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## Accurate level energies in the EF1 g+, GK1 g+, H1 g+, B1 u+, C1 u, B'1 u+, D1 u, I1 g, J1 g states of H2

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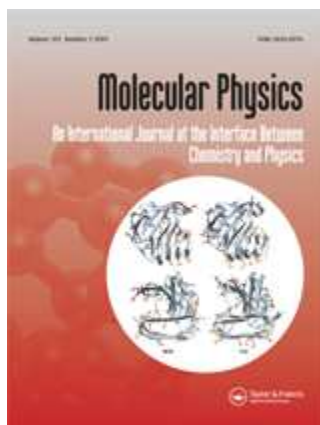
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**Accurate level energies in the  $EF1\Sigma g^+$ ,  $GK1\Sigma g^+$ ,  $H1\Sigma g^+$ ,  $B1\Sigma u^+$ ,  $C1\Pi u$ ,  $B'1\Sigma u^+$ ,  $D1\Pi u$ ,  $I1\Pi g$ ,  $J1\Delta g$  states of  $H_2$**

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**Accurate level energies in the**  
**EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, GK<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, H<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, B<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, C<sup>1</sup>Π<sub>u</sub>, B'<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, D<sup>1</sup>Π<sub>u</sub>, I<sup>1</sup>Π<sub>g</sub>, J<sup>1</sup>Δ<sub>g</sub>**  
**states of H<sub>2</sub> &**

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Abstract

By combining results from a Doppler-free two-photon laser excitation study on several lines in the EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - X<sup>1</sup>Σ<sub>g</sub><sup>+</sup> (0,0) band of H<sub>2</sub> with results from a Fourier-transform spectroscopic study on a low-pressure discharge in hydrogen, absolute level energies, with respect to the X<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, v=0, N=0 ground level, could be determined for 547 rovibronically excited states in H<sub>2</sub>. While for some of the levels in the EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup> and B<sup>1</sup>Σ<sub>u</sub><sup>+</sup> states the uncertainties are as low as 0.0001 cm<sup>-1</sup>, the accuracy of other levels is less accurate. The general improvement on the accuracy for the comprehensive data set of level energies is by an order of magnitude with respect to previous measurements. An updated listing of transition wavelengths of the spectral lines in the Lyman and Werner bands is presented, based on combination differences between the presently obtained B<sup>1</sup>Σ<sub>u</sub><sup>+</sup> and C<sup>1</sup>Π<sub>u</sub> level energies and those in the X<sup>1</sup>Σ<sub>g</sub><sup>+</sup> ground state.

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& Added to this paper is an electronic database (H<sub>2</sub> rovibronic transitions 2000 – 22000 cm<sup>-1</sup>) containing all analyzed transition frequencies of the Fourier transform emission study reported here: <http://www.xxx.xx/xxx> (to be filled).

## 1. Introduction

The hydrogen molecule is the smallest neutral molecular system and therewith a benchmark system in spectroscopy and quantum *ab initio* calculations of molecular structure. It has been the subject of numerous investigations over many decades. The discovery of hydrogen might be ascribed to Cavendish as early as 1766 [1]. From the reactions of different acids with metals he obtained a gas that burns with a blue flame, producing water. He conjectured that this gas was *phlogiston*, the elusive carrier of fire, which was still believed to be some unique substance at that time. Lavoisier [2] gave the gas its name *hydrogen*, Greek for *water former*, after his successful decomposition of water into hydrogen and oxygen; he therewith identified hydrogen as an element. On the basis of Gay-Lussac's law of multiple proportions [3] Avogadro showed that molecules of elementary hydrogen consist of two atoms, as molecules of many other gaseous elements [4]. As early as 1865 Plücker and Hittorf [5] measured, in addition to the Balmer lines, several spectral lines in the visible range; these were referred to as the "second spectrum" of hydrogen. The open structured spectrum was difficult to classify and its origin was a subject of controversy for many years. In the debate over the second spectrum it was contended that a substance could have only one spectrum. Fulcher managed finally to arrange the lines, the number and accuracy of which had grown due to the activity of many researchers, into a Deslandres band scheme, showing that the second spectrum had the signature of a molecular band structure [6]. But at the time that this issue was settled, the VUV-spectroscopic work of Lyman [7] already had set the scene for an unambiguous spectrum of the hydrogen molecule.

Early but comprehensive accounts of the hydrogen spectrum are given in the book by Richardson [8] and in the *Dieke atlas* [9]. These manuscripts contain a wealth of data that still have not been analyzed in their entirety with many lines remaining unassigned. A general feature of the  $H_2$  spectrum is that the  $X^1\Sigma_g^+$  ground electronic state is separated from the manifold of excited states by a large energy gap: hence, the entire electronic absorption spectrum is in the region of the extreme ultraviolet, at wavelengths  $\lambda < 110$  nm, and the emission spectrum involving the electronic ground state is in the range of the vacuum ultraviolet  $\lambda = 100$ -160 nm. In these wavelength ranges it is difficult to perform precision studies for a determination of accurate level energies of the excited states. Progress was made nevertheless, through the use of large classical spectrometers, by Herzberg and Howe [10], later culminating in the combined emission and absorption study of the Lyman and Werner bands by Dabrowski [11]. Later, the hydrogen vacuum-ultraviolet emission spectrum was reinvestigated at the Meudon Observatoire, again resulting in an atlas of spectral lines by Roncin and Launay [12], a listing of tables of spectral lines of the Lyman bands [13] and of the Werner bands [14], and a derivation of rovibronic level energies for the  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  states [15]. With the development of tunable lasers sources in the extreme ultraviolet wavelength range further improvement was made on the accuracy of lines in the  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  electronic systems. (These are the strongest electronic absorption systems in molecular hydrogen, hence these are readily observed in many astrophysical objects.) A first investigation, using a tunable laser based on a grating-based oscillator, led to a slight improvement on the transition wavelengths [16,17], while in second instance implementation of injection-seeding, pulsed-dye-amplification, and molecular beam techniques yielded improvement by another order of magnitude [18].

Transitions between different electronically excited states can be observed in the visible wavelength range, allowing for much higher precision. In fact Dieke focused on this approach. From this perspective, the  $H_2$  molecule has a spectrum that is difficult to interpret. The line assignment is greatly hampered by the fact that rotational and vibrational splittings are of the same order as the electronic separations, to the extent that

1  
2 the typical molecular band structure is fully lost and a random-like spectrum results.  
3 Assignments based on *ab initio* calculations are further hampered by the strong non-Born-  
4 Oppenheimer effects in the hydrogen molecule, due to its low mass. For this reason a large  
5 fraction of the lines in the *Dieke atlas* are still unassigned.  
6

7 The excited states of hydrogen have been the subject of much theoretical work. For  
8 the *gerade* states considered here the most relevant theoretical studies are the high-level  
9 non-adiabatic *ab initio* calculations of Yu and Dressler [19] and the multi-channel  
10 quantum defect (MQDT) calculations of Ross and Jungen [20]. Both those works,  
11 published in 1994, compare their calculated term values with experiment, with Yu and  
12 Dressler also summarizing the results of new assignments of lines from the *Dieke atlas* in  
13 presenting their experimentally determined level energies. For the *ungerade* state  
14 considered here similar work is seen in the non-adiabatic *ab initio* calculations of Senn et  
15 al. [21] and the earlier MQDT calculations of Jungen and Atabek [22].  
16

17 At this point we briefly mention the difference between the approaches to determine  
18 level energies in first principle calculations. The first method starts with an *ab initio*  
19 calculation of potential energy curves in the framework of the Born-Oppenheimer (BO)  
20 approximation, hence for infinite nuclear masses. Variational methods and large basis sets  
21 of Hylleraas-type wave functions are used to solve the Schrödinger equation. This method  
22 was pioneered for the hydrogen molecule by Kolos and Wolniewicz [23]. Subsequently  
23 the so-called adiabatic corrections are calculated, non-BO mass-dependent effects that can  
24 still be expressed in terms of a potential; in a vector representation of all electronic eigen  
25 states their contributions are on the diagonal of the coupling matrix. In a third step the so-  
26 called non-adiabatic corrections are calculated that represent couplings between electronic  
27 states off-diagonal in the coupling matrix. In calculating these corrections the terms are  
28 evaluated, which were left out of the zero-order BO-Hamiltonian. In a final step level  
29 energies are calculated via the method of Coupled Schrödinger Equations (CSE) using the  
30 adiabatic potentials and the off-diagonal matrix elements. This route has been worked out  
31 by Dressler and co-workers deriving level energies for states of *gerade* symmetry [19] and  
32 of *ungerade* symmetry [21]. The achieved accuracy for excited states is typically some  
33 few  $0.1 \text{ cm}^{-1}$  for low vibrational quantum numbers up to several  $\text{cm}^{-1}$  for higher lying  
34 states. For the specific case of the  $X^1\Sigma_g^+$  ground electronic state, not subject of our present  
35 investigation, Wolniewicz perfected this method to obtain an accuracy of  $0.001 \text{ cm}^{-1}$  [24].  
36 The method also yields the wave function composition of each level on a mixed basis,  
37 which may be used for level identification.  
38

39 In the MQDT formalism quantum defect functions are derived from the potential  
40 energy curves, and as Jungen and Atabek have shown [22] for the specific case of the  
41 lowest states of *ungerade* symmetry, there is no need for explicit calculations of adiabatic  
42 and non-adiabatic corrections since the vibronic coupling arises via frame transformations  
43 in the unified treatment of MQDT. The resulting level energies reach similar accuracies as  
44 via the CSE method. The CSE method was further developed by the Meudon group  
45 [15,25]; in order to better reproduce the experimental data on the level energies in the  
46  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  states [12-14] the potential energy functions were adapted in fitting  
47 routines. The latter method is therefore semi-empirical rather than first principles;  
48 accuracies achieved by this method are typically few  $0.10 \text{ cm}^{-1}$ .  
49

50 The quest for detection of a possible variation of fundamental constants, and the  
51 important role of the spectrum of molecular hydrogen therein [26,27], motivated a  
52 reinvestigation of the  $H_2$  spectrum with the goal of determining level energies and  
53 wavelength positions at the highest possible accuracy. It was realized that the most  
54 accurate excited-state level energies can be determined in a two-step approach [28]. In a  
55 first step, anchor levels in the  $EF^1\Sigma_g^+$  system are determined via accurate two-photon laser  
56 spectroscopy [29]. In a second step precision Fourier-Transform spectroscopy within the  
57 manifold of electronically excited states is performed to determine level energies with  
58  
59  
60

respect to the anchor levels. This work builds and improves upon the previous FT-studies of Herzberg and co-workers [30,31]. The extensive FT reinvestigation of H<sub>2</sub> has first led to an analysis of some triplets states [32]; now the same spectrum is used to analyse the EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - B<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - C<sup>1</sup>Π<sub>u</sub>, GK<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - B<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, GK<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - C<sup>1</sup>Π<sub>u</sub>, I<sup>1</sup>Π<sub>g</sub> - C<sup>1</sup>Π<sub>u</sub>, D<sup>1</sup>Π<sub>u</sub> - EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, B<sup>1</sup>Σ<sub>u</sub><sup>+</sup> - EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, H<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - B<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, H<sup>1</sup>Σ<sub>g</sub><sup>+</sup> - C<sup>1</sup>Π<sub>u</sub>, I<sup>1</sup>Π<sub>g</sub> - B<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, J<sup>1</sup>Δ<sub>g</sub> - B<sup>1</sup>Σ<sub>u</sub><sup>+</sup>, J<sup>1</sup>Δ<sub>g</sub> - C<sup>1</sup>Π<sub>u</sub> systems over a wide range of wavelengths. In combination with the determination of anchor levels, this yields accurate *absolute* level energies of a large number of rovibrational levels in these electronic states, with respect to the X<sup>1</sup>Σ<sub>g</sub><sup>+</sup> ground state. An improvement of at least an order of magnitude is achieved over previous studies. It is the purpose of the present paper to present these accurately determined level energies.

## 2. Experimental

The experimental determination of excited state level energies is based on two completely independent measurements. Two anchor lines in the EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup> manifold are determined by two-photon spectroscopy. A highly sophisticated measurement scheme employing Doppler-free two-photon ionization [29], using a home-built narrowband pulsed titanium-sapphire laser with on-line recording of frequency chirp, absolute frequency calibration against a frequency comb laser [33], and Sagnac-interferometric alignment of counter-propagating laser beams [34]. A typical example of a spectrum of the EF - X (0,0) Q(3) line is shown in Fig. 1. The transition energies of Q0-Q5 in the EF - X (0,0) band obtained from the high-resolution two-photon spectroscopy [28,29] are listed in Table 1. These two-photon experiments yield highly accurate level energies for two anchor levels in H<sub>2</sub>: the EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, v=0, N=0 level at 99164.78691 (16) cm<sup>-1</sup> is the anchor level for para-hydrogen, while EF<sup>1</sup>Σ<sub>g</sub><sup>+</sup>, v=0, N=1 level at 99228.21823 (19) cm<sup>-1</sup> is the anchor level for ortho-hydrogen [28]. The entire framework of excited states in H<sub>2</sub> is further built up with respect to these two values. The transition energies of Q(2)-Q(5) are used in the assessment and verification of the combination method described below. Fig. 2 shows the potential energy diagram of H<sub>2</sub> with the relevant states probed in the present study [35].

In a second independent experiment, a Fourier transform emission study is performed revealing a multitude of mutually overlapping band systems over an enormous wavelength interval ranging from 450 nm in the blue to 5 μm in the infrared.

The experimental technique used here has been used previously [32] and is briefly described here. A microwave discharge (2 450 MHz) was established in a low pressure of molecular hydrogen flowing through a quartz tube (diameter: 1 cm, length: 25 cm) at moderate speed by means of a 20 m<sup>3</sup>/h mechanical pump. The power of the discharge (about 70 W) and the gas pressure (about 5 mbar) were adjusted in order to obtain a maximum ratio of the molecular/atomic hydrogen optical emission and to provide optimum stability and intensity of the emitted light. The emission spectrum was recorded from 1800 to 22500 cm<sup>-1</sup> by using appropriate coloured or interference optical filters and detectors. As for detectors we used a liquid nitrogen cooled InSb photodiode for the range 1800 - 6500 cm<sup>-1</sup> (equipped with a cold short wavelength pass interference filter for the range 3300 - 6500 cm<sup>-1</sup>), a liquid nitrogen cooled InGaAs photodiode (for 6500 - 9000 cm<sup>-1</sup>), an avalanche silicon photodiode (9000 - 17000 cm<sup>-1</sup>) and a photomultiplier (17000 - 22500 cm<sup>-1</sup>). An overview spectrum of the entire recorded region is shown in Fig. 3. The spectrum was recorded at Doppler limited resolution, varying from about 0.02 cm<sup>-1</sup> (infrared) to 0.2 cm<sup>-1</sup> (violet). Fig. 4 shows two 15 cm<sup>-1</sup> parts of the spectrum in the infrared and visible regions where it can be easily noted that, for this spectrum, the peak determinations will be more accurate in the infrared than in the visible range. Traces of CO or Ar, for which the line frequencies are reported in [36] and [37] respectively, were added to the hydrogen flow for calibration purposes. The spectrum consists of a total of 61

records. Each record displays one of the four spectral ranges mentioned above and results in the Fourier transform of 100 to 1000 co-added interferograms.

The rotational analysis was carried out with the help of the published results of Dieke [9] and Dabrowski [11] and was guaranteed by using primarily the well known technique of combination differences. First, the analysis was focused on the bands of the system  $EF^1\Sigma_g^+ (v = 0) - B^1\Sigma_u^+ (v)$ , resulting in a set of precise combination differences in  $EF^1\Sigma_g^+ (v = 0)$ . Then, it was followed by an extensive analysis of the entire  $EF^1\Sigma_g^+ - B^1\Sigma_u^+$  system, leading to an increased number of the set of combination differences for each vibrational level of one particular electronic state, or between ro-vibrational states of the two different electronic states, as shown in Fig. 5. At this stage, a preliminary set of energies for the levels involved in the combination differences set was established, taking as anchor energies the very precise values of the levels  $N = 0$  (para  $H_2$ ) and  $N = 1$  (ortho  $H_2$ ),  $EF^1\Sigma_g^+ (v = 0)$  determined by two-photon laser spectroscopy [28]. Afterwards, the determination of the combination differences and level energies was extended to the levels of the  $GK^1\Sigma_g^+$ ,  $H^1\Sigma_g^+$ ,  $I^1\Pi_g$  and  $J^1\Delta_g$  states by analysing the systems  $GK - B$ ,  $H - B$ ,  $I - B$  and  $J - B$ . Subsequently, the combination differences of the C levels and their energies as resulting from the analysis of the systems  $GK - C$ ,  $H - C$ ,  $I - C$ , and  $J - C$  were added. New energies allowed us to expand the analysis ro-vibrational levels towards higher  $N$  and  $v$  quantum numbers for  $B^1\Sigma_u^+$ ,  $C^1\Pi_u$ ,  $EF^1\Sigma_g^+$ ,  $GK^1\Sigma_g^+$ ,  $H^1\Sigma_g^+$ ,  $I^1\Pi_g$  and  $J^1\Delta_g$ . Finally, the precise determination of the  $EF^1\Sigma_g^+ (v, N)$  allows us to carry out the analysis of the  $B^1\Sigma_u^+ - EF^1\Sigma_g^+$  and  $D^1\Pi_u - EF^1\Sigma_g^+$  systems.

The spectral assignment was performed in a number of iterative steps. In view of the extreme density of lines in many cases a choice had to be made for the rovibronic assignment. Those were then first checked on internal consistency verifying combination differences between levels. In second round the resulting level energies were compared with levels and transitions as published from previous studies in the literature; if deviations were found larger than the expected uncertainties in those studies. The vast amount of spectral lines in the FT-spectra usually permits alternative assignments. In this way the present study, which is more accurate than all previous ones, relies on the identifications in previous work.

Each combination difference or each level energy results from the subtraction or the addition of two line frequencies. These quantities were weighted with the weight  $w = 1/\gamma^2$  assigned to each line frequency, where  $\gamma$  is the FWHM linewidth. Furthermore, the signal to noise ratio (SNR) can be very different from one record to another, which introduces additional uncertainty in the determination of the transition frequency, and thereby of the level energies. Therefore, it has been necessary to take into account the SNR to refine the uncertainties in the level energies. In addition, we have included the uncertainties of the anchor lines:  $0.00011 \text{ cm}^{-1}$  for para-hydrogen and  $0.00019 \text{ cm}^{-1}$  for ortho-hydrogen. Consequently, a level energy bears an uncertainty, which depends on the number of lines and on uncertainties of the transition frequencies used to calculate it. In this study we present excitation energies of some 547 levels in the singlet manifold of hydrogen, based on 4754 ro-vibronic assignments for over 25200 spectral lines observed in 61 records of Fourier-transform spectrograms. Thanks to the comprehensive analyses of the large number of records and ro-vibrational assignments, it has been possible to determine the level energies with extreme accuracy. This procedure of combining these uncertainties and averaging the obtained values from the large number of records, results in the uncertainties as stated in the tables below. Tables 2, 3, 4, 5, 6, 7, 8, 9 and 10 report the final rovibronic energies of the electronic states  $EF^1\Sigma_g^+$ ,  $GK^1\Sigma_g^+$ ,  $H^1\Sigma_g^+$ ,  $B^1\Sigma_u^+$ ,  $C^1\Pi_u$ ,  $B^1\Sigma_u^+$ ,  $D^1\Pi_u$ ,  $I^1\Pi_g$  and  $J^1\Delta_g$  respectively.

The data in Tables 2-10 are extracted from a large database of transition frequencies of the Fourier-transform emission study in many rovibronic bands. All these transition

frequencies are made available electronically in an [Appendix to this paper on the Mol. Phys. Website \( \$H\_2\$  rovibronic transitions 2000 – 22000  \$cm^{-1}\$ \)](#).

### 3. Results

In the following subsections the accurately determined level energies for the various states will be presented, discussed, and compared with previous determinations. In particular for the levels in the *gerade* manifolds the assignments of levels has some ambiguity as a result of strong mutual interactions, which were analysed by Yu and Dressler [19] and by Ross and Jungen [20]. Tsukiyama and coworkers studied these levels and provided alternative assignments in some cases [38,39,40]. Since the states are strongly mixed in some cases a definite assignment is difficult to make. Here we choose the most natural assignment from the experimentalists' perspective, that is by following the rotational ladder through the avoided crossings. This choice results in some assignments to be different from that of Ross and Jungen [20] who based the assignments on the wave function composition. For clarity, we present the ordering and assignment of levels in graphical form in Fig. 6 for levels of  $^1\Sigma_g^+$  and  $^1\Pi_g$  symmetry, with only for the (+) or (e) parity component for the latter symmetry; for the (-) or (f) parity components no such ambiguities exist. In the subsections, each devoted to one electronic state investigated, we will briefly mention, in addition to the experimental determinations of level energies in previous studies, some results of *ab initio* and of multi-channel quantum defect calculations. The theoretical predictions of the level energies, from both approaches, are typically at an accuracy of  $\sim 1$   $cm^{-1}$ . Hence, even the older experimental data were more accurate than theory, and the present improvements on the experimental side will not in each case be compared with the theoretical results.

#### 3.1 The $EF^1\Sigma_g^+$ state

The first excited singlet gerade  $EF^1\Sigma_g^+$  state in  $H_2$  has been investigated thoroughly, starting with the classical work of Dieke on the  $EF^1\Sigma_g^+ - B^1\Sigma_u^+$  system [9]. Davidson was the first to propose that the two bound E and F states in  $H_2$  be described by a single adiabatic potential, connected by an avoided crossing at the intersection of the  $1s2s$  Rydberg potential, forming the E state minimum, and the potential of the doubly excited ( $2p\sigma^2$ ) state, giving rise to the F state minimum [41]. Early *ab initio* calculations were then performed by Gerhause and Taylor [42], and subsequently in the advanced framework with two-centered wave functions by Kolos and Wolniewicz [43]. The phenomenon of the double-well structure of the EF state and associated tunneling and predissociation phenomena were further investigated by Dressler and Wolniewicz with coworkers by means of *ab initio* calculations of increasing complexity [44,45,46]. The calculations were then compared with spectral assignments of levels in the inner and outer wells [47,48]. This work culminated in a final listing of level energies of the  $EF^1\Sigma_g^+$  state and other states of *gerade* symmetry in the paper by Yu and Dressler [19]; a comparison of state-of-the-art *ab initio* calculations, which was the focus of their study, is made with classically obtained line positions. The alternative approach of MQDT has led to equally accurate calculation of level energies for the  $EF^1\Sigma_g^+$  state [20].

Two-photon laser excitation of the  $EF^1\Sigma_g^+$  state in  $H_2$  was first demonstrated by Kligler and Rhodes, who monitored fluorescence in the visible domain [49]. Zare and coworkers thereafter showed that 2+1 resonance-enhanced multi-photon ionization (REMPI) can probe both inner and outer well states [50]. Precision studies to bridge the EF – X interval were performed by Glab and Hessler [51], and in a number of subsequent



1 studies by Eyler and coworkers [52-55]. An order of magnitude improvement in accuracy  
2 was obtained in the study by Hannemann et al. achieving an accuracy of  $\Delta\lambda/\lambda$  of  $1 \times 10^{-9}$ .  
3 Calibrated frequencies of the Q(0) to Q(2) lines in the  $EF^1\Sigma_g^+ - X^1\Sigma_g^+$  (0,0) band were  
4 presented in [29], while additional Q(3) to Q(5) lines were used in [28]. The values of  
5 these transition energies are listed in Table 1.  
6

7  
8 Additional two-color two-photon laser studies were performed on a number of  
9 higher vibrational levels in the  $EF^1\Sigma_g^+$  state. Tsukiyama and coworkers probed the  
10 vibrational levels  $v=19-21$  [38], and subsequently the levels  $v=31-32$  [39] and  $v=24-29$   
11 [40]. In a similar scheme Ubachs and coworkers remeasured the  $v=31-32$  levels [56], and  
12 with higher resolution for the  $v=19$  level in the  $EF^1\Sigma_g^+$  state [57].  
13

14 In the present FT study, level energies in the  $EF^1\Sigma_g^+$  state are determined for  
15 vibrational levels  $v=0-28$ . The  $EF^1\Sigma_g^+ - B^1\Sigma_u^+$  system is by far the strongest system  
16 observed, yielding also the most extensive and most accurate information. Further EF-  
17 levels are observed in  $EF^1\Sigma_g^+ - C^1\Pi_u$ ,  $D^1\Pi_u - EF^1\Sigma_g^+$ , and  $B^1\Sigma_u^+ - EF^1\Sigma_g^+$  systems. In  
18 Table 2 the results for the deduced level energies are presented. For EF,  $v=0$  level energies  
19 of the lowest 14 rotational states are determined, while for subsequent vibrational states  
20 more limited numbers of rotational states are found in the spectra. Uncertainties are  
21 derived from a statistical analysis of all the line positions involving the specific level; the  
22 resulting uncertainties are placed in brackets in Table 2. Based on these estimates the level  
23 energies are generally better than  $0.001 \text{ cm}^{-1}$  for lower vibrational (and rotational) quantum  
24 numbers up to  $v=19$ . For the higher vibrational levels ( $v > 19$ ), the the uncertainty is still  
25 better than  $0.01 \text{ cm}^{-1}$ .  
26

27  
28 First we make a comparison with the comprehensive data set of Yu and Dressler  
29 [19]. For the levels  $v=0-11$ , the data are consistent with each other with an rms standard  
30 deviation of  $0.02 \text{ cm}^{-1}$ . For the vibrational levels  $v>12$  there is a systematic shift, with the  
31 present data at lower energy at some  $0.02 \text{ cm}^{-1}$  at  $v=12$ , at  $0.04 \text{ cm}^{-1}$  at  $v=16$  and higher.  
32 Hence for the entire EF ( $v, N$ ) manifold we find agreement with Yu and Dressler [19]  
33 within a few  $0.01 \text{ cm}^{-1}$ , which may be considered good. However, there is one specific  
34 level, EF ( $v=4, N=5$ ), where we determine a level energy (at  $101874.8505 \text{ cm}^{-1}$ ) that  
35 deviates by  $0.2 \text{ cm}^{-1}$  from the previously determined value, thus clearly outside the error  
36 limits. In the FT-spectra we find a level (at  $101875.05 \text{ cm}^{-1}$ ) that might be an alternate  
37 assignment, but we keep the listed value, however as tentative; this is an exceptional case  
38 where the previously determined values do not provide guidance in the assignment. For  
39 some higher lying levels in EF  $v=24-28$ , a few level energies have deviations of  $0.10 -$   
40  $0.15 \text{ cm}^{-1}$ . In view of the fact that transitions involving these levels are much weaker than  
41 the lower lying ones (not only in the present studies, but also in previous studies), we  
42 regard these deviations as reasonable.  
43

44  
45 We note that the values contained in [19] rely on the lowest EF-levels of Jungen et  
46 al. [31]. Jungen et al. also report on FT-spectra on transitions between excited states of the  
47  $H_2$  molecule, and the determination of the level energies of the excited states is similar to  
48 our procedure based on *anchor lines* that are also adopted from the lowest EF,  $v=0$  levels.  
49 However, the anchor lines of [31] are the old and less accurate values of [52]. Comparison  
50 with the present two-photon data on the EF-calibrations [28,29] shows that the level  
51 energies of Jungen et al. [31], and therewith also the level energies of Yu and Dressler [19]  
52 are too high by  $0.014 \text{ cm}^{-1}$ . For most part, this explains the offset between the present and  
53 previous FTIR data sets.  
54

55  
56 In the present listing in Table 2 we have chosen assignments for the  $EF^1\Sigma_g^+$  state  
57 that differ from those of Ross and Jungen [20], with our assignments graphically  
58 illustrated in Fig. 6. Yu and Dressler in the text of the paper and in particular in Table V of  
59 Ref. [19] use assignments in terms of Y1 (corresponding to EF21), Z1 (EF22), U1 (EF23),  
60 X1 (EF25), Z2 (EF26) and Y2 (EF28), which relate to the original assignments used in the  
Dieke atlas. The labels inside the parentheses indicate the EF assignments, which were

used in the PAPS deposit associated with Ref. [19]. Here we adopt this assignment in terms of EF states.

In comparison with the data of Tsukiyama and coworkers [38], remarkable agreement is found within  $0.01 \text{ cm}^{-1}$  for all EF( $v=19$ ) levels. Similarly for EF( $v=20$ ) agreement is found within a few  $0.01 \text{ cm}^{-1}$ , except for  $N=4$ , which is off by  $0.6 \text{ cm}^{-1}$  with respect to both the present data and those of [19], which leads us to conclude an error in [38]. For EF( $v=21$ ) again good agreement is found, where we have a different assignment for the  $N=4$  level following Fig. 6. The data on EF( $v=24$ ) up to EF( $v=28$ ) [40] are found to be in agreement with the present findings, where the laser data are systematically shifted upward by some  $0.05 \text{ cm}^{-1}$ , which is reasonable for a pulsed laser experiment based on commercial dye lasers.

The data of de Lange et al. [57] on EF ( $v=19$ ) allow for an accurate comparison with our data, and therewith a verification, since their values are accurate within  $0.006 \text{ cm}^{-1}$  ( $1\sigma$ ). Four of the five levels observed (for  $N=1-5$ ) fall within the  $1\sigma$  uncertainty, while on average the data of [57] are shifted by  $-0.004 \text{ cm}^{-1}$ . We regard this as a convincing consistency check on both data sets, which have comparable accuracies for EF ( $v=19$ ).

### 3.2 The $\text{GK}^1\Sigma_g^+$ state

The  $\text{GK}^1\Sigma_g^+$  state is the second double well state of  $^1\Sigma_g^+$  symmetry. It has been treated in the early *ab initio* calculations by Dressler, Wolniewicz and coworkers [44,58]. Later, after improved calculations [19] the first 9 vibrational levels pertaining to this potential have been assigned. Strong interactions between the various states of  $^1\Sigma_g^+$  and  $^1\Pi_g^+$  symmetry hamper an unambiguous identification; again in the text and Tables of Ref. [19] some levels are assigned by “W” and “X”, dating back to the assignments of Dieke. We take the W2 level as  $\text{GK}(v=6)$ . For the assignment of lines of  $\text{GK}(5)$ , we follow the assignment of Ross and Jungen [20] and of Ishii et al. [40], which is different from that of Yu and Dressler [19]. For the ambiguous assignments we refer to Fig. 6, where we have indicated the rotational progressions of the  $^1\Sigma_g^+$  and  $^1\Pi_g^+$  levels, that have led us to the chosen identification. In the present FT-emission study we have observed up to  $\text{GK}^1\Sigma_g^+$  ( $v=6$ ), for which the data are listed in Table 3.

