1255.912	1.9 E-06	15	10262.3139 B	121	2 0 2	2 2 1	134.902	2.74E-05	6
10214.6921	121	5 3 3	6 3 4	648.978	1.81E-04	6	10262.5110 P	201	9 6 4	10 6 5	1874.973	3.5 E-06	15
10215.1886 P	121	7 1 6	7 3 5	816.694	4.2 E-06	15	10262.9759 P	121	8 0 8	7 2 5	782.409	2.3 E-07	50
10215.8255	121	1 0 1	2 2 0	136.163	6.5 E-06	15	10264.3021 B	201	7 4 4	7 6 1	1216.193	1.5 E-06	50
10216.0227	220	4 2 3	4 3 2	382.516	6.1 E-06	15	10264.8887 P	041	5 4 1	5 2 4	418.208	2.8 E-07	50
10216.6850	041	6 4 2	5 4 1	610.340	6.0 E-06	15	10265.0764	220	1 0 1	1 1 0	42.371	1.95E-05	6
10218.5358 P	300	7 2 6	8 3 5	1050.157	7.0 E-06	15	10265.7338	220	2 2 1	3 1 2	173.365	4.34E-05	6
10218.6803 B	201	13 2 12	14 2 13	2327.914	2.8 E-06	50	10266.3809	121	3 3 0	4 3 1	383.642	9.49E-05	6
10218.7013 B	201	14 1 14	15 1 15	2358.304	3.5 E-06	50	10267.0282 F	121	4 4 0	5 4 1	610.340	1.1 E-04	10
10218.7013 B	201	14 0 14	15 0 15	2358.304	3.5 E-06	50	10267.1717 P	201	8 4 4	8 6 3	1411.612	1.7 E-05	20
10218.8268 B	121	3 1 2	3 3 1	285.219	4.7 E-06	50	10267.2311 P	121	4 4 1	5 4 2	610.113	3.8 E-05	20
10218.8268 B	220	3 1 3	3 2 2	206.301	4.7 E-06	50	10267.5163	121	3 3 1	4 3 2	382.516	3.05E-04	6
10218.8885 P	300	7 4 3	8 5 4	1255.166	1.3 E-05	20	10267.9534	121	2 1 2	3 1 3	142.278	3.89E-04	6
10219.1407 P	121	6 1 6	6 1 5	542.905	1.2 E-05	10	10268.6254	022	6 4 2	7 5 3	1059.647	3.1 E-06	15
10219.6439	121	4 0 4	5 0 5	325.347	8.80E-04	6	10269.1647 P	201	7 4 3	7 6 2	1216.189	2.1 E-06	50
10219.9587 P	201	6 1 6	7 3 5	816.694	4.5 F-06	20	10269.3983	121	2 2 0	3 2 1	212.156	5.78E-04	6
10221.0665	201	12 2 10	13 2 11	2246.887	2.2 E-06	15	10269.8674 B	121	5 5 0	6 5 1	888.632	2.3 E-05	50
10222.2016	220	5 3 3	6 2 4	602.773	5.6 E-06	15	10269.9019 B	121	5 5 1	6 5 2	888.598	5.3 E-05	50
10222.6190 P	300	5 1 4	6 4 3	756.724	4.1 E-06	50	10270.9421 P	201	10 4 6	10 6 5	1874.973	3.7 E-07	50
10222.7748 P	121	4 1 4	5 1 5	326.625	2.9 E-04	10	10271.4162 B	201	7 7 0	8 7 1	1590.690	7.11E-06	6
10223.3749 P	121	6 1 5	6 3 4	648.978	1.8 E-05	20	10271.4162 B	201	7 7 1	8 7 2	1590.690	7.11E-06	6
10223.4178 P	201	7 2 5	8 4 4	1131.776	2.1 E-05	20	10271.9847 P	201	6 4 3	6 6 0	1045.058	5.1 E-07	50
10224.3771	220	4 0 4	4 1 3	275.497	3.1 E-06	15	10273.2775	201	5 1 5	6 3 4	648.978	2.02E-05	6
10225.1566	121	4 1 3	4 3 2	382.516	9.28E-05	6	10273.4877	201	6 4 2	6 6 1	1045.057	1.8 E-06	15
10225.3686 P	201	4 3 2	5 1 1	742.073	6.1 E-06	50	10273.7771 P	201	9 5 4	10 5 5	1724.707	4.8 E-06	15
10225.4811	121	4 2 3	5 2 4	416.208	1.86E-04	6	10273.9048 P	121	4 1 4	4 1 3	275.497	4.0 E-05	10
10228.2355	121	5 1 4	5 3 3	503.968	5.4 E-06	15	10274.0192	121	2 2 1	3 2 2	206.301	2.61E-04	6
10227.0403	201	4 3 1	5 5 0	742.076	1.26E-05	6	10274.7146	201	9 2 8	9 4 5	1360.235	1.7 E-06	15
10227.9516	220	1 0 1	2 1 2	79.495	2.60E-05	6	10275.9597	201	9 5 5	10 5 6	1718.718	9.79E-06	6
10228.3399 P	220	3 2 1	3 3 0	285.418	3.7 E-06	50	10276.1572	300	7 3 4	8 4 5	1122.709	3.31E-05	6
10228.4128 B	121	5 0 5	5 2 4	416.208	3.2 E-05	10	10276.6924	121	6 6 1	7 6 2	1216.189	4.8 E-06	15
10228.4128 B	220	2 1 2	3 0 3	136.761	3.2 E-05	10	10276.8437 B	300	5 4 2	6 5 1	888.632	2.0 E-05	50
10228.5483	121	3 1 2	4 1 3	275.497	1.87E-04	6	10276.8437 B	121	6 6 0	7 6 1	1216.193	2.0 E-05	50
10229.2258 P	022	7 3 5	8 4 4	1131.776	6.5 E-07	50	10277.1213 P	300	5 4 1	6 5 2	888.598	5.1 E-05	15
10230.2733 P	220	2 1 2	2 2 1	134.902	4.8 E-06	15	10277.2558 P	300	10 3 8	11 2 9	1690.665	7.2 E-06	15
10230.5583 P	220	4 2 2	4 3 1	383.642	8.9 E-07	20	10277.6635 P	102	6 3 3	7 6 2	1218.189	6.6 E-07	20
10230.9913 P	121	8 2 7	8 2 6	982.912	2.7 E-06	15	10278.1588	300	6 2 5	7 3 4	842.356	5.87E-05	6
10231.3411	201	7 1 6	8 3 5	1050.157	1.3 E-06	20	10278.5970 P	201	5 2 3	6 4 2	757.780	1.6 E-05	10
10233.2376	220	5 2 3	5 3 2	508.812	2.7 E-06	15	10279.7118	201	6 0 6	6 4 3	756.724	1.9 E-06	15
10233.8015 P	300	9 3 6	10 4 7	1581.336	4.7 E-06	15	10280.2704 P	300	6 3 4	7 4 3	931.237	4.5 E-05	10
10234.0378 P	220	3 2 2	4 1 3	275.497	1.0 E-04	10	10280.4187	121	1 1 0	2 1 1	95.175	2.85E-04	6
10234.4818 P	041	5 4 2	5 2 3	446.510	1.3 E-06	50	10281.4535	201	11 2 10	12 2 11	1774.751	1.86E-05	6
10234.5198 B	041	6 3 3	5 1 4	399.457	6.1 E-07	50	10281.6324 P	201	11 1 10	12 1 11	1774.619	8.1 E-06	15
10237.3359	121	4 3 1	5 3 2	508.812	2.94E-04	6	10281.8993	121	1 0 1	2 0 2	70.090	4.1 E-04	10
10238.5165 B	300	5 5 1	6 6 0	1045.058	3.65E-05	6	10282.8253	201	9 4 5	10 4 6	1616.452	8.57E-06	6
10238.5165 B	300	5 5 0	6 6 1	1045.057	3.65E-05	6	10284.0692	201	9 3 7	9 5 4	1477.297	2.0 E-06	15
10238.7680	121	5 4 1	6 4 2	757.780	3.43E-05	6	10284.4218	201	4 2 3	5 4 2	610.113	1.33E-05	6
10239.5839	121	5 4 2	6 4 3	756.724	9.44E-05	6	10284.7656	201	10 3 8	11 3 9	1695.071	9.96E-06	6
10239.9431	121	3 2 1	4 2 2	315.779	2.07E-04	6	10285.5387 P	121	6 2 5	6 2 4	602.773	1.7 E-05	10
10240.1675	121	3 0 3	4 0 4	222.052	3.9 E-04	10	10287.5256	201	6 1 5	7 3 4	842.356	5.5 E-06	15
10240.7903 P	300	7 3 5	8 4 4	1131.776	5.4 E-06	15	10287.7752	220	4 2 2	5 1 5	326.625	2.4 E-06	15
10241.1716	121	4 3 2	5 3 3	503.968	9.47E-05	6	10288.9085	220	3 2 1	4 1 4	224.838	1.23E-05	6
10241.3149	121	6 5 1	7 5 2	1059.835	3.96E-05	6	10289.8952	201	10 2 8	11 2 9	1690.665	1.91E-05	6
10241.5577 P	121	6 5 2	7 5 3	1059.847	1.6 E-05	10	10290.2200	121	1 1 1	2 1 2	79.495	8.98E-04	6
10241.7751 B	201	8 7 1	9 7 2	1810.588	5.2 E-06	15	10292.8222	201	9 3 6	10 3 7	1538.150	1.16E-05	6
10241.7751 B	201	8 7 2	9 7 3	1810.584	5.2 E-06	15	10292.9258 P	300	9 2 7	10 3 8	1446.128	5.1 E-06	20
10243.1083 P	201	9 4 6	9 6 3	1631.384	7.0 E-07	50	10293.1564	201	9 4 6	10 4 7	1581.336	2.40E-05	6
10243.6618	220	3 0 3	3 1 2	173.265	1.52E-05	6	10293.3388 P	102	9 2 7	10 5 6	1718.718	7.0 E-07	50
10244.2576	022	7 4 3	8 5 4	1255.166	4.2 E-06	15	10293.5838	022	5 4 2	6 5 1	888.632	4.6 E-06	15
10244.6299	121	4 0 4	4 2 3	300.362	6.50E-05	6	10293.8174	022	5 4 1	6 5 2	888.598	1.4 E-05	15
10245.2536 P	220	4 1 3	4 2 2	315.779	6.4 E-06	50	10294.7974	220	5 2 3	6 1 6	447.252	3.7 E-06	15
10245.5075	121	3 1 3	4 1 4	224.838	1.11E-03	6	10295.1021 P	201	8 8 2	9 6 3	1631.384	9.2 E-08	15
10246.2689 P	300	6 4 3	7 5 2	1059.835	2.3 E-05	10	10295.2140 P	201	8 8 3	9 6 4	1631.251	3.1 E-06	15
10246.6855	220	2 1 1	2 2 0	136.163	2.4 E-08	15	10296.3509	022	4 1 4	5 2 3	446.510	9.4 E-07	15
10246.9074 B	201	10 4 6	11 4 7	1899.008	7.0 E-06	20							

SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %		
10308.2426	121	5 2 4	5 2 3	446.510	1.28E-04	6	10355.3881 P	300	9 1 9	10 0 10	1114.533	8.8 E-06	15
10308.4137	201	8 5 3	9 5 4	1477.297	3.02E-05	6	10355.9954 P	201	9 3 6	9 5 5	1474.981	3.3 E-06	50
10309.2383 P	121	7 3 4	8 1 7	882.891	1.4 E-06	15	10356.0597 P	300	6 2 4	7 3 5	816.694	3.9 E-05	15
10309.4440 P	201	8 5 4	9 5 5	1474.981	1.0 E-05	15	10356.8109	121	4 2 2	4 2 3	300.362	3.01E-04	6
10310.4179	102	9 1 8	10 4 7	1581.336	1.2 E-06	15	10357.3875	300	8 2 7	9 1 8	1079.080	1.37E-05	6
10311.1553 P	201	10 2 9	11 2 10	1525.137	1.7 E-05	15	10357.5951 B	220	4 0 4	3 1 3	142.278	5.3 E-06	50
10311.9209	201	10 1 9	11 1 10	1524.849	5.82E-05	6	10357.7894	201	7 4 4	8 4 5	1122.709	1.70E-04	6
10312.0230 B	121	6 3 3	7 1 6	704.214	1.30E-05	6	10357.9292 P	102	8 0 8	9 3 7	1216.232	3.3 E-06	50
10312.0230 B	220	3 3 0	4 2 3	300.362	1.30E-05	6	10358.9810 B	201	6 6 0	7 6 1	1216.193	3.88E-05	6
10312.2246 B	201	11 0 11	12 0 12	1557.844	9.08E-05	6	10358.9810 B	201	6 6 1	7 6 2	1216.189	3.88E-05	6
10312.2246 B	201	11 1 11	12 1 12	1557.849	9.08E-05	6	10359.8030 P	220	2 2 1	2 1 2	79.495	4.13E-05	6
10312.7599	220	2 1 1	2 0 2	70.090	9.79E-06	6	10360.0573 P	102	7 2 5	8 5 4	1255.166	9.9 E-07	20
10313.8650 P	201	12 0 12	12 2 11	1774.751	1.5 E-06	50	10360.4098	201	7 3 4	8 3 5	1050.157	1.10E-05	10
10313.9381 B	201	12 1 12	12 1 11	1774.619	6.3 E-06	15	10361.2970	121	4 3 2	4 3 1	383.842	1.98E-04	6
10314.5373 P	121	6 0 6	5 2 3	446.510	1.6 E-06	50	10361.7678	121	3 1 2	3 1 3	142.278	4.15E-05	6
10314.6589 P	300	5 3 3	6 4 2	757.780	3.3 E-05	15	10363.2190 P	300	8 5 4	8 6 3	1411.612	1.1 E-06	50
10315.0559 P	121	2 1 2	2 1 1	95.175	1.51E-04	6	10363.8309	121	4 3 1	4 3 2	382.516	6.56E-04	6
10315.2381 P	201	9 3 7	10 3 8	1446.128	6.6 E-05	15	10363.7789	121	5 3 2	5 3 3	503.968	8.84E-05	6
10316.9161	201	3 2 2	4 4 1	488.107	3.28E-05	6	10364.6141	121	3 3 1	3 3 0	285.418	1.37E-03	6
10317.7410 P	300	8 2 6	9 3 7	1216.232	9.9 E-06	10	10364.7439 P	201	3 1 3	4 3 2	382.516	5.6 E-05	10
10317.7986 P	201	9 2 7	10 2 8	1437.969	1.1 E-05	10	10365.0036	121	3 3 0	3 3 1	285.219	4.49E-04	6
10318.4404 P	201	8 2 7	8 4 4	1131.776	2.9 E-06	50	10365.2263	201	4 1 3	5 3 2	508.812	2.32E-04	6
10318.5412 P	201	8 4 4	9 4 5	1360.235	7.32E-05	6	10365.3933 B	300	4 1 4	5 2 3	446.510	9.5 E-05	10
10318.9090	201	5 0 5	6 2 4	602.773	6.6 E-06	15	10365.3933 B	121	8 4 5	8 4 4	1131.776	9.5 E-05	10
10319.2002 B	022	4 4 0	5 5 1	742.073	1.4 E-05	50	10365.3933 B	121	8 1 7	7 3 4	842.356	9.5 E-05	10
10319.2002 B	022	4 4 1	5 5 0	742.076	1.4 E-05	50	10365.5386 P	201	11 2 10	11 2 9	1690.665	4.6 E-06	20
10320.9444 B	300	5 3 2	6 4 3	756.724	1.2 E-04	20	10367.2583 B	121	6 3 3	6 3 4	648.978	1.68E-04	6
10321.3973	201	7 3 5	7 5 2	1059.835	6.69E-06	6	10367.2583 B	220	4 1 4	3 0 3	136.761	1.68E-04	6
10321.8916	201	4 1 4	5 3 3	503.968	1.20E-05	6	10367.2583 B	220	3 2 2	3 1 3	142.278	1.68E-04	6
10322.2560 P	121	4 1 3	3 3 0	285.418	1.0 E-06	15	10369.4450 P	121	5 2 3	5 2 4	416.208	4.1 E-05	15
10323.2949 P	220	3 1 2	3 0 3	136.761	2.3 E-05	10	10369.8275	201	8 2 7	9 2 8	1080.385	1.20E-04	6
10323.3489 P	201	3 2 1	4 4 0	488.134	1.1 E-05	10	10369.9392 P	201	9 1 9	10 1 10	1114.549	3.9 E-04	10
10323.9557 B	121	7 7 0	8 7 1	1590.690	2.4 E-06	20	10370.0769 P	201	9 0 9	10 0 10	1114.533	1.92E-04	6
10323.9557 B	121	7 7 1	8 7 2	1590.690	2.4 E-06	20	10370.3258 P	121	7 1 6	6 3 3	661.548	6.2 E-06	50
10324.8069 B	220	1 1 1	0 0 0	0.000	6.4 E-06	50	10370.4383 P	201	8 1 7	9 1 8	1079.080	6.2 E-04	10
10325.1486 B	220	3 1 2	2 2 1	134.902	2.5 E-05	15	10371.5215 P	300	7 5 3	7 6 2	1216.189	4.7 E-07	50
10325.7758 P	201	8 4 5	9 4 6	1340.885	2.7 E-05	20	10371.9593 P	300	7 5 2	7 6 1	1216.193	1.2 E-06	50
10325.9106 P	121	4 2 3	4 2 2	315.779	1.0 E-04	15	10372.2873	201	7 2 5	8 2 5	982.912	1.02E-04	6
10326.6443 P	201	8 3 5	9 3 6	1282.919	1.37E-04	6	10372.4428 P	102	5 1 8	3 2 7	1201.921	6.5 E-06	20
10327.1098 P	300	9 1 8	10 2 9	1293.634	9.5 E-06	10	10372.9263 P	300	5 4 5	9 3 6	1282.919	1.91E-05	6
10327.3449	121	1 1 1	1 1 0	42.371	1.08E-03	6	10373.0944	121	2 1 2	1 1 1	37.136	3.42E-04	6
10327.4371 P	300	5 2 4	6 3 3	661.548	5.2 E-05	50	10373.4207	121	2 0 2	1 0 1	23.794	1.47E-03	6
10327.5591 P	201	7 6 2	8 6 3	1411.612	2.8 E-05	50	10374.0076	201	6 5 1	7 5 2	1059.835	1.20E-04	6
10327.9621	121	7 3 5	7 3 4	842.356	1.20E-05	6	10374.1055 P	201	6 5 2	7 5 3	1059.647	4.6 E-05	10
10328.8406 P	121	5 0 5	4 2 2	315.779	1.2 E-06	20	10374.4180 B	300	4 2 3	5 3 2	508.812	2.9 E-04	10
10329.2017 P	121	6 2 4	5 4 1	610.340	2.3 E-07	50	10374.4180 B	300	5 2 3	6 3 4	648.978	2.9 E-04	10
10330.3108 P	201	12 1 11	12 3 10	1962.508	8.0 E-07	20	10374.5196 P	300	3 3 1	4 4 0	488.134	7.6 E-05	50
10331.8239	121	4 2 2	5 0 5	325.347	8.0 E-06	15	10374.7656 P	300	3 3 0	4 4 1	488.107	2.5 E-04	20
10332.5940 P	201	12 2 11	12 2 10	1960.208	3.3 E-07	50	10375.1167 B	201	7 3 5	8 3 6	1006.116	3.77E-04	6
10332.8351	121	4 0 4	3 2 1	212.156	5.4 E-06	15	10375.1167 B	201	6 1 6	6 3 3	661.548	3.77E-04	6
10332.9626	201	6 3 4	6 5 1	888.632	2.9 E-06	15	10375.4328 P	121	7 3 4	7 3 5	816.694	1.4 E-05	15
10333.6697	121	3 2 1	4 0 4	222.052	4.3 E-06	15	10375.5498 P	121	7 4 4	7 4 3	931.237	5.1 E-05	15
10336.0171	201	4 0 4	4 4 1	488.107	1.4 E-06	15	10375.7055 P	201	10 1 10	10 1 9	1293.019	5.8 E-06	15
10337.7073 P	300	7 2 5	8 3 6	1006.116	7.3 E-05	50	10376.2517 B	201	6 2 5	6 4 2	757.780	2.3 E-05	50
10337.7878 P	121	3 2 2	3 2 1	212.156	7.3 E-04	10	10376.3712 P	121	8 5 3	9 3 6	1282.919	6.4 E-06	20
10338.4569	121	1 1 0	1 1 1	37.136	3.65E-04	6	10376.4809 P	300	10 2 9	10 3 8	1446.128	2.8 E-06	15
10338.9033 P	220	4 2 2	4 1 3	275.497	1.0 E-05	20	10377.6137 P	201	4 0 4	5 2 3	446.510	5.6 E-05	15
10338.9761 P	220	4 1 3	4 0 4	222.052	6.4 E-06	50	10378.0906	022	7 3 5	5 2 6	982.912	1.74E-05	6
10340.2648 P	201	8 2 6	9 2 7	1201.921	3.1 E-05	15	10378.8730 P	300	6 5 2	6 6 1	1045.057	1.0 E-06	50
10340.3808 P	220	3 2 1	3 1 2	173.365	3.1 E-05	15	10378.9778 P	300	6 5 1	6 6 0	1045.058	2.8 E-07	50
10341.3146 P	201	9 2 8	10 2 9	1293.634	1.6 E-04	10	10379.2134 P	220	5 1 5	4 0 4	222.052	4.7 E-06	15
10341.3831 P	220	2 1 2	1 0 1	23.794	2.4 E-05	20	10380.2634	121	8 4 4	8 4 5	1122.709	2.3 E-05	15
10341.6114 B	201	10 0 10	11 0 11	1327.109	1.9 E-04	10	10380.5151 P	041	6 4 2	5 2 3	446.510	4.2 E-07	20
10341.6114 B	201	10 1 10	11 1 11	1327.119	1.9 E-04	10	10380.9522	121	7 4 3	7 4 4	927.744	2.05E-05	6
10341.7974 B	201	7 5 2	8 5 3	1255.912	2.6 E-05	50	10381.2588 P	300	2 0 2	3 3 1	285.219	1.5 E-06	50
10341.9658	201	9 1 8	10 1 9	1293.019	5.01E-05	6	10381.3833	300	7 1 6	8 2 7	885.600	7.36E-05	6
10342.1768 P	201	7 5 3	8 5 4	1255.166	7.45E-05	6	10382.2947 P	121	6 4 3	6 4 2	757.780	3.7 E-05	15
10342.5927	220	5 2 3	5 1 4	399.457	1.79E-05	6	10382.7557 P	300	8 1 8	9 0 9	920.169	4.8 E-05	10
10343.0004 P	201	12 2 10	12 4 9	2124.952	7.1 E-07	50	10382.8352 P	121	4 1 3	4 1 4	224.838	1.3 E-04	10
10343.7106	121	6 3 4	6 3 3	661.548	3.94E-05	6	10383.3113 B	102	6 2 4	7 5 3	1059.647	2.5 E-05	20
10344.1597	121	2 2 1	2 2 0	136.163	5.14E-04	6	10383.3113 B	300	8 0 8	9 1 9	920.211	2.5 E-05	20
10344.7934	121	2 2 0	3 0 3	136.761	1.56E-05	6	10383.4156 P	121	6 4 2	6 4 3	756.724	1.6 E-04	10
10344.9103 P	201	8 3 6	9 3 7	1216.232	5.3 E-05	20	10385.3147 P	121	2 1 1	1 1 0	42.371	1.1 E-03	10
10345.2249	201	11 1 11	11 1 10	1524.849	4.5 E-06	15	10385.8036 P	300	7 2 6	8 1 7	882.891	8.8 E-06	20
10345.6326	300	4 3 2	5 4 1	610.340	1.50E-04	6	10385.9678	121	5 4 2	5 4 1	610.340	3.99E-04	6
10345.9215 P	022	8 3 6	9 2 7	1201.921	7.1 E-05	15	10386.4334	121	5 4 1	5 4 2	610.113	1.21E-04	6
10346.3761 P	121	5 1 4	4 3 1	383.842	4.2 E-06	50	10386.6365	121	6 2 4	6 2 5	552.911	4.89E-05	6
10346.6530 P	121	2 2 0	2 2 1	134.902	1.6 E-03	10	10387.3092	201	6 4 2	7 4 3	931.237	4.07E-04	6
10347.1056 P	300	3 0 3	4 3 2	382.516									