Comparing the present results with those of [19] we find agreement within  $0.02 \text{ cm}^{-1}$  for the lowest vibrational levels up to  $\text{GK}(v=4)$ . The  $\text{GK}(v=3)$  level for  $N=0$  is lower by  $0.09 \text{ cm}^{-1}$  with respect to [19].

Tsukiyama et al. using double-resonance laser excitation observed  $\text{GK}^1\Sigma_g^+$ ,  $v=0-2$  [38]. All fifteen lines are within  $0.06 \text{ cm}^{-1}$ , while most agree within  $0.02 \text{ cm}^{-1}$ . De Lange et al. [57] observed  $\text{GK}^1\Sigma_g^+$ ,  $v=0$  at higher precision ( $0.006 \text{ cm}^{-1}$ ). The two levels,  $N=2$  and  $N=3$  are higher in energy with respect to De Lange by  $0.004$  and  $0.003 \text{ cm}^{-1}$ , in good agreement and well within the  $1\sigma$  boundaries.

### 3.3 The $\text{H}^1\Sigma_g^+$ state

The  $\text{H}^1\Sigma_g^+$  state in  $\text{H}_2$  is associated with the inner well of the third double well potential of  $^1\Sigma_g^+$  symmetry. This structure has been treated in consecutive *ab initio* studies by Wolniewicz and Dressler [59-61]. After the first observation of the rovibrational levels pertaining to the outer well [62] further improved calculations were performed addressing adiabatic effects [63] and relativistic effects [64]. Finally a comparison between observed and most updated calculations was made in [65]. This work also led to accurate predictions for the  $\text{H}^1\Sigma_g^+$  inner well states. Yu and Dressler [19] assigned the first three vibrational levels  $v=0-2$ , while in the work of Ross and Jungen the first two levels were

1  
2 calculated [20]. Tsukiyama et al. employed their double resonance technique to detect  
3  $H^1\Sigma_g^+$ ,  $v=0$  [38].

4 In the present FT emission study we observed  $H^1\Sigma_g^+$ ,  $v=0-2$ , with the values of the  
5 obtained level energies listed in Table 4. Comparison with [19] yields agreement within  
6  $0.01\text{ cm}^{-1}$  for levels up to  $N=3$ , with somewhat higher discrepancy for the higher rotational  
7 levels.  
8

9 In a recent experiment involving lasers and mm-wave multiple-resonance schemes,  
10 the term value of the H,  $v=0$ ,  $N=3$  level was determined at  $113303.463(3)\text{ cm}^{-1}$  [66]. The  
11 high accuracy achieved in this experiment presents us a means of verification of the states  
12 of *gerade* symmetry in the higher energy range. At first glance, a strong disagreement  
13 seems to persist with the present value. However, the reported value in [66] depends on a  
14 value of the ionization potential of  $H_2$ , for which the authors adopted  $124417.512\text{ cm}^{-1}$   
15 [67]. However, recently an accurate measurement was performed providing a highly  
16 accurate value for the ionization potential of  $H_2$ , yielding  $124417.49113(37)\text{ cm}^{-1}$  [68],  
17 which is consistent with a more recent *ab initio* calculation [24]. This brings down the  
18 level energy of H,  $v=0$ ,  $N=3$  to  $113303.442(3)\text{ cm}^{-1}$ , which is within the  $1\sigma$ -boundaries  
19 with the present value of  $113303.4403(8)\text{ cm}^{-1}$ . For comparison, Yu and Dressler report  
20  $113303.44\text{ cm}^{-1}$  [19] and Tsukiyama et al. report  $113303.50\text{ cm}^{-1}$  [38], but the  
21 uncertainties in these studies are larger.  
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### 27 3.4 The $B^1\Sigma_u^+$ state

28 The  $B^1\Sigma_u^+$  state, the lowest state of  $^1\Sigma_u^+$  symmetry associated with a  $2p\sigma_u$  orbital, is the  
29 upper state of the  $B^1\Sigma_u^+ - X^1\Sigma_g^+$  Lyman band system, which has been investigated over the  
30 years, starting from the first observation by Lyman [7] after whom these bands have been  
31 named. Potential energy curves were calculated by *ab initio* methods by Kolos and  
32 Wolniewicz [69], improved by Wolniewicz and Dressler [70], with non-adiabatic  
33 corrections [71] and relativistic corrections [72] added later. Senn et al. [21] performed  
34 non-adiabatic coupling calculations to determine level energies, based on these potentials;  
35 in these calculations the couplings between the four lowest states of ungerade symmetry  
36 ( $B^1\Sigma_u^+$ ,  $C^1\Pi_u$ ,  $B^1\Sigma_u^+$ , and  $D^1\Pi_u$ ) were included. The same was done in the later coupled  
37 Schrödinger calculations by Abgrall et al. [25] but in the latter case the potential energy  
38 curves were adapted in a fitting procedure, to match the experimental data. Jungen and  
39 Atabek applied their MQDT formalism also to this lowest state of  $^1\Sigma_u^+$  symmetry;  
40 although the  $B^1\Sigma_u^+$  state is not of Rydberg character nevertheless good agreement was  
41 found with experiment [22].  
42  
43  
44  
45  
46

47 Classical spectroscopy has resulted in the accurate studies by Dabrowski [11] and by  
48 the group at the Meudon Observatoire [13]. Both these studies resulted in an absolute  
49 accuracy of some  $0.10\text{ cm}^{-1}$ . The use of lasers and harmonic generation to reach the XUV  
50 domain, has gradually improved the accuracy at which the  $B^1\Sigma_u^+ - X^1\Sigma_g^+$  system was  
51 investigated. Early studies resulted in an accuracy of  $\sim 0.05\text{ cm}^{-1}$  [16,17] for the observed  
52 vibrational levels  $v=10-19$ . Later, with the use of more sophisticated pulsed dye  
53 amplification and calibration techniques, accuracies in the range  $0.004 - 0.011\text{ cm}^{-1}$  Philip  
54 et al. [18] covered the range of  $B^1\Sigma_u^+$ ,  $v=2-18$ , while  $B^1\Sigma_u^+$ ,  $v=0-2$  were added [73], and  
55 the  $B^1\Sigma_u^+$ ,  $v=6$  was recalibrated [74] in separate studies. In the direct XUV-laser excitation  
56 studies accuracies of some  $0.005\text{ cm}^{-1}$  or  $\Delta\lambda/\lambda$  of  $5 \times 10^{-8}$  could be achieved. In the  
57 preliminary investigation on the combination scheme as depicted in Fig. 5, it was  
58 demonstrated that level energies in the  $B^1\Sigma_u^+$  state can be determined to an accuracy of  
59 some  $\Delta\lambda/\lambda$  of  $5 \times 10^{-9}$  [28].  
60

In the present FT emission study levels  $B^1\Sigma_u^+$ ,  $v=0-13$  are observed, with many of the rovibrational lines at an accuracy of few  $0.0001\text{ cm}^{-1}$ . The latter is due to the fact that B-levels are observed in a great number of vibrational bands including the strongest  $EF^1\Sigma_g^+ - B^1\Sigma_u^+$  system, over which data is averaged. Although the values of Abgrall et al. [15] are less accurate, a comparison has been made. In particular, this is because the Abgrall et al. presents such a comprehensive data set that is often used in spectroscopic studies of  $H_2$ . In a comparison between the data of Table 5 and those of [15], we find that virtually all deviations are below  $0.11\text{ cm}^{-1}$  with few exceptions. Overall, in the comparison between the Abgrall data set and the present values, there is an rms deviation of about  $0.05\text{ cm}^{-1}$  and a systematic shift of  $0.04\text{ cm}^{-1}$ . From this it may be concluded, that the classical data are rather accurate; if the systematic shift of  $0.04\text{ cm}^{-1}$  is subtracted, then all levels may be considered to lie well within  $0.1\text{ cm}^{-1}$  on an absolute energy scale.

A comparison with the direct XUV measurements is postponed to section 3.10, where we discuss an updated derivation of Lyman transition wavelengths.

### 3.5 The $C^1\Pi_u$ state

The  $C^1\Pi_u$  state, the lowest state of  $^1\Pi_u$  symmetry in  $H_2$  associated with a  $2p\pi_u$ -orbital, is the upper state of the  $C^1\Pi_u - X^1\Sigma_g^+$  Werner band system, which was first observed by Werner in 1926 [75]. Early *ab initio* calculations for the  $C^1\Pi_u$  state were performed by Kolos and Rychlewski [76], on which Jungen and Atabek [22] based their MQDT calculations for the  $^1\Pi_u$  states. Later Wolniewicz and Staszewka obtained improved potential functions for the  $^1\Pi_u$  states [77]. As for the  $B^1\Sigma_u^+$  state, both Senn et al. [21] and Abgrall et al. [25] performed coupled channel equations to derive level energies.

The absorption spectrum of the Lyman and Werner systems are overlaid, so these systems are usually observed in the same spectroscopic studies. The important data are found in Dabrowski [11] and in the work of the Meudon group [13]. The laser based studies yield data on  $C^1\Pi_u$ ,  $v=2-5$  [9] and  $v=0-4$  [18]. All rovibrational levels in a  $^1\Pi_u$  state are split into two  $\Lambda$ -doublet components  $\Pi^+$  and  $\Pi^-$ . (If excitation takes place in connection to  $^1\Sigma_g^+$ , the  $\Pi^+$  component can be probed in P and R branches, while the  $\Pi^-$  component is probed in the Q branch). The  $\Pi_u^+$  components undergo strong interactions from nearby lying  $^1\Sigma_u^+$  states; due to the accidental resonances in these perturbations [11,17] the energy shifts become somewhat erratic. In any case the  $\Pi_u^+$  and  $\Pi_u^-$  components are treated as separate entities.

The present FT study yields information on level energies for both  $\Pi_u^+$  and  $\Pi_u^-$  components of the  $C^1\Pi_u$  state for vibrational levels  $v=0-3$ , and the results are listed in Table 6. Since the spectral lines, from which line positions are determined (mainly  $EF^1\Sigma_g^+ - C^1\Pi_u$ ), are weaker the accuracy is somewhat less than that for the  $B^1\Sigma_u^+$  state. Nevertheless the accuracy is better than  $0.001\text{ cm}^{-1}$  for  $v=0$  and a few times  $0.001\text{ cm}^{-1}$  for the higher  $v$ -levels.

Similarly as for the  $B^1\Sigma_u^+$  state a comparison can be made with the comprehensive data set of Abgrall et al. [15]. For the 46 level energies determined in the present study for  $C^1\Pi_u$  ( $v=0-3$ ) we find that the data of [15] are shifted to higher energy by on average  $0.07\text{ cm}^{-1}$ . If such an offset is taken into account most level energies agree to within a few  $0.01\text{ cm}^{-1}$ , while there will be no deviations larger than  $0.15\text{ cm}^{-1}$ . In section 3.10 a new line list of Werner line wavelengths are presented. In that section, an assessment based on the comparison with direct XUV measurements is also given.

### 3.6 The $B^1\Sigma_u^+$ state

The  $B^1\Sigma_u^+$  state of  $H_2$ , associated with a  $3p\sigma_u$  orbital. Jungen and Atabek [22] had performed MQDT calculations on this state, deriving a potential energy curve, before this was obtained by *ab initio* methods by Kolos [78]. Again, as for the  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  states, both Senn et al. [21] and Abgrall et al. [25] applied coupled Schrödinger equation calculations to derive level energies.

The  $B^1\Sigma_u^+ - X^1\Sigma_g^+$  band system was observed in a low-pressure emission discharge, revealing levels  $v=0-7$  at the typical accuracy of  $0.10\text{ cm}^{-1}$  [25]. Previously Namioka had observed some of these bands at lower accuracy [79]. XUV laser methods were applied in the range 86-90 nm to calibrate a few transitions in the  $B^1\Sigma_u^+ - X^1\Sigma_g^+$  ( $v,0$ ) bands for  $v=0-2$  [80].

In the present FT-emission study we have determined level energies for  $B^1\Sigma_u^+$ ,  $v=0-2$ ; results are listed in Table 7. A comparison was made with the comprehensive data set of [25], and we find that the presently determined values as listed in Table 7 are all within  $0.1\text{ cm}^{-1}$  from those of Ref. [25]. An average shift is found in the classical data of only  $-0.025\text{ cm}^{-1}$ . The  $R(0)$  transitions of the XUV-laser study can be directly compared with the present level energies of  $B^1\Sigma_u^+$  ( $N=1$ ) level energies; deviations are found within  $0.05\text{ cm}^{-1}$ , while the average shift is around  $0.03\text{ cm}^{-1}$ . This can be considered as good agreement for pulsed laser excitation studies as those of [80].

### 3.7 The $D^1\Pi_u$ state

The  $D^1\Pi_u$  state is associated with a  $3p\pi_u$  orbital. Early *ab initio* calculation of its potential was performed by Kolos and Rychlewski [76], while improved potentials were obtained recently by Wolniewicz and Staszewska [77]. MQDT calculations are contained in the work of Jungen and Atabek [22], as for the other states of ungerade symmetry treated in the above.

Early observations were obtained by Namioka [79] and by Takezawa [81] in the  $D^1\Pi_u - X^1\Sigma_g^+$  absorption system. From these studies it followed that the  $D^1\Pi_u$  state is predissociated for vibrational levels  $v>2$ , for the  $^1\Pi^+$  components. Experimental observation of improved accuracy of the  $D^1\Pi_u - X^1\Sigma_g^+$  system was obtained in the study by Abgrall et al. [25], while a single vibrational level ( $v=1$ ) was observed in XUV-laser excitation [80]. In the present FT-emission study level energies for both  $\Pi_u^+$  and  $\Pi_u^-$  components for  $D^1\Pi_u$ ,  $v=0-2$  were determined, with the results listed in Table 8. The uncertainty is somewhat less than for the other systems and amounts to some  $0.005\text{ cm}^{-1}$ . A comparison between the data of Table 8 and those of [25] yields good agreement, an rms deviation of some  $0.06\text{ cm}^{-1}$ , without in this case a systematic shift. The present level energies are also in agreement within  $1\sigma$  of the XUV-laser results [80]. We note a typographic error in the  $D^1\Pi_u^-$ ,  $v=2$ ,  $N=5$  value of Abgrall et al. [25], which should read  $117974.62\text{ cm}^{-1}$  instead of  $119974.62\text{ cm}^{-1}$ .

### 3.8 The $I^1\Pi_g$ state

The  $I^1\Pi_g$  state, associated with a  $3d\pi$  orbital, is the lowest state of  $^1\Pi_g$  symmetry in  $H_2$ . It was observed by Dieke in emission to the lower lying  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  states [82], at the time labeling the excited state as “3E”. Based on *ab initio* calculations by Kolos and Rychlewski [83], Dressler and Wolniewicz calculated diagonal corrections and rovibrational energies [84]. Similarly in the MQDT framework for the gerade states these level energies were calculated as well [20]. The potential, later calculated to higher

accuracy [85], is known to exhibit a double well structure, where levels in the outer well  $I^1\Pi_g$  were probed with two-step laser excitation via  $B^1\Sigma_u^+ v=16$  [56]. The inner well states have been experimentally investigated, also with double resonance laser excitation for the  $I^1\Pi_g, v=0$  by Tsukiyama et al. [38], for the  $I^1\Pi_g, v=2$  state by Ishii et al. [40], and again for  $I^1\Pi_g, v=0$  by de Lange *et al.* [57]. Yu and Dressler list the values for level energies of  $I^1\Pi_g, v=0-3$  [19].

In the present FT emission study also the  $I^1\Pi_g, v=0-3$  levels are probed, and the values are listed in Table 9. Note that for the assignment we have followed Ross and Jungen [20] and Ishii et al. [40], which deviates from Yu and Dressler [19], in particular for  $I^+(v=2)$ . With this assignment, following Fig. 6, the  $\Lambda$ -doubling in the  $I^1\Pi_g, v=2$  state is smallest. The obtained accuracies vary from one to a few times  $10^{-3} \text{ cm}^{-1}$ . In a comparison with the data (after reassignment) of [19] we find good agreement, with systematically lower term values in the present study by  $0.04 \text{ cm}^{-1}$ , which we consider to be reasonable.

A comparison can be made with the five level energies determined by de Lange *et al.* [57] at an accuracy of  $0.006 \text{ cm}^{-1}$ . The deviation between the values in Table 9 and those of de Lange are  $-0.002 \text{ cm}^{-1}$ , well within the joint uncertainties.

### 3.9 The $J^1\Delta_g$ state

The  $J^1\Delta_g$  state, associated with a  $3d\delta$  orbital, is the lowest state of  $^1\Delta_g$  symmetry in  $H_2$ . Also for the  $^1\Delta_g$  state two  $\Lambda$ -doublet components can be discerned: the  $^1\Delta_g^+$  and  $^1\Delta_g^-$  component. An *ab initio* calculation for the  $J^1\Delta_g$  state was performed by Kolos and Rychlewski [86], and later by Wolniewicz [85]. Similarly MQDT calculations already produced level energies for the  $J^1\Delta_g$  state [20]. The level energies of the Dieke atlas are listed in [19].

In the present FT emission spectrum level energies were determined for  $J^1\Delta_g, v=0-2$ , for both  $^1\Delta_g^+$  and  $^1\Delta_g^-$  components; results are listed in Table 10. The comparison between the data of Table 10 and those of [19] shows the present data to be systematically lower by some  $0.03 \text{ cm}^{-1}$ . For the values obtained by double  $\pi$ -resonance laser excitation by Tsukiyama and coworkers [38,40] the agreement is well within the stated uncertainties. The two level energies measured by de Lange et al. [57] are, again, well within the stated uncertainty of  $0.006 \text{ cm}^{-1}$ .

### 3.10 Updated set of Lyman and Werner lines

The Lyman and Werner band systems are the strongest absorption systems to monitor the hydrogen molecule. These bands can nowadays be observed in absorption against the dim background emission of highly red-shifted quasars systems. Recently these spectra have been used for detecting possible variations in the proton-electron mass ratio [26,27,87,88]. For this application highly accurate laboratory wavelengths of the Lyman and Werner absorption bands are required, and this formed the major motivation for the present investigation, as was elucidated in the preliminary report [28]. The highly accurate level energies of the  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  rovibronic levels now permit a calculation of transition frequencies, or wavelengths, which are more accurate than the best direct measurements in XUV spectroscopies [10,73,74].

From quadrupole spectroscopy of  $H_2$  [89], highly accurate ground state rotational level energies were determined:  $N=1$  at  $118.48684 (10) \text{ cm}^{-1}$ ,  $N=2$  at  $354.37354 (21) \text{ cm}^{-1}$ ,  $N=3$  at  $705.51906 (19) \text{ cm}^{-1}$ ,  $N=4$  at  $1168.79827 (22) \text{ cm}^{-1}$ , and  $N=5$  at  $1740.18930 (19) \text{ cm}^{-1}$ . In the cold environment of distant galaxies absorbing in the Lyman and Werner band

lines only the six lowest rotational ( $N=0-5$ ) states of  $v=0$  are populated. Combining these values with the level energies of the  $B^1\Sigma_u^+$  and  $C^1\Pi_u$  states (as listed in Tables 5 and 6) yield the highly accurate values for Lyman and Werner lines as calculated and listed in Tables 11 and 12. For convenience of use in astrophysical analysis, the data are given in units of (vacuum) wavelength. With respect to the partial listing in [28], we now extend the data to higher  $J$ -values, and include also  $C$  ( $v=3$ ) and  $B$  ( $v=13$ ). The uncertainties in the line wavelengths are derived from the combined uncertainties in the level energies of ground and excited states.

In our preliminary report [28], we have already made a comparison between the newly calibrated data and those obtained from the direct XUV measurements of [10,73,74]. That comparison showed agreement between the data sets to within  $2\sigma$ , and some systematic shift of  $1\sigma$  in the range of  $B^1\Sigma_u^+$ ,  $v=5-8$ . We plot the difference in the transition energies obtained from the present FT-derived and direct XUV data sets, normalized by the combined  $1\sigma$  uncertainty, against the transition energy of the Lyman transitions in Fig. 7a. We have indicated the P- and R-branches to highlight the common systematic trend of both branches. Fig. 7 shows that in certain wavelength ranges there seem to exist systematic shifts even to the  $3\sigma$  level. We attribute these systematic shifts to be from the XUV data set, specifically to unaccounted frequency chirp shifts which are particularly severe around  $97000\text{ cm}^{-1}$  which are at the edge of the emission curve of the dyes used. It has been shown that the shifts due to chirp effects in pulsed dye amplifiers (PDA) can be large [90,91]. We also plot similar differences for all observed P, Q, and R lines in the Werner bands (occurring at  $>98000\text{ cm}^{-1}$ ) in Fig. 7b, where we do not find systematic offsets.

As had been discussed in the context of the direct XUV measurements [10,73,74] the calculated ground state splittings from the combination difference of the respective P and R transitions (in XUV excitation) with a common upper level are more accurate than the transition values since some systematic shifts cancel out, e.g.  $\Delta(N=2 \leftarrow N=0) = 354.373(3)\text{ cm}^{-1}$ . This canceling out also holds for the chirp effects, since the combined P and R lines relatively close on the wavelength scale. As a particular example, the XUV determination of P2, P3, R0, and R1 transitions in the B-X (8,0) Lyman band differ from the FT derived values by as much as  $0.012\text{ cm}^{-1}$ . However, the  $\Delta(N=2 \leftarrow N=0)$  and  $\Delta(N=3 \leftarrow N=1)$  ground state splittings obtained from the respective combination differences agree with the highly accurate results of the far-infrared study [89] to within  $0.0016\text{ cm}^{-1}$ . This deviation is much smaller than the estimated uncertainty of  $0.005\text{ cm}^{-1}$  for the corresponding direct XUV transition energies.

The present reanalysis of the data after our preliminary report [28] includes additional transitions in the determination of the level energies, while also the statistical averaging procedure was reevaluated. As a result, the values and the estimated uncertainties of the Lyman and Werner transitions presented in Tables 11 and 12 are slightly different but are in agreement with the values in the previous report [28]. The wavelengths listed in Tables 11 and 12 are the recommended data to be used in comparison with quasar data extracting possible variations of the proton-electron mass ratio.

#### 4. Conclusion

In the present study, we have determined accurate level energies of over 500 rovibronic quantum levels in the  $EF^1\Sigma_g^+$ ,  $GK^1\Sigma_g^+$ ,  $H^1\Sigma_g^+$ ,  $B^1\Sigma_u^+$ ,  $C^1\Pi_u$ ,  $B'^1\Sigma_u^+$ ,  $D^1\Pi_u$ ,  $I^1\Pi_g$ , and  $J^1\Delta_g$  excited states of  $H_2$ . For some levels with low  $v$  and  $N$  quantum numbers in the  $EF^1\Sigma_g^+$  and  $B^1\Sigma_u^+$  states, observed through many lines in several strong systems from which combination differences could be used, term values were determined with an accuracy of

1  
2 0.001  $\text{cm}^{-1}$  or better, while for most of the other levels the accuracy is at several 0.001  $\text{cm}^{-1}$ . A comparison is made with previous determinations of the level energies. Comparison  
3  $^1$ . A comparison is made with previous determinations of the level energies. Comparison  
4 with the comprehensive studies on the states of gerade symmetry by Yu and Dressler [19]  
5 yield general agreement to within a few 0.01  $\text{cm}^{-1}$ . Comparing with the classical VUV  
6 work on the states of ungerade symmetry by Abgrall et al [15,25] yields agreement at the  
7 level of 0.1  $\text{cm}^{-1}$ , which is the estimated accuracy in these classical studies. Next a  
8 comparison was made with the laser excitation studies in which commercial pulsed dye  
9 lasers were employed [16,17,38,40,80]. Agreement was found at the level of 0.05  $\text{cm}^{-1}$  or  
10 better, which may be typically expected from such experiments involving pulsed dye  
11 lasers.  
12

13  
14 More stringent constraints on the present data set can be obtained from a comparison  
15 with data from studies performed with ultra-narrow bandwidth lasers. Already in the  
16 preliminary report [28] a comparison was made between the present data and the direct  
17 XUV excitation of the Lyman and Werner bands as in [10,73,74], measured at an accuracy  
18 of 0.005  $\text{cm}^{-1}$ . As discussed in [28] good agreement was found, except in a certain  
19 wavelength range where the  $B^1\Sigma_u^+$  ( $v=5-8$ ) levels are excited, somewhat larger  
20 discrepancies persist. These discrepancies were attributed to chirp phenomena in the XUV  
21 laser setup. A highly accurate assessment of the gerade states is possible through a  
22 comparison with the precise two-photon excitation schemes in [57], at the level of 0.006  
23  $\text{cm}^{-1}$ , and in the scheme of [66], where a precision of 0.003  $\text{cm}^{-1}$  was achieved. Both  
24 studies agree well with the present findings.  
25

26  
27 However, comparisons with previous results are insufficient, since in the present  
28 work for some levels an unprecedented accuracy is estimated. For such cases, most  
29 notable in the  $EF^1\Sigma_g^+$  and  $B^1\Sigma_u^+$  states, we have to rely on the internal consistency of the  
30 measurements. These levels were observed in a great number of spectral lines, at widely  
31 varying wavelengths, providing a large number of combination differences. The final  
32 accuracy is derived from an averaging procedure, and is statistical in nature. There is a  
33 further possibility of testing the internal consistency of these methods, and that is based on  
34 the levels in the  $EF^1\Sigma_g^+$  ( $v=0$ ) state. Whereas the anchor lines are determined as the  $N=0$   
35 and  $N=1$  levels in  $EF^1\Sigma_g^+$  ( $v=0$ ), the results of the  $N=2-5$  levels from the FT-spectroscopy  
36 can be compared with the results of the direct two-photon excitation of these levels. The  
37 discrepancies between the methods are found at the level of 0.00021  $\text{cm}^{-1}$ , whereas the  
38 accuracy of the level energies from the direct deep-UV two-photon studies is at 0.00024  
39  $\text{cm}^{-1}$  [28]. This agreement is the most stringent test on the absolute accuracy of those lines  
40 in the present data set, for which the accuracy is estimated to be the highest.  
41

42  
43 Tables 11 and 12 contain the best and most updated values of the Lyman and Werner  
44 band wavelengths to be used in probing possible variations of fundamental constants based  
45 on the  $\text{H}_2$  molecule.  
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47

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Table 1

Transition energies of the EF – X (0,0) Q branch obtained from high-precision deep UV spectroscopy.

Q	Energy cm <sup>-1</sup>
0	99164.78691 (11)
1	99109.73139 (18)
2	99000.18301 (11)
3	98837.24717 (15)
4	98622.52699 (10)
5	98358.07138 (15)

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Table 2

Level energies (term values) in the  $EF^1\Sigma_g^+$  states of  $H_2$  for vibrational levels  $v=0-28$ . The vibrational assignment is given in terms of a combined numbering in the double-well potential as well as separately for the E and F wells. This vibrational progression follows our “natural assignment” as represented in Fig. 6. The level energy for EF ( $v=4$ ,  $N=5$ ) marked with (\*) is tentative (see text). Values are in  $cm^{-1}$  with the uncertainties in brackets () relate to units of the last digits of the upright term values, not including any extra digits given as subscripts, and specify  $1\sigma$  uncertainties.