CM-1	CM-1	CM-2	ATM-1	1	CM-1	CM-1	CM-2	ATM-1	1												
10397.5401	201	7	2	6	885.600	8	24E-04	6	10430.3516 B*	300	8	2	7	8	3	6	1008.116	2	9	E-05	15
10397.8696	201	8	1	8	920.211	2	94E-04	6	10430.4660 P	121	6	4	3	7	2	6	709.608	4	0	E-05	10
10398.3154 B*	201	10	2	9	1437.989	4	5 E-06	50	10430.8595 P	121	4	4	0	5	2	3	446.510	2	6	E-06	15
10398.4104 P	022	3	1	2	300.362	4	7 E-06	50	10430.9757	022	3	0	3	4	1	4	224.838	8	92E-06	6	
10398.6095	201	7	1	6	882.891	2	94E-04	6	10431.6561 P	201	8	0	8	8	2	7	885.600	7	7	E-05	10
10398.8739 P	300	5	0	5	508.812	1	2 E-06	50	10432.4144 P	300	8	3	6	8	4	5	1122.709	4	4	E-06	50
10399.2227	201	10	2	8	1581.336	2	1 E-06	15	10432.9584 P*	220	7	1	6	6	2	5	552.911	2	1	E-06	50
10399.6270	220	7	1	6	586.243	2	9 E-06	15	10433.0274 P	201	9	2	8	9	2	7	1201.921	2	3	E-05	10
10400.2307	220	3	3	0	212.156	2	1 E-05	15	10433.2603 P	022	7	3	5	7	4	4	927.744	2	3	E-06	50
10400.8787 P	300	8	4	5	1255.166	4	2 E-06	15	10433.8053	201	5	2	3	6	2	4	602.773	9	10E-04	6	
10401.2025 B	220	7	0	7	447.252	6	1 E-06	50	10434.3079 P	121	4	1	3	3	1	2	173.365	1	1	E-03	10
10402.1704 P	220	7	1	7	446.697	3	4 E-06	50	10434.3818 P	201	5	3	3	6	3	4	648.978	1	5	E-03	10
10402.2824 P	121	8	2	6	920.169	9	8 E-05	10	10434.9892	201	8	1	8	8	1	7	882.891	2	15E-05	6	
10402.4093 P	201	2	1	2	285.219	1	8 E-05	15	10435.3918 B	121	4	2	3	3	2	2	206.301	7	8	E-04	50
10402.9303	201	6	2	4	782.409	1	05E-03	6	10435.4171 B	121	6	1	6	5	1	5	326.625	7	8	E-04	50
10403.5784 P	121	5	1	4	326.625	2	3 E-05	10	10435.6980 P	121	6	0	6	5	0	5	325.347	1	08E-03	6	
10403.7732 P	201	11	3	9	1813.223	1	3 E-06	50	10435.8593 B	300	6	0	6	7	1	7	588.479	7	8	E-05	50
10404.1236 P	121	8	5	3	1255.166	1	7 E-05	15	10436.3478	300	6	1	6	7	0	7	588.243	1	58E-04	6	
10404.2253 P	201	9	0	9	1080.385	1	1 E-05	15	10436.6293 B	220	5	2	4	4	1	3	275.497	4	7	E-06	50
10404.6973 P	102	5	2	3	888.598	3	4 E-05	15	10436.8442 B	121	8	2	6	8	2	7	885.600	1	6	E-06	50
10404.9027	201	6	3	4	816.694	2	72E-04	6	10438.0942	300	8	6	3	9	5	4	1477.297	3	7	E-06	15
10405.1256 P	201	5	5	0	888.632	7	0 E-05	10	10438.7896	300	2	2	1	3	3	0	285.418	3	56E-04	6	
10405.2748 P	201	5	5	1	888.598	1	7 E-04	10	10439.5900 P	022	7	4	3	7	5	2	1059.835	2	2	E-06	50
10405.4098 P	201	9	1	9	1079.080	2	9 E-05	10	10439.6378 P	022	6	4	2	6	5	1	888.632	1	9	E-06	50
10405.9440 P	220	3	3	1	206.301	7	9 E-06	15	10440.1484 P	022	5	4	2	5	5	1	742.073	4	4	E-06	50
10406.2061 B*	121	9	2	7	1131.776	1	8 E-06	50	10440.2643	300	2	2	0	3	3	1	285.219	1	23E-04	6	
10406.4017 P	201	4	2	3	488.134	4	2 E-06	15	10440.3302 P	022	5	4	1	5	5	0	742.076	1	5	E-05	50
10406.8928 B	121	7	2	5	709.608	6	9 E-06	50	10440.4485 P	300	9	4	5	10	3	8	1446.128	3	5	E-06	20
10407.1230	121	4	1	4	142.278	5	34E-04	6	10440.5509 P	102	7	5	2	8	6	3	1411.612	2	9	E-06	20
10407.3345 P	300	9	5	4	1581.336	5	7 E-06	50	10440.8747	102	7	5	3	8	6	2	1411.646	1	0	E-06	15
10407.9888 P	121	7	5	2	1059.647	1	70E-05	6	10441.6155 B	121	6	2	5	5	0	6	446.697	1	2	E-05	20
10408.1372 P	121	7	5	3	1059.835	7	0 E-05	10	10441.6155 B	102	7	1	7	8	2	6	982.912	1	2	E-05	20
10408.2303 P	121	4	0	4	136.761	1	6 E-03	10	10441.7014 P	201	10	3	8	10	3	7	1538.150	2	2	E-06	50
10408.7770 P	220	5	3	3	416.208	1	7 E-05	50	10441.8172 P	201	4	1	4	4	3	1	383.842	1	5	E-05	10
10408.8663	121	3	1	2	95.175	4	28E-04	6	10442.4975 P	022	4	1	4	4	2	3	300.362	2	0	E-06	50
10410.0425	300	7	0	7	744.163	1	27E-04	6	10443.3970 B	201	8	1	7	8	3	6	1006.116	1	12E-04	6	
10410.2339	121	2	2	1	70.090	1	11E-05	6	10443.3970 B	121	5	4	2	6	2	5	552.911	1	12E-04	6	
10410.3339	300	7	1	7	744.064	3	24E-05	6	10444.2033 P	300	3	0	3	3	3	0	285.418	6	7	E-07	50
10410.5153 P	300	7	4	4	1059.647	2	3 E-06	20	10444.7899 P	300	7	1	7	7	2	6	709.608	1	2	E-05	10
10411.2358 B	300	8	7	2	1631.384	2	0 E-06	15	10445.0165	121	4	2	2	3	2	1	212.156	9	51E-04	6	
10412.5539 B	121	6	5	1	888.598	2	0 E-04	50	10445.3861 P	121	7	1	6	7	1	7	588.479	2	5	E-05	10
10412.5539 B*	121	6	5	2	888.632	2	0 E-04	50	10445.4790	300	4	1	3	5	2	4	416.208	1	50E-04	6	
10413.1825	121	3	2	2	136.761	6	2 E-05	10	10445.8058 B*	003	6	5	2	7	7	1	1394.813	1	3	E-06	50
10413.4421 P	201	5	1	5	508.812	2	9 E-05	50	10445.6663 B*	003	6	5	1	7	7	0	1394.813	2	3	E-06	50
10414.2282 P	300	7	4	3	1059.835	1	5 E-06	50	10446.0808 P	300	5	2	4	5	1	5	542.905	1	8	E-04	20
10414.3588 P	220	3	2	2	95.175	7	4 E-05	10	10446.1416 P	121	7	6	2	7	6	1	1216.193	5	7	E-05	10
10414.5926 P	300	8	5	4	1360.235	9	0 E-06	20	10446.2566 P	121	7	6	1	7	6	2	1216.189	1	8	E-05	10
10414.8958 P*	201	9	2	7	1340.885	7	9 E-06	50	10447.5693 B	121	7	1	7	6	1	6	447.252	6	9	E-04	20
10415.0423	121	3	2	2	134.902	7	63E-04	6	10447.7886 B	121	7	0	7	6	0	6	446.697	2	5	E-04	10
10416.0113	300	3	2	1	382.516	3	21E-04	6	10447.7886 B*	121	6	5	1	6	6	0	1045.058	2	5	E-04	10
10416.3041 P	300	6	2	5	704.214	1	0 E-05	50	10447.9603 P	121	6	6	0	6	6	1	1045.057	1	60E-04	6	
10416.4239 B	121	5	5	1	742.076	5	35E-04	6	10448.7917	102	6	3	3	6	6	0	1045.058	7	1	E-06	15
10416.4239 B	121	5	5	0	742.073	5	35E-04	6	10449.9929 B	201	4	4	0	5	4	1	610.340	8	0	E-04	10
10417.3233	300	8	1	8	885.600	1	42E-05	6	10449.9929 B	300	7	0	7	7	1	6	704.214	8	0	E-04	10
10417.5125 B	022	4	1	4	325.347	8	3 E-06	10	10450.1906 B	201	6	0	6	7	0	7	588.243	4	1	E-03	20
10417.5125 B	300	6	4	3	888.598	8	3 E-06	10	10450.1906 B	201	6	1	6	7	1	7	588.479	4	1	E-03	20
10417.6637 P	201	2	1	1	285.418	1	6 E-04	10	10450.6629 B	300	8	4	4	9	3	7	1216.232	1	0	E-05	50
10417.7769 P	300	7	1	3	315.773	6	9 E-05	10	10451.8720	201	5	2	4	6	2	5	552.911	2	86E-03	6	
10418.2205 B	102	7	0	7	1008.116	1	9 E-06	50	10451.9961 P	300	7	2	6	7	3	5	816.894	1	3	E-05	50
10418.5133 P	121	4	3	2	326.625	1	1 E-06	20	10452.4910 P	201	10	1	10	9	3	7	1216.232	2	1	E-06	50
10418.7541 P	201	9	1	8	1216.232	8	1 E-06	50	10452.5505 P	300	8	1	7	8	2	6	982.912	6	4	E-06	15
10418.8235 P	300	9	1	8	1201.921	6	8 E-06	50	10453.1590	201	5	1	4	6	1	5	542.905	9	88E-04	6	
10418.8863 P	003	7	5	3	1590.690	1	0 E-06	50	10454.3906	121	5	2	4	4	2	3	300.362	8	61E-04	6	
10419.3515	201	5	4	1	757.780	1	86E-04	6	10454.7068	121	5	1	4	4	1	3	275.497	3	08E-04	6	
10419.4788 P	201	8	2	6	1122.709	1	5 E-06	50	10455.0768 P	121	7	2	6	7	0	7	588.243	1	8	E-05	15
10419.5589 P	121	3	2	1	136.163	2	4 E-04	10	10455.9425 B	300	7	5	3	8	4	4	1131.776	5	5	E-06	50
10419.6372 P	121	4	2	3	222.052	2	5 E-05	20	10457.5912 P	121	9	2	7	9	2	8	1080.385	1	1	E-06	50
10420.0040 P	300	7	4	4	1090.157	1															

SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %
10487.2927 B	201	8 2 7	8 2 6	982.912	1.5 E-04 10	10508.4139 P	121	5 4 1	4 4 0	488.134	6.35E-05 6
10487.2927 B	201	7 7 1	7 7 0	1394.813	1.5 E-04 10	10509.1951 B	220	5 3 3	4 2 2	315.779	1.5 E-06 50
10487.2927 B	201	7 7 0	7 7 1	1394.813	1.5 E-04 10	10509.4632 P	300	4 3 2	5 2 3	446.510	2.4 E-04 10
10487.8273 B	300	7 3 4	7 4 3	931.237	1.3 E-06 50	10510.0894 P	102	6 1 6	7 2 5	782.409	3.1 E-06 15
10487.8620 B	300	4 3 2	4 4 1	488.107	1.9 E-06 50	10510.9824 P	201	8 3 6	8 3 5	1050.157	2.49E-05 6
10487.9651 B	121	9 0 9	8 0 8	744.064	7.4 E-05 50	10511.2053 P	300	6 2 4	6 3 3	661.548	9.5 E-06 15
10488.3882	201	2 0 2	3 2 1	212.156	1.55E-04 6	10511.5428 B	300	3 1 3	4 0 4	222.052	2.5 E-04 50
10489.2872 P	300	4 3 1	4 4 0	488.134	5.7 E-07 50	10511.5428 B	300	4 1 4	4 2 3	300.362	2.5 E-04 50
10489.6867 B	300	6 1 6	6 2 5	552.911	2.9 E-04 20	10512.2440 P	201	9 2 8	8 4 5	1122.709	4.5 E-06 10
10489.6867 B	121	9 1 9	8 1 8	744.163	2.9 E-04 20	10513.1079 P	300	3 2 1	3 3 0	285.418	2.1 E-05 15
10489.8751	121	5 2 3	4 2 2	315.779	2.52E-04 6	10513.2658	300	7 3 4	8 2 7	885.600	1.68E-05 6
10471.0167 P	102	6 5 1	7 6 2	1216.189	2.0 E-06 50	10513.7223	121	7 2 5	6 2 4	602.773	7.97E-05 6
10471.0825 P	102	6 5 2	7 6 1	1216.193	4.8 E-06 20	10514.1232 P	102	8 4 3	7 5 2	1059.835	1.2 E-05 15
10471.3540 B	003	8 4 4	9 6 3	1631.384	9.1 E-07 50	10514.2528 B	201	9 4 6	9 4 5	1360.235	3.2 E-05 50
10471.5381 P	300	6 2 5	6 3 4	648.978	9.2 E-05 15	10514.2528 B	121	8 4 5	8 2 6	982.912	3.2 E-05 50
10471.6789 P	121	8 3 6	8 1 7	882.891	2.7 E-06 50	10514.5872	300	5 2 3	5 3 2	508.812	3.81E-05 6
10472.1031	121	6 2 5	5 2 4	416.208	1.93E-04 6	10514.8193 P	201	8 6 3	8 6 2	1411.646	2.1 E-05 50
10472.8947	121	6 1 5	5 1 4	399.457	6.70E-04 6	10514.8747 B	201	8 6 2	8 6 3	1411.612	5.8 E-06 50
10474.5811 P	201	4 1 3	5 1 4	399.457	3.7 E-03 10	10515.0758 P	102	6 4 2	7 5 3	1059.647	4.0 E-06 15
10475.0001 B	201	5 1 5	6 1 6	447.252	6.5 E-03 20	10515.1700 P	300	6 3 3	7 2 6	709.608	1.6 E-05 15
10475.0001 B	201	5 0 5	6 0 6	448.697	6.5 E-03 20	10516.7419 P	300	5 4 1	6 3 4	648.978	6.65E-05 6
10475.6200 P	121	10 2 8	10 2 9	1293.634	4.5 E-06 50	10516.8698 P	003	6 4 2	7 5 1	1216.193	1.8 E-06 50
10476.0818 P	220	3 3 1	2 2 0	136.163	3.5 E-06 20	10517.1094 P	121	9 1 8	8 1 7	882.891	4.6 E-05 50
10476.6678	121	3 3 1	3 1 2	173.365	8.8 E-06 15	10517.2052 B	220	5 2 3	4 1 4	224.838	6.0 E-04 10
10476.8566 P	201	8 4 4	9 2 7	1201.921	1.6 E-06 50	10517.2052 B	300	3 2 2	4 1 3	275.497	6.0 E-04 10
10477.4862 P	220	3 3 0	2 2 1	134.902	8.2 E-06 20	10517.3811 P	201	9 5 5	9 5 4	1477.297	2.7 E-05 10
10477.9565 B	121	10 1 10	9 1 9	920.211	9.8 E-05 10	10518.5286 B	121	9 2 8	8 2 7	885.600	1.3 E-04 10
10477.9565 B	121	10 0 10	9 0 9	920.169	9.8 E-05 10	10518.5286 B	201	7 1 7	6 3 4	648.978	1.3 E-04 10
10478.3273	201	4 2 3	5 2 4	416.208	1.40E-03 6	10518.8419 B	300	8 3 5	9 2 8	1080.385	1.5 E-06 50
10478.4465 P	201	9 3 7	9 3 6	1282.919	2.4 E-05 20	10519.8320 B	121	7 7 1	7 7 0	1394.813	6.4 E-05 15
10479.4435 P	300	6 0 6	6 1 5	542.905	2.2 E-05 15	10519.8320 B	121	7 7 0	7 7 1	1394.813	6.4 E-05 15
10479.7872	121	9 1 8	9 1 9	920.211	1.4 E-06 15	10520.4090	121	4 2 2	3 0 3	136.761	2.97E-05 6
10480.9018 P	201	6 1 5	6 3 4	648.978	1.8 E-04 10	10520.5140 P	300	8 1 8	7 2 5	782.409	3.4 E-06 50
10481.1538	121	5 3 3	4 3 2	382.516	4.91E-04 6	10520.6684 P	022	5 4 2	6 3 3	661.548	3.3 E-06 20
10482.4482 P	022	3 0 3	3 1 2	173.365	8.22E-06 6	10521.3402 P	121	7 3 5	6 3 4	648.978	1.1 E-04 10
10483.3157	300	2 1 1	3 2 2	206.301	1.79E-04 6	10521.5677 P	201	3 0 3	4 0 4	222.052	3.7 E-03 20
10483.5320 B	300	4 0 4	5 1 5	326.625	4.71E-04 6	10521.9323 P	201	7 3 4	6 5 1	886.632	1.4 E-05 50
10483.5320 B	201	6 0 6	6 2 5	552.911	4.71E-04 6	10522.4277 P	201	3 1 3	4 1 4	224.838	9.6 E-03 10
10483.7683 P	300	4 2 3	5 1 4	399.457	2.20E-03 6	10522.7981	201	5 1 5	5 1 4	399.457	5.50E-04 6
10483.9047 P	121	5 3 2	4 3 1	383.842	1.6 E-04 20	10522.9808 B	201	7 6 2	7 6 1	1216.193	2.15E-04 6
10483.9574 P	121	9 2 8	9 0 9	920.169	2.0 E-05 50	10522.9808 B	201	7 6 1	7 6 2	1216.189	2.15E-04 6
10484.5744 P	300	7 1 6	7 2 5	782.409	3.5 E-05 10	10523.5009 P	201	9 5 4	9 5 5	1474.981	1.2 E-05 50
10485.0189	300	5 2 4	5 3 3	503.968	6.76E-05 6	10523.7626	201	4 0 4	4 2 3	300.362	7.03E-04 6
10485.6314 P	121	3 2 1	2 0 2	70.090	8.2 E-06 15	10524.1993	300	2 0 2	3 1 3	142.278	7.74E-04 6
10486.5561 B	300	4 1 4	5 0 5	325.347	2.8 E-04 20	10524.7588 B	003	8 1 8	9 3 7	1216.232	1.1 E-04 20
10487.5093 P	102	7 4 3	8 5 4	1255.166	5.8 E-06 15	10524.7588 B	300	5 3 2	6 2 5	552.911	1.1 E-04 20
10488.4088 P	121	7 2 6	6 2 5	552.911	4.60E-04 6	10525.1608 P	300	5 0 5	4 3 2	382.516	1.5 E-06 50
10488.9581	121	7 1 6	6 1 5	542.905	1.11E-04 6	10525.7851 P	300	5 5 1	6 4 2	757.780	9.9 E-06 50
10490.2862 P	102	7 2 6	8 3 5	1050.157	1.4 E-06 20	10526.2756	201	2 2 0	3 2 1	212.156	4.97E-03 6
10490.7113 P	300	5 4 2	7 3 5	816.694	2.2 E-05 20	10526.8547 P	300	5 5 0	6 4 3	756.724	2.4 E-05 20
10490.9292	201	3 3 0	4 3 1	383.842	7.06E-04 6	10527.2552 P	300	3 1 3	3 2 2	206.301	7.0 E-05 20
10491.5219	201	4 1 3	4 3 2	382.516	2.14E-04 6	10527.6665 B	220	8 3 6	7 2 5	782.409	3.9 E-05 50
10491.9993	201	3 3 1	4 3 2	382.516	2.19E-03 6	10527.6665 B	201	7 3 4	8 1 7	882.891	3.9 E-05 50
10492.1589 P	300	5 1 5	5 2 4	416.208	5.1 E-05 50	10528.2667	220	7 3 5	6 2 4	602.773	1.50E-05 6
10492.3392 P	201	3 1 2	3 3 1	285.219	3.28E-05 6	10528.3794	102	5 0 5	6 3 4	648.978	3.46E-06 6
10492.5650 B	102	5 1 4	6 4 3	756.724	3.1 E-06 50	10528.5134	201	8 5 4	8 5 3	1255.912	2.80E-05 6
10492.5650 B	003	7 4 3	8 6 2	1411.646	3.1 E-06 50	10528.7719 P	041	5 5 1	4 3 2	382.516	2.9 E-06 50
10492.8463 P	201	7 3 5	6 5 2	888.598	7.1 E-06 50	10529.7156 B	201	2 1 1	3 1 2	173.365	1.2 E-02 50
10492.8932 P	300	6 5 2	7 4 3	931.237	2.2 E-05 20	10529.7973 P	121	6 4 2	5 4 1	610.340	2.6 E-04 50
10493.0374	121	6 2 4	5 2 3	446.510	5.17E-04 6	10529.9613 P	121	6 4 2	5 4 2	610.113	6.2 E-05 20
10493.3056 P	022	7 4 3	8 3 6	1006.116	2.7 E-06 20	10530.0959 B	201	6 6 1	6 6 0	1045.058	7.14E-04 6
10493.7484 P	201	6 1 6	6 1 5	542.905	9.8 E-05 15	10530.0959 B	201	6 6 0	6 6 1	1045.057	7.14E-04 6
10494.5173 B	201	6 3 3	5 5 0	742.076	2.4 E-06 50	10530.7118 P	201	2 2 1	3 2 2	206.301	1.62E-03 6
10495.4148 P	201	10 2 9	9 4 6	1340.885	8.0 E-06 50	10531.2572 P	201	6 2 5	6 2 4	602.773	1.34E-04 6
10495.7039	201	3 2 1	4 2 2	315.779	1.80E-03 6	10532.1000 P	121	10 1 9	9 1 8	1079.080	2.9 E-07 50
10496.2877 P	300	6 5 1	7 4 4	927.744	9.3 E-06 15	10532.3680	201	6 3 3	7 1 6	704.214	1.6 E-06 15
10497.2686 P	022	2 2 1	3 1 2	173.365	3.7 E-06 50	10532.6933 P	201	6 1 6	5 3 3	503.968	6.3 E-06 50
10497.3908	300	1 1 1	2 2 0	136.163	1.97E-04 6	10532.8298	300	5 1 4	5 2 3	446.510	1.28E-04 6
10498.7787	201	4 0 4	5 0 5	325.347	8.3 E-03 10	10533.4349 B	022	5 4 1	6 3 4	648.978	6.2 E-06 50
10499.0339 P	201	4 1 4	5 1 5	326.625	2.6 E-03 20	10534.6695 P	300	4 0 4	4 1 3	275.497	7.39E-05 6
10500.3377	201	1 0 1	2 2 0	136.163	1.3 E-05 15	10534.8487 B	201	8 0 8	7 2 5	782.409	3.4 E-05 50
10500.7309	201	7 2 6	7 2 5	782.409	1.63E-04 6	10534.8613 B	201	8 4 5	8 4 4	1131.776	3.4 E-05 50
10501.2898	121	6 3 4	5 3 3	503.968	1.32E-04 6	10535.7706 P	102	6 1 6	6 4 3	756.724	2.4 E-07 50
10501.4655 P	300	7 2 5	7 3 4	842.356	1.7 E-05 10	10536.1346 P	201	6 4 2	7 2 5	782.409	7.2 E-07 20
10501.7070 B	201	9 0 9	8 2 6	982.912	8.4 E-06 50	10536.6562 P	003	8 2 7	9 4 6	1340.885	7.2 E-07 20
10501.8731 B	102	5 5 0	6 6 1	1045.057	2.4 E-05 50	10537.1149 B	300	2 1 2	3 0 3	136.761	5.3 E-06 50
10501.8731 B	102	5 5 1	6 6 0	1045.058	2.4 E-05 50	10537.3185	201	3 0 3	3 2 2	206.301	2.12E-04 6
10502.0616 P	201	3 1 2	4 1 3	275.497	2.40E-03 6	10537.5078	201	7 5 3	7 5 2	1059.835	2.72E-04 6
10503.5347 P	121	8 1 7	7 1 6	704.214	2.4 E-04 10	10537.8775 P	121	8 3 6	7 3 5	816.694	4.4 E-05 15
10503.9361 P	300	5 4 2	6 3 3	881.548	2.8 E-05 20	10538.0615 P	201	7 5 2	7 5 3	1059.647	9.0 E-05 10
10504.1719	300	1 1 0	2 2 1	134.902	4.81E-04 6	10538.8758 P	300	2 1 2	2 2 1	134.902	1.8 E-04 20
10504.2949 P	121	8 2 7	7 2 6	709.608	6.9 E-05 10	10538.9716 P	300	4 4 1	5 3 2	508.812	5.3 E-05 10
10504.6621 P	201	3 2 2	4 2 3	300.362	5.4 E-03 10	10539.7431 P	201	5 1 5	4 3 2	382.516	1.8 E-05 10
10504.78											

SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %
10545.7292 P	102	7 3 4	8 4 5	1122.709	1.8 E-05 50	10586.2745 B	300	6 2 4	7 1 7	586.479	6 1 E-06 10
10545.9090 P	300	4 1 3	4 2 2	315.779	8.8 E-05 10	10586.9999 P	201	4 3 1	4 3 2	382.516	4 8 E-03 10
10546.8749 B	300	3 3 1	4 2 2	315.779	4.6 E-06 10	10587.7290 P	121	6 4 2	6 2 5	552.911	7 1 E-06 50
10547.0174 P	201	10 3 7	11 1 10	1524.849	1.2 E-06 50	10587.2680 P	300	7 4 4	8 1 7	882.891	4 5 E-06 50
10547.4567 P	102	6 3 4	7 4 3	931.237	1.2 E-05 15	10587.6024 P	201	6 3 3	6 3 4	646.978	6 65E-04 6
10548.2419 B	201	5 2 3	4 4 0	488.134	1.0 E-06 50	10588.6198 P	201	4 1 3	3 3 0	285.418	3 0 E-05 50
10548.5505 P	201	9 5 5	10 3 8	1446.128	1.0 E-06 20	10589.0978 P	201	3 3 1	3 3 0	285.418	1 1 E-02 10
10549.1190 P	102	6 2 5	7 3 4	842.356	2.6 E-05 10	10589.5604 B	201	3 3 0	3 3 1	285.219	1 0 E-02 20
10549.2810	201	7 4 4	7 4 3	931.237	3.14E-04 6	10589.5604 B	201	0 0 0	1 0 1	23.794	1 0 E-02 20
10549.7289 P	201	8 3 5	7 5 2	1059.835	5.1 E-06 50	10589.5604 B	300	5 3 2	4 4 1	488.107	1 0 E-02 20
10549.7987 P	121	5 4 2	5 2 3	446.510	3.2 E-05 10	10589.9273 P	201	6 0 6	5 2 3	446.510	3 9 E-05 10
10550.0818	121	7 4 4	6 4 3	756.724	1.22E-04 6	10590.5654 P	121	9 5 5	9 3 6	1282.919	7 8 E-06 50
10550.1624	201	4 1 4	4 1 3	275.497	3.49E-04 6	10591.1361 P	022	2 2 1	2 1 2	79.495	2 0 E-06 15
10550.8522 B	102	10 3 8	11 2 9	1690.665	6.75E-06 6	10591.2281 P	201	7 5 3	8 3 6	1006.116	3 1 E-06 20
10550.8425 P	300	2 2 1	3 1 2	173.365	4.03E-04 6	10591.4885 B	201	6 5 1	7 3 4	842.356	2 3 E-06 50
10550.9155 P	121	7 4 3	6 4 2	757.780	5.0 E-05 50	10592.4537	201	2 1 2	2 1 1	95.175	1 40E-03 6
10551.2200	102	5 2 3	5 5 0	742.076	3.96E-04 6	10592.6680 P	201	3 2 2	3 2 1	212.156	6 2 E-03 10
10551.6829 P	201	5 5 0	5 5 1	742.073	6.9 E-04 10	10593.8731	201	7 3 4	7 3 5	816.694	6 37E-05 6
10551.7936 P	201	5 5 1	5 5 0	742.076	1.6 E-03 10	10594.0908 P	300	8 2 7	7 3 4	842.356	2 5 E-06 20
10552.1920	300	3 1 2	3 2 1	212.156	2.12E-04 6	10594.5726	201	10 3 7	9 5 4	1477.297	1 7 E-06 15
10552.4589 P	022	4 4 1	5 3 2	508.812	7.8 E-06 15	10594.8983 P	201	7 4 4	8 2 7	885.600	2 3 E-06 15
10553.1319 B	121	8 3 5	7 3 4	842.356	3.0 E-05 50	10596.0097	300	8 4 5	7 5 2	1059.835	1 85E-05 6
10553.4539	300	2 1 1	2 2 0	136.163	4.94E-05 6	10597.4086 P	201	7 2 5	6 4 2	757.780	2 5 E-06 20
10553.8498 P	201	10 1 9	9 3 8	1282.919	2.8 E-06 20	10597.8073	300	4 2 3	3 3 0	285.418	1 75E-05 6
10554.0842	121	9 3 7	8 3 6	1006.116	5.92E-05 6	10598.1214 P	102	9 1 8	10 2 9	1293.634	6 66E-06 6
10554.3180 P	102	6 2 4	6 5 1	888.632	1.0 E-06 10	10598.6475 P	003	6 3 3	7 5 2	1059.835	3 1 E-06 50
10555.0834 P	121	9 2 7	8 2 6	982.912	2.0 E-05 10	10599.0936 P	201	6 2 4	7 0 7	586.243	3 7 E-06 50
10555.3892 P	102	7 2 5	7 5 2	1059.835	1.0 E-06 50	10599.2813 P	201	3 3 0	4 1 3	275.497	1 0 E-06 50
10556.0674	201	8 4 4	8 4 5	1122.709	9.94E-05 6	10599.4553	121	8 5 3	7 5 2	1059.835	2 65E-05 6
10556.2574	300	3 0 3	3 1 2	173.365	3.90E-04 6	10599.6585 P	300	7 2 5	8 1 8	744.163	3 8 E-06 15
10557.4317 P	201	1 1 0	2 1 1	95.175	2.6 E-03 10	10599.7654 P	102	5 2 4	6 3 3	661.548	8 3 E-06 15
10557.6026 P	201	7 4 3	7 4 4	927.744	1.0 E-04 20	10600.8494	201	2 2 1	2 2 0	136.163	4 63E-03 6
10558.2732	201	5 2 4	5 2 3	446.510	1.07E-03 6	10601.1666 P	300	6 3 4	5 4 1	610.340	1 8 E-05 10
10558.3898 P	201	9 4 5	9 4 6	1340.885	1.2 E-05 50	10601.6703 P	201	2 2 0	3 0 3	136.161	1 8 E-05 10
10558.6313 P	300	8 5 4	7 6 1	1216.193	3.7 E-06 20	10601.8903 P	300	6 4 3	7 1 6	704.214	5 0 E-06 15
10559.0738 P	121	6 5 1	5 5 0	742.076	8.0 E-05 10	10602.8594 P	121	4 3 2	3 1 3	142.278	6 6 E-06 50
10559.1338 P	121	6 5 2	5 5 1	742.073	2.5 E-05 20	10603.5297 P	201	2 2 0	2 2 1	134.902	1 4 E-02 10
10559.2581	201	5 4 3	6 4 2	757.780	3.32E-04 6	10605.0451 P	201	1 1 1	1 1 0	42.371	1 0 E-02 10
10560.0484	201	5 3 4	6 3 3	661.548	2.62E-04 6	10605.1817 P	201	3 2 1	3 2 2	206.301	2 1 E-03 10
10561.8212 P	201	5 4 2	6 4 3	756.724	9.35E-04 6	10605.9035 P	201	5 0 5	4 2 2	315.779	3 1 E-05 10
10562.0114 P	022	3 1 2	3 0 3	136.161	1.5 E-05 50	10606.1001	022	4 1 4	3 0 3	116.761	2 44E-05 6
10562.5129 P	300	3 3 0	4 2 3	300.362	1.3 E-04 50	10607.1566 B	300	7 2 6	6 3 3	661.548	2 0 E-05 20
10562.5494 P	300	0 0 0	1 1 1	37.136	1.4 E-04 50	10607.1566 B	201	8 1 7	7 3 4	842.356	2 0 E-05 20
10563.4640 P	300	1 1 1	2 0 2	70.090	1.2 E-04 10	10607.2563 P	300	8 4 4	7 5 3	1059.847	1 9 E-06 50
10563.5994 P	121	5 2 3	4 0 4	222.052	2.9 E-06 50	10607.4590	201	3 0 3	2 2 0	136.163	5 02E-05 6
10563.8716	022	3 1 2	2 2 1	134.902	1.6 E-06 15	10607.6808 B	300	10 3 8	9 4 5	1360.235	1 1 E-05 15
10564.5788 P	201	10 4 6	10 4 7	1581.336	4.8 E-06 15	10607.6808 B	003	7 0 7	8 2 6	382.912	1 1 E-05 15
10565.3350 P	300	6 4 2	5 5 1	742.073	1.1 E-06 50	10609.1096	102	7 2 5	8 3 6	1006.116	1 13E-05 6
10565.7804 P	201	7 0 7	6 2 4	602.773	5.6 E-06 20	10610.7394	201	4 2 2	4 2 3	300.362	2 45E-03 6
10565.9294 P	102	9 2 7	10 3 8	1446.128	6.2 E-06 50	10611.1278 P	201	7 2 5	8 0 8	744.064	3 6 E-05 10
10566.1118 P	102	6 3 3	7 4 4	927.744	1.2 E-05 50	10611.7042 P	300	6 2 5	5 3 2	508.812	1 8 E-06 15
10566.4094 P	201	1 0 1	2 0 2	70.090	3.7 E-03 10	10611.9686 P	201	4 0 4	3 2 1	212.156	1 60E-04 6
10566.5390 P	201	5 4 2	5 4 1	610.340	2.4 E-03 10	10612.2225 B	003	8 2 6	9 4 5	1360.235	2 83E-05 6
10567.0172 P	201	5 4 1	5 4 2	610.113	7.3 E-04 10	10612.2225 B	201	5 1 4	4 3 1	383.842	2 83E-05 6
10567.3391 P	121	10 2 8	9 2 7	1201.921	7.8 E-06 50	10612.7461	102	4 3 2	5 4 1	610.340	4 26E-05 6
10567.9205	201	1 1 1	2 1 2	79.495	8.0 E-03 10	10612.8520 P	300	4 2 2	3 3 1	285.219	1 8 E-06 50
10568.0728 P	102	5 1 5	5 4 2	610.113	6.8 E-05 20	10613.2167	300	9 3 6	9 2 7	1201.921	9 95E-06 6
10568.9821 P	121	6 3 3	6 1 6	447.252	3.4 E-06 20	10614.6721 P	300	6 3 3	5 4 2	610.113	6 3 E-06 50
10569.4177 P	121	8 4 5	7 4 4	927.744	2.7 E-05 15	10614.7164 P	102	4 3 1	5 4 2	610.113	1 8 E-05 20
10569.8578 P	201	4 3 1	5 1 4	399.457	1.2 E-06 50	10614.7858 P	300	7 3 5	6 4 2	757.780	9 2 E-06 50
10570.5378 B	121	3 3 1	2 1 2	79.495	2.6 E-06 50	10615.2789 P	300	1 1 0	1 0 1	23.794	6 4 E-04 10
10571.3021	300	2 0 2	2 1 1	95.175	1.60E-04 6	10615.4704 P	201	1 1 0	1 1 1	37.136	3 2 E-03 10
10571.4517	300	4 2 2	5 1 5	326.625	2.45E-05 6	10616.3155 P	300	8 3 5	8 2 6	982.912	1 4 E-05 15
10571.7343 P	121	9 4 4	7 4 3	931.237	7.8 E-05 10	10616.4549 B	300	7 3 4	7 2 5	782.409	8 44E-05 6
10572.1622 P	201	4 4 1	4 4 0	488.134	2.0 E-03 20	10616.4549 B	201	7 6 2	8 4 5	1122.709	8 44E-05 6
10572.2262 P	201	4 4 0	4 4 1	488.107	5.5 E-03 10	10616.6036 P	022	8 3 6	7 4 3	931.237	3 9 E-06 50
10572.7846 P	121	4 3 1	3 1 2	173.365	9.7 E-06 50	10616.7469 P	300	8 4 4	8 3 5	1050.157	1 2 E-05 15
10572.9175 B	102	4 4 0	5 5 1	742.073	4.1 E-05 20	10617.2784 P	121	7 6 2	6 6 1	1045.057	2 19E-05 6
10572.9175 B	102	4 4 1	5 5 0	742.076	4.1 E-05 20	10617.3864 P	121	7 6 1	6 6 0	1045.058	7 36E-06 6
10573.8887	300	3 2 1	4 1 4	224.838	1.41E-04 6	10618.3226 P	121	9 5 5	8 5 4	1255.166	2 14E-05 6
10573.8952	201	3 1 3	3 1 2	173.365	2.08E-03 6	10618.4997 P	102	8 3 6	9 2 7	1201.921	7 03E-06 50
10574.5472	201	5 3 3	5 3 2	508.812	2.01E-03 6	10618.9442 B	003	5 3 2	6 5 1	888.632	6 3 E-07 50
10574.9979 P	201	6 2 4	5 4 1	610.340	7.7 E-06 20	10619.5268 P	300	2 1 1	2 0 2	70.090	2 43E-04 6
10575.4145 B	102	5 1 5	6 2 4	602.773	2.2 E-06 50	10619.9501 B	201	7 1 6	6 3 3	661.548	1 9 E-05 50
10576.1465 P	300	5 2 3	6 1 6	447.252	2.8 E-05 15	10620.1686 P	201	5 2 3	5 2 4	416.208	3 0 E-04 10
10576.3176 P	022	3 0 3	2 1 2	79.495	1.5 E-05 15	10621.0709 P	201	6 1 5	5 3 2	508.812	8 42E-05 6
10576.7712 P	300	8 4 5	9 1 8	1079.080	2.7 E-06 50	10622.0062 B	201	8 2 6	9 0 9	920.169	7 1 E-05 20
10577.0033 P	121	4 4 0	4 2 3	300.362	5.3 E-06 50	10622.0062 B	300	5 3 3	6 2 4	602.773	7 1 E-05 20
10577.0551 P	300	9 5 4	8 6 3	1411.812	2.1 E-06 50	10622.5805 B	300	4 2 2	4 1 3	275.497	1 9 E-04 10
10578.7568	201	4 2 3	4 2 2	315.779	8.93E-04 6	10622.5805 B	300	5 4 2	6 1 5	542.905	1 9 E-04 10
10579.0029 P	121	7 5 2	6 5 1	888.632	2.37E-05 6	10623.5873 P	201	2 1 1	2 1 2	79.495	4 0 E-03 10
10579.3733	121	7 5 3	6 5 2	888.598	7.12E-05 6	10623.9422 P	300	5 2 3	5 1 4	399.457	3 73E-04 6
10580.0460	300	1 0 1	1 1 0	42.371	4.54E-04 6	10625.1622 P	300	3 2 1	3 1 2	173.365	7 5 E-04 10
10580.3440 P	121										

SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %	SIGMA CM-1	VIB	J'KA'KC'	J''KA''KC''	E' CM-1	INTENSITY CM-2 ATM-1 %
10629.8487	300	6 2 4	6 1 5	542.805	6 55E-05 6	10672.4839	201	4 2 3	4 0 4	222.052	1 94E-04 6
10630.3074	300	2 2 0	2 1 1	95.175	1 93E-04 6	10672.5899 P	201	9 4 6	9 2 7	1201.921	9 4 E-06 50
10630.8298 P	300	4 3 2	5 0 5	325.347	9 7 E-06 20	10673.2380 P	300	5 5 0	5 4 1	610.340	1 14E-04 6
10630.9949 P	300	8 7 2	8 6 3	1411.812	6 4 E-06 50	10673.4582 P	300	5 5 1	5 4 2	610.113	7 9 E-05 50
10631.1590 P	300	5 3 2	5 2 3	448.510	3 7 E-04 20	10673.5304 P	201	3 0 3	2 0 2	70.090	5 0 E-03 10
10631.4120 P	300	9 4 5	8 5 4	1255.166	3 5 E-06 50	10674.2817 P	300	10 3 8	10 2 9	1293.634	4 8 E-06 20
10631.6995 P	300	7 4 3	7 3 4	842.356	8 21E-05 6	10675.1427 P	300	4 1 4	3 0 3	136.761	1 10E-03 6
10632.4289	201	6 2 4	6 2 5	552.911	2 99E-04 6	10675.3197 P	201	3 2 1	2 2 0	136.163	2 30E-03 6
10633.5549	300	1 1 1	0 0 0	0.000	8 05E-04 6	10677.0157 B	201	7 3 5	7 1 6	704.214	1 4 E-04 50
10634.1280	003	4 0 4	5 4 1	810.340	1 8 E-06 15	10677.0157 B	102	3 2 2	4 3 1	283.842	1 4 E-04 50
10635.0153 P	102	4 1 4	5 2 3	448.510	1 8 E-05 20	10677.0704 P	300	6 6 1	6 5 2	888.598	6 2 E-05 20
10635.2805 P	201	3 1 2	3 1 3	142.278	5 52E-04 6	10677.4564 P	022	4 4 0	4 3 1	383.842	1 3 E-05 15
10635.9686 P	102	7 5 2	7 6 1	1218.193	3 5 E-06 15	10677.9259 B*	102	8 5 4	9 4 5	1360.235	3 4 E-06 50
10636.1158 B	201	5 3 3	6 1 6	447.252	5 4 E-06 20	10678.2492 B	201	8 3 6	8 1 7	882.891	2 4 E-05 10
10636.1158 B	102	7 5 3	7 6 2	1218.189	5 4 E-06 20	10678.2492 B	022	5 4 2	5 3 3	503.968	2 4 E-05 10
10636.5003	201	1 0 1	0 0 0	0.000	1 99E-03 6	10678.6353 P	121	6 3 4	5 1 5	326.625	2 5 E-06 50
10637.0718 B	201	7 3 5	8 1 8	744.163	3 2 E-06 50	10678.8922 P	201	6 3 4	6 1 5	542.905	3 7 E-05 10
10639.8291 B	300	4 1 3	4 0 4	222.052	1 8 E-04 50	10678.7582 P	022	4 4 1	4 3 2	382.516	3 7 E-05 10
10640.0566 P	003	4 3 2	5 5 1	742.073	6 8 E-07 50	10678.9823 B	300	5 1 4	4 2 3	300.362	8 4 E-06 20
10640.6018 P	300	3 3 1	4 0 4	222.052	1 8 E-06 15	10679.2162 P	003	6 2 4	7 4 3	931.237	2 9 E-06 50
10640.8818 P	300	5 2 3	4 3 2	382.516	9 0 E-06 20	10679.4357 P	201	5 2 4	5 0 5	325.347	4 25E-04 6
10640.9245 P*	201	8 3 6	9 1 9	920.211	2 4 E-06 50	10680.1729	102	7 0 7	8 1 8	744.163	9 41E-05 6
10641.5887 P	102	3 3 1	4 4 0	488.134	5 1 E-05 50	10680.4681	102	7 1 7	8 0 8	744.064	3 46E-05 6
10641.6441 P	300	4 3 1	4 2 2	315.779	1 34E-04 6	10680.7403 P	300	7 1 6	7 0 7	586.243	6 1 E-05 10
10642.1357 B	300	7 3 4	6 4 3	756.724	1 3 E-05 50	10681.8367 P	300	2 2 1	1 1 0	42.371	8 2 E-05 20
10642.1357 B	102	6 5 1	6 6 0	1045.058	1 3 E-05 50	10682.2187 B	300	7 2 6	7 1 7	586.479	1 2 E-03 20
10643.9250	201	6 6 0	7 4 3	931.237	4 4 E-06 15	10682.2187 B	201	4 3 2	3 3 1	285.219	1 2 E-03 20
10644.3178 B	102	5 2 3	6 3 4	648.978	3 3 E-05 50	10682.3828 B*	300	8 7 2	9 4 5	1360.235	4 4 E-03 10
10644.7121	300	2 2 1	2 1 2	79.495	5 47E-04 6	10682.3828 B	201	3 1 2	2 1 1	95.175	4 4 E-03 10
10644.8960 P	201	5 5 1	6 3 4	648.978	8 5 E-06 10	10682.6292 P	201	6 1 5	6 1 6	447.252	5 6 E-04 50
10645.5917 P	201	7 2 5	7 2 6	709.808	2 3 E-05 10	10682.8493 B	300	5 0 5	4 1 4	224.838	5 27E-04 6
10645.5959 B	300	6 4 2	6 3 3	661.548	5 2 E-05 50	10682.8493 B	102	7 4 3	7 5 2	1059.835	5 27E-04 6
10648.9305 B	300	4 4 1	5 1 4	399.457	2 9 E-06 50	10683.0852 P	003	8 6 2	9 6 3	1631.384	5 4 E-06 50
10649.2024	201	4 1 3	4 1 4	224.838	6 67E-04 6	10683.3812 P	201	4 1 4	3 1 3	142.278	5 0 E-03 10
10649.7291 P	300	8 4 5	8 3 6	1006.116	4 1 E-05 10	10683.6981 P	201	4 3 1	3 3 0	285.418	3 5 E-03 10
10650.0830 P	300	2 1 2	1 0 1	23.794	2 1 E-03 10	10683.9014 P	201	5 3 3	5 1 4	399.457	1 32E-04 6
10650.1020 B*	300	3 0 3	2 1 2	79.495	4 1 E-04 50	10684.3406 P	270	7 3 5	5 0 6	446.697	2 9 E-06 50
10650.4217 P	300	3 2 2	3 1 3	142.278	3 8 E-04 50	10684.8292	102	3 2 1	4 3 2	382.516	1 07E-03 5
10650.4924 P	201	2 1 2	1 1 1	37.136	3 4 E-03 10	10685.8039 B	003	7 7 0	8 7 1	1590.690	2 5 E-06 20
10650.7169	300	3 3 0	3 2 1	212.156	4 06E-04 6	10685.8039 B	003	7 7 0	8 7 1	1590.690	2 5 E-06 20
10650.9386 P	121	7 5 2	7 3 5	816.694	9 0 E-06 50	10686.0820 P	102	5 4 2	6 5 1	888.632	4 8 E-06 50
10651.0810 P	300	8 2 6	8 1 7	882.891	1 6 E-05 20	10686.3151 P	300	5 1 5	4 0 4	222.052	2 8 E-04 20
10651.3959 P	022	7 3 5	7 2 6	709.808	6 4 E-06 20	10686.8312 P	201	10 3 8	10 1 9	1293.634	4 8 E-06 20
10651.4892 P	102	7 1 6	8 7 7	885.600	3 1 E-05 10	10686.9255 P	201	10 2 8	10 2 9	1293.634	1 6 E-05 20
10652.1212 P	300	8 5 4	8 4 5	1122.709	3 2 E-05 10	10687.3630 P	201	4 0 4	3 0 3	136.761	1 5 E-02 10
10652.1689 P*	121	6 5 1	6 3 4	648.978	4 0 E-06 50	10688.2346 P	201	4 2 3	3 2 2	206.301	3 0 E-03 10
10653.1745 P	121	8 5 3	8 3 6	1006.116	7 9 E-08 15	10688.3453 P	300	2 2 0	1 1 1	37.136	5 4 E-05 20
10653.4684 P	300	7 4 4	7 3 5	816.694	2 8 E-05 10	10688.7726	201	5 4 2	4 4 1	488.107	1 33E-03 6
10653.9925	300	5 1 4	5 0 5	325.347	2 6 E-04 10	10688.9976	201	5 4 1	4 4 0	488.134	3 98E-04 6
10654.1989 B	102	8 1 8	9 0 9	920.169	6 9 E-05 20	10690.0538	102	5 1 5	4 4 0	488.134	3 10E-05 6
10654.5165 P	121	5 5 0	5 3 3	503.968	8 8 E-07 50	10690.2471 P	102	5 4 2	5 5 1	742.073	9 3 E-07 50
10655.3906 P	300	4 1 3	3 2 2	206.301	3 5 E-06 50	10690.2986 B	102	5 4 1	5 5 0	742.076	1 6 E-06 50
10655.6114	300	4 3 2	4 2 3	300.362	5 25E-04 6	10691.2783 B	121	8 3 5	7 1 6	704.214	1 6 E-06 50
10656.2314	300	5 3 3	5 2 4	416.208	1 41E-04 6	10691.2783 B	102	8 0 8	8 1 7	882.891	1 6 E-06 50
10656.3534	300	3 0 1	3 2 2	206.301	1 27E-04 6	10691.3982 P	300	8 1 7	8 0 8	744.064	6 4 E-06 15
10656.7507 P	201	2 0 2	1 0 1	23.794	1 2 E-02 10	10691.6787	201	6 5 2	5 5 1	742.073	1 04E-04 6
10656.9091 B	300	5 4 1	5 3 2	508.812	4 2 E-04 50	10691.7665	201	6 5 1	5 5 0	742.076	7 44E-04 6
10656.9091 B	300	7 5 2	7 4 3	931.237	4 2 E-04 50	10691.9412 P	201	4 3 2	4 1 3	275.497	3 0 E-05 15
10657.0694 P	022	7 4 3	7 3 4	842.356	1 4 E-05 10	10692.1502 P	201	11 3 9	11 1 10	1524.849	3 3 E-06 15
10657.1261 P	300	6 4 3	6 3 4	648.978	1 7 E-04 10	10692.2852 B	300	8 2 7	8 1 8	744.163	1 6 E-05 20
10657.5508 B	201	8 7 2	7 7 1	1394.813	3 11E-05 6	10692.4289	300	9 3 6	8 4 5	1122.709	4 5 E-06 15
10657.5508 B	201	8 7 1	7 7 0	1394.813	3 11E-05 6	10693.0649 B	003	10 3 7	11 3 8	1813.223	1 3 E-05 50
10657.5508 B	102	7 2 6	8 1 7	882.891	3 11E-05 6	10693.1957 P	201	12 2 10	12 2 11	1774.751	1 2 E-06 50
10658.3878	300	4 2 3	4 1 4	224.838	8 84E-04 6	10693.3797 P	121	6 4 3	6 0 6	446.697	6 2 E-06 15
10658.5961 P	300	6 3 4	6 2 5	552.911	2 57E-04 6	10693.6286 B	121	6 4 2	5 2 3	446.510	1 4 E-06 50
10659.9753 B	300	7 5 3	7 4 4	927.744	4 9 E-05 15	10694.1164 B	201	7 6 1	6 6 0	1045.058	1 3 E-04 10
10659.9753 B	102	10 3 8	10 4 7	1581.336	4 9 E-05 15	10694.1164 B	201	7 6 2	6 6 1	1045.057	1 3 E-04 10
10659.9753 B	300	9 2 7	9 1 8	1079.080	4 9 E-05 15	10694.8433 P	300	7 2 5	6 3 4	648.978	8 3 E-06 15
10660.2301 P	300	8 6 3	8 5 4	1255.166	2 2 E-05 50	10695.0202 P	201	7 1 6	7 1 7	586.479	6 8 E-05 15
10660.7121 P	201	2 1 1	1 1 0	42.371	9 9 E-03 10	10695.7234	300	6 0 6	5 1 5	326.625	1 54E-04 6
10661.5175 B	300	5 4 2	5 3 3	503.968	7 9 E-05 20	10695.9568 B*	121	5 4 2	4 2 3	300.362	1 4 E-04 50
10662.2425	022	8 3 6	8 2 7	885.600	2 1 E-05 15	10696.2831 P	102	6 3 4	7 2 5	782.409	1 5 E-05 20
10662.3605 P	300	5 2 4	5 1 5	326.625	3 E-06 15	10696.3772 P	102	5 1 4	6 2 5	552.911	8 6 E-05 10
10662.8007 P	201	11 4 8	11 2 9	1890.665	1 8 E-06 20	10698.8986	201	7 2 6	7 0 7	586.243	1 55E-04 6
10662.9593	300	7 3 5	7 2 6	709.808	5 38E-05 6	10697.2478 P	300	6 1 6	5 0 5	325.347	8 1 E-04 10
10663.4855	300	3 1 3	2 0 2	70.090	4 92E-04 6	10697.4172 P	201	5 1 5	4 1 4	224.838	1 3 E-02 10
10663.5252 P	102	4 2 2	5 3 3	503.968	2 4 E-05 50	10698.0910 B	201	7 4 4	7 2 5	782.409	1 3 E-05 50
10664.5703 P	300	4 4 0	4 3 1	383.842	7 65E-05 6	10698.2183 P	003	9 5 5	10 5 6	1718.718	4 7 E-06 20
10665.8663	300	4 4 1	4 3 2	382.516	2 35E-04 6	10698.6988 P	300	6 1 5	5 2 4	416.208	3 1 E-05 50
10666.2516 P	300	6 5 1	6 4 2	757.780	3 20E-05 6	10698.9454 P	201	4 2 2	3 2 1	212.156	8 4 E-03 10
10666.7233 P	022	6 4 2	6 3 3	661.548	7 7 E-06 20	10699.8303 P	201	5 0 5	4 0 4	222.052	4 2 E-03 10
10666.9224 P	201	2 2 1	2 0 2	70.090	8 4 E-05 10	10700.8725 P	201	4 1 3	3 1 2	173.365	1 1 E-02 20
10667.2057 P	300	8 5 2	8 4 3	756.724	1 0 E-04 10	10700.8424 P	201	5 3 3	4 3 2	382.516	4 1 E-03 10
10667.7847 P	2										