N	EF ( $v=0$ ) $E0$	EF ( $v=1$ ) $F0$	EF ( $v=2$ ) $F1$	EF ( $v=3$ ) $E1$
0	99164.78702 (15)	99363.8875 <sub>8</sub> (4)	100558.851 <sub>62</sub> (1)	101494.74402 (15)
1	99228.21824 (19)	99376.0474 <sub>2</sub> (4)	100570.8430 <sub>5</sub> (3)	101554.0269 <sub>7</sub> (2)
2	99354.55632 (14)	99400.512 <sub>24</sub> (1)	100594.8070 <sub>1</sub> (6)	101671.64197 (15)
3	99542.7660 <sub>7</sub> (2)	99437.1665 <sub>3</sub> (5)	100630.7127 <sub>2</sub> (3)	101849.4044 <sub>9</sub> (2)
4	99791.32519 (15)	99485.971 <sub>96</sub> (3)	100678.510 <sub>38</sub> (1)	102081.0311 <sub>5</sub> (2)
5	100098.2609 <sub>2</sub> (2)	99546.868 <sub>64</sub> (1)	100738.1316 <sub>6</sub> (6)	102367.1451 <sub>8</sub> (2)
6	100461.1973 <sub>3</sub> (2)		100809.502 <sub>52</sub> (2)	102701.554 <sub>92</sub> (4)
7	100877.3708 <sub>0</sub> (2)		100892.549 <sub>19</sub> (1)	
8	101343.8245 <sub>1</sub> (3)			
9	101857.1748 <sub>2</sub> (2)			
10	102414.0458 <sub>8</sub> (5)			
11	103010.4999 <sub>3</sub> (3)			
12	103641.5428 <sub>6</sub> (8)			
13	104303.018 <sub>34</sub> (4)			

N	EF ( $v=4$ ) $F2$	EF ( $v=5$ ) $F3$	EF ( $v=6$ ) $E2$	EF ( $v=7$ ) $F4$
0	101698.951 <sub>96</sub> (2)	102778.228 <sub>25</sub> (1)	103559.59794 (15)	103838.5656 <sub>5</sub> (4)
1	101710.8478 <sub>3</sub> (4)	102790.1364 <sub>6</sub> (3)	103605.6119 <sub>8</sub> (2)	103857.8468 <sub>1</sub> (2)
2	101735.0306 <sub>2</sub> (4)	102813.8838 <sub>7</sub> (4)	103690.14695 (14)	103902.9828 <sub>8</sub> (3)
3	101768.5780 <sub>9</sub> (3)	102849.3611 <sub>7</sub> (3)	103995.2119 <sub>0</sub> (2)	103789.9773 <sub>1</sub> (2)
4	101816.1295 <sub>7</sub> (9)	102896.461 <sub>94</sub> (1)	104159.80598 (15)	103876.3768 <sub>5</sub> (3)
5	101874.8505 <sub>1</sub> * (5)	102955.1176 <sub>7</sub> (7)	104386.8711 <sub>4</sub> (2)	103953.0198 <sub>1</sub> (4)
6	101945.009 <sub>9</sub> (4)	103025.519 <sub>04</sub> (2)		104396.442 <sub>05</sub> (2)
7	102026.5741 <sub>0</sub> (6)	103106.663 <sub>20</sub> (3)		104989.956 <sub>05</sub> (5)
8		103199.241 <sub>86</sub> (4)		103838.5656 <sub>5</sub> (4)

N	EF ( $v=8$ ) $F5$	EF ( $v=9$ ) $E3$	EF ( $v=10$ )	EF ( $v=11$ )
0	104730.5923 <sub>1</sub> (8)	105384.9129 <sub>0</sub> (2)	105966.1527 <sub>1</sub> (8)	106713.0458 <sub>9</sub> (5)
1	104747.3423 <sub>1</sub> (3)	105415.2551 <sub>9</sub> (2)	105991.2171 <sub>5</sub> (2)	106734.2282 <sub>3</sub> (3)
2	104780.218 <sub>90</sub> (4)	105473.96704 (15)	106042.5481 <sub>2</sub> (4)	106776.4459 <sub>8</sub> (4)
3	104828.3982 <sub>5</sub> (3)	105556.8403 <sub>3</sub> (2)	106122.3648 <sub>8</sub> (3)	106839.6678 <sub>0</sub> (3)
4	104891.6909 <sub>2</sub> (9)	105657.7072 <sub>0</sub> (3)	106232.9271 <sub>1</sub> (4)	106924.5280 <sub>9</sub> (6)
5	104972.0087 <sub>1</sub> (3)	105770.1314 <sub>4</sub> (3)	106374.1301 <sub>3</sub> (3)	107033.0022 <sub>1</sub> (6)

N	EF (v=12)	EF (v=13)	EF (v=14)	EF (v=15)
0	107425.8433 <sub>8</sub> (6)	108098.4828 <sub>6</sub> (5)	108793.5127 <sub>2</sub> (8)	109493.862 <sub>22</sub> (2)
1	107449.6180 <sub>5</sub> (2)	108122.1662 <sub>1</sub> (3)	108814.7762 <sub>0</sub> (3)	109514.6472 <sub>5</sub> (4)
2	107496.5311 <sub>8</sub> (3)	108169.5762 <sub>6</sub> (3)	108857.3759 <sub>3</sub> (4)	109555.8956 <sub>6</sub> (7)
3	107565.3271 <sub>8</sub> (3)	108240.6288 <sub>0</sub> (3)	108921.5417 <sub>6</sub> (3)	109617.0661 <sub>8</sub> (5)
4	107654.281 <sub>33</sub> (1)	108334.7489 <sub>9</sub> (7)	109007.7279 <sub>7</sub> (8)	109697.637 <sub>75</sub> (2)
5	107761.6899 <sub>2</sub> (7)	108450.405 <sub>00</sub> (3)	109116.5370 <sub>8</sub> (5)	109797.451 <sub>10</sub> (4)

N	EF (v=16)	EF (v=17)	EF (v=18)	EF (v=19)
0	110163.3433 <sub>3</sub> (9)	110794.156 <sub>94</sub> (1)	111370.657 <sub>80</sub> (1)	112106.044 <sub>16</sub> (5)
1	110185.0710 <sub>7</sub> (4)	110815.1784 <sub>2</sub> (4)	111387.144 <sub>27</sub> (1)	112126.1482 <sub>0</sub> (6)
2	110228.1677 <sub>8</sub> (7)	110857.5131 <sub>4</sub> (7)	111420.668 <sub>8</sub> (4)	112167.804 <sub>92</sub> (1)
3	110291.8400 <sub>0</sub> (3)	110921.5971 <sub>3</sub> (4)	111472.533 <sub>8</sub> (1)	112230.8714 <sub>2</sub> (9)
4	110374.764 <sub>47</sub> (1)	111007.608 <sub>67</sub> (2)	111544.971 <sub>95</sub> (9)	112315.879 <sub>58</sub> (1)
5	110475.207 <sub>07</sub> (1)	111114.581 <sub>18</sub> (1)	111641.800 <sub>9</sub> (2)	112421.403 <sub>96</sub> (3)

N	EF (v=20)	EF (v=21)	EF (v=22)	EF (v=23)
0	112711.783 <sub>5</sub> (5)	113258.183 <sub>5</sub> (7)	113861.3805 (4)	114510.48 <sub>85</sub> (1)
1	112729.053 <sub>0</sub> (1)	113277.710 <sub>6</sub> (1)	113879.358 <sub>7</sub> (2)	114528.546 <sub>6</sub> (3)
2	112763.909 <sub>5</sub> (2)	113316.620 <sub>6</sub> (3)	113920.241 <sub>0</sub> (6)	114566.185 <sub>3</sub> (9)
3	112818.800 <sub>2</sub> (1)	113378.422 <sub>2</sub> (4)	113987.540 <sub>8</sub> (2)	114636.149 <sub>1</sub> (3)
4	112887.012 <sub>5</sub> (3)	113434.292 <sub>5</sub> (8)	114075.259 <sub>1</sub> (8)	114620.095 <sub>9</sub> (4)
5	112966.327 <sub>2</sub> (4)	113536.168 <sub>0</sub> (4)	114173.45 <sub>62</sub> (2)	114711.60 <sub>66</sub> (1)

N	EF (v=24)	EF (v=25)	EF (v=26)	EF (v=27)
0	115024.789 <sub>8</sub> (4)	115563.75 <sub>76</sub> (1)	116031.668 <sub>6</sub> (3)	116508.080 <sub>5</sub> (5)
1	115043.907 <sub>5</sub> (8)	115577.717 <sub>7</sub> (3)	116047.290 <sub>3</sub> (9)	116523.527 <sub>8</sub> (3)
2	115079.889 <sub>6</sub> (8)	115606.692 <sub>9</sub> (9)	116047.290 <sub>3</sub> (9)	116554.487 <sub>1</sub> (9)
3	115131.078 <sub>6</sub> (2)	115653.885 <sub>9</sub> (4)	116088.621 <sub>9</sub> (4)	116604.092 <sub>2</sub> (4)
4	115207.286 <sub>8</sub> (7)	115692.83 <sub>88</sub> (2)	116151.563 <sub>3</sub> (6)	116633.396 <sub>4</sub> (8)
5	115275.732 <sub>1</sub> (8)	115777.601 <sub>9</sub> (4)	116232.397 <sub>1</sub> (7)	116722.051 <sub>6</sub> (8)

N	EF (v=28)
0	116915.37 <sub>73</sub> (1)
1	116931.887 <sub>7</sub> (4)
2	116964.345 <sub>8</sub> (4)
3	117016.209 <sub>5</sub> (5)

Table 3

Level energies in the  $GK^1\Sigma_g^+$  state of  $H_2$  for vibrational levels  $v=0-6$ . Values in  $cm^{-1}$ .

N	GK (v=0)	GK (v=1)	GK (v=2)	GK (v=3)
0	111628.811 <sub>1</sub> (5)	111812.629 <sub>01</sub> (4)	113393.440 <sub>2</sub> (6)	114044.568 <sub>3</sub> (8)
1	111650.285 <sub>5</sub> (1)	111805.110 <sub>14</sub> (1)	113418.857 <sub>0</sub> (2)	114030.871 <sub>4</sub> (2)
2	111693.728 <sub>4</sub> (1)	111827.733 <sub>83</sub> (1)	113470.560 <sub>3</sub> (3)	114046.342 <sub>7</sub> (3)
3	111759.941 <sub>1</sub> (1)	111893.0788 <sub>4</sub> (8)	113550.359 <sub>0</sub> (2)	114093.595 <sub>8</sub> (1)
4	111845.249 <sub>6</sub> (3)	112005.477 <sub>37</sub> (2)	113662.426 <sub>8</sub> (4)	114180.217 <sub>5</sub> (2)
5	111941.701 <sub>3</sub> (4)	112169.981 <sub>28</sub> (1)	113772.464 <sub>2</sub> (3)	114318.559 <sub>6</sub> (1)
6	112052.45 <sub>87</sub> (2)	112387.425 <sub>79</sub> (3)		114508.071 <sub>9</sub> (6)
7		112640.877 <sub>64</sub> (4)		114744.939 <sub>0</sub> (2)
8		112986.494 <sub>34</sub> (7)		115035.519 <sub>7</sub> (5)
9		113349.35 <sub>043</sub> (1)		115391.19 <sub>35</sub> (1)

N	GK (v=4)	GK (v=5)	GK (v=6) W2
0	115099.829 <sub>3</sub> (8)	116164.637 <sub>3</sub> (8)	117081.398 <sub>2</sub> (2)
1	115136.740 <sub>96</sub> (1)	116233.784 <sub>3</sub> (4)	117106.473 <sub>6</sub> (1)
2	115207.323 <sub>69</sub> (1)	116349.110 <sub>1</sub> (2)	117156.368 <sub>0</sub> (2)
3	115310.0163 <sub>5</sub> (1)	116495.004 <sub>5</sub> (1)	117232.048 <sub>1</sub> (2)
4	115450.269 <sub>05</sub> (1)	116701.857 <sub>3</sub> (7)	117340.448 <sub>5</sub> (3)
5	115646.201 <sub>92</sub> (2)	116883.505 <sub>4</sub> (3)	117520.535 <sub>4</sub> (4)

Table 4

Level energies in the  $H^1\Sigma_g^+$  state of  $H_2$  for vibrational levels  $v=0-2$ . Values in  $\text{cm}^{-1}$ .

N	H (v=0)		H (v=1)		H (v=2)	
0	112957.559 <sub>84</sub>	(1)	115251.502 <sub>4</sub>	(5)	117297.069 <sub>3</sub>	(7)
1	113016.7423 <sub>4</sub>	(6)	115296.922 <sub>3</sub>	(1)	117338.524 <sub>4</sub>	(4)
2	113134.067 <sub>91</sub>	(2)	115393.820 <sub>6</sub>	(3)	117455.509 <sub>8</sub>	(2)
3	113303.4403 <sub>4</sub>	(8)	115544.946 <sub>1</sub>	(4)	117590.233 <sub>3</sub>	(3)
4	113548.795 <sub>36</sub>	(3)			117759.242 <sub>5</sub>	(8)
5	113860.362 <sub>88</sub>	(6)			117999.511 <sub>2</sub>	(4)

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Table 5

Level energies in the  $B^1\Sigma_u^+$  state of  $H_2$  for vibrational levels  $v=0-13$ . Values in  $cm^{-1}$ .

N	B (v=0)	B (v=1)	B (v=2)	B (v=3)
0	90203.49985 (11)	91521.82475 (15)	92803.3007 <sub>9</sub> (2)	94050.0108 <sub>6</sub> (3)
1	90242.3381 <sub>1</sub> (2)	91558.7249 <sub>4</sub> (3)	92838.5583 <sub>9</sub> (3)	94083.8145 <sub>9</sub> (3)
2	90319.64269 (14)	91632.2020 <sub>1</sub> (3)	92908.78707 (15)	94151.16500 (15)
3	90434.6796 <sub>5</sub> (2)	91741.6225 <sub>0</sub> (5)	93013.4211 <sub>1</sub> (3)	94251.5492 <sub>4</sub> (3)
4	90586.3775 <sub>0</sub> (3)	91886.0530 <sub>8</sub> (2)	93151.62962 (15)	94384.2121 <sub>6</sub> (2)
5	90773.3593 <sub>5</sub> (5)	92064.2938 <sub>2</sub> (5)	93322.3367 <sub>2</sub> (3)	94548.1738 <sub>1</sub> (5)
6	90993.9775 <sub>9</sub> (3)	92274.9023 <sub>1</sub> (3)	93524.2452 <sub>9</sub> (3)	94742.2539 <sub>2</sub> (4)
7	91246.3738 <sub>7</sub> (4)	92516.2362 <sub>0</sub> (5)	93755.8737 <sub>9</sub> (7)	94965.091 <sub>84</sub> (4)
8	91528.5155 <sub>3</sub> (2)	92786.4891 <sub>1</sub> (5)	94015.5785 <sub>3</sub> (3)	95215.165 <sub>00</sub> (3)
9	91838.2518 <sub>0</sub> (8)	93083.7343 <sub>3</sub> (6)	94301.5980 <sub>7</sub> (7)	95490.8480 <sub>2</sub> (7)
10	92173.3753 <sub>0</sub> (3)	93405.9694 <sub>4</sub> (3)	94612.0897 <sub>8</sub> (5)	
11	92531.6503 <sub>0</sub> (2)	93751.1504 <sub>4</sub> (7)	94945.1527 <sub>7</sub> (1)	
12	92910.8984 <sub>3</sub> (9)	94117.231 <sub>05</sub> (2)	95298.8812 <sub>8</sub> (7)	
13			95671.370 <sub>50</sub> (2)	

N	B (v=4)	B (v=5)	B (v=6)	B (v=7)
0	95263.0277 <sub>0</sub> (4)	96443.0271 <sub>2</sub> (3)	97590.5317 <sub>2</sub> (5)	98706.0107 <sub>7</sub> (5)
1	95295.5100 <sub>8</sub> (3)	96474.2818 <sub>0</sub> (2)	97620.6205 <sub>4</sub> (6)	98734.9180 <sub>0</sub> (4)
2	95360.23720 (15)	96536.5721 <sub>7</sub> (2)	97680.6069 <sub>1</sub> (2)	98792.61094 (15)
3	95456.7430 <sub>7</sub> (3)	96629.4727 <sub>4</sub> (3)	97770.0977 <sub>6</sub> (4)	98878.7888 <sub>3</sub> (4)
4	95584.3352 <sub>5</sub> (2)	96752.3439 <sub>7</sub> (2)	97888.5137 <sub>5</sub> (3)	98992.9382 <sub>1</sub> (3)
5	95742.1146 <sub>5</sub> (6)	96904.3557 <sub>8</sub> (4)	98035.0798 <sub>7</sub> (7)	99134.344 <sub>33</sub> (1)
6	95928.9842 <sub>9</sub> (4)	97084.4918 <sub>3</sub> (4)	98208.974 <sub>98</sub> (2)	99302.100 <sub>60</sub> (1)
7	96143.695 <sub>54</sub> (4)		98408.623 <sub>20</sub> (2)	

N	B (v=8)	B (v=9)	B (v=10)	B (v=11)
0	99789.9191 <sub>7</sub> (4)	100842.7319 <sub>8</sub> (3)	101864.9344 <sub>9</sub> (5)	102857.0266 <sub>6</sub> (6)
1	99817.9578 <sub>8</sub> (4)	100869.6120 <sub>0</sub> (5)	101891.2328 <sub>3</sub> (7)	102882.1159 <sub>9</sub> (8)
2	99873.8857 <sub>4</sub> (2)	100923.2800 <sub>9</sub> (1)	101943.7821 <sub>4</sub> (3)	102932.2179 <sub>1</sub> (2)
3	99957.4178 <sub>4</sub> (4)	101003.5037 <sub>6</sub> (4)	102022.6417 <sub>4</sub> (5)	103007.13912 (19)
4	100068.2015 <sub>3</sub> (4)	101109.8691 <sub>4</sub> (2)	102129.2272 <sub>9</sub> (5)	103106.5349 <sub>9</sub> (3)
5	100206.185 <sub>42</sub> (2)	101241.7707 <sub>8</sub> (4)		103229.913 <sub>67</sub> (2)

N	B (v=12)	B (v=13)
0	103819.5225 <sub>0</sub> (6)	104752.940 <sub>05</sub> (1)
1	103844.5343 <sub>0</sub> (9)	104776.414 <sub>29</sub> (1)
2	103895.1340 <sub>4</sub> (3)	104823.3190 <sub>2</sub> (5)
3	103976.408 <sub>30</sub> (3)	104893.469 <sub>76</sub> (2)
4	104045.7890 <sub>8</sub> (4)	104986.6099 <sub>0</sub> (7)
5	104172.590 <sub>17</sub> (1)	105102.401 <sub>60</sub> (6)

Table 6

Level energies in the  $C^1\Pi_u$  state of  $H_2$  for vibrational levels  $v=0-3$ . Values in  $cm^{-1}$ .

N	$C^+$ ( $v=0$ )	$C^-$ ( $v=0$ )	$C^+$ ( $v=1$ )	$C^-$ ( $v=1$ )
1	99152.059 <sub>51</sub> (2)	99150.8516 <sub>5</sub> (5)	101457.5690 <sub>1</sub> (9)	101456.3442 <sub>7</sub> (8)
2	99275.8297 <sub>7</sub> (4)	99272.3582 <sub>5</sub> (7)	101574.9639 <sub>3</sub> (4)	101571.5631 <sub>2</sub> (9)
3	99459.9488 <sub>4</sub> (4)	99453.4335 <sub>2</sub> (5)	101749.1534 <sub>5</sub> (6)	101743.2410 <sub>6</sub> (1)
4	99702.6511 <sub>8</sub> (5)	99692.669 <sub>89</sub> (3)	101976.605 <sub>15</sub> (7)	101970.043 <sub>12</sub> (3)
5	100001.144 <sub>3</sub> (3)	99988.281 <sub>02</sub> (3)	102294.170 <sub>63</sub> (4)	102250.235 <sub>00</sub> (2)
6		100338.044 <sub>24</sub> (7)	102610.526 <sub>40</sub> (5)	102581.606 <sub>70</sub> (4)
7				102962.145 <sub>12</sub> (4)

N	$C^+$ ( $v=2$ )	$C^-$ ( $v=2$ )	$C^+$ ( $v=3$ )	$C^-$ ( $v=3$ )
1	103628.665 <sub>09</sub> (6)	103627.8560 <sub>9</sub> (7)	105660.713 <sub>1</sub> (3)	105668.0822 <sub>0</sub> (3)
2	103738.4627 <sub>7</sub> (7)	103736.940 <sub>17</sub> (3)	105783.757 <sub>3</sub> (1)	105771.126 <sub>90</sub> (2)
3	103895.959 <sub>22</sub> (2)	103899.441 <sub>50</sub> (1)	105938.546 <sub>2</sub> (5)	105924.621 <sub>20</sub> (2)
4	104141.627 <sub>07</sub> (3)	104114.096 <sub>25</sub> (2)	106144.062 <sub>6</sub> (3)	106127.311 <sub>60</sub> (7)
5	104403.464 <sub>40</sub> (8)	104379.225 <sub>35</sub> (2)	106397.043 <sub>8</sub> (8)	
6	104718.714 <sub>29</sub> (6)	104692.909 <sub>63</sub> (3)		
7		105052.72 <sub>930</sub> (1)		

Table 7

Level energies in the  $B'^1\Sigma_u^+$  state of  $H_2$  for vibrational levels  $v=0-3$ . Values in  $cm^{-1}$ .

N	$B' (v=0)$	$B' (v=1)$	$B' (v=2)$	$B' (v=3)$
0	110478.5399 <sub>9</sub> (3)	112358.5811 <sub>9</sub> (3)	114075.2169 <sub>8</sub> (2)	115606.4790 <sub>8</sub> (4)
1	110529.4148 <sub>4</sub> (7)	112404.4426 <sub>9</sub> (3)	114118.3519 <sub>6</sub> (2)	115647.0450 <sub>3</sub> (4)
2	110630.8213 <sub>3</sub> (2)	112496.1851 <sub>9</sub> (15)	114204.4154 <sub>0</sub> (1)	115728.0738 <sub>8</sub> (1)
3	110782.0710 <sub>7</sub> (3)	112633.6854 <sub>5</sub> (3)	114332.9670 <sub>1</sub> (6)	115849.4711 <sub>8</sub> (5)
4	110982.1341 <sub>5</sub> (2)	112816.4707 <sub>9</sub> (15)	114503.2778 <sub>4</sub> (2)	116011.5202 <sub>7</sub> (5)
5	111229.6470 <sub>9</sub> (9)	113043.599 <sub>92</sub> (1)	114714.299 <sub>60</sub> (1)	
6	111522.8962 <sub>7</sub> (5)		114964.623 <sub>20</sub> (2)	
7	111859.892 <sub>64</sub> (1)			

Table 8

Level energies in the  $D^1\Pi_u$  state of  $H_2$  for vibrational levels  $v=0-2$ . Values in  $cm^{-1}$ .

N	$D^+$ ( $v=0$ )	$D^-$ ( $v=0$ )	$D^+$ ( $v=1$ )	$D^-$ ( $v=1$ )
1	112935.281 <sub>31</sub> (5)	112931.659 <sub>86</sub> (1)	115155.804 <sub>8</sub> (4)	115154.407 <sub>5</sub> (6)
2	113059.7180 <sub>7</sub> (5)	113049.293 <sub>62</sub> (4)	115269.651 <sub>91</sub> (1)	115265.911 <sub>1</sub> (6)
3	113244.077 <sub>40</sub> (3)	113224.6070 <sub>7</sub> (3)	115437.952 <sub>7</sub> (2)	115431.971 <sub>6</sub> (6)
4	113486.041 <sub>66</sub> (4)	113456.222 <sub>23</sub> (4)	115657.511 <sub>5</sub> (2)	115651.412 <sub>5</sub> (9)
5		113742.355 <sub>37</sub> (3)		115922.53 <sub>29</sub> (1)
6		114080.951 <sub>09</sub> (6)		
7		114469.484 <sub>99</sub> (3)		

N	$D^+$ ( $v=2$ )	$D^-$ ( $v=2$ )
1	117251.705 <sub>9</sub> (4)	117247.8630 <sub>9</sub> (6)
2	117363.322 <sub>7</sub> (2)	117353.380 <sub>64</sub> (5)
3	117526.890 <sub>5</sub> (1)	117510.5466 <sub>8</sub> (5)
4	117738.446 <sub>5</sub> (3)	117718.179 <sub>67</sub> (3)
5		117974.570 <sub>58</sub> (2)

Table 9

Level energies in the  $\Gamma^1\Pi_g$  state of  $H_2$  for vibrational levels  $v=0-3$ . Values in  $cm^{-1}$ .

N	$\Gamma^+$ (v=0)	$\Gamma$ (v=0)	$\Gamma^+$ (v=1)	$\Gamma$ (v=1)
1	112135.236 <sub>91</sub> (2)	112072.863 <sub>98</sub> (1)	114223.9470 <sub>0</sub> (4)	114172.095 <sub>22</sub> (1)
2	112282.267 <sub>40</sub> (3)	112147.626 <sub>83</sub> (1)	114353.725 <sub>86</sub> (1)	114252.8794 <sub>7</sub> (7)
3	112471.0364 <sub>5</sub> (9)	112272.0685 <sub>2</sub> (9)	114502.4711 <sub>4</sub> (6)	114379.092 <sub>86</sub> (2)
4	112703.686 <sub>23</sub> (3)	112449.0935 <sub>4</sub> (8)	114785.379 <sub>40</sub> (8)	114552.919 <sub>65</sub> (1)
5	-	112679.057 <sub>91</sub> (2)	115004.829 <sub>20</sub> (3)	114775.079 <sub>70</sub> (4)
6	113291.620 <sub>88</sub> (3)	112961.096 <sub>58</sub> (3)		115045.125 <sub>69</sub> (2)
7	113701.409 <sub>40</sub> (8)	113293.457 <sub>38</sub> (9)		
8		113674.027 <sub>40</sub> (9)		
9		114101.489 <sub>70</sub> (3)		
10		114569.16 <sub>500</sub> (1)		

N	$\Gamma^+$ (v=2)	$\Gamma$ (v=2)	$\Gamma^+$ (v=3)	$\Gamma$ (v=3)
1	116103.609 <sub>9</sub> (2)	116114.3010 <sub>6</sub> (9)	117940.136 <sub>2</sub> (1)	117881.460 <sub>4</sub> (3)
2	116148.288 <sub>2</sub> (2)	116197.5009 <sub>7</sub> (8)	118027.201 <sub>6</sub> (5)	117964.098 <sub>2</sub> (1)
3	116214.186 <sub>0</sub> (3)	116323.956 <sub>59</sub> (2)	118139.270 <sub>7</sub> (3)	118088.261 <sub>3</sub> (3)
4	116305.278 <sub>2</sub> (4)	116494.578 <sub>99</sub> (2)	118257.59 <sub>92</sub> (1)	118253.948 <sub>4</sub> (4)
5	116424.434 <sub>8</sub> (6)	116709.641 <sub>07</sub> (4)		118460.839 <sub>6</sub> (8)
6	116573.342 <sub>2</sub> (8)	116968.697 <sub>40</sub> (5)		

Table 10

Level energies in the  $J^1\Delta_g$  state of  $H_2$  for vibrational levels  $v=0-2$ . Values in  $cm^{-1}$ .

N	$J^+$ (v=0)	$J^-$ (v=0)	$J^+$ (v=1)	$J^-$ (v=1)
2	112536.7484 <sub>5</sub> (5)	112525.955 <sub>01</sub> (1)	114721.398 <sub>80</sub> (2)	114718.212 <sub>9</sub> (2)
3	112774.584 <sub>53</sub> (1)	112743.5527 <sub>0</sub> (3)	114923.4519 <sub>8</sub> (2)	114914.494 <sub>2</sub> (3)
4	113078.128 <sub>30</sub> (8)	113018.3700 <sub>1</sub> (4)	115164.888 <sub>50</sub> (5)	115166.533 <sub>8</sub> (3)
5	113415.499 <sub>90</sub> (2)	113346.500 <sub>66</sub> (3)	115459.48 <sub>950</sub> (2)	115470.26 <sub>73</sub> (1)
6		113724.735 <sub>90</sub> (7)		

N	$J^+$ (v=2)	$J^-$ (v=2)
2	116787.679 <sub>4</sub> (2)	116787.229 <sub>2</sub> (5)
3	116960.087 <sub>7</sub> (2)	116963.152 <sub>0</sub> (3)
4	117193.174 <sub>8</sub> (3)	117191.590 <sub>9</sub> (1)
5	117413.867 <sub>0</sub> (4)	

Table 11

Calculated wavelengths of the Lyman band lines in the  $B^1\Sigma_u^+ - X^1\Sigma_g^+$  band system, with  $L_v$  referring to the  $(v',0)$  band. Values in nm.

	P(1)	P(2)	P(3)	P(4)
L0	111.0062558 (3)	111.2495989 (3)	111.5895530 (3)	112.0248839 (3)
L1	109.4051949 (3)	109.6438914 (5)	109.9787177 (5)	110.4083933 (7)
L2	107.8925400 (3)	108.1265950 (4)	108.4560256 (3)	108.8795369 (4)
L3	106.4605318 (4)	106.6900633 (4)	107.0140818 (3)	107.4312899 (5)
L4	105.1032451 (5)	105.3284210 (4)	105.6471373 (3)	106.0580970 (4)
L5	103.8157044 (4)	104.0367202 (3)	104.3503090 (4)	104.7551786 (4)
L6	102.5935181 (6)	102.8105875 (7)	103.1192672 (4)	103.5182762 (5)
L7	101.4327128 (6)	101.6461136 (5)	101.9502139 (3)	102.3436799 (5)
L8	100.3296508 (5)	100.5393086 (5)	100.8386075 (3)	101.2262348 (5)
L9	99.2809625 (4)	99.4874026 (6)	99.7827121 (3)	100.1655682 (5)
L10	98.2835296 (5)	98.4864026 (7)	98.7768823 (4)	99.1533853 (6)
L11	97.3344571 (6)	97.5345771 (8)	97.8218030 (3)	98.1948441 (3)
L12	96.4310524 (6)	96.6275434 (9)	96.9089768 (4)	97.269064 (3)
L13	95.5708153 (9)	95.7652228 (9)	96.0450567 (5)	96.409079 (2)

	P(5)	R(0)	R(1)	R(2)
L0	112.5540690 (5)	110.81273169 (17)	110.8633244 (3)	111.0120562 (3)
L1	110.9313238 (4)	109.2195201 (4)	109.2732382 (4)	109.4244560 (7)
L2	109.3954976 (3)	107.7138656 (3)	107.7698852 (3)	107.9225425 (4)
L3	107.9400450 (4)	106.2882074 (4)	106.3460086 (3)	106.4994759 (4)
L4	106.5596570 (4)	104.9367383 (4)	104.9959704 (3)	105.1498512 (4)
L5	105.2496918 (4)	103.65456797 (16)	103.7149822 (3)	103.8690179 (3)
L6	104.0059726 (4)	102.4373738 (6)	102.4987976 (3)	102.6528323 (5)
L7	102.8248570 (4)	101.2812914 (4)	101.3436916 (2)	101.4976843 (5)
L8	101.7004186 (5)	100.1823741 (4)	100.2452009 (3)	100.3985377 (5)
L9	100.6343184 (3)	99.1378851 (5)	99.2016320 (2)	99.3550563 (5)
L10	99.6124697 (6)	98.1438709 (7)	98.2074245 (4)	98.3591063 (5)
L11	98.6520717 (4)	97.1986230 (8)	97.2632731 (3)	97.4157875 (2)
L12	97.7463601 (5)	96.2977981 (8)	96.3607928 (3)	96.504571 (3)
L13	96.8556580 (7)	95.4413268 (9)	95.5065759 (5)	95.6579917 (18)

	R(3)	R(4)	R(5)
L0	111.2583944 (5)	111.6014618 (7)	112.0400623 (5)
L1	109.6725316 (4)	110.0164528 (7)	110.4548705 (5)
L2	108.1711274 (3)	108.5145527 (5)	108.9513848 (5)
L3	106.7478598 (4)	107.0900286 (6)	107.5244947 (6)
L4	105.3976051 (4)	105.7380706 (7)	106.1697413 (5)
L5	104.1158832 (4)	104.4543977 (5)	104.8830369 (5)
L6	102.8986607 (4)	103.2350972 (8)	103.660473 (2)
L7	101.7424212 (4)	102.0767035 (11)	102.4990170 (11)
L8	100.6414053 (5)	100.971969 (2)	-
L9	99.5972783 (3)	99.9270807 (5)	-
L10	98.5962767 (6)	-	-
L11	97.6552811 (4)	97.980509 (2)	-
L12	96.7676976 (5)	97.0838045 (10)	-
L13	95.8946624 (7)	96.215273 (6)	-



Table 12

Calculated wavelengths of the Werner band lines in the  $C^1\Pi_u - X^1\Sigma_g^+$  band system, with Wv referring to the  $(v',0)$  band. Values in nm.