SIGMA CM-1	V16	J KA KC	J KA KC	INTENSITY CM-1 CM-2 ATM-1	SIGMA CM-1	V16	J KA KC	J KA KC	INTENSITY CM-1 CM-2 ATM-1				
10706 9289 B	300	7 0 7	6 1 6	447 252	5.3 E-04	50	10741 3925	201	3 2 1	2 0 2	70 090	1 86E-04	6
10706 9289 B	201	6 4 3	5 4 2	610 113	5.3 E-04	50	10741 9285 P	003	4 1 4	5 3 3	503 968	1 4 E-06	15
10707 0340 P	102	2 2 1	3 3 0	285 418	1 8 E-04	10	10742 2643 P	003	12 0 12	12 2 11	1774 751	3 9 E-07	50
10707 7014	300	7 1 7	6 0 6	448 697	1 38E-04	6	10742 3398 P	003	9 3 7	10 3 8	1446 128	7 7 E-06	15
10707 9565 P	003	6 1 5	7 3 4	842 356	4 2 E-06	50	10742 4875 B	003	8 4 4	9 4 5	1360 235	2 3 E-05	20
10708 0689 P	300	10 2 9	10 1 10	1114 549	1 2 E-05	50	10742 4875 B	102	6 2 5	6 3 4	648 978	2 3 E-05	20
10708 2047	201	6 4 2	5 4 1	610 340	1 32E-03	6	10742 5701 P	201	9 5 4	8 5 3	1255 912	3 1 E-05	15
10708 8618 P	102	2 2 0	3 3 1	285 219	4 8 E-09	10	10743 5292 B	003	7 3 5	7 5 2	1059 835	2 8 E-05	15
10708 7451 P	201	7 5 3	6 5 2	888 598	3 2 E-04	10	10743 5292 B	300	10 2 9	9 1 8	1079 080	2 8 E-05	15
10709 0754 P	201	7 5 2	6 5 1	888 632	1 1 E-04	10	10743 8167 P	300	4 3 2	3 2 1	212 156	9 3 E-07	20
10709 8603 P	300	4 2 3	3 1 2	173 365	1 18E-03	6	10744 2798 P	201	4 3 1	4 1 4	224 838	8 1 E-06	10
10710 0288 P	201	6 1 6	5 1 5	328 625	3 2 E-03	10	10744 4442 P	201	8 3 6	7 3 5	818 694	3 4 E-04	20
10710 2682 B	201	8 6 2	7 6 1	1218 193	6 4 E-05	10	10745 2989 P	201	8 1 7	7 1 6	704 214	1 79E-03	6
10710 2682 B	201	8 6 3	7 6 2	1218 189	6 4 E-05	10	10747 3997 P	003	8 4 5	9 4 6	1340 885	6 8 E-06	50
10711 0898 P	201	6 0 6	5 0 5	325 347	9 5 E-03	10	10747 5395 P	201	8 4 4	7 4 3	931 237	4 6 E-04	10
10713 4897	300	5 2 4	4 1 3	275 497	1 56E-03	6	10747 6645 B	003	6 6 0	7 6 1	1216 193	8 8 E-06	20
10714 0724 P	300	7 1 6	6 2 5	552 911	4 8 E-05	10	10747 6645 B	003	6 6 1	7 6 2	1216 189	8 8 E-06	20
10714 2644 P	201	6 4 3	6 2 4	602 773	3 9 E-06	15	10748 5138 P	201	10 1 10	9 1 9	920 211	4 1 E-04	50
10714 6369	201	2 2 0	1 0 1	23 794	2 62E-04	6	10748 5148 P	201	10 0 10	9 0 9	920 169	9 8 E-04	20
10714 7788 B	201	9 1 8	9 1 9	920 211	4 5 E-05	20	10749 0170	201	7 3 4	6 3 3	661 548	6 78E-04	6
10714 7788 B	201	9 2 8	9 0 9	920 189	4 5 E-05	20	10749 2089 P	102	6 0 6	6 1 5	542 905	9 4 E-06	20
10714 9207 P	102	7 1 7	7 2 6	709 608	2 0 E-06	50	10749 3484 P	201	9 2 8	8 2 7	885 600	9 1 E-04	10
10715 3137 B	102	4 1 3	5 2 4	416 208	3 9 E-05	50	10751 1224 P	300	4 3 1	3 2 2	206 301	4 0 E-06	15
10715 5170 B	003	7 6 2	8 6 3	1411 612	4 7 E-06	15	10751 3262 P	102	4 2 3	5 1 4	399 457	8 9 E-05	10
10715 5170 B	003	7 6 1	8 6 2	1411 646	4 7 E-06	15	10751 7844	201	9 4 6	8 4 5	1122 709	2 19E-04	6
10716 6802	300	8 1 8	7 0 7	588 243	1 70E-04	6	10752 0932	201	9 1 8	8 1 7	882 891	2 81E-04	6
10717 0430	300	8 0 8	7 1 7	588 479	6 54E-05	6	10752 3233 P	300	5 3 2	5 0 5	325 347	2 3 E-05	10
10717 2818 P	300	8 2 6	7 3 5	816 694	2 7 E-06	50	10752 4251 P	201	7 2 5	6 2 4	602 773	6 72E-04	6
10717 8291	201	6 3 4	5 3 3	503 968	9 74E-04	6	10752 6144 P	102	2 1 1	3 2 2	206 301	1 5 E-04	10
10717 8217	201	6 2 5	5 2 4	416 208	1 65E-03	6	10753 0268 P	102	4 0 4	5 1 5	326 625	1 2 E-04	10
10718 4101 P	102	5 2 4	6 1 5	542 905	2 7 E-05	15	10753 2518 P	003	5 1 4	6 3 3	661 548	2 7 E-06	15
10718 7372	003	9 4 6	10 4 7	1581 336	4 5 E-06	15	10753 8759	121	4 4	6 2 5	552 911	4 59E-05	6
10719 0313 P	300	3 2 1	2 1 2	79 495	2 01E-05	6	10753 9887 P	003	7 5 2	8 5 3	1255 912	3 2 E-06	20
10720 2528 P	201	7 1 7	6 1 6	447 252	3 7 E-03	10	10754 4115 P	003	7 5 3	8 5 4	1255 166	6 39E-06	6
10720 5874 B	201	5 2 3	4 2 2	315 779	3 9 E-03	50	10754 6790 P	102	7 1 6	7 2 5	782 409	1 1 E-05	10
10721 0576	300	6 2 5	5 1 4	399 457	1 15E-03	6	10755 0095 P	102	8 2 6	8 3 5	1050 157	5 9 E-06	20
10721 2039 P	003	4 2 2	5 4 1	610 340	1 4 E-05	50	10755 2511	201	9 3 7	8 3 6	1006 116	4 52E-04	6
10721 8562 P	201	7 0 7	6 0 6	448 697	2 0 E-03	10	10755 5252 B	201	11 1 11	10 1 10	1114 549	5 88E-04	6
10722 2182 P	201	10 1 9	10 1 10	1114 549	1 8 E-05	15	10755 5252 B	201	11 0 11	10 0 10	1114 533	5 88E-04	6
10723 0667	121	7 3 5	6 1 6	447 252	2 54E-03	6	10755 7506 P	003	8 3 5	7 3 6	1282 919	2 6 E-05	10
10723 7733 P	201	7 4 4	6 4 3	758 724	8 9 E-04	20	10755 9066 P	201	10 2 2	9 2 8	1080 385	1 09E-04	6
10723 8678 P	121	6 4 3	5 2 4	416 208	1 8 E-04	20	10756 1765	102	4 1 4	5 0 5	325 347	3 28E-04	6
10724 7780 P	201	8 5 4	7 5 3	1059 647	6 6 E-05	20	10756 6602	300	5 3 3	4 2 2	315 779	1 5 E-05	15
10724 8405 P	003	9 3 6	10 3 7	1538 150	3 5 E-06	50	10756 8885	102	9 2 7	8 5 4	1255 166	2 4 E-06	15
10725 6709	300	9 0 9	8 1 8	744 163	9 51E-05	6	10757 3480	102	5 2 4	5 3 3	503 968	7 98E-06	6
10725 7885 P	300	7 2 6	6 1 5	542 905	8 0 E-05	10	10757 4712 P	102	8 0 8	7 3 5	816 694	7 5 E-06	15
10725 8739 B	300	9 1 9	8 0 8	744 064	2 63E-04	6	10757 6886	201	10 1 9	9 1 8	1079 080	4 00E-04	6
10725 8739 B	201	8 5 3	7 5 2	1059 835	2 63E-04	6	10758 0271 P	102	6 4 2	7 3 5	816 694	2 9 E-06	20
10725 8739 B	201	9 6 4	8 6 3	1411 612	2 63E-04	6	10758 2303 P	022	7 3 5	6 2 4	602 773	7 0 E-05	10
10725 9689 P	201	9 6 3	8 6 2	1411 646	3 4 E-05	10	10758 3645 P	003	5 3 3	5 5 0	742 076	1 6 E-06	50
10726 1115	300	3 3 0	3 0 3	136 761	1 37E-05	6	10759 4588 P	102	8 5 1	7 4 4	927 744	2 8 E-06	20
10726 4905	300	3 3 1	2 2 0	136 163	4 28E-05	6	10759 7767 P	201	8 2 6	7 2 5	782 409	4 32E-04	6
10727 5661 P	201	7 4 3	6 4 2	757 780	2 5 E-04	20	10759 9680 P	201	4 4 0	4 2 3	300 362	3 4 E-06	50
10727 7700 P	201	6 3 3	5 3 2	508 812	2 9 E-03	10	10760 9230	201	5 4 1	5 2 4	416 201	2 4 E-06	15
10727 9706 P	300	3 3 0	2 2 1	134 902	1 32E-04	6	10761 1826 P	102	5 1 4	4 4 1	488 107	3 9 E-07	50
10728 8005 P	102	5 3 3	5 4 2	610 113	3 4 E-06	15	10761 4345 P	201	12 1 12	11 1 11	1327 119	4 1 E-05	20
10729 0949 P	201	11 2 10	11 0 11	1327 109	8 2 E-06	20	10761 5032 P	201	12 0 12	11 0 11	1327 109	2 1 E-04	10
10729 1286 B	102	9 2 7	8 3 6	1282 919	4 7 E-06	50	10761 9779 P	102	5 1 5	5 2 4	416 208	7 4 E-06	15
10729 1286 B	102	11 1 10	11 1 11	1327 119	4 7 E-06	50	10762 4876 P	102	6 6 1	7 5 2	1059 835	6 9 E-06	15
10729 4562 P	102	7 5 2	8 4 5	1122 709	4 1 E-06	20	10762 5708 P	201	11 2 10	10 2 9	1293 634	1 5 E-04	10
10730 1093 B	102	5 0 5	6 1 6	447 252	3 9 E-04	20	10762 9589 B	300	4 4 1	3 3 0	285 418	7 1 E-05	10
10730 2291 P	201	7 2 6	6 2 5	552 911	3 4 E-03	10	10763 2303 B	201	11 1 10	10 1 9	1293 019	5 1 E-05	20
10730 4254 P	201	6 1 5	5 1 4	399 457	4 9 E-03	10	10763 2303 B	300	4 4 0	3 3 1	285 219	5 1 E-05	20
10731 0123 P	201	8 0 8	7 0 7	588 243	3 2 E-03	10	10763 6201	201	10 3 8	9 3 7	1216 232	6 7 E-05	15
10731 1871 P	102	2 1 2	3 2 1	212 156	8 3 E-05	10	10763 8422	003	9 2 8	10 2 9	1293 634	1 55E-05	6
10731 4003 P	201	8 1 8	7 1 7	588 479	1 2 E-03	10	10764 5006	300	6 4 2	6 1 5	542 905	2 8 E-06	15
10731 4914 P	102	5 1 5	6 0 6	448 697	7 8 E-05	10	10764 6914	003	9 1 8	10 1 9	1293 019	5 61E-06	6
10731 6028 P	102	6 4 3	7 3 4	842 356	9 0 E-06	20	10764 9970	300	6 3 4	5 2 3	446 510	1 47E-04	6
10732 2537 P	201	7 3 5	6 3 4	648 978	2 04E-03	6	10765 4334 P	022	8 3 6	7 2 5	782 409	4 36E-04	6
10732 4916 P	201	3 3 0	3 1 3	142 278	4 1 E-06	10	10765 9948	300	10 3 8	9 2 7	1201 921	1 7 E-05	15
10732 9388 P	300	9 2 7	8 3 6	1006 116	1 9 E-06	50	10766 2611 P	300	5 4 1	5 1 4	399 457	1 1 E-05	15
10733 5779 B	102	3 1 2	4 2 3	300 362	1 5 E-04	50	10766 4357 B	201	13 0 13	12 0 12	1557 849	9 9 E-05	10
10734 4301	003	3 2 2	4 4 1	488 107	2 8 E-06	15	10766 4357 B	201	13 1 13	12 1 12	1557 849	9 9 E-05	10
10734 9770 P	102	4 3 2	4 4 1	488 107	1 1 E-05	15	10768 7844	102	1 1 1	2 2 0	136 163	4 63E-05	6
10735 1439 P	300	9 1 8	8 2 7	885 600	4 2 E-05	15	10767 1072 B	003	10 1 10	11 1 11	1327 119	2 5 E-05	20
10735 3764 B	102	5 3 2	5 4 1	610 340	1 7 E-05	20	10767 1072 B	003	10 0 10	11 0 11	1327 109	2 5 E-05	20
10735 9421 P	102	5 3 3	6 2 4	602 773	4 4 E-06	20	10767 2059	201	8 3 5	7 3 4	842 356	7 94E-04	6
10736 0751	102	8 3 3	6 4 2	757 780	2 7 E-05	50	10767 5030 P	201	9 4 5	8 4 4	1131 776	6 5 E-05	10