	P(2)	P(3)	P(4)	P(5)
W0	101.216946 (2)	101.4504259 (5)	101.7385588 (5)	102.0799172 (6)
W1	98.9088421 (9)	99.1380493 (5)	99.4229935 (6)	99.764142 (7)
W2	96.829519 (6)	97.0563360 (7)	97.345239 (2)	97.654879 (3)
W3	94.961045 (3)	95.167184 (1)	95.447400 (5)	95.781887 (3)

	Q(1)	Q(2)	Q(3)	Q(4)
W0	100.9770899 (6)	101.0938509 (8)	101.2679615 (6)	101.498244 (3)
W1	98.6798049 (8)	98.7974478 (9)	98.9729361 (3)	99.205124 (3)
W2	96.6096120 (7)	96.728107 (3)	96.9049316 (10)	97.138968 (2)
W3	94.7421917 (3)	94.861582 (18)	95.0397767 (18)	95.275740 (6)

	Q(5)	R(0)	R(1)	R(2)
W0	101.783147 (3)	100.855192 (2)	100.8498181 (5)	100.9024969 (5)
W1	99.492543 (2)	98.5633709 (9)	98.5644316 (4)	98.6244066 (6)
W2	97.428818 (2)	96.498397 (6)	96.5064884 (7)	96.579552 (2)
W3	-	94.642556 (3)	94.6384745 (9)	94.711165 (5)

	R(3)	R(4)	R(5)
W0	101.0130272 (6)	101.181449 (3)	
W1	98.744868 (7)	98.887151 (4)	99.137172 (5)
W2	96.678038 (3)	96.866686 (8)	97.107625 (6)
W3	94.841978 (3)	95.031519 (7)	

## Figure Captions

Fig. 1: Spectral recording of the Q(3) line in the  $EF^1\Sigma_g^+ - X^1\Sigma_g^+$  (0,0) band using Doppler-free two-photon spectroscopy with counter-propagating laser beams in the deep ultraviolet.

Fig. 2: Potential energy diagram of the relevant states probed: states of *gerade* symmetry on the left, and states of *ungerade* symmetry on the right. The potentials are obtained from [35].

Fig. 3: Overview of the entire Fourier-transform emission spectrum obtained from 2000 to 22000  $\text{cm}^{-1}$ . The very strong and saturated lines are atomic lines: (1) Brackett- $\alpha$ ; (2) Brackett- $\beta$ ; (3) Paschen- $\alpha$ ; (4) Paschen- $\beta$ ; (5) Paschen- $\gamma$ . The two ranges without records correspond to the atomic line Balmer- $\alpha$  (6) and Balmer- $\beta$  (7).

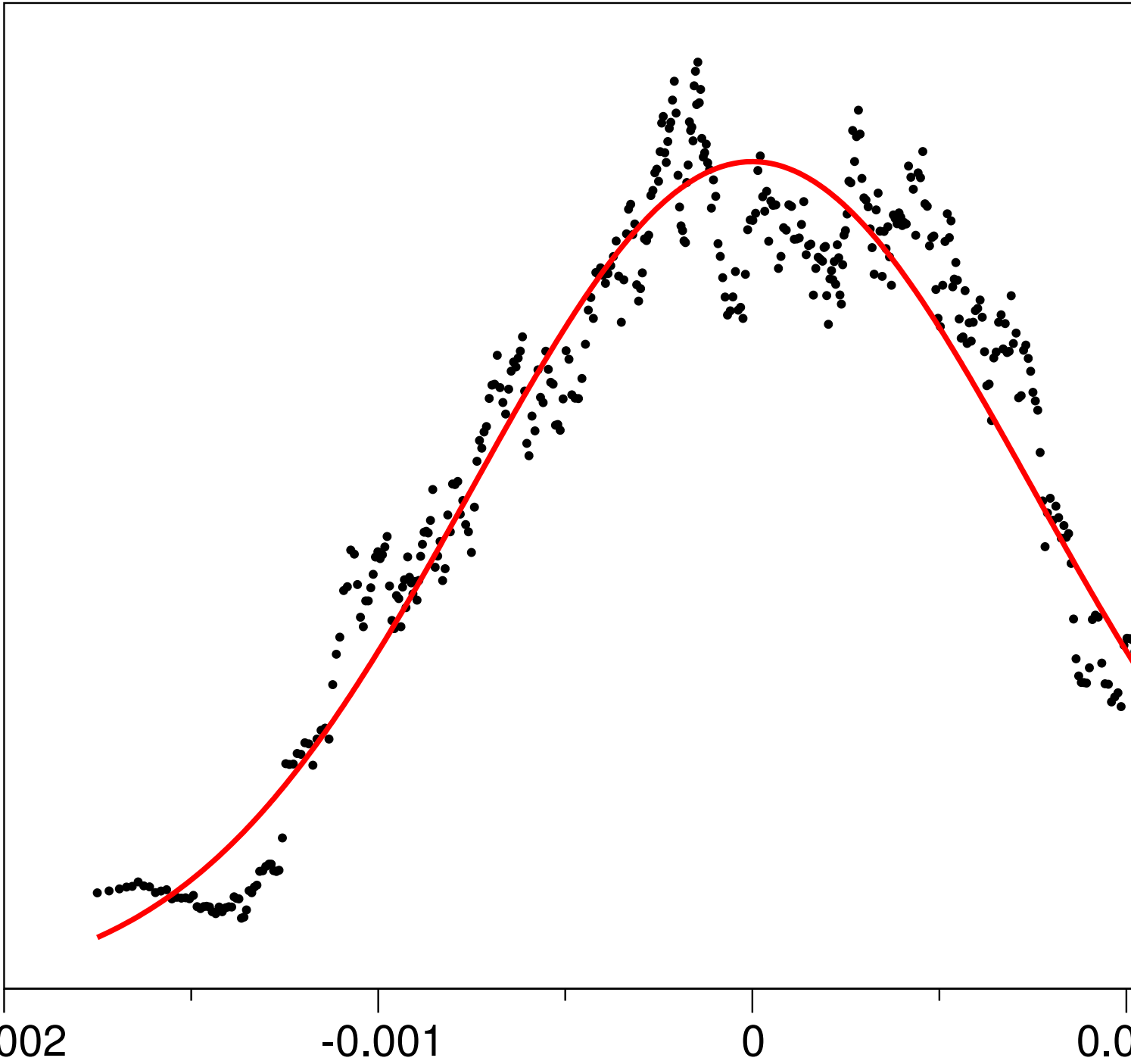
Fig. 4: Detail spectra of two spectral ranges covering 15.5  $\text{cm}^{-1}$ : (a) in the blue spectral region and, (b) in the infrared region. The spectra clearly show the different Doppler-limited resolution for the FT-emission spectrum in both regions.

Fig. 5: Schematic of the method by which the level energies are determined in the present study. Energy levels in  $EF^1\Sigma_g^+$  and  $B^1\Sigma_u^+$ , and all other excited states are interconnected in the FT-spectra by a large number of spectral lines.

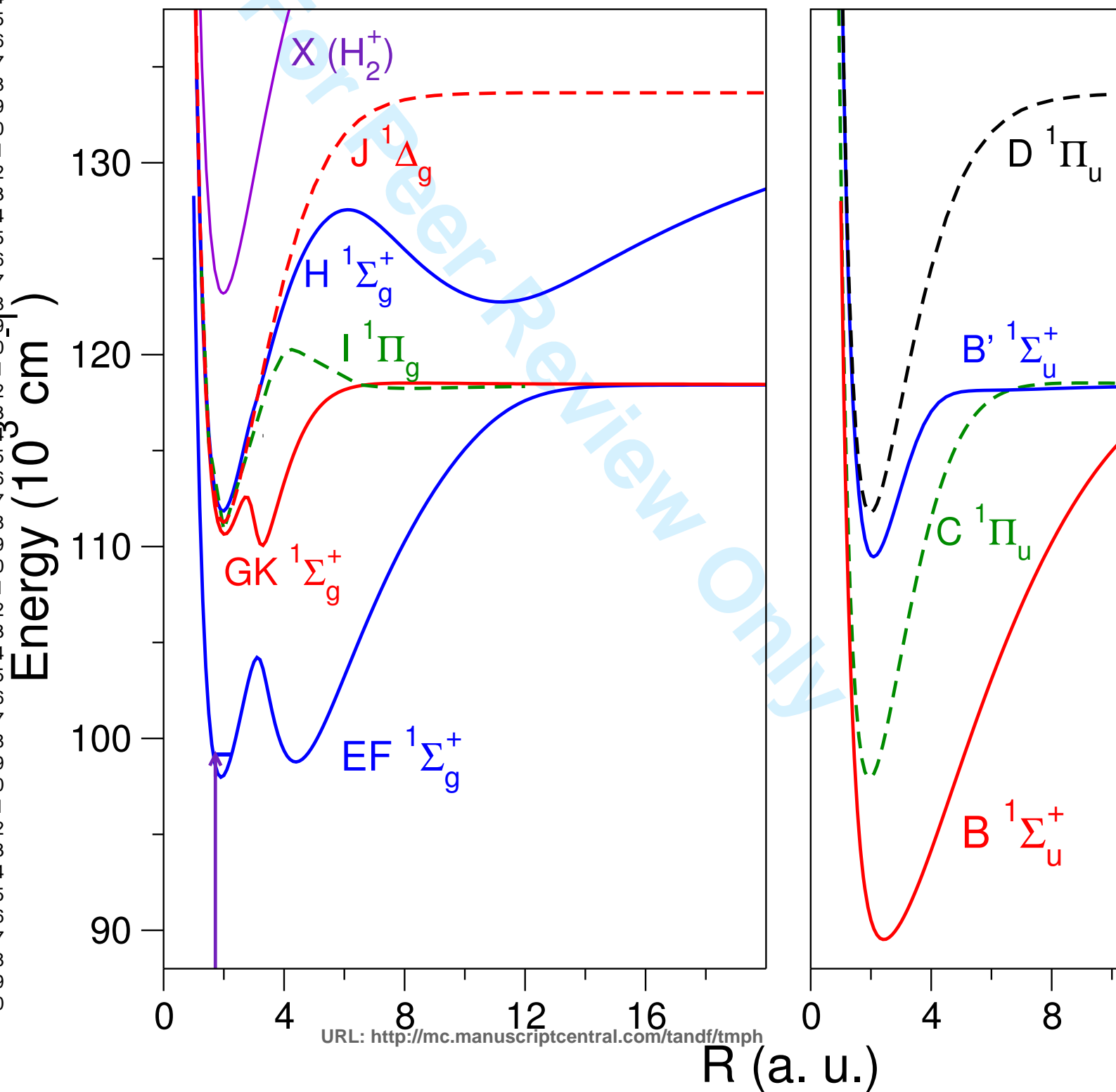
Fig. 6: Graphical representation of the level energies of  $^1\Sigma_g^+$  and  $^1\Pi_g^+$  symmetries as a function of rotational quantum number N, in the energy range 111500 – 114000  $\text{cm}^{-1}$  (left) and for the range 115000 – 118000  $\text{cm}^{-1}$  (right).  $EF^1\Sigma_g^+$  rovibrational levels are indicated by filled circles (●),  $GK^1\Sigma_g^+$  levels as open circles (○),  $H^1\Sigma_g^+$  levels as stars (\*),  $I^1\Pi_g^+$  levels as squares (■), and  $J^1\Delta_g^+$  levels as triangles (▲).

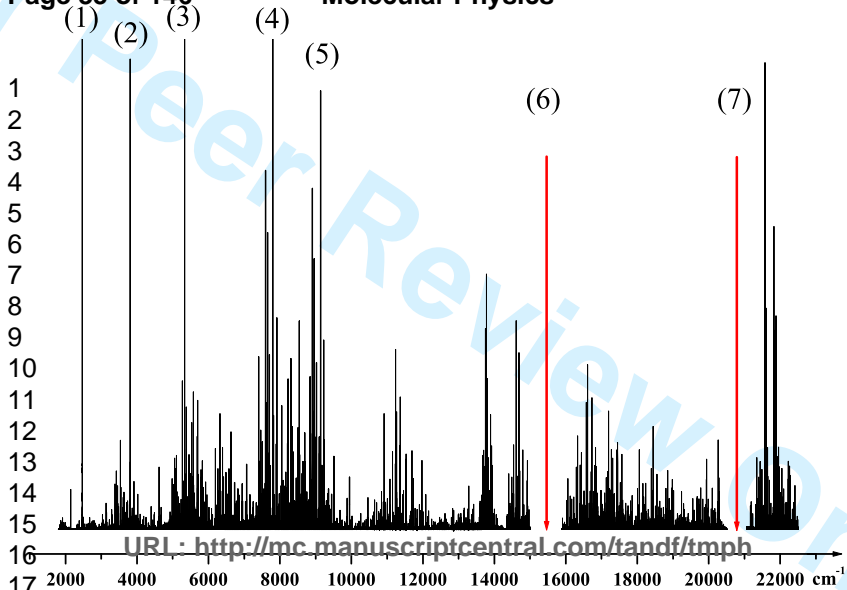
Fig. 7: Comparison of the Lyman and Werner transitions derived from the FT data and from direct XUV excitation. The filled circles (●), squares (■) and triangles (▲) indicate transitions belonging to the P-, R- and Q-branch (Werner), respectively. a) The normalized transition energy differences of the Lyman transitions show severe systematic shifts around 97000  $\text{cm}^{-1}$ , which we attribute to frequency chirp effects in the PDA. b) Werner transitions (>98000  $\text{cm}^{-1}$ ) do not show severe systematic trends.

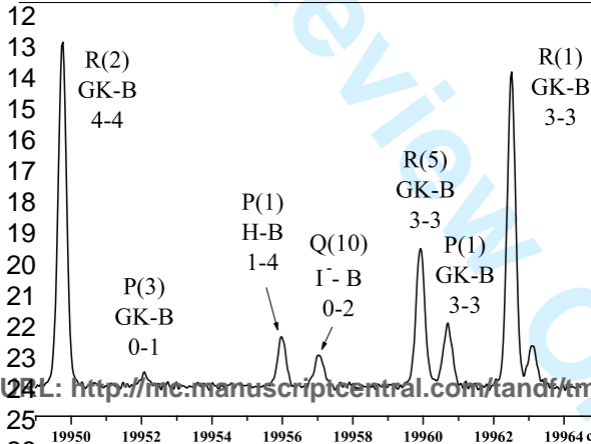
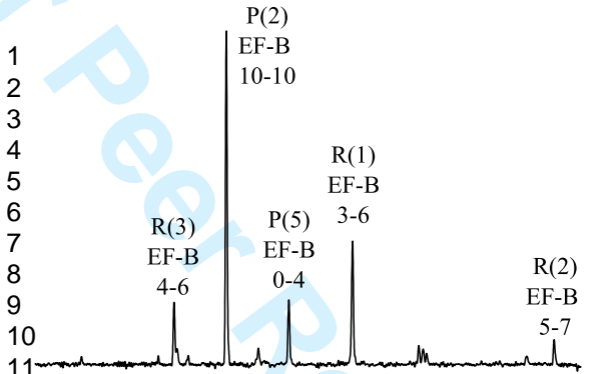
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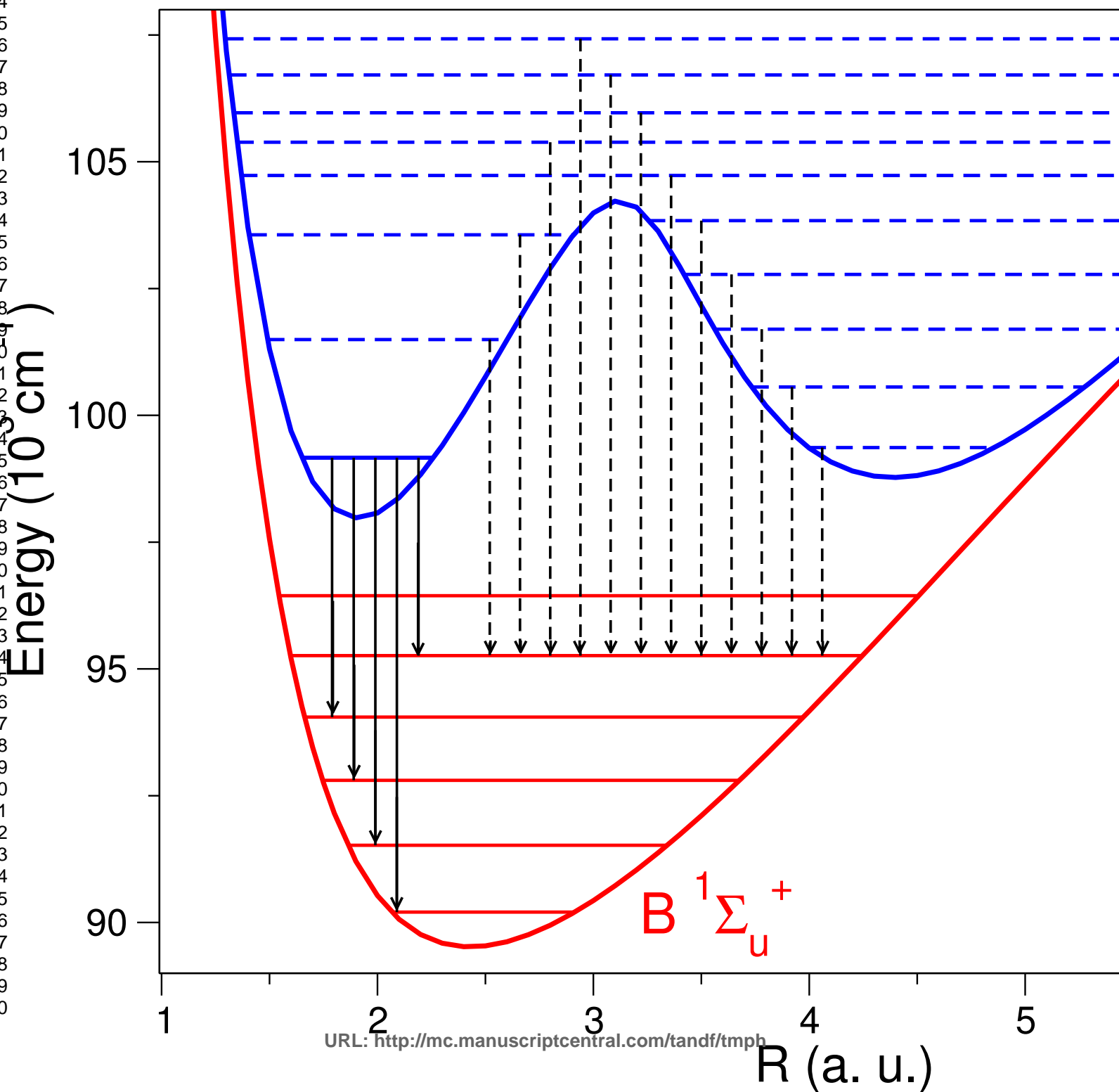
URL: <http://mc.manuscriptcentral.com/landimph>  
Energy - 98837.24717 (cm<sup>-1</sup>)

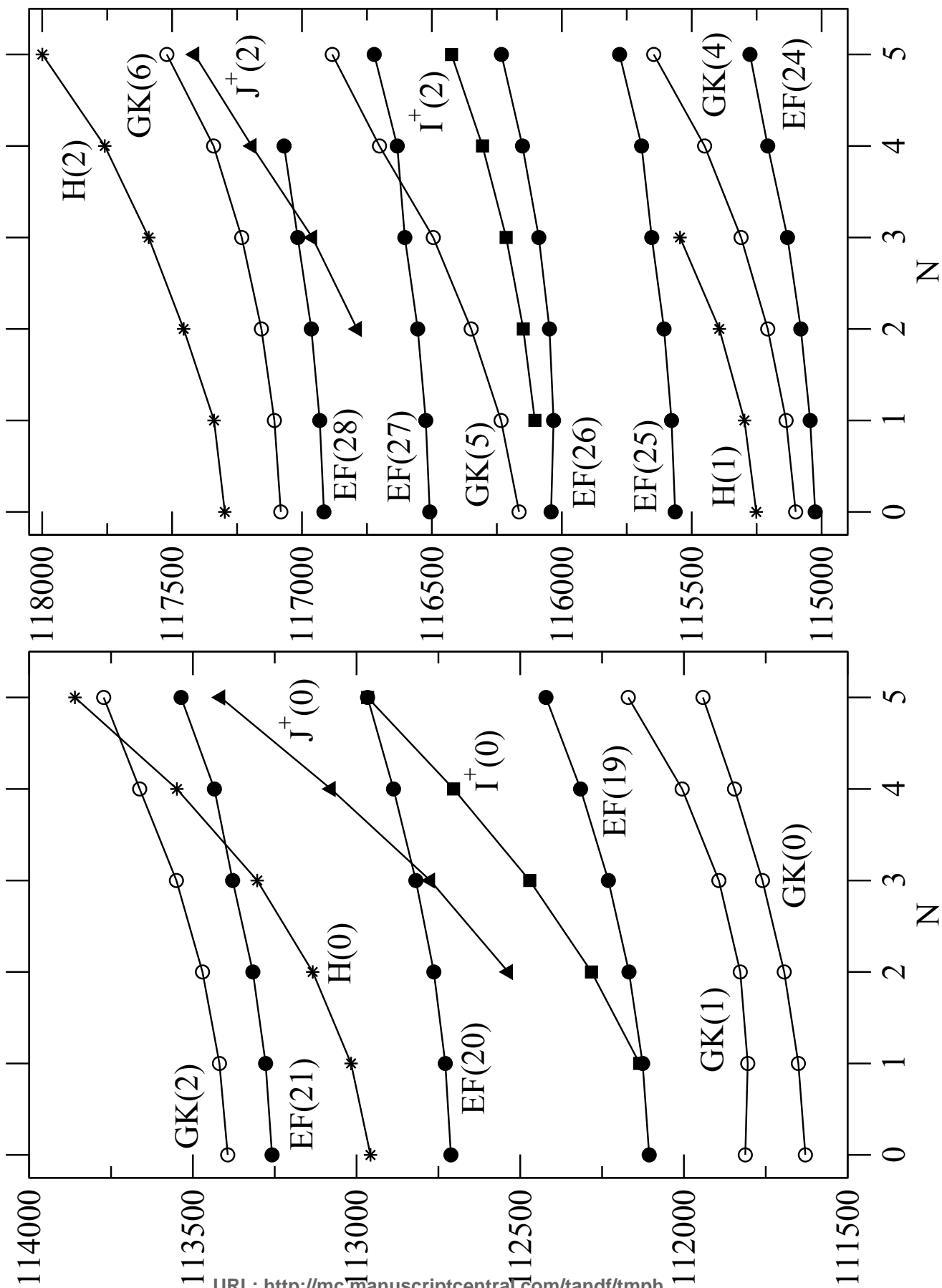




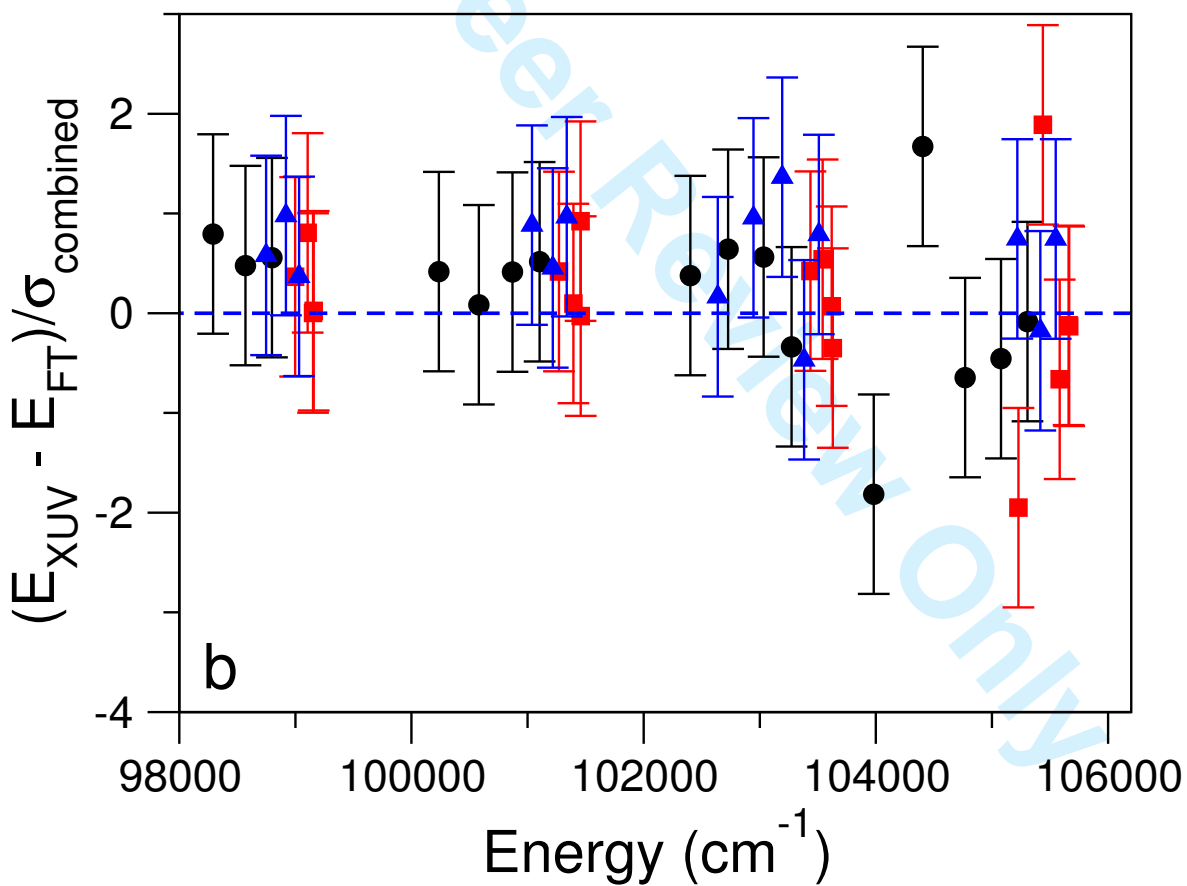
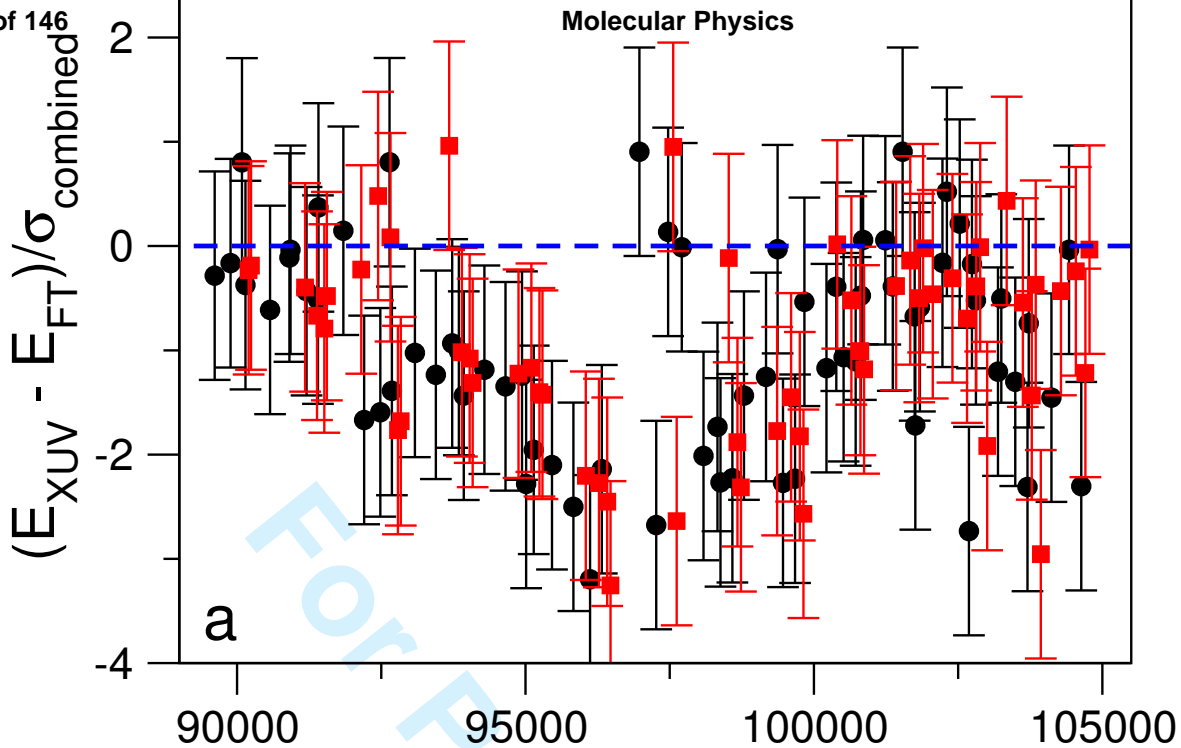


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# **H<sub>2</sub> Rovibronic Transitions**

**2000-22000 cm<sup>-1</sup>**

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4 This document contains the spectral line positions as derived from the Fourier-Transform  
5 emission study, as described in the paper  
6 Accurate level energies in the  $EF^1\Sigma_g^+$ ,  $GK^1\Sigma_g^+$ ,  $H^1\Sigma_g^+$ ,  $B^1\Sigma_u^+$ ,  $C^1\Pi_u$ ,  $B'^1\Sigma_u^+$ ,  $D^1\Pi_u$ ,  $I^1\Pi_g$ ,  $J^1\Delta_g$   
7 states of  $H_2$   
8 by D. Bailly, E. J. Salumbides, M. Vervloet, and W. Ubachs,  
9 which appeared in *Molecular Physics* xx, xxx-xxx (2009).  
10

11 Note:

12 The spectral assignment for the line positions in this Appendix may differ somewhat from the  
13 assignment in the Tables of the level energies in the Molecular Physics paper. Where in the  
14 paper a “natural assignment” was adopted (shown in Fig. 6), in this Appendix the EF, GK, H,  
15 I, and J states were assigned according to that of Ross and Jungen [Phys. Rev. A50, 4618-  
16 4628], the levels of the B and C states were assigned according to Dabrowski [Can. J. Phys.  
17 62, 1639-1664 (1984)], and the B' states were assigned according to Tsukiyama and  
18 coworkers [J. Chem. Phys. 97, 875-882 (1992), J. Mol. Spectr. 155, 352-359 (1992), Laser  
19 Chem. 14, 31-44 (1994)].  
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# TRANSITIONS

**EF → B**

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<b>H<sub>2</sub> EF → B 0-0</b>					<b>H<sub>2</sub> EF → B 0-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 2	8908.576	8908.575	6.269	-1	P 2	7596.016	7596.016	10.593	0
P 3	8919.877	8919.876	6.184	-1	P 1	7606.062	7606.062	10.164	0
P 1	8922.449	8922.448	6.123	-1	P 3	7612.934	7612.935	10.398	1
P 4	8956.388	8956.388	6.186	0	P 4	7656.713	7656.713	9.988	0
P 5	9017.966				R 0	7706.394	7706.394	9.003	0
R 0	9024.718	9024.718	7.326	0	P 5	7727.031	7727.032	10.238	1
P 6	9104.284	9104.282	5.715	-2	R 1	7795.831	7795.830	8.367	-1
R 1	9112.218	9112.219	6.955	1	P 6	7823.359	7823.360	7.268	1
P 7	9214.823	9214.823	4.967	0	R 2	7910.564	7910.564	7.538	0
R 2	9223.123	9223.123	6.394	0	P 7	7944.962	7944.963	5.790	1
P 8	9348.856	9348.855	4.736	-1	R 3	8049.703			
R 3	9356.646	9356.645	5.553	-1	P 8	8090.882	8090.882	5.500	0
P 9	9505.573	9505.572	4.453	-1	R 4	8212.208	8212.205	5.770	-3
R 4	9511.883	9511.883	5.234	0	P 9	8260.090	8260.091	4.474	1
P10	9683.799	9683.800	4.459	1	R 5	8396.904	8396.903	4.096	-1
R 5	9687.838	9687.839	4.835	1	P10	8451.206	8451.206	4.005	0
P11	9882.396	9882.398	1.743	2	R 6	8602.469	8602.468	4.341	-1
R 6	9883.394	9883.396	4.010	2	P11	8662.897	8662.896	3.866	-1
R 7	10097.450	10097.448	3.235	-2	R 7	8827.589	8827.589	3.699	0
P12	10099.602	10099.602	4.417	0	P12	8893.270	8893.268	5.493	-2
R 8	10328.660	10328.660	3.937	0	R 8	9070.686	9070.686	7.005	0
R 9	10575.794	10575.794	2.816	0	R 9	9330.311	9330.312	4.559	1
R10	10837.124	10837.125	3.001	1	R10	9604.531	9604.531	4.408	0
R11	11109.893	11109.892	1.879	-1	R11	9890.394	9890.396	3.186	2
R12	11392.118				R12	10185.787	10185.792	2.948	5
<b>RMS= 0.9 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 1.1 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 0-2</b>					<b>H<sub>2</sub> EF → B 0-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 2	6319.431	6319.431	11.953	0	P 2	5077.053	5077.053	10.216	0
P 1	6326.229	6326.229	10.017	0	P 1	5080.972	5080.971	10.284	-1
P 3	6341.135	6341.137	11.602	2	P 3	5103.007	5103.007	11.285	0
P 4	6391.136	6391.137	15.073	1	P 4	5158.554	5158.554	9.947	0
R 0	6424.918	6424.918	14.818	0	R 0	5178.208	5178.208	9.985	0
P 5	6468.988	6468.989	15.684	1	P 5	5243.150	5243.149	9.383	-1
R 1	6515.998	6515.998	15.968	0	R 1	5270.741	5270.742	9.681	1
P 6	6574.015	6574.016	14.615	1	P 6	5356.008	5356.010	6.187	2
R 2	6633.979	6633.980	15.480	1	R 2	5391.601	5391.601	9.518	0
P 7	6705.323	6705.323	12.172	0	P 7	5496.105	5496.109	4.568	4
R 3	6777.904	6777.904	14.068	0	R 3	5539.776	5539.776	8.542	0
P 8	6861.792	6861.793	11.475	1	P 8	5662.209	5662.211	6.926	2
R 4	6946.631	6946.632	13.176	1	R 4	5714.048	5714.050	5.973	2
P 9	7042.535	7042.535	5.136	0	P 9	5852.977	5852.976	4.207	-1
R 5	7138.861	7138.860	8.673	-1	R 5	5913.023	5913.028	0.346	5
P10	7245.085	7245.086	10.035	1	R 6	6135.118	6135.118	5.017	0
R 6	7353.126	7353.123	9.112	-3	R 7	6378.732	6378.735	2.760	3
P11	7468.893	7468.892	6.211	-1	R 8	6642.013	6642.012	9.564	-1
R 7	7587.950				R 9	6923.198	6923.196	5.610	-2
P12	7711.617	7711.619	5.978	2	<b>RMS= 1.2 10<sup>3</sup> cm<sup>-1</sup></b>				
R 8	7841.596	7841.593	5.268	-3					
P13	7970.174	7970.173	4.004	-1					
R 9	8112.756								
R10	8398.410	8398.412	3.818	2					
R11	8696.390	8696.391	2.840	1					
R12	9004.134								
<b>RMS= 1.0 10<sup>3</sup> cm<sup>-1</sup></b>									



<b>H<sub>2</sub> EF → B 1-5</b>					<b>H<sub>2</sub> EF → B 2-1</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+3</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>
P 6	2462.378	2462.372	13.238	-6	P 8	8106.06	8106.05	3.965	-1
P 5	2581.615	2581.614	6.857	-1	P 7	8293.27	8293.24	4.371	-3
P 4	2684.823	2684.822	28.644	-1	P 6	8463.23	8463.22	3.162	-1
P 3	2771.040	2771.040	17.437	0	P 5	8614.22	8614.20	3.181	-2
R 4	2794.526	2794.522	16.439	-4	R 6	8617.65			
P 2	2839.475	2839.474	31.389	-1	P 4	8744.66	8744.66	7.212	0
R 3	2856.498				R 5	8745.21			
P 1	2889.606	2889.606	23.310	0	R 4	8852.08	8852.08	9.679	0
R 2	2900.595	2900.594	27.565	1	P 3	8853.18			
R 1	2926.231	2926.232	10.506	1	R 3	8936.89	8936.84	0.054	-5
R 0	2933.020	2933.018	23.613	-2	P 2	8938.64	8938.62	5.727	-2
<b>RMS= 2.1 10<sup>3</sup> cm<sup>-1</sup></b>					R 2	8998.51	8998.51	3.162	0
					P 1	9000.13	9000.13	0.819	0
					R 1	9036.08	9036.06	1.641	-2
					R 0	9049.02	9049.03	2.576	1
					<b>RMS= 1.3 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 2-2</b>					<b>H<sub>2</sub> EF → B 2-3</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+3</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+3</sup>cm<sup>-1</sup></b>
P 8	6876.969	6876.973	6.652	4	P 8	5677.386	5677.386	3.513	0
P 7	7053.627	7053.626	4.397	-1	P 7	5844.409			
P 6	7213.886				P 6	5995.879	5995.880	5.196	1
P 5	7356.175	7356.175	5.892	0	P 5	6130.337	6130.335	4.470	-2
R 6	7368.303	7368.300	4.206	-3	R 6	6150.295	6150.299	1.899	4
P 4	7479.083	7479.085	10.963	2	P 4	6246.501	6246.500	6.384	-1
R 5	7487.164	7487.167	2.189	3	R 5	6261.326	6261.328	1.496	2
P 3	7581.385	7581.387	15.416	2	P 3	6343.257	6343.261	5.963	4
R 4	7586.502	7586.506	4.608	3	R 4	6353.919	6353.918	4.060	-1
P 2	7662.056	7662.047	9.626	-9	P 2	6419.678	6419.678	10.147	0
R 3	7665.090	7665.087	3.178	-4	R 3	6426.962	6426.967	6.325	5
P 1	7720.293	7720.292	3.254	-1	P 1	6475.037	6475.036	12.647	-1
R 2	7721.926	7721.929	5.061	3	R 2	6479.548	6479.547	14.416	-1
R 1	7756.248	7756.249	3.052	2	R 1	6510.991	6510.991	12.699	0
R 0	7767.542	7767.544	4.942	2	R 0	6520.833	6520.832	13.684	-1
<b>RMS= 3.8 10<sup>-3</sup> cm<sup>-1</sup></b>					<b>RMS= 1.7 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF-B 2-4</b>					<b>H<sub>2</sub> EF → B 2-5</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+3</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>
P 7	4665.808	4665.804	6.121	-4	P 4	3878.37	3878.36	1.811	-1
P 6	4809.148	4809.147	6.441	0	P 3	3965.33			
P 5	4936.396	4936.395	5.415	-1	R 4	3985.79			
R 6	4963.564	4963.568	3.316	4	P 2	4034.27	4034.28	1.187	1
P 4	5046.378	5046.377	7.003	-1	R 3	4049.04			
R 5	5067.386				P 1	4084.57			
P 3	5138.063	5138.066	5.546	3	R 2	4094.14			
R 4	5153.797	5153.799	4.390	2	R 1	4120.52	4120.54	16.797	2
P 2	5210.606	5210.606	9.081	0	R 0	4127.82			
R 3	5221.768	5221.765	3.604	-3	<b>RMS= 1.7 10<sup>2</sup> cm<sup>-1</sup></b>				
P 1	5263.342	5263.343	6.001	1					
R 2	5270.476	5270.476	7.362	0					
R 1	5299.296	5299.295	7.639	-1					
R 0	5307.816	5307.816	7.135	0					
<b>RMS= 2.0 10<sup>3</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 2-6</b>					<b>H<sub>2</sub> EF → B 3-0</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 4	2742.20	2742.20	20.375	0	P 2	11234.384	11234.385	4.204	1
R 5	2774.42				P 3	11236.963	11236.963	3.804	0
P 3	2824.71				P 1	11252.406	11252.406	4.310	0
R 4	2849.62	2849.62	3.035	0	P 4	11263.027	11263.028	4.809	1
P 2	2890.24	2890.24	23.231	0	P 5	11307.671	11307.672	3.870	1
R 3	2908.41				R 0	11350.527	11350.528	4.098	1
P 1	2938.23				P 6	11373.168	11373.169	3.858	1
R 2	2950.11	2950.11	13.870	0	R 1	11429.304	11429.305	3.929	1
R 1	2974.19	2974.17	6.674	-2	P 7	11455.176			
R 0	2980.31	2980.30	1.291	-1	R 2	11529.762	11529.763	3.058	1
<b>RMS= 0.6 10<sup>2</sup>cm<sup>-1</sup></b>					R 3	11646.351	11646.352	2.903	1
					R 4	11780.768	11780.768	2.764	0
					R 5	11928.191			
					<b>RMS= 0.9 10<sup>3</sup>cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 3-1</b>					<b>H<sub>2</sub> EF → B 3-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 2	9921.82	9921.82	4.789	0	P 2	8645.240	8645.240	5.917	0
P 3	9930.02	9930.02	3.071	0	P 1	8656.186	8656.184	5.837	-2
P 1	9936.02	9936.03	5.971	1	P 3	8658.221	8658.221	4.146	0
P 4	9963.35	9963.35	5.537	0	P 4	8697.775	8697.773	4.311	-2
P 5	10016.74	10016.72	3.618	-2	R 0	8750.727	8750.726	5.700	-1
R 0	10032.20	10032.20	1.344	0	P 5	8758.694	8758.694	3.953	0
P 6	10092.24	10092.24	3.370	0	R 1	8833.084	8833.084	5.971	0
R 1	10112.92				P 6	8842.900	8842.901	4.035	1
P 7	10185.32				R 2	8940.617	8940.618	5.994	1
R 2	10217.20	10217.19	3.155	-1	R 3	9067.610	9067.609	5.063	-1
R 3	10339.41				R 4	9215.516	9215.515	5.035	-1
R 4	10481.09				R 5	9379.214			
R 5	10637.26				<b>RMS= 1.0 10<sup>3</sup>cm<sup>-1</sup></b>				
<b>RMS= 0.7 10<sup>3</sup>cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 3-3</b>					<b>H<sub>2</sub> EF → B 3-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 2	7402.862	7402.862	12.314	0	P 2	6193.790	6193.789	7.808	-1
P 1	7410.929	7410.929	12.151	0	P 1	6199.234	6199.234	7.846	0
P 3	7420.093	7420.093	10.462	0	P 3	6214.899	6214.899	7.867	0
P 4	7465.192	7465.192	12.863	0	P 4	6265.069	6265.069	7.652	0
R 0	7504.017	7504.017	10.139	0	R 0	6291.000	6291.000	6.749	0
P 5	7532.856	7532.855	5.451	-1	P 5	6338.916	6338.917	8.424	1
R 1	7587.827	7587.828	7.713	1	R 1	6376.132	6376.133	7.864	1
P 6	7624.892	7624.891	5.910	-1	P 6	6438.161	6438.161	11.921	0
R 2	7698.239	7698.241	7.946	2	R 2	6489.167	6489.168	16.218	1
P 7	7736.458				P 7	6557.858			
R 3	7829.482	7829.482	6.797	0	R 3	6624.288	6624.288	11.938	0
R 4	7982.933	7982.933	5.468	0	R 4	6782.810	6782.810	10.946	0
R 5	8153.376				R 5	6959.435	6959.435	7.267	0
<b>RMS= 0.7 10<sup>3</sup>cm<sup>-1</sup></b>					<b>RMS= 0.4 10<sup>3</sup>cm<sup>-1</sup></b>				



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<b>H<sub>2</sub> EF → B 3-5</b>					<b>H<sub>2</sub> EF → B 3-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 2	5017.455	5017.454	10.826	-1	P 2	3873.420	3873.421	20.341	1
P 1	5020.462	5020.462	10.954	0	P 1	3874.124	3874.122	13.889	-2
P 3	5042.169	5042.175	7.506	6	P 3	3901.545	3901.544	16.046	-1
P 4	5097.060	5097.061	10.376	1	P 4	3960.892	3960.892	15.760	0
R 0	5111.000	5110.999	10.336	-1	R 0	3963.496	3963.497	15.380	1
P 5	5176.675	5176.676	9.549	1	P 5	4045.952	4045.951	12.302	-1
R 1	5197.360	5197.359	11.898	-1	R 1	4051.022	4051.023	13.250	1
P 6	5282.654	5282.654	9.136	0	R 2	4168.798	4168.801	14.075	3
R 2	5312.832				R 3	4310.934	4310.936	10.188	2
R 3	5451.558	5451.558	7.156	0	R 4	4478.633	4478.635	9.213	2
R 4	5614.801	5614.799	6.541	-2	R 5	4666.471			
R 5	5797.194								
<b>RMS= 1.8 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 1.7 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 3-7</b>					<b>H<sub>2</sub> EF → B 4-0</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 1	2759.829	2759.827	12.591	-2	P 8	10498.06	10498.05	0.577	-1
P 2	2761.418	2761.417	36.260	-1	P 7	10698.65	10698.62	0.353	-3
P 3	2792.854	2792.854	27.514	0	P 6	10881.08	10881.01	2.068	-7
R 0	2848.020	2848.018	26.260	-2	R 6	11032.59			
P 4	2856.468	2856.467	26.499	-1	P 5	11042.77	11042.78	0.400	1
R 1	2936.727	2936.725	5.729	-2	R 5	11171.66	11171.74	0.117	8
P 5	2946.688	2946.690	7.663	2	P 4	11182.20	11182.20	1.181	0
R 2	3056.795	3056.793	21.821	-2	R 4	11288.68	11288.66	0.392	-2
P 6	3065.046	3065.046	20.718	0	P 3	11300.35			
R 3	3202.243				R 3	11381.45			
R 4	3374.208				P 2	11391.21			
R 5	3567.207				R 2	11448.94	11448.93	2.734	-1
<b>RMS= 1.3 10<sup>3</sup> cm<sup>-1</sup></b>					P 1	11456.62	11456.58	1.145	-4
					R 1	11492.69			
					R 0	11507.35			
<b>RMS= 1.3 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 3.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 4-1</b>					<b>H<sub>2</sub> EF → B 4-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 8	9240.08	9240.09	2.795	1	P 8	8010.99	8010.99	3.871	0
P 7	9428.79	9428.80	2.655	1	P 7	8189.15	8189.10	5.463	-5
P 6	9600.15				P 6	8350.81			
R 6	9751.67	9751.68	0.818	1	P 5	8493.79	8493.79	3.388	0
P 5	9751.84				R 6	8502.33	8502.33	2.637	0
R 5	9880.73	9880.74	1.598	1	P 4	8616.95	8616.95	4.900	0
P 4	9882.52				R 5	8622.69	8622.68	0.705	-1
R 4	9989.00				P 3	8721.61	8721.61	5.522	0
P 3	9993.41	9993.42	3.529	1	R 4	8723.42			
R 3	10074.51	10074.51	1.445	0	P 2	8802.06	8802.06	5.741	0
P 2	10078.65	10078.65	4.182	0	R 3	8802.71	8802.73	3.784	2
R 2	10136.38	10136.37	3.653	0	R 2	8859.79	8859.80	4.585	1
P 1	10140.23	10140.23	2.159	0	P 1	8860.40	8860.39	3.594	-1
R 1	10176.31	10176.30	1.332	0	R 1	8896.47	8896.47	4.019	0
R 0	10189.02	10189.03	3.069	1	R 0	8907.55	8907.55	3.969	0
<b>RMS= 0.7 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 1.7 10<sup>2</sup> cm<sup>-1</sup></b>				



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<b>H<sub>2</sub> EF → B 5-2</b>					<b>H<sub>2</sub> EF → B 5-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 7	9269.644	9269.642	2.006	-2	P 8	7891.505	7891.502	6.408	-3
P 6	9430.873	9430.873	3.692	0	P 7	8060.426			
R 7	9443.360				P 6	8212.866	8212.866	3.392	0
P 5	9574.130	9574.126	1.971	-4	R 7	8234.142			
R 6	9582.422	9582.422	0.112	0	P 5	8348.292	8348.291	2.359	-1
P 4	9697.733	9697.735	2.876	2	R 6	8364.414			
R 5	9703.181	9703.180	2.635	-1	P 4	8465.150	8465.150	3.239	0
P 3	9800.463	9800.460	4.666	-3	R 5	8477.343	8477.340	2.009	-3
R 4	9803.489	9803.487	3.480	-2	P 3	8562.335	8562.330	2.554	-5
P 2	9881.350	9881.350	4.454	0	R 4	8570.906	8570.906	1.421	0
R 3	9883.046	9883.040	2.769	-6	P 2	8638.972	8638.970	3.606	-2
P 1	9939.673	9939.673	3.853	0	R 3	8644.918	8644.916	4.624	-2
R 2	9940.575	9940.575	3.803	0	P 1	8694.416	8694.416	3.096	0
R 1	9975.326	9975.323	2.411	-3	R 2	8698.197	8698.195	3.313	-2
R 0	9986.836	9986.835	2.847	-1	R 1	8730.069	8730.070	3.366	1
<b>RMS = 2.5 10<sup>3</sup> cm<sup>-1</sup></b>					R 0	8740.127	8740.126	2.528	-1
					<b>RMS = 2.1 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 5-4</b>					<b>H<sub>2</sub> EF → B 5-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 7	6881.825	6881.832	0.919	7	P 6	5870.627	5870.624	5.163	-3
P 6	7026.135	7026.137	4.220	2	P 5	5992.111	5992.109	1.990	-2
R 7	7055.542	7055.546	0.628	4	R 6	6022.175			
P 5	7154.352				P 4	6097.018	6097.017	5.945	-1
R 6	7177.683				R 5	6121.162			
P 4	7265.027	7265.031	3.698	4	P 3	6184.411	6184.413	4.878	2
R 5	7283.403				R 4	6202.775	6202.775	3.163	0
P 3	7357.141	7357.142	7.713	1	P 2	6253.565	6253.565	6.068	0
R 4	7370.783				R 3	6266.994	6266.998	2.139	4
P 2	7429.900	7429.903	1.053	3	P 1	6303.949	6303.952	4.330	3
R 3	7439.724	7439.727	4.705	3	R 2	6312.790	6312.790	5.007	0
P 1	7482.721				R 1	6339.602	6339.601	3.336	-1
R 2	7489.125				R 0	6347.110			
R 1	7518.374	7518.378	0.033	4	<b>RMS = 1.8 10<sup>3</sup> cm<sup>-1</sup></b>				
R 0	7527.110								
<b>RMS = 2.8 10<sup>3</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 5-6</b>					<b>H<sub>2</sub> EF → B 5-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 6	4746.14				P 6	3653.019	3653.016	8.098	-3
R 7	4790.61				P 5	3762.124	3762.123	0.537	-1
P 5	4861.39				R 6	3804.568			
R 6	4897.69	4897.72	5.614	3	P 4	3856.425	3856.423	7.655	-2
P 4	4960.85	4960.89	6.097	4	R 5	3891.175			
R 5	4990.44				P 3	3935.096	3935.097	5.947	1
P 3	5043.79				R 4	3962.182			
R 4	5066.61	5066.56	6.017	-5	P 2	3997.528	3997.526	13.144	-2
P 2	5109.53	5109.54	5.050	1	R 3	4017.679			
R 3	5126.37	5126.41	3.398	4	P 1	4043.316	4043.316	5.459	0
P 1	5157.61				R 2	4056.753	4056.753	9.968	0
R 2	5168.76				R 1	4078.969	4078.975	3.049	6
R 1	5193.26				R 0	4084.130	4084.130	7.435	0
R 0	5199.61				<b>RMS = 2.0 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS = 3.6 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 6-0</b>					<b>H<sub>2</sub> EF → B 6-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 3	13255.467	13255.468	1.223	1	P 3	11948.525	11948.524	1.162	-1
P 2	13285.969	13285.973	1.235	4	P 2	11973.410	11973.411	1.839	1
P 1	13317.260	13317.260	0.987	0	P 1	12000.873	12000.871	1.632	-2
P 5	13386.447	13386.451	1.225	4	R 0	12083.788	12083.788	1.147	0
P 6	13392.894	13392.894	1.002	0	P 5	12095.512	12095.513	0.734	1
R 0	13402.112	13402.112	1.251	0	P 4	12109.159	12109.160	1.128	1
P 4	13408.834	13408.834	1.231	0	P 6	12111.969	12111.970	1.120	1
R 1	13447.808	13447.809	0.964	1	R 1	12131.421	12131.422	1.126	1
R 2	13675.569	13675.572	1.215	3	R 2	12363.010	12363.011	1.094	1
R 3	13725.127	13725.129	1.377	2	R 3	12418.184	12418.184	1.070	0
R 4	13800.494				R 4	12500.819	12500.819	1.007	0
<b>RMS = 2.1 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 0.9 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 6-2</b>					<b>H<sub>2</sub> EF → B 6-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 3	10676.726	10676.724	2.144	-2	P 3	9438.597			
P 2	10696.825	10696.825	4.356	0	P 2	9454.447	9454.444	0.749	-3
P 1	10721.040	10721.040	3.193	0	P 1	9475.783	9475.787	1.020	4
R 0	10802.312	10802.312	3.045	0	R 0	9555.602	9555.603	1.197	1
P 5	10837.469	10837.470	4.117	1	R 1	9606.332	9606.332	1.389	0
P 4	10843.582	10843.583	4.431	1	P 4	9610.999	9610.999	4.817	0
R 1	10851.588				P 5	9611.631	9611.631	0.242	0
P 6	10862.626	10862.624	2.817	-2	P 6	9644.618	9644.620	2.066	2
R 2	11086.425	11086.425	4.230	0	R 2	9844.047	9844.046	5.052	-1
R 3	11146.385	11146.386	3.522	1	R 3	9908.257	9908.259	3.512	2
R 4	11235.242	11235.242	2.287	0	R 4	10002.659	10002.660	2.913	1
<b>RMS = 1.0 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 1.3 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 6-4</b>					<b>H<sub>2</sub> EF → B 6-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 3	8233.404				P 3	7060.673	7060.675	13.881	2
P 2	8245.375	8245.375	6.001	0	P 2	7069.040	7069.040	14.229	0
P 1	8264.088	8264.086	4.472	-2	P 1	7085.316	7085.316	15.061	0
R 0	8342.585	8342.589	3.279	4	R 0	7162.585	7162.585	15.013	0
R 1	8394.637	8394.639	3.754	2	R 1	7215.864	7215.865	13.285	1
P 4	8410.877	8410.875	6.096	-2	P 4	7242.868	7242.866	7.423	-2
P 5	8417.691	8417.687	3.970	-4	P 5	7255.450	7255.449	6.655	-1
P 6	8457.887	8457.888	4.605	1	P 6	7302.380			
R 2	8634.975	8634.974	4.505	-1	R 2	7458.640	7458.639	3.921	-1
R 3	8703.063	8703.063	3.778	0	R 3	7530.333	7530.334	5.732	1
R 4	8802.536	8802.536	4.274	0	R 4	7634.528	7634.528	6.177	0
<b>RMS = 2.0 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 0.9 10<sup>3</sup> cm<sup>-1</sup></b>				





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<b>H<sub>2</sub> EF → B 7-8</b>					<b>H<sub>2</sub> EF → B 7-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	
P 5	3670.191	3670.195	26.672	4	P 5	2634.609	2634.608	1.696	-1
P 4	3721.776				P 4	2680.108	2680.108	34.792	0
R 4	3884.819				R 4	2843.150	2843.148	5.785	-2
R 2	3916.092				R 2	2866.698	2866.698	32.443	0
R 3	3918.960				R 3	2872.872	2872.878	0.448	6
P 3	3945.566	3945.571	4.566	5	P 3	2899.478			
P 2	3983.960	3983.964	14.470	4	P 2	2934.566	2934.568	31.420	2
P 1	4020.607	4020.609	2.131	2	P 1	2968.953	2968.955	2.630	2
R 0	4067.926	4067.928	9.290	2	R 0	3015.114	3015.114	17.823	0
R 1	4085.025	4085.031	6.712	6	R 1	3033.371			
R 5	4190.254				R 5	3154.672			
<b>RMS = 4.0 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 1.8 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 8-0</b>					<b>H<sub>2</sub> EF → B 8-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	
P 4	14242.02	14241.98	0.610	-4	P 6	12697.106	12697.107	0.876	1
P 3	14345.54				P 5	12827.397	12827.396	0.897	-1
R 4	14385.63				P 4	12942.345	12942.346	0.647	1
P 2	14427.70	14427.70	0.997	0	P 3	13038.597	13038.590	0.760	-7
R 3	14457.01				R 4	13085.955	13085.955	0.301	0
P 1	14488.25				P 2	13115.140	13115.142	0.978	2
R 2	14508.76				R 3	13150.068			
R 1	14537.88	14537.87	1.055	-1	P 1	13171.867	13171.864	0.951	-3
R 0	14543.84	14543.85	0.924	1	R 2	13196.196	13196.198	0.937	2
<b>RMS = 1.7 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.9 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 8-2</b>					<b>H<sub>2</sub> EF → B 8-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 6	11447.763	11447.759	2.123	-4	P 6	10229.76	10229.77	3.903	1
P 5	11569.354	11569.349	1.621	-5	P 5	10343.52	10343.51	2.204	-1
P 4	11676.768	11676.763	2.385	-5	P 4	10444.19	10444.19	3.601	0
P 3	11766.798	11766.802	1.709	4	P 3	10528.67	10528.67	2.706	0
R 4	11820.379	11820.382	1.244	3	R 4	10587.80			
P 2	11838.555	11838.553	2.209	-2	P 2	10596.18	10596.17	3.950	-1
R 3	11878.269	11878.269	1.158	0	R 3	10640.14	10640.15	0.558	1
P 1	11892.034	11892.028	0.387	-6	P 1	10646.78	10646.78	4.701	0
R 2	11919.611	11919.614	1.424	3	R 2	10677.23	10677.17	1.914	-6
R 1	11941.661				R 1	10696.40	10696.40	1.616	0
R 0	11944.042	11944.044	1.374	2	R 0	10697.33	10697.31	5.255	-2
<b>RMS = 3.7 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 1.8 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 8-4</b>					<b>H<sub>2</sub> EF → B 8-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	9149.575	9149.577	3.727	2	P 6	7887.52	7887.52	1.577	0
P 4	9244.063	9244.062	5.222	1	P 5	7987.33			
P 3	9323.476	9323.475	3.867	-1	P 4	8076.05	8076.05	0.647	0
P 2	9387.105	9387.104	5.703	-1	P 3	8150.75	8150.74	4.363	-1
R 4	9387.673	9387.677	4.452	4	P 2	8210.77	8210.80	1.520	3
R 3	9434.947				R 4	8219.66	8219.71	0.059	5
P 1	9435.082	9435.078	1.800	-4	P 1	8256.31			
R 2	9468.161	9468.161	5.239	0	R 3	8262.22	8262.16	1.268	-6
R 0	9484.315	9484.313	5.443	-2	R 2	8291.83			
R 1	9484.709	9484.709	5.267	0	R 0	8304.32	8304.25	3.955	-7
<b>RMS= 20 10<sup>3</sup> cm<sup>-1</sup></b>					R 1	8305.94	8305.91	13.016	-3
					<b>RMS= 3.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 8-6</b>					<b>H<sub>2</sub> EF → B 8-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	6763.031				P 4	5835.46	5835.46	7.042	0
P 5	6856.611	6856.611	4.436	0	P 3	5901.43	5901.46	8.405	3
P 4	6939.886	6939.887	6.088	1	P 2	5954.73	5954.73	6.646	0
P 3	7010.122	7010.118	6.659	-4	R 4	5979.07	5979.10	1.992	3
P 2	7066.736	7066.739	9.214	3	P 1	5995.68			
R 4	7083.496	7083.494	4.989	-2	R 3	6012.90	6012.91	4.712	1
P 1	7109.972	7109.971	7.988	-1	R 2	6035.79	6035.79	5.972	0
R 3	7121.593	7121.594	0.379	1	R 0	6041.33	6041.33	6.092	0
R 2	7147.791	7147.786	10.630	-5	R 1	6045.30	6045.30	0.796	0
R 0	7156.811	7156.805	10.069	-6	<b>RMS= 1.5 10<sup>2</sup> cm<sup>-1</sup></b>				
R 1	7159.599	7159.602	12.291	3	<b>RMS= 3.9 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 8-8</b>					<b>H<sub>2</sub> EF → B 9-0</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 4	4760.197	4760.197	11.272	0	P 6	14776.15	14776.16	0.836	1
P 3	4822.802	4822.801	11.050	-1	P 5	14884.35	14884.35	0.489	0
P 2	4873.457	4873.458	11.176	1	P 4	14970.46	14970.45	0.743	-1
R 4	4903.807	4903.804	2.635	-3	P 3	15039.29	15039.27	0.235	-2
P 1	4912.634	4912.630	6.666	-4	P 2	15095.61	15095.60	0.257	-1
R 3	4934.273				P 1	15142.57			
R 2	4954.512	4954.510	9.349	-2	R 4	15183.75			
R 0	4957.423	4957.424	10.954	1	R 0	15211.76			
R 1	4962.262	4962.266	1.978	4	R 3	15223.03			
<b>RMS= 2.1 10<sup>3</sup> cm<sup>-1</sup></b>					R 1	15231.63			
					R 2	15237.20			
					<b>RMS= 0.9 10<sup>2</sup> cm<sup>-1</sup></b>				