SIGMA CM-1	VIB	J*KA*KC'	J*KA*KC"	E* CM-1	INTENSITY CM-2 ATM-1	%	SIGMA CM-1	VIB	J*KA*KC'	J*KA*KC"	E* CM-1	INTENSITY CM-2 ATM-1	%
10772.8569 B	102	7 2 5	7 3 4	842.358	9.1 E-05	10	10814.7933 P	121	6 4 2	5 0 5	325.347	1.9 E-06	20
10772.8569 B	201	9 2 7	8 2 6	982.912	9.1 E-05	10	10814.8472 P	003	10 1 9	10 3 6	1448.128	1.7 E-06	20
10773.2333	102	1 1 0	2 2 1	134.902	1.92E-04	6	10815.7439	102	4 1 3	4 2 2	315.779	4.43E-05	6
10774.1837	102	3 0 3	4 1 4	224.838	3.35E-04	6	10816.0403 P	121	9 3 7	8 1 8	744.163	3.5 E-06	10
10774.3400	201	4 2 2	3 0 3	138.781	5.04E-04	6	10816.1385 P	003	6 3 3	7 3 4	842.358	9.7 E-05	10
10774.6420 P	121	5 5 0	4 3 1	383.842	3.3 E-06	50	10816.9344	121	8 5 3	7 3 4	842.358	1.98E-05	6
10774.9800 B-	003	7 2 6	7 4 3	931.237	4.9 E-06	15	10818.4339 P	201	6 6 0	6 4 3	756.724	3.4 E-07	50
10775.3453 B	201	18 1 16	15 1 15	2358.304	3.4 E-06	15	10818.9993 P	121	7 5 3	6 3 4	648.978	2.9 E-06	10
10775.3453 B	201	16 0 16	15 0 15	2358.304	3.4 E-06	15	10819.0887 P	102	2 2 1	3 1 2	173.365	4.35E-05	6
10775.6383 B	102	3 2 2	3 3 1	285.219	3.9 E-05	50	10819.2114 P	300	4 3 2	3 0 3	136.781	9.1 E-06	15
10775.6383 B	003	7 4 4	8 4 5	1122.709	3.9 E-05	50	10819.6890	003	7 1 6	8 1 7	882.891	3.36E-05	6
10775.8561 P	022	4 4 1	3 3 0	285.418	6.0 E-05	10	10820.8254 P	003	7 2 6	8 2 7	885.600	9.0 E-05	20
10775.9849 P	121	5 5 1	4 3 2	382.516	2.3 E-06	50	10820.7937 P	003	8 1 8	9 1 9	920.211	3.3 E-05	50
10776.0800	022	4 4 0	3 3 1	285.219	1.53E-05	6	10820.8403 P	003	8 0 8	9 0 9	920.169	8.9 E-05	20
10776.5953 B	003	7 3 4	7 5 3	1059.647	6.61E-05	6	10821.3620 P	003	2 1 2	3 3 1	285.219	1.8 E-06	15
10776.5953 B	102	4 3 2	5 2 3	448.510	6.61E-05	6	10821.7828	102	3 1 2	3 2 1	212.156	1.64E-04	6
10777.2879 P	201	12 2 10	11 2 9	1890.665	2.4 E-05	15	10822.7554	102	2 1 1	2 2 0	136.163	3.87E-05	6
10777.9002	102	5 0 5	5 1 4	399.457	3.4 E-05	15	10823.5906 B	300	6 6 0	5 5 1	742.073	5.8 E-06	20
10778.0822 B	300	6 3 3	6 0 6	448.897	3.2 E-06	20	10823.5906 B	300	6 6 1	5 5 0	742.076	5.8 E-06	20
10778.1213 B-	102	8 1 7	7 4 4	927.744	1.1 E-06	50	10824.3039	022	6 4 2	5 3 3	503.968	2.7 E-06	15
10778.6382 P	201	10 2 8	9 2 7	1201.921	1.3 E-04	10	10824.5180	003	6 3 4	7 3 5	816.694	3.41E-05	6
10779.5966	201	3 3 0	2 1 1	95.175	3.1 E-05	15	10824.7014	121	9 4 6	8 2 7	885.600	4.24E-06	6
10780.3850 P	102	7 1 6	6 4 3	756.724	8.9 E-07	20	10825.0782 P	300	7 4 3	6 3 4	648.978	1.7 E-05	10
10780.8508	003	6 5 1	7 5 2	1059.835	1.51E-05	6	10825.1598 P	201	4 3 2	3 1 3	142.278	2.8 E-05	10
10780.8144	201	9 3 6	8 3 5	1050.157	1.08E-04	6	10825.3294 P	003	4 2 3	4 4 0	488.134	1.4 E-06	50
10781.0288	102	3 1 3	4 0 4	222.052	1.12E-04	6	10825.6562	102	3 0 3	3 1 2	173.365	1.52E-04	6
10781.1618 P	102	4 1 4	4 2 3	300.362	4.76E-05	6	10826.4155 P	300	8 7 2	7 6 1	1216.193	3.9 E-07	50
10781.4061	102	6 2 4	6 3 3	661.548	8.40E-06	6	10828.0450 B	003	6 2 4	7 2 5	782.409	1.7 E-04	10
10781.6386 P	300	5 4 2	4 3 1	383.842	7.9 E-07	20	10828.5243	003	9 0 9	9 2 8	1080.385	1.7 E-06	15
10781.9283 P	102	3 2 1	3 3 0	285.418	4.3 E-05	20	10829.6181	102	3 3 0	4 2 3	300.362	1.4 E-05	15
10782.1089	102	6 1 5	6 2 4	602.773	9.91E-06	6	10829.8127 P	003	9 1 9	9 1 8	1079.080	5.45E-06	6
10782.8481	102	7 3 4	8 2 7	885.600	4.20E-06	6	10829.9378 P	300	7 5 3	6 4 2	757.780	2.1 E-06	20
10783.3976	102	5 4 1	6 3 4	648.978	8.61E-06	6	10830.0560	003	5 4 1	6 4 2	757.780	2.53E-05	6
10783.5072 P	003	8 3 5	8 5 4	1255.166	9.9 E-07	20	10830.6775	003	5 4 2	6 4 3	756.724	7.57E-05	6
10783.6550 P	102	4 2 2	4 3 1	383.842	1.5 E-05	15	10831.4286	300	7 5 2	6 4 3	756.724	5.3 E-06	15
10784.0136 P	300	8 4 4	8 1 7	882.891	1.0 E-06	20	10831.7388	102	0 0 0	1 1 1	37.136	6.50E-05	6
10784.3468	003	3 1 3	4 2 2	382.516	5.19E-06	6	10832.8373	102	1 1 1	2 0 2	70.090	5.03E-05	6
10784.4846	102	5 2 3	5 3 2	508.812	3.13E-05	6	10834.3487	003	5 1 5	5 3 2	508.812	4.9 E-06	15
10784.8252	102	5 3 5	5 2 5	1080.385	5.6 E-06	15	10837.1251	201	6 3 3	5 1 4	399.457	3.0 E-04	10
10785.0575	201	5 5 1	5 3 2	508.812	8.72E-06	6	10838.8612 P	300	5 4 2	5 1 5	326.625	3.9 E-07	50
10785.3506	102	3 2 2	4 1 3	275.497	2.68E-05	6	10840.6441 P	102	2 0 2	2 1 1	95.175	8.3 E-05	10
10785.6804 P	201	10 4 6	9 4 5	1360.235	7.24E-05	6	10840.8718 P	102	4 2 2	5 1 5	326.625	2.8 E-06	15
10786.0719	003	7 3 4	8 3 5	1050.157	1.5 E-05	15	10841.4796	003	9 1 8	9 3 7	1216.232	1.5 E-06	15
10787.5551 B	003	10 3 7	10 5 6	1718.718	4.7 E-06	20	10842.5069	102	3 2 1	4 1 4	224.838	1.4 E-05	15
10787.5551 B	121	8 4 5	7 2 6	709.608	4.7 E-06	20	10843.4513	003	4 2 2	4 4 1	488.107	2.52E-06	6
10787.9342	003	4 1 3	5 3 2	508.812	8.71E-06	6	10843.5911	300	8 5 4	7 4 3	931.237	7.85E-06	6
10788.9515	201	10 3 7	9 3 6	1282.919	9.75E-05	6	10845.9583 P	300	7 3 4	6 2 5	552.911	4.4 E-06	20
10789.1570 P	102	5 5 1	6 4 2	757.780	2.0 E-06	15	10846.0272 P	003	5 3 2	6 3 3	661.548	6.2 E-05	20
10789.7835 B	201	5 5 0	5 3 3	503.988	4.3 E-06	15	10846.0963 P	003	6 1 5	7 1 6	704.214	1.9 E-04	10
10790.2024	102	5 5 0	6 4 3	756.724	5.1 E-06	15	10846.2941 P	003	7 1 7	8 1 8	744.163	1.8 E-04	10
10790.7398 P	003	11 2 10	11 2 9	1690.665	8.4 E-07	50	10846.5328 B	003	6 2 5	7 2 6	709.608	1.2 E-04	20
10791.9552 P	102	8 1 8	7 2 5	752.409	1.08E-05	6	10846.5328 B	003	7 0 7	8 0 8	744.064	1.2 E-04	20
10792.3384 P	121	6 5 1	5 3 2	508.812	2.2 E-06	20	10847.6568	003	3 0 3	4 2 2	315.779	5.6 E-06	15
10792.5425 P	003	8 1 7	9 1 8	1079.080	4.3 E-05	10	10848.1780	201	4 4 0	3 2 1	212.156	2.91E-05	6
10792.8123 P	102	5 3 2	6 2 5	552.911	1.05E-05	6	10849.3044	102	1 0 1	1 1 0	42.371	2.46E-04	6
10793.5427	102	2 0 2	3 1 3	142.278	1.23E-04	6	10849.7487	003	8 2 6	8 4 5	1122.709	4.7 E-06	15
10793.9118	121	9 2 7	8 0 8	744.064	1.6 E-06	15	10850.2087	300	8 4 4	7 3 5	816.694	3.9 E-06	15
10794.3495 B	003	9 1 9	10 1 10	1114.549	4.8 E-05	50	10850.3892 P	300	5 3 3	4 0 4	222.052	2.7 E-06	20
10794.3751 B-	003	9 0 9	10 0 10	1114.533	2.7 E-05	50	10850.4441 P	022	4 3 3	6 3 4	648.978	3.7 E-06	20
10795.0203	201	3 3 1	2 1 2	79.495	5.14E-05	6	10850.5771 P	102	5 3 3	4 4 0	488.134	3.4 E-07	50
10795.2085 P	022	7 4 3	7 1 6	704.214	1.3 E-06	50	10851.4693	003	5 3 3	6 3 4	648.978	1.73E-04	6
10795.4336 P-	300	5 5 1	4 4 0	488.134	1.1 E-05	50	10851.8022 P	102	2 2 0	3 1 3	142.278	4.66E-06	6
10795.4683 P	300	5 5 0	4 4 1	488.107	2.5 E-05	50	10853.7262	003	6 2 4	6 4 3	756.724	6.00E-06	6
10795.7512 P	201	4 3 1	3 1 2	173.365	2.2 E-04	10	10854.7282 P	003	7 2 5	7 4 4	927.744	2.2 E-06	15
10796.7789 B	102	3 1 3	3 2 2	206.301	2.5 E-05	50	10854.8082 B	121	7 1 7	7 5 2	1059.835	3.4 E-07	50
10797.0675 P	003	6 1 6	6 3 3	661.548	2.2 E-06	20	10855.4081	003	8 0 8	8 2 7	885.600	1.1 E-05	15
10797.1566 P	003	8 2 7	9 2 8	1080.385	9.3 E-06	10	10855.5561 B	003	9 2 8	9 2 7	1201.921	6.5 E-06	15
10797.2489 P	003	7 3 5	8 3 6	1005.116	4.9 E-05	20	10855.5561 B	300	8 6 3	7 5 2	1059.835	6.5 E-06	15
10797.2887 P	300	6 4 3	5 3 2	508.812	1.9 E-05	50	10856.4389 P	003	5 2 3	6 2 4	602.773	9.1 E-05	10
10797.9811	003	4 0 4	5 2 3	448.510	7.8 E-06	15	10857.2749	003	4 4 0	5 4 1	610.340	8.34E-05	6
10798.3735 B	022	5 4 2	4 3 1	383.842	8.84E-06	6	10857.4487	003	4 4 1	5 4 2	610.113	2.78E-05	15
10798.3735 B	003	6 2 5	6 4 2	757.780	6.64E-06	6	10858.1119	003	8 1 8	8 1 7	882.891	3.6 E-06	15
10799.5615	003	7 2 5	8 2 6	982.912	2.05E-05	6	10858.5215 P	201	5 3 3	4 1 4	224.838	8.34E-05	6
10799.8995	022	5 4 1	4 3 2	382.516	1.67E-05	6	10859.8924	201	6 2 4	5 0 5	325.347	1.33E-04	6
10800.5844	003	10 1 10	10 2 9	1293.634	1.8 E-06	15	10861.3528	201	5 4 1	4 2 2	315.779	1.92E-05	6
10801.1980 P	003	10 1 10	10 1 9	1293.019	5.9 E-07	20	10862.0527 P	003	4 1 4	4 3 1	383.842	2.1 E-06	20
10801.8252	003	6 4 2	7 4 3	931.237	4.78E-05	6	10862.4088	102	5 1 5	4 2 2	315.779	2.3 E-06	15
10802.7778	102	5 1 4	5 2 3	448.510	7.70E-05	6	10865.3582 B	102	4 2 3	3 3 0	285.418	2.6 E-06	20
10803.4088 B	003	6 4 3	7 4 4	927.744	1.7 E-05	50	10865.5050	003	8 1 7	8 3 6	1006.116		

Table 2

SIGMA CM-1	VIB	J*KA*RC'	J*KA*RC"	E* CM-1	INTENSITY CM-2 ATM-1	%	SIGMA CM-1	VIB	J*KA*RC'	J*KA*RC"	E* CM-1	INTENSITY CM-2 ATM-1	%
10975.9370 P	003	1 1 0	2 1 1	95.175	2.66E-04	6	11039.3889	102	10 3 8	9 2 7	1201.921	1 4 E-06	15
10976.3373	003	6 4 2	6 4 3	758.724	8.38E-05	6	11041.0112	003	7 1 6	6 3 3	661.548	1.5 E-06	15
10976.4585 P	003	7 4 3	7 4 4	927.744	1.0 E-05	20	11041.2194	003	8 2 6	7 4 3	931.237	2.1 E-06	15
10977.0634 P	003	5 4 2	5 4 1	610.340	3.24E-04	6	11043.0046 P	003	5 2 3	5 2 4	416.208	4 1 E-05	50
10977.4184 B	300	6 5 2	5 2 3	448.510	1.71E-04	6	11043.0710 P	003	2 1 1	2 1 2	79.495	4 7 E-04	10
10977.4184 B	102	4 2 3	3 1 2	173.365	1.71E-04	6	11045.3612	102	5 3 2	4 2 3	300.362	7 16E-05	6
10977.7213 P	003	5 4 1	5 4 2	610.113	7.42E-05	6	11046.7703	003	9 3 6	9 3 7	1216.232	8 1 E-07	15
10977.8349 P	102	7 1 7	6 0 6	446.697	1.85E-05	6	11048.4794 P	102	5 4 2	4 3 1	383.842	3.9 E-05	20
10978.4879 P	003	5 2 4	5 2 3	446.510	1.1 E-04	10	11049.8586 P	102	5 4 1	4 3 2	382.516	9.9 E-05	10
10978.8394 P	003	8 3 5	7 5 2	1059.835	8.5 E-07	15	11055.4714	003	1 0 1	0 0 0	0.000	2.80E-04	6
10979.4284 P	003	4 4 1	4 4 0	488.134	2.3 E-04	10	11056.1490	003	3 1 2	3 1 3	142.278	7 80E-05	6
10979.5080 P	003	4 4 0	4 4 1	488.107	6.0 E-04	10	11058.8556	300	6 6 1	5 3 2	508.812	2.5 E-06	15
10979.8627 P	003	6 3 4	6 3 3	661.548	2.4 E-05	10	11057.5407	003	6 2 4	6 2 5	552.911	4 33E-05	6
10980.0223	003	8 4 4	8 4 5	1122.709	7.67E-06	6	11058.8156 B	102	5 5 0	4 4 1	488.107	1 1 E-04	50
10980.7779	300	6 4 2	5 1 5	326.625	7.0 E-07	15	11058.8156 B	102	5 5 1	4 4 0	488.134	1 1 E-04	50
10981.3968 B	201	7 6 1	6 4 2	757.780	1.0 E-06	50	11059.6397 B	102	3 3 1	2 0 2	70.090	1 6 E-06	50
10982.4486	201	7 6 2	6 4 3	758.724	2.9 E-06	15	11059.6397 B	201	10 3 8	9 1 9	920.211	1 6 E-06	50
10983.2098 P	300	5 5 0	4 2 3	300.362	3.0 E-07	50	11059.8305	201	11 4 8	10 2 9	1293.634	2 2 E-06	15
10984.1785	102	7 1 6	6 2 5	552.911	2.72E-05	6	11060.1505 P	003	10 3 7	10 3 8	1446.128	7 1 E-07	50
10984.7232 B*	003	4 3 1	5 1 4	399.457	2.4 E-06	50	11060.3902	201	10 2 8	9 0 9	920.169	2 5 E-06	15
10985.3811	003	1 0 1	2 0 2	70.090	4.14E-04	6	11065.1466	102	6 4 3	5 3 2	508.812	5 34E-05	6
10985.6189	102	5 2 4	4 1 3	275.497	3.33E-05	6	11068.4585 P	102	5 2 3	4 1 4	224.838	1 1 E-05	15
10986.2785	003	1 1 1	2 1 2	79.495	8.88E-04	6	11069.0325 P	201	5 5 1	4 1 4	224.838	3 4 E-06	15
10987.6863 B	102	8 0 8	7 1 7	586.479	1.3 E-05	50	11069.4463	003	2 1 2	1 1 1	37.136	3 63E-04	6
10987.8500 P	102	3 2 1	2 1 2	79.495	1.23E-04	6	11069.7419 P	102	7 5 2	7 2 5	782.409	1 5 E-06	50
10988.1205 P	102	8 1 8	7 0 7	586.243	3.2 E-05	15	11070.7533	102	6 4 2	5 3 3	503.968	1 36E-05	6
10988.4709 P	102	8 2 6	7 3 5	816.694	1.9 E-08	15	11071.9079	003	4 1 3	4 1 4	224.838	1 15E-04	6
10988.5620 P	201	9 5 5	8 3 6	1006.116	6.9 E-06	15	11072.8647	003	7 2 5	7 2 6	709.608	6 0 E-06	15
10988.8933	201	9 4 6	8 2 7	885.600	9.61E-06	6	11073.0399	300	8 6 3	7 3 4	842.356	1 4 E-06	15
10991.6356	003	5 3 3	5 3 2	508.812	1.99E-04	6	11076.1792	003	2 0 2	1 0 1	23.794	1 49E-03	6
10992.0197	102	6 2 5	5 1 4	399.457	5.85E-05	6	11076.6728 P	121	6 6 1	5 2 4	416.208	2 4 E-06	20
10992.5275	201	8 7 1	7 5 2	1059.835	1.7 E-06	15	11076.9361	102	6 5 2	5 4 1	610.340	3 35E-05	6
10992.7916	201	10 3 7	9 1 8	1079.080	7.10E-06	6	11077.0877	102	6 5 1	5 4 2	610.113	1 15E-05	6
10993.2132 B	102	3 3 0	3 0 3	136.761	4 1 E-06	50	11077.6433	102	6 3 3	5 2 4	416.208	6 83E-06	6
10993.4981 P	003	3 1 3	3 1 2	173.365	2.2 E-04	20	11080.1957	003	2 1 1	1 1 0	42.371	1 05E-03	6
10993.5540 P	102	3 3 1	2 2 0	136.163	9 7 E-05	50	11082.0762 B	003	7 6 2	6 6 1	1045.057	3 2 E-06	15
10994.8888	300	9 2 7	8 1 8	744.163	8.86E-06	6	11082.0762 B	003	7 6 1	6 6 0	1045.058	3 2 E-06	15
10995.0787	102	3 3 0	2 2 1	134.902	2.95E-04	6	11082.2024	102	7 3 4	7 0 7	586.243	1 2 E-06	15
10995.2470 P	201	8 6 2	7 4 3	931.237	3 6 E-06	10	11083.1800	003	2 2 1	2 0 2	70.090	1 10E-05	5
10996.2564	102	8 1 7	7 2 6	709.608	5 1 E-06	15	11085.7767 P	003	3 2 2	3 0 3	136.761	6 5 E-05	15
10997.5381	102	7 2 6	6 1 5	542.905	1.08E-05	6	11086.8568 P	003	8 2 6	8 2 7	885.600	8 6 E-06	15
10997.6836	003	4 2 3	4 2 2	315.779	9 14E-05	6	11087.3672	003	3 1 3	2 1 2	79.495	1 57E-03	6
10997.9375 P	003	10 4 6	10 4 7	1581.336	1 0 E-06	50	11087.6375	003	3 2 2	2 2 1	134.902	7 48E-04	6
10998.2898	003	4 3 2	4 3 1	383.842	1 61E-04	6	11088.1697	003	5 1 4	5 1 5	326.625	2 09E-05	6
10999.4526	102	9 0 9	8 1 8	744.163	1 6 E-06	15	11091.4102	003	4 2 3	4 0 4	222.052	2 4 E-05	15
10999.6328	102	9 1 9	8 0 8	744.064	6 0 E-07	20	11093.3854	003	3 0 3	2 0 2	70.090	5 59E-04	6
11000.1088	003	6 2 4	5 4 1	610.340	1 9 E-06	15	11093.5448 P	003	3 2 1	2 2 0	136.163	3 3 E-04	20
11001.6992 B	003	3 3 1	3 3 0	285.418	1 2 E-03	50	11093.6992 P	102	7 4 3	6 3 4	648.978	1 5 E-05	10
11002.2187	003	3 3 0	3 3 1	285.219	3.83E-04	6	11094.5377	102	7 5 3	6 4 2	757.780	3 6 E-06	15
11002.7777	102	4 3 1	4 0 4	222.052	2 1 E-06	15	11095.4385	102	7 5 2	6 4 3	758.724	7 27E-06	6
11003.4848 P	102	8 2 7	7 1 6	704.214	1 41E-05	6	11096.9129	003	4 3 2	3 3 1	285.219	1 27E-04	6
11003.6074 P	003	5 3 2	5 3 3	503.968	6 28E-05	6	11098.1564 B*	003	9 4 6	9 2 7	1201.921	1 3 E-06	50
11005.8341	201	9 6 3	8 4 4	1131.776	8 0 E-07	15	11098.2714 B	003	8 6 2	7 6 1	1216.931	4 2 E-06	50
11005.9399	102	9 2 7	8 3 6	1006.116	3 3 E-06	15	11098.3091 P*	003	6 3 4	6 1 5	542.905	1 0 E-05	50
11006.1537	102	9 1 8	8 2 7	885.600	8 3 E-06	15	11098.3494 B	102	7 6 2	6 5 1	888.832	2 6 E-05	50
11007.5527 P	003	9 1 8	8 3 5	1050.157	4 0 E-07	50	11098.3494 B	003	6 5 2	5 5 1	742.073	2 6 E-05	50
11007.6534 P	003	3 2 1	4 0 4	222.052	3 5 E-07	50	11098.4097 P	003	6 5 1	5 5 0	742.076	7 6 E-05	20
11008.6113	003	0 0 0	1 0 1	23.794	7 85E-04	6	11098.7665	003	4 3 1	3 3 0	285.418	3 90E-04	6
11009.5168	003	6 3 3	6 3 4	648.978	6 67E-05	6	11099.1509 P	003	7 3 5	7 1 6	704.214	9 54E-06	6
11010.3831	003	3 2 2	3 2 1	212.156	6 41E-04	6	11099.2942	003	5 4 2	4 4 1	488.107	1 90E-04	6
11010.9312	102	4 3 2	3 2 1	212.156	1 79E-04	6	11099.6514 P	003	5 2 4	5 0 5	325.347	5 3 E-05	20
11011.3272 P	003	4 1 3	3 3 0	285.418	4 0 E-06	50	11099.7013 P	003	5 4 1	4 4 0	488.134	5 7 E-05	20
11011.4078 P	003	2 1 2	2 1 1	95.175	1 5 E-04	10	11100.9900 P	003	5 3 3	5 1 4	399.457	1 8 E-05	15
11011.7019 P	201	9 2 7	8 0 8	744.064	2 2 E-06	15	11102.4471 P	201	11 3 9	10 1 10	1114.549	1 0 E-06	20
11014.7758	201	9 6 4	8 4 5	1122.709	2 2 E-08	15	11103.0584 P	003	6 1 5	6 1 6	447.252	3 46E-05	6
11017.1076	003	2 2 1	2 2 0	136.163	4 94E-04	6	11103.2516	003	3 1 2	2 1 1	95.175	4 70E-04	6
11017.2052 P	201	9 3 7	8 1 8	744.163	1 3 E-05	20	11103.6175	003	4 1 4	3 1 3	142.278	5 44E-04	6
11018.1056	003	2 2 0	3 0 3	136.761	1 7 E-06	15	11105.3682 P	003	8 4 5	8 2 6	982.912	5 6 E-07	15
11018.5285	102	4 3 1	3 2 2	208.301	5 29E-05	6	11106.8365	003	4 3 2	4 1 3	275.497	4 8 E-06	15
11019.5352 P	003	7 3 4	7 3 5	816.694	8 6 E-06	20	11106.9323 P	102	8 5 4	7 4 3	931.237	5 4 E-06	20
11019.9669	003	2 2 0	2 2 1	134.902	1 44E-03	6	11107.1612	003	4 2 3	3 2 2	208.301	3 00E-04	6
11020.3761 P	102	5 3 2	5 0 5	325.347	4 7 E-08	10	11107.7106	003	4 0 4	3 0 3	136.761	1 64E-03	6
11021.3293	003	7 7 1	8 5 4	1255.166	1 6 E-06	15	11109.3843 P	003	9 3 7	9 1 8	1079.080	1 9 E-06	20
11022.9334	102	5 3 3	4 2 2	315.779	1 93E-05	6	11109.4488 P	003	6 2 5	6 0 6	446.697	1 1 E-05	10
11023.4030 B	003	3 2 1	3 2 2	208.301	1 29E-03	6	11111.3765	300	8 7 2	7 4 3	931.237	2 7 E-06	15
11023.4030 B	003	1 1 1	1 1 0	42.371	1 29E-03	6	11113.7553	003	3 3 1	3 1 2	173.365	6 3 E-06	15
11024.6904 P	003	7 2 5	6 4 2	757.780	1 0 E-08	50	11115.5348 P	102	7 3 4	6 2 5	552.911	2 1 E-06	15
11025.2203	102	4 2 2	3 1 3	142.278	1 76E-05	6	11115.9419 P	003	7 4 4	7 2 5	782.409	2 2 E-06	15
11026.8004 P	300	7 4 3	6 1 6	447.252	6 0 E-07	50	11116.0799 P	003	7 1 6	7 1 7	586.479	6 3 E-06	15
11027.3124	003	3 0 3											