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<b>H<sub>2</sub> EF → B 9-1</b>					<b>H<sub>2</sub> EF → B 9-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 6	13495.229	13495.233	1.074	4	P 6	12245.885	12245.885	1.009	0
P 5	13593.413	13593.420	0.579	7	P 5	12335.370	12335.373	0.777	3
P 4	13670.788	13670.789	1.398	1	P 4	12405.211	12405.212	1.069	1
P 3	13732.344	13732.346	1.417	2	P 3	12460.545			
P 2	13783.053	13783.055	1.422	2	P 2	12506.468	12506.469	1.091	1
P 1	13826.187	13826.191	1.361	4	P 1	12546.354	12546.353	1.053	-1
R 4	13884.078	13884.072	1.467	-6	R 0	12611.955	12611.955	1.069	0
R 0	13893.431	13893.429	1.673	-2	R 4	12618.501	12618.503	0.969	2
R 1	13915.241	13915.241	1.567	0	R 1	12635.408	12635.409	1.033	1
R 3	13916.085				R 3	12644.286	12644.286	0.919	0
R 2	13924.639	13924.639	2.168	0	R 2	12648.054	12648.055	1.026	1
<b>RMS = 3.1 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 1.1 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 9-3</b>					<b>H<sub>2</sub> EF → B 9-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 6	11027.878	11027.878	3.796	0	P 6	9841.15	9841.13	3.086	-2
P 5	11109.532	11109.538	3.981	6	P 5	9915.59	9915.54	0.126	-5
P 4	11172.628	11172.629	4.172	1	P 4	9972.51	9972.44	2.254	-7
P 3	11222.417	11222.417	3.991	0	P 3	10017.22	10017.26	4.352	4
P 2	11264.090	11264.091	4.137	0	P 2	10055.02	10055.02	2.837	0
P 1	11301.097	11301.101	3.757	4	P 1	10089.40			
R 0	11365.245	11365.247	4.120	2	R 0	10152.23			
R 4	11385.918	11385.916	2.426	-2	R 1	10178.46			
R 1	11390.151	11390.150	4.058	-1	R 4	10185.80	10185.79	3.344	-1
R 2	11405.676	11405.677	3.530	1	R 2	10196.60	10196.62	5.355	2
R 3	11406.158	11406.158	1.240	0	R 3	10200.96	10200.95	1.756	-1
<b>RMS = 2.5 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 2.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 9-5</b>					<b>H<sub>2</sub> EF → B 9-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 6	8685.639	8685.637	4.784	-2	P 6	7561.15	7561.11	6.021	-4
P 5	8753.351	8753.349	4.037	-2	P 5	7622.63			
P 4	8804.497	8804.499	5.832	2	P 4	7668.33	7668.32	3.906	-1
P 3	8844.493	8844.490	5.828	-3	P 3	7703.87	7703.87	4.806	0
P 2	8878.683	8878.682	5.891	-1	P 2	7734.65	7734.62	4.065	-3
P 1	8910.630	8910.628	5.723	-2	P 1	7764.29	7764.30	6.551	1
R 0	8972.228	8972.226	5.750	-2	R 0	7824.72	7824.73	6.853	1
R 1	8999.684	8999.680	5.671	-4	R 1	7853.35	7853.32	5.181	-3
R 4	9017.787				R 2	7876.23	7876.24	2.727	1
R 2	9020.269	9020.269	6.545	0	R 4	7881.62			
R 3	9028.234	9028.238	4.186	4	R 3	7887.61			
<b>RMS = 2.5 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 2.3 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 9-7</b>					<b>H<sub>2</sub> EF → B 9-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 4	6563.90	6563.86	5.425	-4	P 4	5488.640	5488.635	7.587	-5
P 3	6595.18				P 3	5516.549	5516.548	8.227	-1
P 2	6622.65	6622.65	4.412	0	P 2	5541.370	5541.369	8.733	-1
P 1	6650.00	6650.07	0.355	7	P 1	5566.954	5566.952	7.608	-2
R 0	6709.25	6709.25	1.967	0	R 0	5625.336	5625.336	8.244	0
R 1	6739.05				R 1	5656.008	5656.006	5.396	-2
R 2	6764.23				R 2	5682.955	5682.954	6.616	-1
R 4	6777.19				R 3	5700.290	5700.289	3.530	-1
R 3	6778.92				R 4	5701.930	5701.929	3.969	-1
<b>RMS = 3.4 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.0 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 9-9</b>					<b>H<sub>2</sub> EF → B 9-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 5	4415.939	4415.940	8.055	1	P 3	3451.327	3451.332	10.371	5
P 4	4446.971	4446.972	12.956	1	P 2	3471.473	3471.470	16.002	-3
P 3	4470.462	4470.464	12.615	2	P 1	3493.680			
P 2	4491.976	4491.976	13.096	0	R 0	3550.321	3550.322	5.164	1
P 1	4515.300	4515.300	12.397	0	R 1	3582.734			
R 0	4572.523	4572.524	12.210	0	R 2	3613.058	3613.062	0.555	4
R 1	4604.354	4604.355	12.676	1	R 3	3635.068			
R 2	4633.561	4633.561	11.903	0	<b>RMS = 3.7 10<sup>3</sup> cm<sup>-1</sup></b>				
R 3	4654.202	4654.202	8.622	0					
R 4	4660.261	4660.262	9.378	1					
<b>RMS = 1.0 10<sup>3</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 9-11</b>					<b>H<sub>2</sub> EF → B 10-0</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 4	2450.306	2450.304	10.613	-2	P 4	15535.99			
P 3	2466.824	2466.830	98.495	6	P 3	15607.87			
P 2	2483.037	2483.039	8.463	2	P 2	15671.57			
P 1	2502.795				P 1	15723.81			
R 0	2558.229	2558.233	9.898	4	R 0	15787.72	15787.77	9.601	5
R 1	2591.849	2591.850	1.517	1	R 4	15787.75	15787.77	9.601	2
R 2	2624.623	2624.617	3.623	-6	R 3	15798.25	15798.25	9.401	0
R 3	2650.565				R 1	15800.21	15800.21	16.346	0
R 4	2663.596				R 2	15802.72	15802.75	13.262	3
<b>RMS = 5.4 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 2.3 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 10-1</b>					<b>H<sub>2</sub> EF → B 10-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 4	14236.311				P 5	12910.591	12910.592	1.500	1
P 3	14300.925	14300.924	0.960	-1	P 4	12970.735	12970.736	1.459	1
P 2	14359.015	14359.007	1.443	-8	P 3	13029.126	13029.130	1.008	4
P 1	14407.427	14407.425	1.073	-2	P 2	13082.430	13082.432	1.034	2
R 0	14469.393	14469.391	1.126	-2	P 1	13127.594	13127.598	0.993	4
R 1	14483.822	14483.826	1.109	4	R 0	13187.917	13187.917	1.045	0
R 4	14488.077	14488.077	0.960	0	R 1	13203.989	13203.994	0.362	5
R 2	14490.162	14490.161	1.072	-1	R 2	13213.577	13213.576	1.015	-1
R 3	14491.306	14491.306	0.602	0	R 3	13219.507	13219.501	0.100	-6
<b>RMS= 3.6 10<sup>3</sup> cm<sup>-1</sup></b>					R 4	13222.501			
					<b>RMS= 2.3 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 10-3</b>					<b>H<sub>2</sub> E → B 10-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	11631.877	11631.879	2.265	2	P 6	10445.146	10445.144	2.550	-2
P 5	11684.753	11684.757	1.247	4	P 5	10490.813	10490.811	4.145	-2
P 4	11738.152	11738.151	2.785	-1	P 4	10538.029	10538.029	4.552	0
P 3	11790.998	11790.996	2.526	-2	P 3	10585.804	10585.806	4.727	2
P 2	11840.052	11840.052	2.217	0	P 2	10630.980	10630.980	4.702	0
P 1	11882.337	11882.341	0.803	4	P 1	10670.642	10670.646	3.874	4
R 0	11941.207	11941.207	1.108	0	R 0	10728.190	10728.189	4.669	-1
R 1	11958.732	11958.733	1.164	1	R 1	10747.038	10747.039	4.095	1
R 2	11971.199	11971.198	1.186	-1	R 2	10762.127	10762.127	4.488	0
R 3	11981.379	11981.380	1.181	1	R 3	10776.185	10776.185	1.939	0
R 4	11989.918	11989.917	1.084	-1	R 4	10789.795			
<b>RMS= 1.8 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 1.5 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 10-5</b>					<b>H<sub>2</sub> EF → B 10-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	9289.639	9289.639	4.148	0	P 5	8197.849	8197.846	2.277	-3
P 5	9328.572	9328.572	3.679	0	P 4	8233.852	8233.852	6.459	0
P 4	9370.020	9370.024	4.089	4	P 3	8272.450	8272.453	5.752	3
P 3	9413.074	9413.077	1.958	3	P 2	8310.610	8310.610	6.448	0
P 2	9454.645	9454.649	0.319	4	P 1	8345.532	8345.533	6.210	1
P 1	9491.870	9491.867	2.332	-3	R 0	8400.686	8400.686	6.041	0
R 0	9548.190	9548.186	5.294	-4	R 1	8421.927	8421.923	2.346	-4
R 1	9568.265	9568.264	4.756	-1	R 2	8441.757	8441.756	5.710	-1
R 2	9585.792	9585.791	5.061	-1	R 3	8462.831	8462.836	5.381	5
R 3	9603.455	9603.458	4.280	3	R 4	8485.618	8485.618	4.181	0
R 4	9621.786	9621.790	5.005	4	<b>RMS= 2.6 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS= 2.6 10<sup>3</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 10-7</b>					<b>H<sub>2</sub> EF → B 10-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	7072.031	7072.033	4.540	2	P 5	4991.160	4991.160	2.860	0
P 5	7098.585				P 4	5012.494	5012.495	10.601	1
P 4	7129.427	7129.426	11.476	-1	P 3	5039.043			
P 3	7163.759	7163.759	8.549	0	P 2	5067.937	5067.938	10.156	1
P 2	7198.608	7198.609	11.463	1	P 1	5096.540	5096.540	2.555	0
P 1	7231.237	7231.235	1.747	-2	R 0	5148.485	5148.486	8.454	1
R 0	7285.210	7285.208	9.561	-2	R 1	5172.935			
R 1	7307.632	7307.635	3.578	3	R 2	5199.084	5199.087	8.352	3
R 2	7329.755	7329.749	5.515	-6	R 3	5229.423	5229.422	1.235	-1
R 3	7354.140	7354.145	1.441	5	R 4	5264.261	5264.263	5.272	2
R 4	7381.193	7381.195	1.023	2					
<b>RMS= 2.4 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 1.4 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 10-10</b>					<b>H<sub>2</sub> EF → B 10-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 4	3993.137	3993.138	15.150	1	P 5	3003.017	3003.026	1.967	9
P 3	4019.908	4019.906	14.479	-2	P 4	3015.829	3015.831	26.127	2
P 2	4047.435	4047.436	15.705	1	P 3	3035.405	3035.408	20.892	3
P 1	4074.920	4074.922	14.768	2	P 2	3058.999	3058.999	28.027	0
R 0	4126.283	4126.286	14.949	3	P 1	3084.035	3084.037	16.884	2
R 1	4151.315	4151.318	12.605	3	R 0	3134.191			
R 2	4178.582	4178.583	12.488	1	R 1	3160.431			
R 3	4210.289	4210.285	6.357	-4	R 2	3190.146			
R 4	4244.903	4244.907	10.538	4	R 3	3225.786			
<b>RMS= 2.5 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 2.4 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 10-12</b>					<b>H<sub>2</sub> EF → B 11-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 5	2060.346	2060.352	73.348	6	P 6	13508.756	13508.757	1.064	1
P 3	2066.146	2066.151	64.683	5	P 5	13602.192	13602.195	0.728	3
P 4	2076.575	2076.571	2.375	-4	P 4	13688.038	13688.040	1.404	2
P 2	2096.085				P 3	13763.024	13763.026	1.392	2
P 1	2121.619				P 2	13825.441			
R 0	2171.695	2171.698	3.664	3	P 1	13874.486	13874.491	1.308	5
R 1	2198.014	2198.009	0.247	-5	R 4	13881.372	13881.374	1.026	2
R 2	2227.232	2227.229	2.096	-3	R 3	13911.108	13911.105	1.409	-3
R 3	2256.526	2256.527	0.023	1	R 2	13930.881			
R 4	2328.341				R 0	13930.928			
<b>RMS= 5.6 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 2.6 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 11-3</b>					<b>H<sub>2</sub> EF → B 11-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 6	12290.75	12290.75	3.561	0	P 6	11104.018	11104.019	3.909	1
P 5	12376.35	12376.37	0.453	2	P 5	11182.414	11182.413	2.894	-1
P 4	12455.46				P 4	11255.333	11255.335	4.496	2
P 3	12524.90				P 3	11319.702	11319.698	3.893	-4
P 2	12583.06	12583.07	3.078	1	P 2	11373.991	11373.991	4.026	0
P 1	12629.23				P 1	11417.534	11417.534	2.437	0
R 4	12648.79				R 4	11448.666	11448.668	2.021	2
R 3	12672.98	12672.98	0.479	0	R 3	11467.786	11467.784	1.642	-2
R 0	12684.22				R 0	11471.201	11471.202	3.637	1
R 2	12688.50	12688.50	0.684	0	R 2	11479.431	11479.427	3.089	-4
R 1	12692.63				R 1	11480.935	11480.935	2.158	0
<b>RMS = 0.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.2 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 11-5</b>					<b>H<sub>2</sub> EF → B 11-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 5	10020.173	10020.176	4.022	3	P 5	8889.450	8889.449	3.498	-1
P 4	10087.324	10087.322	4.168	-2	P 4	8951.156	8951.152	4.890	-4
P 3	10146.972	10146.971	4.600	-1	P 3	9006.348	9006.350	4.997	2
P 2	10197.656	10197.656	4.894	0	P 2	9053.621	9053.623	6.668	2
P 1	10238.762	10238.760	4.742	-2	P 1	9092.424	9092.425	5.287	1
R 4	10280.658	10280.663	0.891	5	R 0	9143.697	9143.700	5.920	3
R 0	10291.201	10291.197	4.768	-4	R 4	9144.490	9144.489	3.997	-1
R 3	10295.056	10295.056	0.899	0	R 3	9154.432	9154.431	3.042	-1
R 1	10302.163	10302.168	1.747	5	R 1	9155.825			
R 2	10303.096	10303.098	2.485	2	R 2	9159.061	9159.061	5.612	0
<b>RMS = 2.5 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 2.1 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 11-7</b>					<b>H<sub>2</sub> EF → B 11-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	7730.902	7730.901	6.048	-1	P 4	6771.47	6771.46	4.615	-1
P 5	7790.186	7790.186	6.454	0	P 3	6819.03	6819.03	0.837	0
P 4	7846.731	7846.728	6.789	-3	P 2	6860.34	6860.31	10.268	-3
P 3	7897.657	7897.657	13.309	0	P 1	6895.09			
P 2	7941.619	7941.616	6.251	-3	R 0	6944.31	6944.34	4.070	3
P 1	7978.129	7978.128	6.942	-1	R 1	6958.49			
R 0	8028.221	8028.223	6.739	2	R 4	6964.80	6964.78	5.203	-2
R 4	8040.065	8040.064	6.233	-1	R 2	6965.78			
R 1	8041.530	8041.526	6.489	-4	R 3	6967.11			
R 3	8045.741	8045.742	7.932	1	<b>RMS = 24 10<sup>2</sup> cm<sup>-1</sup></b>				
R 2	8047.059	8047.057	6.808	-2	<b>RMS = 1.8 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 11-9</b>					<b>H<sub>2</sub> EF → B 11-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 4	5729.80	5729.77	9.098	-3	P 4	4710.441	4710.441	8.934	0
P 3	5772.94	5772.94	4.432	0	P 3	4753.806	4753.810	11.417	4
P 2	5810.95	5810.97	0.633	2	P 2	4790.446	4790.448	6.088	2
P 1	5843.43	5843.41	5.526	-2	P 1	4821.812			
R 0	5891.50				R 0	4869.294	4869.292	10.045	-2
R 1	5906.83	5906.80	4.251	-3	R 1	4885.212	4885.207	5.450	-5
R 2	5916.39				R 2	4895.886	4895.887	7.488	1
R 3	5921.02				R 3	4901.890	4901.879	0.823	-9
R 4	5923.13	5923.17	3.533	4	R 4	4903.775			
<b>RMS= 2.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.4 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 11-11</b>					<b>H<sub>2</sub> EF → B 11-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 5	3694.618	3694.619	17.379	1	P 4	2793.879	2793.876	20.081	-3
P 4	3733.133	3733.132	29.048	-1	P 3	2800.043	2800.041	4.116	-2
P 3	3769.303	3769.306	23.211	3	P 2	2839.096	2839.095	32.535	1
P 2	3802.010	3802.010	26.586	0	P 1	2868.510	2868.510	2.993	0
P 1	3830.927	3830.926	15.895	-1	R 0	2914.706	2914.707	4.583	1
R 0	3877.202	3877.201	16.293	-1	R 1	2931.911			
R 1	3894.328	3894.330	13.252	2	R 2	2944.535	2944.539	3.282	4
R 2	3907.450	3907.449	15.133	-1	R 3	2948.127			
R 3	3917.387	3917.394	0.273	7	R 4	2987.212			
R 4	3926.466	3926.468	10.398	2	<b>RMS= 1.9 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS= 1.6 10<sup>3</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 12-1</b>					<b>H<sub>2</sub> EF → B 12-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 4	15679.27	15679.19	0.097	-8	P 6	14237.445	14237.445	0.581	0
P 3	15754.91	15754.94	1.355	3	P 5	14331.943	14331.938	1.044	-5
P 2	15817.42	15817.43	12.947	1	P 4	14413.697	14413.697	0.787	0
P 1	15867.12	15867.11	13.282	-1	P 3	14483.110	14483.108	1.083	-2
R 4	15875.64	15875.61	10.874	-3	P 2	14540.831	14540.829	1.109	-2
R 3	15912.66	15912.68	8.748	2	P 1	14587.286	14587.283	1.175	-3
R 0	15927.79	15927.79	5.178	0	R 4	14610.061	14610.058	0.989	-3
R 2	15933.12	15933.14	3.893	2	R 3	14640.859	14640.858	1.073	-1
R 1	15937.81	15937.80	3.901	-1	R 0	14646.318	14646.316	1.196	-2
<b>RMS= 1.7 10<sup>2</sup> cm<sup>-1</sup></b>					R 2	14656.539	14656.540	1.054	1
					R 1	14657.973	14657.971	0.737	-2
					<b>RMS= 2.3 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 12-3</b>					<b>H<sub>2</sub> EF → B 12-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	13019.438	13019.437	0.845	-1	P 6	11832.706	11832.715	4.594	9
P 5	13106.105				P 5	11912.165	11912.160	1.210	-5
P 4	13181.114				P 4	11980.991	11980.991	1.138	0
P 3	13244.982	13244.983	0.949	1	P 3	12039.788	12039.788	1.755	0
P 2	13298.453	13298.451	0.980	-2	P 2	12089.381	12089.379	1.122	-2
P 1	13342.029	13342.030	1.221	1	P 1	12130.334	12130.333	1.140	-1
R 4	13377.478	13377.470	0.529	-8	R 4	12177.355	12177.353	1.000	-2
R 0	13399.608	13399.606	1.041	-2	R 0	12186.591	12186.594	1.109	3
R 3	13402.731	13402.727	0.394	-4	R 3	12197.537	12197.540	1.239	3
R 1	13412.716	13412.719	1.114	3	R 1	12201.021	12201.020	1.040	-1
R 2	13414.161	13414.159	0.797	-3	R 2	12205.089	12205.090	1.119	1
<b>RMS = 3.0 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 4.7 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 12-5</b>					<b>H<sub>2</sub> EF → B 12-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	10677.20	10677.17	2.261	-3	P 6	9552.71	9552.75	2.260	4
P 5	10749.92	10749.89	3.045	-3	P 5	9619.20			
P 4	10812.98	10812.98	4.375	0	P 4	9676.81	9676.82	3.463	1
P 3	10867.06	10867.06	4.413	1	P 3	9726.43	9726.44	2.190	1
P 2	10913.05	10913.05	4.175	0	P 2	9769.01	9769.01	5.527	0
P 1	10951.56	10951.56	4.435	0	P 1	9805.22			
R 0	11006.59	11006.59	4.022	0	R 0	9859.09	9859.09	1.743	0
R 4	11009.35	11009.29	0.454	-6	R 4	9873.18			
R 1	11022.25	11022.25	3.896	0	R 1	9875.91	9875.97	0.775	6
R 3	11024.81	11024.83	2.345	2	R 3	9884.18	9884.14	12.950	-4
R 2	11028.75	11028.75	4.021	0	R 2	9884.72			
<b>RMS = 1.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.0 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 12-7</b>					<b>H<sub>2</sub> EF → B 12-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	8459.591	8459.592	4.005	1	P 4	7497.125	7497.124	8.786	-1
P 5	8519.937	8519.937	4.363	0	P 3	7539.114	7539.113	7.176	-1
P 4	8572.389	8572.389	5.196	0	P 2	7575.732	7575.730	8.917	-2
P 3	8617.743	8617.738	4.458	-5	P 1	7607.886	7607.886	8.994	0
P 2	8657.009	8657.007	5.960	-2	R 0	7659.698	7659.698	6.946	0
P 1	8690.929	8690.926	5.241	-3	R 1	7678.573	7678.574	6.128	1
R 0	8743.611	8743.609	5.304	-2	R 2	7691.441	7691.442	6.450	1
R 1	8761.616	8761.617	5.194	1	R 4	7693.489	7693.484	4.177	-5
R 4	8768.754	8768.754	4.229	0	R 3	7696.863	7696.864	4.543	1
R 2	8772.717	8772.716	5.269	-1	<b>RMS = 1.9 10<sup>3</sup> cm<sup>-1</sup></b>				
R 3	8775.492	8775.491	2.585	-1	<b>RMS = 1.9 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS = 1.9 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 1.9 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 12-9</b>					<b>H<sub>2</sub> EF → B 12-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 3	6493.03				P 4	5436.10	5436.11	21.007	1
P 2	6526.34	6526.33	9.385	-1	P 3	5473.89	5473.93	7.172	4
P 1	6556.23				P 2	5505.84			
R 0	6606.89				P 1	5534.61			
R 1	6626.92	6626.96	10.223	4	R 0	5584.68			
R 2	6642.05	6642.01	10.181	-4	R 1	5605.30			
R 3	6650.78	6650.74	0.984	-4	R 2	5621.54			
R 4	6651.82				R 3	5631.64	5631.67	8.508	3
<b>RMS = 3.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 12-11</b>					<b>H<sub>2</sub> EF → B 12-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 5	4424.37	4424.41	1.063	4	P 5	3481.698	3481.695	1.802	-3
P 4	4458.79	4458.79	6.863	0	P 4	3519.537	3519.537	28.081	0
P 3	4489.39	4489.42	0.670	3	P 3	3520.129	3520.131	21.899	2
P 2	4517.40	4517.40	12.768	0	P 2	3554.486	3554.484	32.919	-2
P 1	4543.73	4543.71	8.371	-2	P 1	3581.310	3581.308	20.023	-2
R 0	4592.59	4592.59	8.832	0	R 0	3630.096	3630.094	30.974	-2
R 1	4614.41				R 1	3651.997	3651.996	24.177	-1
R 2	4633.11	4633.11	10.683	0	R 2	3670.194	3670.195	26.672	1
R 3	4647.14				R 3	3677.878	3677.877	0.324	-1
R 4	4655.16	4655.16	1.648	0	R 4	3715.901	3715.899	13.987	-3
<b>RMS = 0.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.7 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 12-13</b>					<b>H<sub>2</sub> EF → B 13-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	2578.716	2578.717	14.732	1	P 6	16175.50	16175.45	0.119	-5
P 3	2603.062	2603.055	2.544	-7	P 5	16270.46			
P 2	2626.299	2626.299	26.302	0	P 4	16354.57	16354.58	0.601	1
P 1	2649.432				P 3	16427.95	16427.93	0.265	-2
R 0	2696.682	2696.676	1.892	-5	P 2	16489.96	16489.93	1.081	-3
R 1	2720.119				P 1	16539.75			
R 2	2742.007				R 4	16564.35			
R 3	2760.811				R 3	16593.13	16593.08	0.997	-5
R 4	2775.080				R 0	16600.34	16600.34	1.316	0
<b>RMS = 2.1 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				



<b>H<sub>2</sub> EF → B 13-3</b>					<b>H<sub>2</sub> EF → B 13-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	13708.15	13708.17	1.174	2	P 4	12656.29	12656.37	0.705	8
P 5	13786.57	13786.57	1.223	0	P 3	12712.83			
P 4	13856.41	13856.43	1.534	2	P 2	12761.93	12761.91	0.401	-2
P 3	13918.02	13918.01	2.488	-1	P 1	12802.96			
P 2	13971.00	13971.01	1.686	1	R 0	12859.14	12859.14	13.899	0
P 1	14014.66	14014.64	0.377	-2	R 4	12866.07	12866.06	10.329	-1
R 4	14066.19	14066.18	0.702	-1	R 1	12874.06			
R 0	14072.16	14072.13	1.125	-3	R 3	12878.01	12878.03	2.533	2
R 3	14083.20	14083.16	0.412	-4	R 2	12880.39	12880.39	0.043	0
R 1	14085.76	14085.75	0.879	-1	<b>RMS= 1.6 10<sup>2</sup> cm<sup>-1</sup></b>				
R 2	14089.46	14089.45	1.054	-1	<b>RMS= 1.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 13-5</b>					<b>H<sub>2</sub> EF → B 13-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 5	11430.393	11430.394	2.566	1	P 5	10299.670	10299.673	4.057	3
P 4	11488.283	11488.286	3.837	3	P 4	10352.115	10352.114	4.639	-1
P 3	11540.100	11540.103	1.490	3	P 3	10399.476	10399.478	3.208	2
P 2	11585.594	11585.597	4.087	3	P 2	10441.559	10441.560	4.795	1
P 1	11624.192	11624.201	1.229	9	P 1	10477.854	10477.861	4.331	7
R 0	11679.139	11679.141	2.184	2	R 0	10531.635	10531.635	4.879	0
R 1	11695.291	11695.296	1.649	5	R 1	10548.953	10548.952	6.170	-1
R 4	11698.060				R 2	10560.021	10560.023	4.671	2
R 2	11704.055	11704.054	1.691	-1	R 4	10561.892	10561.895	0.444	3
R 3	11705.276	11705.277	1.153	1	R 3	10564.652	10564.655	2.853	3
<b>RMS= 3.3 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 3.1 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 13-7</b>					<b>H<sub>2</sub> EF → B 13-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 4	9247.69	9247.64	0.754	-5	P 4	8172.426	8172.429	6.533	3
P 3	9290.79				P 3	8212.156			
P 2	9329.56	9329.60	5.772	4	P 2	8248.281	8248.281	6.614	0
P 1	9363.56				P 1	8280.517			
R 0	9416.16	9416.16	2.452	0	R 0	8332.247	8332.248	5.724	1
R 1	9434.66	9434.68	0.892	2	R 1	8351.616	8351.620	5.955	4
R 2	9448.02	9448.00	4.040	-2	R 2	8366.742	8366.743	5.832	1
R 3	9455.96	9455.97	0.984	1	R 3	8377.332	8377.335	3.816	3
R 4	9457.47	9457.47	3.683	0	R 4	8382.203	8382.206	5.261	3
<b>RMS= 2.7 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.5 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 13-9</b>					<b>H<sub>2</sub> EF → B 13-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 5	7092.981	7092.981	6.412	0	P 3	4193.172	4193.179	2.390	7
P 4	7130.758	7130.759	14.822	1	P 4	4194.838	4194.838	5.691	0
P 3	7166.069	7166.071	12.628	2	P 2	4227.034	4227.036	13.006	2
P 2	7198.886	7198.886	15.034	0	P 1	4253.941	4253.948	5.628	7
P 1	7228.862	7228.871	12.857	9	R 0	4302.645	4302.649	6.977	4
R 0	7279.434	7279.434	13.241	0	R 1	4325.040	4325.038	4.114	-2
R 1	7299.961	7299.966	13.111	5	R 2	4345.495	4345.499	7.949	4
R 2	7317.348	7317.350	12.318	2	R 3	4358.347			
R 3	7331.244	7331.250	3.994	6	R 4	4404.615	4404.618	3.120	3
R 4	7340.534	7340.536	1.068	2					
<b>RMS = 4.0 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 4.3 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 13-13</b>					<b>H<sub>2</sub> EF → B 14-0</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	3254.017	3254.019	16.097	2	P 4	18335.16	18335.24	0.170	8
P 3	3276.105	3276.105	9.456	0	P 3	18422.70	18422.67	7.911	-3
P 2	3298.847	3298.847	18.864	0	P 2	18495.13	18495.10	0.899	-3
P 1	3322.062	3322.062	9.466	0	R 4	18530.16			
R 0	3369.230	3369.230	19.873	0	P 1	18551.17			
R 1	3393.161	3393.156	3.944	-5	R 3	18573.05	18573.00	0.408	-5
R 2	3417.308	3417.312	18.050	4	R 2	18601.90	18601.84	1.074	-6
R 3	3441.280	3441.273	2.195	-7	R 0	18611.28	18611.26	1.800	-2
R 4	3463.794	3463.803	2.117	9	R 1	18615.04	18614.99	1.067	-4
<b>RMS = 2.6 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 3.5 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 14-1</b>					<b>H<sub>2</sub> EF → B 14-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	16841.64	16841.62	1.251	-2	P 4	15769.91	15769.87	6.684	-4
P 5	16943.43				P 3	15843.95	15843.95	2.627	0
P 4	17035.49				P 2	15905.99	15905.95	4.482	-4
P 3	17115.75				P 1	15954.95	15955.00	1.989	5
P 2	17182.57	17182.54	0.410	-3	R 4	15964.91	15964.87	1.731	-4
R 4	17230.48	17230.46	2.881	-2	R 3	15994.31			
P 1	17234.79				R 0	16011.48	16011.51	1.491	3
R 3	17266.10	17266.14	1.177	4	R 2	16012.75	16012.72	1.678	-3
R 2	17289.34	17289.31	0.307	-3	R 1	16018.82			
R 0	17292.95								
R 1	17298.65								
<b>RMS = 2.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.9 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 14-3</b>					<b>H<sub>2</sub> EF - B 14-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	14374.28	14374.28	1.065	0	P 6	13187.55	13187.57	1.331	2
P 5	14459.55	14459.56	0.896	1	P 5	13265.61	13265.63	0.908	2
P 4	14537.33	14537.28	0.837	-5	P 4	13337.21	13337.22	0.977	1
P 3	14605.83	14605.83	1.071	0	P 3	13400.63	13400.63	1.132	0
P 2	14663.61	14663.66	0.689	5	P 2	13454.54	13454.53	1.190	-1
P 1	14709.70	14709.73	0.441	3	P 1	13498.00	13498.00	1.414	0
R 4	14732.33	14732.34	0.843	1	R 4	13532.20	13532.20	0.807	0
R 3	14756.18	14756.18	0.617	0	R 3	13550.98	13550.99	0.205	1
R 0	14764.77	14764.77	1.030	0	R 0	13551.75	13551.75	1.075	0
R 2	14770.38	14770.38	1.111	0	R 2	13561.30	13561.32	1.229	2
R 1	14773.56	14773.55	0.771	-1	R 1	13561.87	13561.78	1.038	-9
<b>RMS = 2.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 14-5</b>					<b>H<sub>2</sub> EF → B 14-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	12032.05	12032.04	0.959	-1	P 5	10972.648	10972.651	1.468	3
P 5	12103.37	12103.40	0.708	3	P 4	11033.030	11033.028	4.199	-2
P 4	12169.20	12169.20	1.041	0	P 3	11087.278	11087.277	3.898	-1
P 3	12227.90	12227.89	0.664	-1	P 2	11134.169	11134.174	3.788	5
P 2	12278.20	12278.20	0.987	0	P 1	11172.892	11172.892	4.887	0
P 1	12319.23	12319.20	6.487	-3	R 0	11224.245	11224.244	4.379	-1
R 4	12364.19	12364.21	0.896	2	R 4	11228.026	11228.025	2.847	-1
R 0	12371.75	12371.77	0.631	2	R 1	11236.755			
R 3	12378.25	12378.25	0.953	0	R 3	11237.629	11237.631	1.689	2
R 1	12383.09	12379.11	0.932	2	R 2	11240.935	11240.940	3.682	5
R 2	12384.97	12384.97	1.181	0	<b>RMS = 2.6 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS = 2.3 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 14-7</b>					<b>H<sub>2</sub> EF → B 14-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	9814.439	9814.442	3.726	3	P 4	8853.34	8853.33	5.601	-1
P 5	9873.384	9873.381	3.761	-3	P 3	8899.96	8899.93	2.682	-3
P 4	9928.605	9928.603	4.758	-2	P 2	8940.89	8940.88	6.757	-1
P 3	9978.587	9978.583	4.588	-4	P 1	8975.55	8975.56	1.845	1
P 2	10022.167	10022.165	5.246	-2	R 0	9024.86			
P 1	10058.597	10058.601	4.302	4	R 1	9039.42	9039.43	2.846	1
R 0	10108.769	10108.768	4.601	-1	R 2	9047.66	9047.66	3.602	0
R 1	10122.460	10122.465	4.224	5	R 4	9048.34	9048.33	2.767	-1
R 4	10123.601	10123.600	1.000	-1	R 3	9050.31	9050.29	5.733	-2
R 2	10128.932	10128.932	4.414	0	<b>RMS = 1.3 10<sup>2</sup> cm<sup>-1</sup></b>				
R 3	10128.939	10128.932	4.414	-7					
<b>RMS = 3.5 10<sup>3</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 14-9</b>					<b>H<sub>2</sub> EF → B 14-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	7765.959	7765.958	3.984	-1	P 4	6792.31	6792.31	14.079	0
P 4	7811.672	7811.673	7.116	1	P 3	6834.74	6834.73	11.828	-1
P 3	7853.871	7853.871	6.322	0	P 2	6870.99	6870.99	14.042	0
P 2	7891.496	7891.497	3.480	1	P 1	6902.28	6902.28	8.309	0
P 1	7923.900	7923.899	6.440	-1	R 0	6949.84	6949.84	14.773	0
R 0	7972.044	7972.044	6.201	0	R 1	6966.14	6966.15	8.531	1
R 1	7987.763	7987.767	6.616	4	R 2	6977.76	6977.76	10.597	0
R 2	7998.262	7998.261	6.253	-1	R 3	6985.09	6985.10	14.643	1
R 3	8004.222	8004.218	5.505	-4	R 4	6987.31	6987.33	6.633	2
R 4	8006.668	8006.669	5.458	0					
<b>RMS= 1.8 10<sup>-3</sup> cm<sup>-1</sup></b>					<b>RMS= 0.8 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 14-13</b>					<b>H<sub>2</sub> EF → B 15-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	3934.931	3934.935	5.632	3	P 5	17633.35	17633.39	0.100	4
P 3	3963.907				P 4	17731.01	17730.99	0.596	-2
P 2	3991.457	3991.460	10.046	3	P 3	17814.27	17814.34	0.136	7
P 1	4017.100				P 2	17882.44			
R 0	4061.840	4061.837	7.210	-3	R 4	17911.40			
R 1	4080.963	4080.962	0.570	-1	P 1	17935.14	17935.22	0.084	8
R 2	4098.223	4098.223	6.166	0	R 3	17956.02			
R 3	4114.258				R 2	17984.86	17984.89	7.882	3
R 4	4129.928				R 0	17992.82	17992.89	0.621	7
					R 1	17997.17			
<b>RMS= 2.9 10<sup>-3</sup> cm<sup>-1</sup></b>					<b>RMS= 3.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 15-2</b>					<b>H<sub>2</sub> EF → B 15-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	16465.44	16465.53	0.235	9	P 6	13868.47	13868.45	1.233	-2
P 3	16542.48	16542.46	2.261	-2	P 5	13955.53	13955.53	1.086	0
P 2	16605.86	16605.86	0.707	0	P 4	14032.73	14032.71	0.884	-2
R 4	16645.83				P 3	14099.15	14099.19	0.478	4
P 1	16655.31				P 2	14154.41	14154.32	0.064	-9
R 3	16684.22				P 1	14198.35	14198.34	1.013	-1
R 2	16708.28	16708.27	0.815	-1	R 4	14213.12	14213.10	0.391	-2
R 0	16711.35				R 3	14240.90	14240.86	0.538	-4
R 1	16717.34				R 0	14251.62	14251.60	0.926	-2
<b>RMS= 2.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
					R 2	14256.83	14256.81	0.946	-2
					R 1	14260.39	14260.37	0.952	-2

<b>H<sub>2</sub> EF → B 15-5</b>					<b>H<sub>2</sub> EF → B 15-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	12864.72	12864.71	20.102	-1	P 5	11662.56	11662.59	0.395	3
P 3	12926.42	12926.44	0.491	2	P 4	11728.55	11728.54	1.100	-1
P 2	12978.07	12978.06	0.693	-1	P 3	11785.80	11785.80	1.230	0
P 1	13019.58				P 2	11834.04	11834.04	1.270	0
R 4	13045.11	13045.19	0.575	8	P 1	11873.24	11873.25	1.260	1
R 3	13068.17				R 4	11908.94	11908.92	0.953	-2
R 0	13071.62				R 0	11924.12	11924.12	1.298	0
R 2	13080.49	13080.49	6.588	0	R 3	11927.55	11927.55	0.971	0
R 1	13081.61	13081.66	3.035	5	R 1	11935.28	11935.26	0.394	-2
<b>RMS = 2.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 15-7</b>					<b>H<sub>2</sub> EF → B 15-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 6	10495.36	10495.33	3.496	-3	P 5	9491.456			
P 5	10563.30	10563.29	2.911	-1	P 4	9548.865	9548.859	10.550	-6
P 4	10624.13	10624.13	4.317	0	P 3	9598.479	9598.478	3.351	-1
P 3	10677.11	10677.17	2.002	6	P 2	9640.761	9640.759	4.858	-2
P 2	10722.04	10722.04	4.530	0	P 1	9675.906	9675.903	3.028	-3
P 1	10758.95	10758.95	4.127	0	R 0	9724.727	9724.731	2.901	4
R 4	10804.52	10804.55	4.481	4	R 4	9729.254			
R 0	10808.64	10808.64	4.081	0	R 1	9737.938	9737.944	1.175	6
R 3	10818.85	10818.83	1.499	-2	R 3	9740.226			
R 1	10820.98	10820.97	3.691	-1	R 2	9743.180	9743.172	0.690	-8
R 2	10824.46	10824.45	4.262	0	<b>RMS = 4.7 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS = 2.0 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 15-9</b>					<b>H<sub>2</sub> EF → B 15-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>
P 5	8455.87	8455.86	2.364	-1	P 4	7487.839	7487.837	8.287	-2
P 4	8507.20	8507.20	4.387	0	P 3	7533.257	7533.253	8.146	-4
P 3	8552.39	8552.39	2.585	0	P 2	7570.864	7570.867	8.169	3
P 2	8591.37	8591.37	4.765	0	P 1	7602.631	7602.628	5.513	-3
P 1	8624.25	8624.24	2.875	-1	R 0	7649.712	7649.714	7.539	2
R 0	8671.91	8671.92	4.798	1	R 1	7664.664	7664.662	5.966	-2
R 1	8686.28	8686.29	4.612	1	R 4	7668.228	7668.220	2.418	-8
R 4	8687.58	8687.56	4.032	-2	R 2	7673.284	7673.283	7.027	-1
R 2	8693.79	8693.78	4.822	-1	R 3	7675.003	7675.012	5.347	8
R 3	8694.14	8694.12	4.213	-2	<b>RMS = 3.8 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 15-11</b>					<b>H<sub>2</sub> EF → B 15-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 5	6467.73	6467.72	0.990	-1	P 3	5579.49	5579.54	0.950	5
P 4	6510.53	6510.53	15.327	0	P 2	5619.51	5619.55	5.114	4
P 3	6548.75	6548.76	10.894	1	P 1	5649.33			
P 2	6582.43	6582.43	14.071	0	R 0	5695.13			
P 1	6611.75	6611.75	6.853	0	R 1	5711.36			
R 0	6657.62	6657.62	10.302	0	R 3	5721.24	5721.28	0.400	4
R 1	6673.78				R 2	5721.93			
R 2	6684.85	6684.85	8.046	0	<b>RMS = 3.9 10<sup>2</sup> cm<sup>-1</sup></b>				
R 3	6690.50	6690.56	1.838	6					
R 4	6690.92	6690.90	0.635	-2					
<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 16-1</b>					<b>H<sub>2</sub> EF → B 16-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 6	18200.30	18200.39	2.542	9	P 6	16950.96	16950.93	0.362	-3
P 5	18310.47	18310.46	2.119	-1	P 5	17052.43			
P 4	18405.79	18405.75	3.451	-4	P 4	17140.21	17140.22	0.518	1
P 3	18486.54				P 3	17214.74	17214.70	0.279	-4
P 2	18552.87	18552.84	0.403	-3	P 2	17276.28	17276.26	1.107	-2
R 4	18589.15	18589.14	4.452	-1	R 4	17323.58			
P 1	18604.62	18604.71	1.078	9	P 1	17324.78	17324.77	0.315	-1
R 3	18633.14				R 3	17361.34	17361.36	0.458	2
R 2	18659.64				R 0	17381.77	17381.77	1.033	0
R 0	18663.25	18663.23	0.448	-2	R 2	17383.05	17383.03	0.567	-2
R 1	18669.44				R 1	17389.61	17389.63	0.072	2
<b>RMS = 4.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 16-3</b>					<b>H<sub>2</sub> EF → B 16-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 5	15826.59	15826.59	12.730	0	P 6	14546.22	14546.20	0.261	-2
P 4	15907.63	15907.63	6.704	0	P 5	14632.65	14632.67	0.499	2
P 3	15976.62	15976.59	3.865	-3	P 4	14707.50	14707.50	1.019	0
P 2	16033.91				P 3	14771.42	14771.42	0.791	0
P 1	16079.53				P 2	14824.83	14824.83	0.935	0
R 4	16090.99				P 1	14867.83	14867.81	0.526	-2
R 3	16123.21	16123.23	1.362	2	R 4	14890.87	14890.89	0.169	2
R 0	16135.06				R 3	14918.02	14918.01	0.316	-1
R 2	16140.67	16140.66	1.036	-1	R 0	14922.04	14922.04	1.244	0
R 1	16144.35	16144.39	0.556	4	R 2	14931.60	14931.60	0.757	0
<b>RMS = 1.3 10<sup>2</sup> cm<sup>-1</sup></b>					R 1	14932.66	14932.68	0.767	2
					<b>RMS = 1.3 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 16-5</b>					<b>H<sub>2</sub> EF → B 16-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	
P 6	13390.72	13390.72	0.922	0	P 5	12339.683	12339.691	3.189	8
P 5	13470.41	13470.34	1.203	-7	P 4	12403.328	12403.336	1.061	8
P 4	13539.50	13539.47	3.890	-3	P 3	12458.069	12458.074	0.217	5
P 3	13598.69	13598.70	1.068	1	P 2	12504.464			
P 2	13648.50	13648.50	1.463	0	P 1	12542.720	12542.715	0.637	-5
P 1	13689.06	13689.08	1.098	2	R 4	12586.695			
R 4	13722.86	13722.82	0.828	-4	R 0	12594.539	12594.538	1.114	-1
R 0	13742.04	13742.04	1.295	0	R 3	12604.665			
R 3	13745.29	13745.34	2.227	5	R 1	12607.546	12607.545	0.840	-1
R 1	13753.88	13753.88	1.076	0	R 2	12611.233	12611.226	0.472	-7
R 2	13755.27	13755.28	0.855	1					
<b>RMS= 3.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 6.6 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 16-7</b>					<b>H<sub>2</sub> EF → B 16-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	
P 6	11173.107	11173.107	3.732	0	P 4	10223.639	10223.642	4.376	3
P 5	11240.419	11240.417	1.249	-2	P 3	10270.749	10270.750	4.602	1
P 4	11298.903	11298.904	2.080	1	P 2	10311.185	10311.183	4.731	-2
P 3	11349.378				P 1	10345.383	10345.381	3.483	-2
P 2	11392.461	11392.466	3.297	5	R 0	10395.151	10395.148	4.101	-3
P 1	11428.425	11428.422	3.101	-3	R 4	10407.006	10407.006	1.402	0
R 0	11479.063	11479.066	1.889	3	R 1	10410.208	10410.204	4.170	-4
R 4	11482.270	11482.266	1.069	-4	R 3	10417.345			
R 1	11493.251	11493.252	1.169	1	R 2	10417.954	10417.958	4.640	4
R 3	11495.974	11495.978	0.384	4					
R 2	11499.231	11499.229	1.336	-2					
<b>RMS=2.7 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 2.8 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 16-9</b>					<b>H<sub>2</sub> EF → B 16-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	
P 4	9181.970				P 4	8162.613	8162.616	3.629	3
P 3	9224.661				P 3	8205.526	8205.526	2.395	0
P 2	9261.791				P 2	8241.288	8241.287	6.208	-1
P 1	9293.728				P 1	8272.108	8272.109	6.255	1
R 0	9342.339	9342.335	10.352	-4	R 0	8320.136	8320.136	5.470	0
R 1	9358.554				R 1	8336.933			
R 4	9365.337	9365.342	7.245	5	R 4	8345.980	8345.979	3.971	-1
R 2	9368.560	9368.564	1.177	4	R 2	8348.057	8348.059	5.740	2
R 3	9371.258				R 3	8352.123	8352.123	3.457	0
<b>RMS= 4.5 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 1.5 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 16-11</b>					<b>H<sub>2</sub> EF → B 16-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>
P 5	7144.852	7144.852	5.145	0	P 4	6246.051	6246.052	4.202	1
P 4	7185.305	7185.305	13.876	0	P 3	6251.764	6251.761	1.902	-3
P 3	7221.024	7221.028	12.158	4	P 2	6289.938	6289.936	6.333	-2
P 2	7252.853	7252.853	13.384	0	P 1	6318.807	6318.813	1.528	6
P 1	7281.224	7281.227	10.308	3	R 0	6365.549	6365.552	3.882	3
R 0	7328.044	7328.047	7.942	3	R 1	6383.632			
R 1	7346.049	7346.048	8.017	-1	R 2	6396.707			
R 2	7359.622	7359.619	10.940	-3	R 3	6398.360			
R 3	7367.620	7367.624	4.225	4	R 4	6429.418			
R 4	7368.672	7368.668	5.340	-4					
<b>RMS = 2.6 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 4.9 10<sup>3</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 17-1</b>					<b>H<sub>2</sub> EF → B 17-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 6	18839.68	18839.69	0.088	1	P 6	17590.33	17590.31	0.609	-2
P 5	18943.33				P 5	17685.28	17685.31	0.579	3
P 4	19035.54	19035.57	0.403	3	P 4	17769.97	17769.97	0.687	0
P 3	19115.89				P 3	17844.09	17844.06	0.525	-3
P 2	19182.98	19182.95	0.374	-3	P 2	17906.39	17906.38	1.011	-1
R 4	19228.53				P 1	17955.60	17955.61	0.262	1
P 1	19235.43				R 4	17962.95			
R 3	19266.00				R 3	17994.20	17994.24	0.635	4
R 2	19289.40	19289.36	0.212	-4	R 0	18011.88	18011.85	0.803	-3
R 0	19293.35	19293.35	0.307	0	R 2	18012.81	18012.79	0.896	-2
R 1	19298.79				R 1	18018.95	18018.96	4.210	1
<b>RMS = 2.5 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 17-5</b>					<b>H<sub>2</sub> EF → B 17-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 6	14030.09	14030.06	0.378	-3	P 4	13033.09	13033.10	0.512	1
P 5	14103.26	14103.22	0.282	-4	P 3	13087.41	13087.43	3.078	2
P 4	14169.25	14169.24	1.281	-1	P 2	13134.57	13134.57	0.970	0
P 3	14228.04	14228.00	0.989	-4	P 1	13173.54	13173.51	0.254	-3
P 2	14278.61	14278.60	0.990	-1	R 0	13224.65	13224.60	0.900	-5
P 1	14319.87	14319.87	0.434	0	R 4	13226.07			
R 4	14362.23	14362.26	0.411	3	R 1	13236.89			
R 0	14372.15	14372.15	1.157	0	R 3	13237.52			
R 3	14378.15				R 2	13240.99			
R 1	14383.23	14383.24	0.565	1					
R 2	14385.03	14385.03	1.103	1					
<b>RMS = 1.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.5 10<sup>2</sup> cm<sup>-1</sup></b>				



<b>H<sub>2</sub> EF → B 17-7</b>					<b>H<sub>2</sub> EF → B 17-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 6	11812.48	11812.49	1.640	1	P 5	10801.43	10801.40	2.755	-3
P 5	11873.28	11873.25	1.260	-3	P 4	10853.40	10853.39	2.682	-1
P 4	11928.66	11928.66	1.292	0	P 3	10900.09	10900.09	3.100	0
P 3	11978.72				P 2	10941.29	10941.30	4.240	1
P 2	12022.57	12022.57	1.029	0	P 1	10976.20	10976.21	2.894	1
P 1	12059.24	12059.24	0.892	0	R 0	11025.26	11025.26	3.817	0
R 0	12109.17	12109.16	1.128	-1	R 1	11039.55	11039.54	2.865	-1
R 4	12121.64	12121.64	1.266	0	R 4	11046.38	11046.38	2.112	0
R 1	12122.60				R 2	11047.71	11047.71	3.265	0
R 3	12128.83				R 3	11050.20	11050.18	1.836	-2
R 2	12128.99	12129.08	1.072	9					
<b>RMS = 3.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.5 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 17-9</b>					<b>H<sub>2</sub> EF → B 17-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 5	9765.85	9765.83	2.799	-2	P 4	8792.37			
P 4	9811.73	9811.72	4.179	-1	P 3	8834.87			
P 3	9854.01	9854.01	3.933	0	P 2	8871.40	8871.40	1.933	0
P 2	9891.90	9891.89	5.110	-1	P 1	8902.92			
P 1	9924.54	9924.54	2.835	0	R 0	8950.24	8950.24	0.484	0
R 0	9972.45	9972.44	3.718	-1	R 1	8966.28	8966.28	0.883	0
R 1	9987.90	9987.90	3.360	0	R 2	8977.82	8977.81	1.302	-1
R 2	9998.32	9998.32	4.593	0	R 3	8984.98			
R 3	10004.11	10004.10	0.454	-1	R 4	8985.35	8985.38	1.515	3
R 4	10004.71	10004.70	0.588	-1					
<b>RMS = 0.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 17-11</b>					<b>H<sub>2</sub> EF → B 17-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	
P 4	7815.063	7815.063	6.224	0	P 5	6835.037	6835.030	7.118	-7
P 3	7850.368	7850.372	4.669	4	P 4	6875.808	6875.807	13.039	-1
P 2	7882.961	7882.963	6.536	2	P 3	6881.108	6881.113	6.118	5
P 1	7912.040	7912.041	6.570	1	P 2	6920.047	6920.046	13.759	-1
R 0	7958.153	7958.153	5.763	0	P 1	6949.623	6949.625	13.329	2
R 1	7975.394	7975.392	6.201	-2	R 0	6995.658	6995.657	13.873	-1
R 2	7989.380	7989.383	6.128	3	R 1	7012.977	7012.977	5.387	0
R 3	8000.477	8000.468	1.213	-9	R 2	7026.465	7026.465	10.629	0
R 4	8008.043	8008.048	4.827	5	R 3	7031.217			
<b>RMS = 4.0 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS = 2.7 10<sup>3</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 17-13</b>					<b>H<sub>2</sub> EF → B 18-0</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	5905.24	5905.20	0.937	-4	P 4	20886.16			
P 4	5934.99	5934.98	2.664	-1	P 3	20986.02			
P 3	5964.04				R 4	21055.43	21055.38	0.288	
P 2	5991.86	5991.86	4.195	0	P 2	21067.50	21067.50	0.253	
P 1	6017.74				R 3	21110.30	21110.25	1.197	
R 0	6062.24				P 1	21128.32	21128.29	0.017	
R 1	6081.10	6081.07	1.903	-3	R 2	21152.89	21152.94	0.068	
R 2	6098.28	6098.30	2.905	2	R 1	21178.36	21178.31	0.181	
R 3	6114.15				R 0	21183.64	21183.67	0.095	
<b>RMS = 1.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 4.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → -B 18-2</b>					<b>H<sub>2</sub> EF → B 18-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	18117.56	18117.56	0.260	0	P 4	17088.32	17088.31	1.278	
P 5	18222.64	18222.73	1.915	9	P 3	17169.15	17169.21	0.826	
P 4	18320.90	18320.89	0.710	-1	P 2	17235.98	17235.95	1.207	
P 3	18407.28	18407.23	4.808	-5	R 4	17257.59	17257.60	0.024	
P 2	18478.36	18478.33	0.968	-3	P 1	17286.84	17286.81	0.127	
R 4	18490.17	18490.17	0.429	0	R 3	17293.43	17293.46	0.134	
R 3	18531.56				R 2	17321.37	17321.36	0.329	
P 1	18532.10	18532.12	0.214	2	R 1	17336.89	17336.93	0.113	
R 2	18563.75	18563.74	0.617	-1	R 0	17337.13			
R 1	18582.14	18582.11	2.135	-3	<b>RMS = 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				
R 0	18583.84	18583.81	2.164	-3	<b>RMS = 4.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 18-4</b>					<b>H<sub>2</sub> EF → B 18-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	15712.82	15712.76	0.447	-6	P 4	14720.19	14720.24	0.739	
P 5	15802.86	15802.88	16.196	2	P 3	14791.23			
P 4	15888.20	15888.22	4.710	2	P 2	14850.57	14850.60	0.631	
P 3	15963.96	15963.93	2.303	-3	R 4	14889.46			
P 2	16026.91				P 1	14896.38			
R 4	16057.47	16057.50	1.404	3	R 3	14915.51	14915.47	0.162	
P 1	16075.15	16075.21	0.627	6	R 2	14935.96			
R 3	16088.24	16088.18	1.337	-6	R 0	14944.12			
R 2	16112.30				R 1	14946.42			
R 0	16124.12				<b>RMS = 4.3 10<sup>2</sup> cm<sup>-1</sup></b>				
R 1	16125.19				<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 18-6</b>					<b>H<sub>2</sub> EF → B 18-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	13432.83	13432.76	1.415	-7	P 6	12339.70	12339.75	6.507	5
P 5	13509.90				P 5	12410.64	12410.72	0.264	8
P 4	13584.02	13584.07	0.165	4	P 4	12479.60			
P 3	13650.60	13650.52	0.660	-8	P 3	12541.91			
P 2	13706.54	13706.56	0.186	2	P 2	12594.53	12594.54	1.114	1
P 1	13750.04	13750.10	0.624	6	P 1	12635.74			
R 4	13753.29				R 4	12648.87			
R 3	13774.88				R 3	12666.19			
R 2	13791.93				R 2	12679.93			
R 0	13796.61	13796.58	0.052	-3	R 0	12681.14			
R 1	13800.08	13800.02	0.026	-6	R 1	12685.79			
<b>RMS= 6.6 10<sup>-2</sup> cm<sup>-1</sup></b>					<b>RMS= 4.3 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 18-8</b>					<b>H<sub>2</sub> EF → B 18-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	11338.79	11338.79	2.416	0	P 4	10362.66	10362.66	2.617	0
P 4	11404.33	11404.35	0.016	2	P 3	10417.20			
P 3	11463.28				P 2	10463.86	10463.86	2.724	0
P 2	11513.26	11513.22	12.056	-4	P 1	10501.05	10500.98	0.484	-7
P 1	11552.70	11552.63	0.714	-7	R 4	10531.93	10531.91	4.595	-2
R 4	11573.60	11573.64	0.213	4	R 3	10541.47	10541.46	0.827	-1
R 3	11587.56				R 0	10544.41	10544.42	2.675	1
R 0	11597.22	11597.26	2.747	4	R 2	10549.25	10549.32	1.336	7
R 2	11598.65	11598.64	0.751	-1	R 1	10551.09	10551.11	0.195	2
R 1	11602.74	11602.72	0.130	-2	<b>RMS= 2.6 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>RMS= 3.6 10<sup>-2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 18-12</b>					<b>H<sub>2</sub> EF → B 18-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	7372.40	7372.43	2.345	3	P 4	6485.92	6485.92	10.048	0
P 4	7426.75	7426.74	3.350	1	P 3	6527.23	6527.20	4.193	-3
P 3	7444.30	7444.26	4.719	-4	P 2	6563.82	6563.84	11.073	2
P 2	7492.01	7492.01	5.591	0	P 1	6594.25	6594.31	0.496	6
P 1	7526.12	7526.15	2.161	3	R 0	6634.21	6634.23	1.619	2
R 0	7567.62	7567.62	2.629	0	R 1	6644.29	6644.25	3.182	-4
R 3	7568.58	7568.54	4.442	-4	R 2	6649.22	6649.22	7.485	0
R 1	7576.17	7576.14	3.179	-3	R 3	6651.51	6651.53	1.615	2
R 2	7577.40	7577.41	4.842	1	R 4	6655.19	6655.19	8.257	0
R 4	7596.01	7596.02	10.593	1	<b>RMS= 1.9 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>RMS= 2.2 10<sup>-2</sup> cm<sup>-1</sup></b>									