CM-1	CM-2	ATN-1	Z	CM-1	CM-2	ATN-1	Z
11127.4587	003	8 1 7	8 1 8	744.163	8.49E-06	6	
11128.3796 P	003	6 4 3	6 2 4	602.773	8.1 E-07	50	
11131.0741 P	003	2 2 0	1 0 1	23.794	3.68E-05	6	
11131.9801	003	6 1 6	5 1 5	328.625	3.61E-04	6	
11132.2100	003	6 0 6	5 0 5	325.347	1.03E-03	6	
11133.4782	003	8 2 7	8 0 8	744.064	1.7 E-08	15	
11137.2431	003	6 3 4	5 3 3	503.988	1.22E-04	6	
11137.3032 P*	003	9 2 8	9 0 9	920.169	9.2 E-08	50	
11137.4989 P	003	9 1 8	9 1 9	920.211	1.6 E-06	15	
11139.2977	003	5 1 4	4 1 3	275.497	3.23E-04	6	
11139.9359	003	6 2 5	5 2 4	418.208	1.96E-04	6	
11140.8367 B	201	12 2 10	11 0 11	1327.109	5.6 E-07	50	
11140.8918	003	5 4 2	5 2 3	448.510	1.9 E-06	15	
11141.6270 B	102	4 4 1	3 1 2	173.365	1.2 E-04	10	
11141.6270 B	003	7 4 4	6 4 3	756.724	1.2 E-04	10	
11142.1445 P	003	8 5 4	7 5 3	1059.647	1.10E-05	6	
11143.2043 P	003	7 1 7	6 1 6	447.252	7.0 E-04	10	
11143.4320	003	5 2 3	4 2 2	315.779	2.49E-04	6	
11143.8952 P	003	7 0 7	6 0 6	446.697	2.46E-04	6	
11145.1579 P	003	3 3 0	3 1 3	142.278	5.6 E-07	50	
11146.4217 B	003	7 4 3	6 4 2	757.780	3.55E-05	6	
11146.4217 B	003	10 1 9	10 1 10	1114.549	3.55E-05	6	
11148.8830	003	6 3 3	5 3 2	508.812	3.30E-04	6	
11150.8533 P	003	6 1 5	5 1 4	399.457	6.6 E-04	10	
11151.7817 P	003	4 4 1	4 2 2	315.779	5.6 E-07	50	
11153.3143	003	7 2 6	6 2 5	552.911	4.01E-04	6	
11154.2794 P	003	11 2 10	11 0 11	1327.109	4.1 E-06	50	
11154.3858	003	7 3 5	6 3 4	648.978	2.05E-04	6	
11154.5221	003	8 1 8	7 1 7	588.479	1.22E-04	6	
11154.7652	003	8 0 8	7 0 7	586.243	4.59E-04	6	
11155.6028	102	8 3 5	7 2 6	709.608	1.4 E-05	15	
11156.8255	102	5 4 2	4 1 3	275.497	8.7 E-06	15	
11159.3460 P	003	4 3 1	4 1 4	224.838	1.9 E-06	20	
11159.6171 P*	003	3 2 1	2 0 2	70.090	5.1 E-05	50	
11159.6538 P	003	7 1 6	6 1 5	542.905	1.2 E-04	20	
11160.5364	003	8 4 5	7 4 4	927.744	2.03E-05	6	
11161.7785	003	9 5 5	8 5 4	1255.166	1.6 E-05	15	
11163.9413	003	6 2 4	5 2 3	446.510	4.96E-04	6	
11164.7341	003	9 1 9	8 1 8	744.163	2.48E-04	6	
11164.8453 P	003	9 0 9	8 0 8	744.064	7.3 E-05	10	
11166.2100	300	6 6 1	5 1 4	399.457	2.9 E-06	15	
11167.4079	003	8 1 7	7 1 6	704.214	2.04E-04	6	
11167.9356 P	003	8 2 7	7 2 6	709.608	5.9 E-05	50	
11167.9698 P	102	7 2 5	6 1 6	447.252	4.0 E-05	50	
11169.2002	003	8 3 6	7 3 5	816.694	4.04E-05	6	
11171.4945	003	8 4 4	7 4 3	931.237	5.74E-05	6	
11171.8759	003	9 2 8	8 2 7	885.600	9.08E-05	6	
11172.7133 P	102	4 4 0	3 1 3	142.278	3.5 E-07	50	
11174.0171 P	003	10 1 10	9 1 9	920.211	6.0 E-05	50	
11174.0489 P	003	10 0 10	9 0 9	920.169	1.1 E-04	50	
11174.5011	102	6 4 3	5 1 4	399.457	2.84E-05	6	
11174.6808	003	7 3 4	6 3 3	661.548	6.47E-05	6	
11174.8210	003	9 1 8	8 1 7	882.891	3.16E-05	6	
11177.3642	003	9 4 6	8 4 5	1122.709	2.82E-05	6	
11179.6996 P	003	7 2 5	6 2 4	602.773	8.8 E-05	10	
11180.1485 P	003	6 4 2	6 2 5	552.911	7.1 E-07	20	
11180.5570	201	13 3 11	12 1 12	1557.849	1.6 E-05	15	
11181.8978	003	10 1 9	9 1 8	1079.080	4.21E-05	6	
11182.3551 P	003	9 3 7	8 3 6	1006.116	5.9 E-05	50	
11182.3887 B	003	11 0 11	10 0 10	1114.533	6.0 E-05	50	
11182.3887 B	003	11 1 11	10 1 10	1114.549	6.0 E-05	50	
11187.7722	003	11 2 10	10 2 9	1293.634	1.81E-05	6	
11189.9036 B	003	12 0 12	11 0 11	1327.109	2.42E-05	6	
11189.9036 B	003	12 1 12	11 1 11	1327.119	2.42E-05	6	
11190.0476 P	003	8 2 6	7 2 5	782.409	1.3 E-04	10	
11192.2630	003	3 3 0	2 1 1	95.175	5.5 E-06	15	
11192.7185	102	7 3 5	6 0 6	446.697	5.7 E-06	15	
11194.5932 P*	003	7 4 3	7 2 6	709.608	5.5 E-07	50	
11194.7978	003	4 2 2	3 0 3	138.761	7.66E-05	6	
11196.3179 P	003	8 3 5	7 3 4	842.356	9.4 E-05	10	
11196.7395 P	003	13 1 13	12 1 12	1557.849	8.9 E-06	10	
11199.0513	003	10 2 8	9 2 7	1201.921	2.07E-05	6	
11207.5369 P	102	5 4 1	4 1 4	224.838	1.9 E-08	20	
11207.6231 P	003	3 3 1	2 1 2	79.495	9.1 E-06	15	
11210.8193	003	4 3 1	3 1 2	173.365	4.0 E-05	15	
11211.1839	300	8 6 3	7 1 6	704.214	2.6 E-06	15	
11212.8460	003	9 3 6	8 3 5	1050.157	1.27E-05	6	
11218.6859	102	8 2 6	7 1 7	586.479	3.0 E-06	15	
11219.0399	003	10 4 6	9 4 5	1360.235	1.0 E-05	15	
11223.3598	003	10 3 7	9 3 6	1282.919	1.45E-05	6	
11231.1577 P	102	5 5 1	4 2 2	315.779	4.6 E-07	50	
11232.0790	003	5 3 2	4 1 3	275.497	1.9 E-05	15	
11234.1736	102	8 3 6	7 0 7	586.243	7.8 E-06	15	
11237.1592 P	003	5 2 3	4 0 4	222.052	1.5 E-05	15	
11239.8547	003	4 3 2	3 1 3	142.278	5.2 E-06	15	
11240.7676	102	6 5 2	5 2 3	446.510	3.3 E-06	15	
11246.5661 P	102	5 5 0	4 2 3	300.362	8.2 E-07	20	
11246.0978	102	6 4 2	5 1 5	326.625	5.6 E-07	15	
11249.5465	102	7 5 3	6 2 4	602.773	1.1 E-06	15	
11255.4598	003	4 4 0	3 2 1	212.156	7.3 E-06	15	
11255.7605	102	8 5 4	7 2 5	782.409	3.1 E-06	15	
11259.0381	003	6 3 3	5 1 4	399.457	4.72E-05	6	
11260.2055	300	8 7 2	7 2 5	782.409	1.9 E-06	15	
11261.2613	003	4 4 1	3 2 2	206.301	2.2 E-06	15	
11267.8928	102	9 2 7	8 1 8	744.163	3.7 E-06	15	
11270.9918 P	102	6 5 1	5 2 4	416.208	5.1 E-07	20	
11272.0564	003	5 4 1	4 2 2	315.779	4.4 E-06	15	
11275.6103	003	5 3 3	4 1 4	224.838	1.48E-05	6	
11285.1044	003	6 2 4	5 0 5	325.347	2.08E-05	6	
11286.5520	003	6 4 2	5 2 3	446.510	1.67E-05	6	
11287.0399	003	5 4 2	4 2 3	300.362	1.0 E-05	15	
11293.3241 P	003	7 3 4	6 1 5	542.905	8.5 E-06	15	
11295.4247	102	7 4 3	6 1 6	447.252	1.1 E-06	15	
11299.2529 P	102	7 5 2	6 2 5	552.911	1.2 E-06	15	
11301.4276	003	7 4 3	6 2 4	602.773	5.2 E-06	15	
11311.1254	003	5 5 1	4 3 2	382.516	3.2 E-06	15	
11313.5094	102	6 6 1	5 3 2	508.812	1.6 E-06	15	
11314.5858	003	6 3 4	5 1 5	326.625	3.8 E-06	15	
11314.9427	003	6 4 3	5 2 4	416.208	3.6 E-06	15	
11320.3226	003	8 4 4	7 2 5	782.409	1.1 E-05	10	
11321.1383	102	10 3 8	9 0 9	920.169	1.5 E-06	15	
11331.6740	003	6 5 1	5 3 2	508.812	3.6 E-06	15	
11334.4614	003	8 3 5	7 1 6	704.214	1.1 E-05	10	
11335.7770	003	7 2 5	6 0 6	446.697	3.1 E-06	15	
11336.4556	003	6 5 2	5 3 3	503.988	1.3 E-06	15	
11345.4398	003	7 4 4	6 2 5	552.911	7.9 E-06	10	
11348.3528	003	7 5 2	6 3 3	661.548	1.1 E-06	15	
11353.5175	003	6 6 0	5 4 1	610.340	1.2 E-06	20	
11353.7451 P	003	6 6 1	5 4 2	610.113	4.6 E-07	50	
11356.1120	003	7 3 5	6 1 6	447.252	6.7 E-06	15	
11360.6027 P	003	7 5 3	6 3 4	648.978	3.4 E-06	50	
11377.3532	003	10 4 6	9 2 7	1201.921	1.9 E-06	15	
11378.8723	003	8 4 5	7 2 6	709.608	1.6 E-06	15	
11380.1106	003	9 3 6	8 1 7	882.891	1.3 E-06	15	
11383.2234	003	5 6 2	4 3 3	931.237	1.1 E-06	15	
11385.0970	003	8 5 4	7 3 5	816.694	7.8 E-07	20	
11386.2130	003	8 2 6	7 0 7	586.243	4.2 E-06	15	
11387.8907 P	003	7 7 1	6 5 2	888.598	5.2 E-07	50	
11399.4137 P	003	8 3 6	7 1 7	586.479	1.2 E-06	20	
11410.8305	003	9 5 5	8 3 6	1006.116	1.2 E-06	15	
11414.4732	003	9 4 6	8 2 7	885.600	2.2 E-06	15	
11427.1992	003	10 3 7	9 1 8	1079.080	1.5 E-06	15	
11480.8045	003	10 2 8	9 0 9	920.169	8.4 E-07	20	

Table 2 (concluded) Com. J. Phys. Chevrolet et al. page 13

Can. J. Zool. CHEVILLARD et al.

JRA NC	0.4.1		2.2.0		1.2.1		0.2.2		3.0.0		2.0.1		1.0.2		0.0.3	
	E	CM-1	E	CM-1	E	CM-1	E	CM-1	E	CM-1	E	CM-1	E	CM-1	E	CM-1
0 0 0	9833 5845	0.9 1	10284 3670	2.9 1	10128 7309	0.9 1			10599 6863	8.8 1	10613 3547	2.9 1	10868 8757	0.9 1	11032 4056	0.9 1
1 0 1	9857 1978	0.8 2	10307 4477	0.6 2	10351 9900	0.5 3			10522 4172	0.6 2	10616 5007	0.5 3	10891 8758	0.6 2	11055 4716	0.6 2
1 1 1	9888 6978	0.8 2	10324 8055	0.8 3	10389 7162	0.6 2			10833 5548	0.5 3	10847 4165	0.8 2	10902 8780	0.5 3	11065 7745	0.8 2
1 1 0	9885 3288	0.8 2	10330 7309	0.9 2	10375 5942	0.8 2			10839 0735	0.6 2	10852 8074	0.6 2	10908 1348	0.6 2	11071 1125	0.8 2
2 0 2	9903 4914	0.8 3	10352 4238	0.6 2	10397 2151	0.4 4			10866 4779	0.5 4	10860 5447	0.5 4	10935 8203	0.8 2	11099 8736	0.4 4
2 1 2	9929 7137	0.5 3	10385 1750	0.6 4	10410 2316	0.5 4			10873 8774	0.5 4	10887 8793	0.5 4	10943 3735	0.4 4	11108 8629	0.5 4
2 1 1	9948 0786	0.5 3	10382 8491	0.5 3	10427 8863	0.4 4			10889 8175	0.5 3	10703 0830	0.5 4	10958 9189	0.6 3	11122 5670	0.5 3
2 2 1	10110 5405	0.5 3	10438 0993	0.5 3	10430 3279	0.5 3	10670 6378	0.6 3	10724 2081	0.4 4	10737 0132	0.5 3	10992 4537	0.4 4	11153 2711	0.5 3
2 2 0	10040 3024	0.6 3	10440 1058	0.6 2	10481 5546	0.4 4			10725 4831	0.5 4	10738 4316	0.4 4	10993 8806	0.5 4	11154 8683	0.4 4
3 0 3	9970 7532	0.8 4	10417 2270	0.6 2	10462 2196	0.5 4	10655 8136	0.5 3	10729 5223	0.5 5	10743 6213	0.5 4	10999 0217	0.5 3	11183 4767	0.4 5
3 1 3	9990 3995	0.8 3	10425 1239	0.8 4	10470 3453	0.4 5			10733 5563	0.5 4	10747 2808	0.4 5	11003 0809	0.5 4	11186 8632	0.4 5
3 1 2	10028 8170	0.6 3	10480 0561	0.5 4	10504 0454	0.5 5	10698 7731	0.6 3	10784 3479	0.5 4	10777 5587	0.4 5	11033 9883	0.5 4	11198 4273	0.5 4
3 2 2	10110 5405	0.5 3	10505 5348	0.6 4	10549 9438	0.4 5			10792 7022	0.9 2	10805 0743	0.4 5	11080 9477	0.5 5	11222 5388	0.4 5
3 2 1	10114 7989	0.5 5	10513 7485	0.5 4	10555 7222	0.4 5			10798 5272	0.4 5	10811 4833	0.5 5	11067 3460	0.4 5	11229 7058	0.5 5
3 3 1	10285 8208	0.8 3	10612 2455	0.5 4	10650 0379	0.5 4			10862 8544	0.5 5	10874 5180	0.4 4	11129 7183	0.8 6	11287 1198	0.6 4
3 3 0	10285 9024	0.8 2	10612 3870	0.5 4	10650 2233	0.6 3			10862 8729	0.5 5	10874 7717	0.5 5	11129 9805	0.5 4	11287 4383	0.5 4
4 0 4	10056 9878	0.5 4	10499 8744	0.8 3	10544 9918	0.4 5	10742 8614	0.6 4	10810 1659	0.5 4	10824 1241	0.3 7	11079 8537	0.5 3	11244 4715	0.4 6
4 1 4	10070 3965	0.6 3	10504 0379	0.6 4	10549 4009	0.5 5			10811 9039	0.5 4	10825 5593	0.4 6	11081 5245	0.4 5	11245 8962	0.4 5
4 1 3	10133 8604	0.5 3	10581 0314	0.9 3	10607 8732	0.4 6			10861 6880	0.6 5	10874 0387	0.4 6	11131 5230	0.4 5	11296 7457	0.4 6
4 2 3	10204 4914	0.5 4	10598 5396	0.5 4	10641 8897	0.5 5			10883 2259	0.4 5	10894 5359	0.4 6	11150 7835	0.4 5	11313 4623	0.5 5
4 2 2	10218 4620	0.5 4	10614 4010	0.5 4	10657 1718	0.4 7			10898 0771	0.5 4	10911 1012	0.4 6	11167 4980	0.5 5	11331 8592	0.4 6
4 3 2	10382 5892	0.5 3			10745 1395	0.4 6			10955 8734	0.4 7	10967 4382	0.4 6	11223 0867	0.4 6	11382 1328	0.4 6
4 3 1	10383 1247	0.5 5			10746 1475	0.4 5			10957 4221	0.5 6	10969 1188	0.4 7	11224 8298	0.5 5	11384 1851	0.5 5
4 4 1	10539 5387	0.9 2			10877 3449	0.9 3	11061 2735	0.5 4	11048 3833	0.5 6	11060 2962	0.9 1	11314 9539	0.4 5	11467 5825	0.5 4
4 4 0	10539 5586	0.9 2			10877 3695	0.5 4	11061 2992	0.6 3	11048 4128	0.9 3	11060 3339	0.5 4	11314 9908	0.5 5	11467 8158	0.5 3
5 0 5	10180 6560	0.6 2	10599 2394	2.8 3	10644 5204	0.6 5			10907 6833	0.8 6	10921 5828	0.5 5	11177 3580	0.5 4	11343 8246	0.4 8
5 1 5	10189 0593	0.8 3	10601 2666	0.6 4	10646 7808	0.4 5			10908 3680	0.8 4	10922 2568	0.4 6	11178 1874	0.4 8	11343 1614	0.4 5
5 1 4	10282 1892	0.8 3			10730 2038	0.4 5			10978 3404	0.5 5	10996 0646	0.5 3	11249 2883	0.4 8	11414 7949	0.4 8
5 2 4	10320 5893	0.4 4	10712 1195	2.8 2	10754 7530	0.4 6			10988 9863	0.4 6	11004 7831	0.4 8	11261 3154	0.4 8	11424 9985	0.5 8
5 2 3	10348 9078	0.6 3	10742 0499	0.4 5	10785 8543	0.5 5			11023 3866	0.4 5	11038 3755	0.4 7	11293 2966	0.4 8	11459 2118	0.5 5
5 3 3	10483 4278	0.4 5	10824 9746	0.6 4	10863 6710	0.4 6			11072 4394	0.4 6	11083 3595	0.4 7	11336 7147	0.4 7	11500 4478	0.4 6
5 3 2	10485 5444	0.5 3			10867 7469	0.5 5			11077 8701	0.6 5	11089 3468	0.4 5	11345 7234	0.4 5	11507 5754	0.5 5
5 4 2	10680 9899	0.5 4			10985 3088	0.4 8	11182 2168	0.5 5	11165 4854	0.6 7	11176 6802	0.4 5	11432 3224	0.5 6	11587 4026	0.4 8
5 4 1	10681 1033	0.6 3			10998 5478	0.5 4	11182 4182	0.6 4	11165 7198	0.5 5	11177 1315	0.4 7	11432 3753	0.4 8	11587 8357	0.5 4
5 5 1	10911 2899	1.7 4			11158 5002	0.9 3			11283 5854	0.9 4	11293 8712	0.3 7	11446 9369	0.6 5	11593 8430	0.6 3
5 5 0	10911 3186	8.6 1			11158 4949	2.8 4			11283 5768	0.5 5	11293 7567	0.5 4	11446 9289	0.6 5	11593 8438	8.4 2
6 0 6	10281 0537	0.6 3	10715 4348	0.6 3	10781 0453	0.4 5			11022 3485	0.5 4	11038 4373	0.4 6	11292 1046	0.6 3	11457 5574	0.6 2
6 1 6	10286 1346	0.6 2	10716 3092	0.6 4	10782 0462	0.6 5			11022 5932	0.6 3	11038 8543	0.5 6	11292 4987	0.8 5	11458 8152	0.5 5
6 1 5	10412 5741	0.6 3			10872 3522	0.5 5			11114 9009	2.1 4	11129 8824	0.4 8	11384 8828	0.5 3	11550 3107	0.4 5
6 2 5	10458 0628	0.8 3			10888 3118	0.5 6			11120 5155	0.4 5	11134 0307	0.6 5	11391 4788	0.4 5	11558 1450	0.5 8
6 2 4	10502 8888	0.6 3			10939 5481	0.4 7			11172 7543	0.4 5	11185 3400	0.3 8	11442 9539	0.4 7	11610 4514	0.4 7
6 3 4					11005 2582	0.5 6			11211 5073	0.4 6	11231 5969	0.4 7	11478 6834	0.4 6	11841 2114	0.5 6
6 3 3					11016 2357	0.4 7			11224 7792	0.8 5	11236 5818	0.3 8	11493 8527	0.4 8	11858 4954	0.4 8
6 4 3					11140 0756	0.4 6			11306 1048	0.4 7	11317 0382	0.4 7	11574 7220	0.4 4	11733 0822	0.4 8
6 4 2					11140 1405	0.6 8			11307 4058	0.5 8	11318 5454	0.4 7	11574 7220	0.4 4	11733 0822	0.4 8
6 5 2					11301 2080	0.7 3	11128 2721	0.5 5	11307 1048	0.4 7	11318 5454	0.4 7	11574 7220	0.4 4	11733 0822	0.4 8
6 5 1					11301 1502	0.5 5			11423 9298	0.4 8	11433 7321	0.5 5	11687 2772	0.4 4	11840 4231	0.6 4
6 6 1					11492 8814	0.5 5			11424 0317	0.6 4	11433 8430	0.5 6	11687 2020	0.5 6	11840 4860	0.4 4
6 6 0					11493 0778	0.6 3			11565 6677	0.4 7	11575 1504	0.9 2	11822 3018	0.6 4	11863 8584	2.7 3
									11565 6639	2.9 2	11575 1547	0.5 5	11822 3018	0.6 4	11863 8581	0.5 3

J K L M C	0.4.1		2.2.0		1.2.1		0.2.2		3.0.0		2.0.1		1.0.2		0.0.3	
	E	DELTA E M	E	DELTA E M	E	DELTA E M	E	DELTA E M	E	DELTA E M	E	DELTA E M	E	DELTA E M	E	DELTA E M
	CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1
7 0 7	10418 1024	0.9 2	10848 4533	0.9 3	10894 4854	0.5 3	11154 2064	0.6 4	11154 3883	0.5 4	11159 5535	0.5 5	11424 3380	0.9 2	11590 5927	0.5 4
7 1 7	10421 0437	0.6 3	10848 8652	0.9 3	10894 8230	0.4 5	11154 3883	0.5 4	11154 3883	0.5 4	11167 5052	0.4 5	11424 5318	0.5 4	11590 4569	0.5 3
7 2 7	10532 7728	0.9 2	10965 8706	0.5 4	11031 8641	0.5 5	11266 9839	0.4 5	11266 9839	0.4 5	11281 4397	0.4 6	11537 0894	0.4 5	11702 5897	0.5 5
7 3 7	10618 1248	0.6 4			11041 3204	0.4 6	11266 9839	0.4 5	11266 9839	0.4 5	11281 4397	0.4 6	11537 0894	0.4 5	11702 5897	0.5 5
7 4 7	10635 3912	0.9 2			11116 4957	0.5 5	11343 8223	0.4 6	11343 8223	0.4 6	11355 1994	0.4 8	11815 2241	0.4 8	11702 2256	0.4 8
7 5 7			11131 0401	0.6 4	11170 3190	0.4 7	11361 0038	0.5 5	11372 5672	0.4 5	11381 2322	0.4 8	11815 2241	0.4 8	11702 2256	0.4 8
7 6 7					11170 3190	0.4 7			11372 5672	0.4 5	11381 2322	0.4 8	11815 2241	0.4 8	11702 2256	0.4 8
7 7 7					11170 3190	0.4 7			11372 5672	0.4 5	11381 2322	0.4 8	11815 2241	0.4 8	11702 2256	0.4 8
7 8 7					11170 3190	0.4 7			11372 5672	0.4 5	11381 2322	0.4 8	11815 2241	0.4 8	11702 2256	0.4 8
7 9 7					11170 3190	0.4 7			11372 5672	0.4 5	11381 2322	0.4 8	11815 2241	0.4 8	11702 2256	0.4 8
7 0 8	10571 5556	0.6 2			11045 3901	0.5 5			11303 5226	0.6 4	11317 2562	0.5 5	11574 1652	0.8 4	11741 0088	0.5 4
7 1 8	10573 6006	0.6 2			11045 3901	0.5 5			11303 5226	0.6 4	11317 2562	0.5 5	11574 1652	0.8 4	11741 0088	0.5 4
7 2 8	10770 9641	0.9 3			11207 7488	0.4 6			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 3 8	10784 0232	0.9 2			11213 9035	0.5 4			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 4 8					11322 4512	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 5 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 6 8			11310 0760	0.9 3	11354 5724	0.5 5	11547 8427	0.4 6	11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 7 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 8 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
7 9 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 0 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 1 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 2 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 3 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 4 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 5 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 6 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 7 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 8 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
8 9 8					11354 5724	0.5 5			11435 4626	0.7 4	11449 5134	0.4 8	11705 8848	0.5 4	11871 8218	0.4 5
9 0 9	10742 8083	0.9 2			11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 1 9	10743 6530	0.9 2			11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 2 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 3 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 4 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 5 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 6 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 7 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 8 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
9 9 9					11212 0330	0.7 3			11469 8342	0.6 3	11484 6112	0.6 5	11743 6163	0.4 4	11908 9098	0.7 3
10 0 10	10930 8567	0.9 2			11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 1 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 2 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 3 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 4 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 5 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 6 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 7 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 8 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 9 10					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 0 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 1 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 2 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 3 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 4 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 5 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 6 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 7 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 8 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3
10 9 11					11398 1253	0.6 3			11822 6099	0.5 4	11836 2926	0.7 4	12241 3077	0.5 6	12094 2178	0.6 3

CHEVILLARD et al.

Can. J. Phys.

page 2

TABLE 3 (continued)

J	RA	KC	1 2 1		2 0 1		0 0 1	
			ϵ	DELTA ϵ M	ϵ	DELTA ϵ M	ϵ	DELTA ϵ M
			CM-1	10-3CM-1	CM-1	10-3CM-1	CM-1	10-3CM-1
11	0	11	11598	2376	0 9 2			
11	1	11				11870 0581	2 8 2	12296 9372
11	1	11				11870 0743	0 5 4	12296 9425
11	1	10				12056 2515	1 0 3	
11	2	10				12056 2047	0 5 4	12481 4055
11	3	9				12315 5982	0 4 5	
11	4	8				12353 4848	0 6 3	
12	0	12						
12	1	12				12068 6129	0 9 2	12517 0132
12	1	11				12068 5554	0 7 2	12517 0227
12	2	11				12282 8190	0 6 3	
12	2	10				12292 7991	0 7 3	
12	2	10				12487 9536	0 7 5	
13	0	13						
13	1	13				12324 2802	2 9 2	
13	2	12				12324 2853	0 8 2	12754 5891
13	3	11				12548 3899	0 8 4	
13	3	11				12738 4068	0 9 1	
14	0	14						
14	1	14				12577 0058	0 9 2	
14	1	14				12577 0082	2 9 2	
15	0	15						
15	1	15				13133 8497	1 0 1	
16	1	16				13133 8500	3 0 1	

TABLE 3 (Concluded) page 3 Com. J. Phys.
CHEVILLARD et al.

SIGMA	VIB	J'KA'KC'			J''KA''KC''			S01	S02	R
10407.1230	(121)	4	1	4	3	1	3	5.50 E-4	5.34 E-4	0.971
10415.0423	(121)	3	2	2	2	2	1	7.40 E-4	7.63 E-4	1.031
10421.9428	(121)	5	1	5	4	1	4	1.39 E-3	1.42 E-3	1.022
10435.6980	(121)	6	0	6	5	0	5	1.03 E-3	1.08 E-3	1.049
10438.7896	(300)	2	2	1	3	3	0	3.65 E-4	3.56 E-4	0.975
10445.0165	(121)	4	2	2	3	2	1	9.36 E-4	9.51 E-4	1.016
10454.3906	(121)	5	2	4	4	2	3	8.84 E-4	8.81 E-4	0.997
10460.7294	(121)	4	3	1	3	3	0	3.82 E-4	4.43 E-4	1.160
10463.9858	(300)	3	1	2	4	2	3	5.48 E-4	5.58 E-4	1.018
10468.3882	(201)	2	0	2	3	2	1	1.46 E-4	1.55 E-4	1.062
10483.7683	(300)	4	2	3	5	1	4	2.45 E-3	2.20 E-3	0.898
10492.3392	(201)	3	1	2	3	3	1	3.86 E-5	3.28 E-5	0.850
10495.7039	(201)	3	2	1	4	2	2	1.84 E-3	1.80 E-3	0.978
10497.3908	(300)	1	1	1	2	2	0	2.06 E-4	1.97 E-4	0.956
10502.0616	(201)	3	1	2	4	1	3	2.43 E-3	2.40 E-3	0.988
10504.1719	(300)	1	1	0	2	2	1	4.93 E-4	4.81 E-4	0.976
10520.4090	(121)	4	2	2	3	0	3	3.40 E-5	2.97 E-5	0.874
10523.7626	(201)	4	0	4	4	2	3	7.34 E-4	7.03 E-4	0.958
10524.1993	(300)	2	0	2	3	1	3	2.88 E-4	2.74 E-4	0.951
10526.2756	(201)	2	2	0	3	2	1	5.09 E-3	4.97 E-3	0.976
10530.7118	(201)	2	2	1	3	2	2	1.79 E-3	1.62 E-3	0.905
10534.6695	(300)	4	0	4	4	1	3	8.37 E-5	7.39 E-5	0.883
10537.3185	(201)	3	0	3	3	2	2	2.36 E-4	2.12 E-4	0.898
10550.8425	(300)	2	2	1	3	1	2	4.86 E-4	4.03 E-4	0.829
10552.1920	(300)	3	1	2	3	2	1	2.33 E-4	2.12 E-4	0.910
10553.4539	(300)	2	1	1	2	2	0	5.23 E-5	4.94 E-5	0.945
10556.2574	(300)	3	0	3	3	1	2	4.31 E-4	3.90 E-4	0.905
10573.6887	(300)	3	2	1	4	1	4	1.87 E-4	1.41 E-4	0.754
10573.8952	(201)	3	1	3	3	1	2	2.28 E-3	2.08 E-3	0.912
10578.7568	(201)	4	2	3	4	2	2	9.25 E-4	8.93 E-4	0.965
10600.8494	(201)	2	2	1	2	2	0	4.70 E-3	4.63 E-3	0.985
10607.4590	(201)	3	0	3	2	2	0	4.64 E-5	5.02 E-5	1.082
10610.7394	(201)	4	2	2	4	2	3	2.45 E-3	2.45 E-3	1.000
10611.9686	(201)	4	0	4	3	2	1	1.74 E-4	1.60 E-4	0.920
10627.5864	(300)	3	1	2	3	0	3	5.87 E-4	5.66 E-4	0.964
10631.6995	(300)	7	4	3	7	3	4	7.20 E-5	8.21 E-5	1.140
10635.2805	(201)	3	1	2	3	1	3	6.20 E-4	5.52 E-4	0.890
10649.2024	(201)	4	1	3	4	1	4	5.95 E-4	6.67 E-4	1.121
10650.7169	(300)	3	3	0	3	2	1	4.79 E-4	4.06 E-4	0.848
10655.6114	(300)	4	3	2	4	2	3	5.61 E-4	5.25 E-4	0.936
10658.3878	(300)	4	2	3	4	1	4	9.71 E-4	8.84 E-4	0.910
10668.2629	(201)	3	2	2	3	0	3	6.39 E-4	5.35 E-4	0.837
10669.4388	(201)	5	1	4	5	1	5	2.89 E-4	2.54 E-4	0.879
10670.1227	(201)	3	2	2	2	2	1	7.11 E-3	7.09 E-3	0.997
10672.4839	(201)	4	2	3	4	0	4	1.96 E-4	1.94 E-4	0.990
10675.1427	(300)	4	1	4	3	0	3	1.23 E-3	1.10 E-3	0.894
10675.3197	(201)	3	2	1	2	2	0	2.37 E-3	2.30 E-3	0.970
10679.4357	(201)	5	2	4	5	0	5	4.36 E-4	4.25 E-4	0.975
10682.8493	(300)	5	0	5	4	1	4	5.65 E-4	5.27 E-4	0.933
10695.7234	(300)	6	0	6	5	1	5	1.55 E-4	1.54 E-4	0.994
10709.8603	(300)	4	2	3	3	1	2	1.22 E-3	1.18 E-3	0.967
10713.4897	(300)	5	2	4	4	1	3	1.59 E-3	1.56 E-3	0.981
10726.4905	(300)	3	3	1	2	2	0	4.14 E-5	4.28 E-5	1.034

TABLE 4

Gen. J. Phys.

CHEVILLARD et al.