<b>H<sub>2</sub> EF → B 19-12</b>					<b>H<sub>2</sub> EF → B 19-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+3</sup> cm <sup>-1</sup>	
P 5	8143.30	8143.30	2.796	0	P 5	7213.501	7213.500	9.074	0
P 4	8185.08	8185.08	3.651	0	P 4	7244.259	7244.254	33.530	-5
P 3	8191.40	8191.41	1.643	1	P 3	7274.332	7274.331	21.941	0
P 2	8231.02	8231.01	5.532	-1	P 2	7302.830	7302.828	26.822	-2
P 1	8261.51				P 1	7329.634	7329.631	18.996	-3
R 0	8306.63	8306.61	3.375	-2	R 0	7373.213	7373.213	18.437	0
R 1	8323.27	8323.27	3.091	0	R 1	7391.388	7391.387	9.906	-1
R 2	8335.74	8335.74	3.557	0	R 2	7407.550	7407.554	18.480	4
R 3	8339.48	8339.51	5.062	3	R 3	7422.409	7422.411	8.000	1
R 4	8375.61	8375.63	2.622	2	R 4	7434.794	7434.800	12.412	6
<b>RMS = 1410<sup>2</sup>cm<sup>-1</sup></b>					<b>RMS = 3210<sup>3</sup>cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 20-2</b>					<b>H<sub>2</sub> EF → B 20-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	19442.08	19442.07	0.366	-1	P 6	18224.08	18224.06	2.187	-2
P 5	19564.69				P 5	18338.85	18338.79	0.752	-6
P 4	19667.17	19667.16	0.422	-1	P 4	18434.58			
P 3	19750.49	19750.56	0.388	7	P 3	18512.36			
R 4	19814.70	19814.68	0.203	-2	P 2	18577.89	18577.85	6.014	-4
P 2	19820.27	19820.25	0.426	-2	R 4	18582.12	18582.11	2.135	-1
P 1	19873.22				P 1	18627.97	18627.88	0.410	-9
R 3	19873.60	19873.68	0.131	8	R 3	18635.47			
R 2	19910.01				R 2	18667.63	18667.58	0.167	-5
R 1	19925.35				R 0	18679.05			
R 0	19925.75				R 1	18680.09	18680.10	0.099	1
<b>RMS = 3910<sup>2</sup>cm<sup>-1</sup></b>					<b>RMS = 3510<sup>2</sup>cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 20-7</b>					<b>H<sub>2</sub> EF → B 20-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	13664.23	13664.19	1.068	-4	P 3	12806.49			
P 5	13752.68				P 2	12855.17	12855.15	9.730	-2
P 4	13825.86	13825.84	2.713	-2	P 1	12893.82			
P 3	13885.12	13885.10	0.298	-2	R 0	12939.14	12939.05	0.309	-9
P 2	13936.45	13936.44	0.340	-1	R 2	12944.91	12944.88	3.155	-3
R 4	13973.39				R 1	12945.95	12945.88	2.863	-7
P 1	13976.87	13976.88	0.121	1	<b>RMS = 3.610<sup>2</sup>cm<sup>-1</sup></b>				
R 3	14008.23	14008.19	0.223	-4					
R 0	14023.05	14023.01	0.010	-4					
R 2	14026.19	14026.18	0.240	-1					
R 1	14028.99								
<b>RMS = 2910<sup>2</sup>cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 20-9</b>					<b>H<sub>2</sub> EF → B 20-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 4	11708.93	11708.94	1.009	1	P 4	10689.57	10689.58	2.773	1
P 3	11760.40	11760.40	0.743	0	P 3	10741.27	10741.28	3.223	1
P 2	11805.78	11805.78	1.248	0	P 2	10785.27	10785.27	4.467	0
P 1	11842.17	11842.15	9.164	-2	P 1	10820.55	10820.53	1.149	-2
R 4	11856.46	11856.42	4.115	-4	R 4	10837.10	10837.13	4.815	3
R 3	11883.52	11883.50	3.133	-2	R 0	10864.12	10864.12	2.261	0
R 0	11886.32	11886.30	4.118	-2	R 3	10864.38	10864.38	3.779	0
R 1	11894.30	11894.35	3.189	5	R 1	10872.68	10872.72	6.944	4
R 2	11895.52	11895.56	3.856	4	R 2	10875.01	10875.02	2.512	1
<b>RMS = 2.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 20-11</b>					<b>H<sub>2</sub> EF → B 20-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	9657.11	9657.10	0.237	-1	P 4	8773.01			
P 4	9712.26	9712.27	3.431	1	P 3	8787.51			
P 3	9756.77	9756.78	0.122	1	P 2	8833.92			
P 2	9796.84	9796.83	4.561	-1	P 1	8867.25			
P 1	9829.66	9829.67	1.343	1	R 0	8909.53	8909.58	0.199	5
R 4	9859.79				R 3	8910.62	8910.63	5.723	1
R 0	9872.03	9872.00	5.867	-3	R 1	8919.38			
R 3	9879.88	9879.84	1.499	-4	R 4	8920.54	8920.54	1.575	0
R 1	9881.79	9881.78	3.206	-1	R 2	8923.66			
R 2	9886.58	9886.56	2.070	-2	<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 2.0 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 20-13</b>					<b>H<sub>2</sub> EF → B 21-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 4	7832.19	7832.19	2.116	0	P 5	21369.97	21370.01	0.321	4
P 3	7870.44	7870.44	2.179	0	P 4	21492.38	21492.39	0.320	1
P 2	7905.74	7905.74	6.293	0	P 3	21574.99	21574.97	0.646	-2
P 1	7935.37				R 4	21650.12			
R 0	7976.12	7976.12	4.015	0	R 3	21692.65	21692.67	0.084	2
R 4	7979.72	7979.71	2.038	-1	R 2	21746.23	21746.24	0.404	1
R 1	7987.50	7987.47	2.213	-3	R 1	21757.88	21757.88	0.201	0
R 3	7993.55				P 2	21786.66	21786.67	0.422	1
R 2	7995.48	7995.48	4.324	1	P 1	21834.71	21834.74	0.569	2
<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>					R 0	21897.04	21897.03	0.312	-1
					<b>RMS = 2.0 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 21-2</b>					<b>H<sub>2</sub> EF → B 21-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 5	20111.93	20111.97	0.053	4	P 6	18793.92	18793.89	2.221	-3
P 4	20226.80	20226.85	0.259	5	P 5	18886.09			
P 3	20303.19	20303.15	0.058	-4	P 4	18994.22			
R 4	20384.55				P 3	19065.06	19065.08	0.492	2
R 3	20420.85	20420.87	0.159	2	R 4	19151.96			
R 2	20469.64	20469.66	0.343	2	R 3	19182.72			
R 1	20478.05	20477.99	0.185	-6	R 2	19227.26	19227.24	0.676	-2
P 2	20510.07	20510.06	0.333	-1	R 1	19232.79	19232.82	1.681	3
P 1	20554.88				P 2	19267.70			
R 0	20615.56				P 1	19309.62			
<b>RMS = 3.6 10<sup>2</sup> cm<sup>-1</sup></b>					R 0	19368.85	19368.86	0.209	1
					<b>RMS = 2.8 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 21-4</b>					<b>H<sub>2</sub> EF → B 21-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 5	17692.15	17692.16	7.710	1	P 4	16626.08			
P 4	17794.09	17794.06	0.893	-3	P 3	16687.14			
P 3	17859.87	17859.89	0.168	2	R 4	16783.83	16783.82	0.127	-1
R 4	17951.84				R 3	16804.79			
R 3	17977.52	17977.51	0.799	-1	R 2	16841.86	16841.78	0.176	-8
R 2	18018.19	18018.15	0.705	-4	R 1	16842.33			
R 1	18021.10				P 2	16882.29			
P 2	18058.62	18058.61	1.020	-1	P 1	16919.16			
P 1	18097.93	18097.95	1.030	2	R 0	16975.83			
R 0	18155.83	18155.81	1.079	-2	<b>RMS = 5.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 1.7 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF-B 21 → 6</b>					<b>H<sub>2</sub> EF → B 21-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	15489.92	15489.89	0.017	-3	P 6	14234.08	14234.07	3.429	-1
P 3	15546.51				P 5	14299.92			
R 4	15647.66				P 4	14385.49			
R 3	15664.17				P 3	14437.82			
R 1	15695.99				R 4	14543.24			
R 2	15697.82				R 3	14555.48	14555.41	0.849	-7
P 2	15738.25	15738.26	1.831	1	R 1	14581.69			
P 1	15772.82	15772.81	2.952	-1	R 2	14585.82	14585.84	0.230	2
R 0	15828.33	15828.31	6.113	-2	P 2	14626.25	14626.25	1.009	0
<b>RMS = 1.8 10<sup>2</sup> cm<sup>-1</sup></b>					P 1	14658.52			
					R 0	14712.85	14712.87	0.527	2
					<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 21-8</b>					<b>H<sub>2</sub> EF → B 21-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 5	13228.08	13228.09	0.429	1	P 3	12313.11	12313.19	3.468	8
P 4	13310.23				R 3	12430.76			
P 3	13359.19				R 1	12447.00			
R 4	13467.98				R 2	12455.15			
R 3	13476.85	13476.79	1.158	-6	P 2	12495.58			
R 1	13498.65				P 1	12523.83	12523.84	0.312	1
R 2	13504.54				R 0	12576.13	12576.13	3.212	0
P 2	13544.98	13545.02	3.133	4	<b>RMS = 6.2 10<sup>2</sup> cm<sup>-1</sup></b>				
P 1	13575.48	13575.48	1.091	0					
R 0	13628.94								
<b>RMS = 4.0 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF-B 21-10</b>					<b>H<sub>2</sub> EF → B 21-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	11249.20				P 5	10204.36	10204.41	0.341	5
P 3	11293.97				P 4	10271.89	10271.89	2.566	0
R 4	11406.95	11406.94	2.471	-1	P 3	10309.47	10309.44	1.310	-3
R 3	11411.63				R 3	10427.13	10427.18	0.460	5
R 1	11425.38				R 4	10429.64			
R 2	11434.65	11434.64	0.599	-1	R 1	10434.49			
P 2	11475.08	11475.08	1.475	0	R 2	10446.21	10446.23	1.530	2
P 1	11502.20	11502.25	1.030	5	P 2	10486.64	10486.64	3.341	0
R 0	11553.93	11553.92	1.373	-1	P 1	10511.32	10511.35	2.136	3
<b>RMS = 1.7 10<sup>2</sup> cm<sup>-1</sup></b>					R 0	10561.83	10561.88	2.267	5
					<b>RMS = 2.6 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 21-12</b>					<b>H<sub>2</sub> EF → B 21-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	9332.64	9332.64	0.223	0	R 1	8540.20	8540.15	0.234	-5
P 3	9340.21				R 2	8555.11			
R 3	9457.87				P 2	8595.54	8595.54	2.329	0
R 1	9472.08	9472.09	3.520	1	P 1	8617.03			
R 2	9483.30	9483.29	0.017	-1	R 0	8665.92	8665.87	8.813	-5
R 4	9490.39				<b>RMS = 4.7 10<sup>2</sup> cm<sup>-1</sup></b>				
P 2	9523.73								
P 1	9548.90	9548.88	7.256	-2					
R 0	9599.34	9599.37	3.028	3					
<b>RMS = 2.0 10<sup>2</sup> cm<sup>-1</sup></b>									



<b>H<sub>2</sub> EF → B 22-1</b>					<b>H<sub>2</sub> EF → B 22-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	22010.96	22010.93	0.016	-3	P 2	20970.57			
P 4	22101.49				P 1	21022.82	21022.78	0.238	-4
P 3	22178.62	22178.67	0.120	5	R 0	21076.06	21076.04	0.357	-2
P 2	22247.16	22247.19	0.453	3	R 2	21078.76	21078.75	0.240	-1
R 4	22287.41				R 1	21081.69	21081.68	0.095	-1
P 1	22302.65	22302.66	0.049	1	<b>RMS = 2.3 10<sup>2</sup> cm<sup>-1</sup></b>				
R 3	22333.63								
R 2	22355.34	22355.32	0.119	-2					
R 0	22357.53	22357.55	0.189	2					
R 1	22361.52								
<b>RMS = 3.0 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 22-3</b>					<b>H<sub>2</sub> EF → B 22-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	19527.07	19527.07	0.211	0	P 5	18333.13	18333.06	0.031	-7
P 4	19603.33	19603.32	0.464	-1	P 4	18403.21	18403.15	4.697	-6
P 3	19668.70	19668.71	0.946	1	P 3	18463.50	18463.53	1.147	3
P 2	19728.19	19728.19	0.498	0	P 2	18519.12	18519.10	0.786	-2
P 1	19777.56	19777.55	0.433	-1	P 1	18565.87			
R 4	19789.25				R 4	18589.13	18589.13	4.820	0
R 3	19823.70	19823.69	0.391	-1	R 0	18616.33	18616.30	0.738	-3
R 0	19829.35	19829.32	0.535	-3	R 3	18618.51	18618.44	1.014	-7
R 2	19836.38	19836.39	0.512	1	R 1	18624.74	18624.72	2.194	-2
R 1	19836.43	19836.39	0.512	-4	R 2	18627.31	18627.30	3.248	-1
<b>RMS = 1.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 22-5</b>					<b>H<sub>2</sub> EF → B 22-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	17170.89	17170.81	0.103	-8	P 6	15964.49	15964.47	2.006	-2
P 4	17235.20	17235.24	0.298	4	P 5	16040.17	16040.18	1.871	1
P 3	17290.77				P 4	16099.03	16099.07	0.326	4
P 2	17342.79	17342.76	1.128	-3	P 3	16150.15			
P 1	17387.10	17387.11	0.855	1	P 2	16198.75	16198.69	0.998	-6
R 4	17421.12	17421.10	0.167	-2	P 1	16240.76	16240.78	1.250	2
R 0	17436.33	17436.33	1.164	0	R 4	16284.96			
R 3	17445.78				R 0	16288.83	16288.79	1.145	-4
R 1	17445.96	17445.94	0.270	-2	R 1	16299.63			
R 2	17450.97	17450.97	1.624	0	R 3	16305.15			
<b>RMS = 1.9 10<sup>2</sup> cm<sup>-1</sup></b>					R 2	16306.94	16306.90	0.555	-4
					R 2	16306.94	16306.90	1.109	-4
					<b>RMS = 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → -B 22-10</b>					<b>H<sub>2</sub> EF → B 22-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	11858.32	11858.32	3.163	0	P 5	10845.34	10845.34	0.955	0
P 3	11897.61	11897.57	3.294	-4	P 4	10881.01	10881.01	2.772	0
P 2	11935.58	11935.60	0.862	2	P 3	10913.10	10913.05	4.175	-5
P 1	11970.14				P 2	10947.14	10947.12	4.801	-2
R 0	12014.42				P 1	10979.26	10979.26	2.544	0
R 1	12029.01	12029.03	0.578	2	R 0	11022.33	11022.25	0.815	-8
R 2	12043.76	12043.76	0.890	0	R 1	11038.13	11038.16	1.514	3
R 4	12044.24	12044.20	0.671	-4	R 2	11055.33	11055.33	1.580	0
R 3	12052.61				R 4	11066.93			
<b>RMS = 2.6 10<sup>2</sup> cm<sup>-1</sup></b>					R 3	11068.11	11068.13	0.532	2
					<b>RMS = 3.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 22-12</b>					<b>H<sub>2</sub> EF → B 22-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	9902.67	9902.69	0.796	3	P 4	9000.93	9000.94	0.149	1
P 4	9941.76	9941.75	3.841	-1	P 3	9026.78			
P 3	9943.84	9943.86	4.027	2	P 2	9056.04			
P 2	9984.23	9984.23	3.338	0	P 1	9084.97	9084.93	6.471	-4
P 1	10016.84				R 0	9126.42			
R 0	10059.84	10059.84	2.708	0	R 1	9143.83			
R 1	10075.71	10075.75	1.189	4	R 2	9164.23			
R 2	10092.41				R 3	9181.78	9181.73	0.009	-5
R 3	10098.85				R 4	9186.86			
R 4	10127.68				<b>RMS = 3.8 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 1.6 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 23-2</b>					<b>H<sub>2</sub> EF → B 23-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	21187.34	21187.31	0.425	-3	P 4	20251.94	20251.94	0.374	0
P 5	21297.76				P 3	20314.63	20314.60	0.102	-3
P 4	21484.53	21484.53	0.532	0	R 4	20327.38	20327.39	0.182	1
P 3	21552.76	21552.69	0.130	-7	R 3	20368.55			
R 4	21559.96	21560.03	0.880	7	P 2	20377.39	20377.38	0.357	-1
R 3	21606.68	21606.70	1.174	2	P 1	20426.68	20426.64	0.046	-4
P 2	21619.76	21619.81	0.323	5	R 0	20478.54			
P 1	21671.94	21671.95	0.156	1	R 1	20482.37			
R 0	21725.25	21725.24	1.937	-1	R 2	20484.99			
R 2	21727.37	21727.36	2.324	-1	<b>RMS = 1.3 10<sup>2</sup> cm<sup>-1</sup></b>				
R 1	21727.62	21727.69	0.662	7					
<b>RMS = 3.4 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> EF → B 23-4</b>					<b>H<sub>2</sub> EF → B 23-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	19051.82	19051.80	0.424	-2	P 4	17883.81	17883.81	0.845	0
P 3	19109.44	19109.44	0.227	0	P 3	17936.71	17936.62	0.159	-9
R 4	19127.26				R 4	17959.25	17959.22	0.208	-3
R 3	19163.36				R 3	17990.63	17990.62	2.189	-1
P 2	19168.31	19168.25	0.530	-6	P 2	17991.98	17991.94	0.813	-4
P 1	19214.99				P 1	18036.21	18036.28	0.158	7
R 0	19265.52	19265.58	0.196	6	R 0	18085.52	18085.47	0.090	-5
R 1	19270.67	19270.63	8.450	-4	R 1	18091.90	18091.87	0.408	-3
R 2	19275.92				R 2	18099.58	18099.56	0.649	-2
<b>RMS = 3.7 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 23-8</b>					<b>H<sub>2</sub> EF-B 23-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	14567.95	14567.94	0.329	-1	P 4	13526.29			
P 3	14608.76	14608.73	0.250	-3	P 3	13562.68			
R 4	14643.39				R 4	13601.72	13601.63	1.167	-9
P 2	14654.67	14654.62	0.230	-5	P 2	13605.27	13605.27	2.629	0
R 3	14662.68				R 3	13616.60			
P 1	14692.54	14692.50	0.223	-4	P 1	13640.88			
R 0	14738.63	14738.63	0.561	0	R 0	13685.82	13685.78	0.861	-4
R 1	14748.22				R 1	13696.57			
R 2	14762.27	14762.28	0.256	1	R 2	13712.88	13712.85	1.654	-3
<b>RMS = 2.4 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 4.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 23-10</b>					<b>H<sub>2</sub> EF → B 23-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	12506.93	12506.96	0.803	3	P 5	11390.19	11390.15	4.058	-4
P 3	12543.54				P 4	11529.62			
R 4	12582.36	12582.41	3.882	5	P 3	11559.04			
P 2	12584.77	12584.85	2.882	8	P 2	11596.33	11596.31	1.541	-2
R 3	12597.46	12597.49	1.062	3	R 4	11605.05	11605.08	0.225	3
P 1	12619.26				R 3	11612.96			
R 0	12663.62				P 1	11628.38	11628.40	0.967	2
R 1	12674.95				R 0	11671.53	11671.59	0.453	6
R 2	12692.37				R 1	11684.06	11684.00	0.318	-6
<b>RMS = 5.5 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.9 10<sup>2</sup> cm<sup>-1</sup></b>				



<b>H<sub>2</sub> EF → B 24-11</b>					<b>H<sub>2</sub> EF → B 24-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	12024.54	12024.55	0.673	1	P 4	11085.29	11085.28	0.948	-1
P 3	12072.76				P 3	11103.50	11103.44	3.564	-6
P 2	12111.67				P 2	11148.76	11148.76	3.792	0
P 1	12142.67				P 1	11180.25	11180.25	1.940	0
R 4	12169.19	12169.20	1.041	1	R 0	11224.37			
R 0	12186.87	12186.92	1.008	5	R 4	11229.94	11229.85	0.644	-9
R 1	12197.78				R 3	11230.89	11230.81	0.219	-8
R 2	12198.86	12198.86	1.174	0	R 1	11235.36			
R 3	12200.15				R 2	11235.94	11235.94	0.767	0
<b>RMS= 2.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 24-13</b>					<b>H<sub>2</sub> EF → B 25-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 4	10144.47	10144.47	2.841	0	P 6	21035.35	21035.36	0.095	1
P 3	10186.43	10186.46	1.431	3	P 5	21144.65	21144.64	0.626	-1
P 2	10220.57	10220.62	3.673	5	P 4	21269.67	21269.61	0.094	-6
P 1	10248.38	10248.38	5.963	0	P 3	21355.14			
R 4	10289.12				R 4	21393.39			
R 0	10290.96				P 2	21426.56	21426.57	0.164	1
R 1	10303.49	10303.52	0.821	3	R 3	21441.28	21441.27	0.165	-1
R 2	10307.76				P 1	21479.96			
R 3	10313.82	10313.77	4.960	-5	R 2	21502.72	21502.68	0.104	-4
<b>RMS= 3.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 25-4</b>					<b>H<sub>2</sub> EF → B 25-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	19848.62	19848.64	0.324	2	P 6	18693.11	18693.11	0.251	0
P 5	19950.71				P 5	18788.47	18788.44	0.697	-3
P 4	20069.55	20069.47	0.209	-8	P 4	18901.54	18901.50	0.120	-4
P 3	20149.95	20149.96	0.376	1	P 3	18977.22	18977.22	0.158	0
R 4	20193.27	20193.27	0.096	0	R 4	19025.26			
P 2	20217.48	20217.44	0.564	-4	P 2	19041.15	19041.14	0.421	-1
R 3	20236.08				R 3	19063.35	19063.39	0.319	4
P 1	20268.26				P 1	19089.49	19089.44	0.332	-5
R 2	20293.64	20293.63	0.254	-1	R 2	19117.31	19117.29	0.671	-2
R 1	20311.18	20311.21	0.259	3	R 1	19132.41	19132.38	0.285	-3
R 0	20314.69	20314.61	0.052	-8	R 0	19134.69	19134.71	0.535	2
<b>RMS= 3.7 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 25-6</b>					<b>H<sub>2</sub> EF → B 25-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>
P 5	17657.75	17657.84	0.180	9	P 2	15703.84			
P 4	17765.37	17765.34	0.069	-3	R 4	15709.40			
P 3	17836.59				R 3	15735.41			
R 4	17889.09	17889.05	0.280	-4	P 1	15745.81	15745.82	2.560	1
P 2	17897.11	17897.09	0.934	-2	R 2	15780.00	15780.03	3.270	3
R 3	17922.73				R 0	15787.80	15787.80	6.401	0
P 1	17943.15	17943.17	0.768	2	R 1	15788.73	15788.74	6.124	1
R 2	17973.27	17973.33	0.536	5	<b>RMS = 1.6 10<sup>2</sup> cm<sup>-1</sup></b>				
R 1	17986.07	17986.06	3.371	-1					
R 0	17987.19	17987.17	0.778	-2					
<b>RMS = 2.8 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 25-9</b>					<b>H<sub>2</sub> EF → B 25-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>
P 4	14544.01				P 4	13524.65	13524.56	0.227	-9
P 3	14603.19				P 3	13584.05	13584.07	0.165	2
P 2	14654.44	14654.51	0.044	7	P 2	13633.94			
R 4	14667.73	14667.74	0.405	1	R 4	13648.37			
R 3	14689.32				R 3	13670.19			
P 1	14694.16				P 1	13672.54	13672.56	1.213	2
R 2	14730.60	14730.62	3.179	2	R 2	13710.10			
R 0	14734.99				R 0	13712.79	13712.85	1.654	6
R 1	14737.08				R 1	13715.46			
<b>RMS = 2.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 5.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 25-11</b>					<b>H<sub>2</sub> EF → B 25-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>
P 2	12645.50	12645.44	0.314	-6	P 5	11520.24	11520.33	0.276	9
P 1	12681.66				P 4	11608.09			
R 0	12720.69				P 3	11630.29			
R 2	12721.66	12721.63	0.061	-3	P 2	11682.59	11682.59	1.218	0
R 1	12724.57	12724.56	1.008	-1	R 3	11716.43	11716.34	0.527	-9
<b>RMS = 3.0 10<sup>2</sup> cm<sup>-1</sup></b>					P 1	11719.24			
					R 4	11731.81	11731.88	3.442	7
					R 0	11758.20	11758.21	0.461	1
					R 2	11758.75	11758.74	0.305	-1
					R 1	11762.16	11762.13	0.013	-3
					<b>RMS = 5.8 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 25-13</b>					<b>H<sub>2</sub> EF → B 26-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	10590.45	10590.38	1.296	-7	P 3	21795.74	21795.81	0.746	7
P 4	10667.27	10667.28	8.091	1	R 4	21848.18	21848.20	0.337	2
P 3	10713.22	10713.29	1.224	7	P 2	21880.51			
P 2	10754.40	10754.40	5.144	0	R 3	21900.01	21900.02	0.112	1
P 1	10787.36	10787.30	2.071	-6	R 2	21937.46	21937.45	0.434	0
R 4	10790.99	10790.99	6.795	0	P 1	21957.61			
R 3	10799.36	10799.42	1.891	6	R 1	21963.48	21963.55	0.059	7
R 0	10824.78	10824.77	0.978	-1	R 0	21981.66	21981.69	0.319	3
R 1	10830.28	10830.26	2.041	-2	<b>RMS = 43 10<sup>-2</sup> cm<sup>-1</sup></b>				
R 2	10830.56	10830.55	1.682	-1	<b>RMS = 29 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 26-5</b>					<b>H<sub>2</sub> EF → B 26-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	19247.21	19247.19	0.224	-2	P 4	18200.11	18200.16	0.157	5
P 4	19336.28	19336.27	0.440	-1	P 3	18277.20			
P 3	19417.82	19417.83	0.388	1	R 4	18343.88	18343.88	0.736	0
R 4	19480.05	19480.03	0.532	-2	P 2	18351.06	18351.14	1.368	8
P 2	19495.10	19495.10	0.771	0	R 3	18381.47	18381.48	2.427	1
R 3	19522.09	19522.06	0.641	-3	R 2	18408.01	18408.01	1.651	0
R 2	19552.05	19552.05	0.632	0	P 1	18420.80	18420.79	3.514	-1
P 1	19567.14				R 1	18426.67	18426.65	1.822	-2
R 1	19573.01	19573.01	0.501	0	R 0	18441.14	18441.14	0.904	0
R 0	19588.64	19588.64	0.561	0	<b>RMS = 3.0 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>RMS = 14 10<sup>-2</sup> cm<sup>-1</sup></b>					<b>H<sub>2</sub> EF → B 26-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	16930.29	16930.30	0.035	1	P 5	15945.38	15945.40	4.399	2
P 5	17017.22				P 4	16020.42	16020.45	2.882	3
P 4	17095.68	17095.66	1.312	-2	P 3	16089.88			
P 3	17168.51				P 2	16157.78			
P 2	17239.06				R 4	16164.19	16164.27	0.195	8
R 4	17239.45				R 3	16194.15			
R 3	17272.78	17272.78	0.427	0	R 2	16214.74	16214.68	1.184	-6
R 2	17296.01	17296.03	0.990	2	P 1	16223.46			
P 1	17306.51	17306.55	0.756	4	R 1	16229.34	16229.33	1.434	-1
R 1	17312.38	17312.44	1.157	6	R 0	16241.75	16241.83	1.742	8
R 0	17325.66	17325.68	2.164	2	<b>RMS = 43 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>RMS = 3.4 10<sup>-2</sup> cm<sup>-1</sup></b>					<b>RMS = 43 10<sup>-2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> EF → B 26-11</b>					<b>H<sub>2</sub> EF → B 26-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	12921.65	12921.68	0.191	3	P 4	12042.83	12042.84	0.681	1
P 4	12982.09				P 3	12070.89	12070.89	1.647	0
P 3	13040.15	13040.13	0.806	-2	P 2	12136.54			
P 2	13099.45	13099.49	3.235	4	R 3	12175.16	12175.16	0.851	0
R 4	13125.86				R 4	12186.60	12186.59	1.109	-1
R 3	13144.42				R 2	12193.49			
R 2	13156.40				P 1	12196.89			
P 1	13159.31	13159.36	1.099	5	R 1	12202.76			
R 1	13165.18				R 0	12212.15			
R 0	13174.64								
<b>RMS= 3.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 0.5 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 26-13</b>					<b>H<sub>2</sub> EF → B 27-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	11049.19	11049.23	0.199	4	P 4	21019.75	21019.67	0.050	-8
P 4	11102.01	11101.96	1.977	-5	P 3	21097.76	21097.77	1.358	1
P 3	11153.82				R 4	21137.71			
P 2	11208.35				P 2	21163.30	21163.24	0.050	-6
R 4	11245.78	11245.81	0.338	3	R 3	21176.65			
R 3	11258.09	11258.08	0.533	-1	P 1	21212.57			
P 1	11265.01				R 2	21243.85			
R 2	11265.30	11265.32	0.793	2	R 1	21258.99	21259.02	0.136	2
R 1	11270.88				R 0	21260.51	21260.48	6.845	-3
R 0	11278.73	11278.75	0.590	2					
<b>RMS= 3.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.0 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 27-6</b>					<b>H<sub>2</sub> EF → B 27-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 6	18513.07	18513.06	0.661	-1	P 5	17499.05	17499.10	2.369	5
P 5	18598.32	18598.30	4.898	-2	P 4	17611.15	17611.11	0.032	-4
P 4	18715.58	18715.54	0.246	-4	P 3	17675.71	17675.74	0.196	3
P 3	18784.41	18784.42	1.919	1	R 4	17729.11			
R 4	18833.54				P 2	17730.93	17730.96	0.725	3
P 2	18842.93	18842.93	0.490	0	R 3	17754.61	17754.63	0.174	2
R 3	18863.30				P 1	17773.17	17773.15	0.578	-2
P 1	18887.46	18887.40	0.014	-6	R 2	17811.48			
R 2	18923.48				R 0	17817.53	17817.52	2.874	-1
R 0	18933.01	18932.95	0.262	-6	R 1	17819.59			
R 1	18933.88								
<b>RMS= 2.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				



<b>H<sub>2</sub> EF → B 27-10</b>					<b>H<sub>2</sub> EF → B 27-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>
P 4	14474.86	14474.90	0.668	4	P 4	13497.55	13497.54	0.488	-1
P 3	14531.86	14531.77	0.861	-9	P 3	13547.36			
P 2	14579.76	14579.75	0.660	-1	P 2	13591.32			
R 4	14592.82				R 4	13615.51			
R 3	14610.76				P 1	13625.96	13625.89	0.317	-7
P 1	14616.85	14616.84	1.402	-1	R 3	13626.25			
R 0	14658.61				R 0	13666.51			
R 2	14660.30				R 2	13671.87	13671.86	0.881	-1
R 1	14663.27				R 1	13672.39			
<b>RMS = 5.0 10<sup>-2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.4 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> EF → B 27-12</b>					<b>H<sub>2</sub> EF → B 27-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>
P 5	12460.81	12460.80	1.838	-1	P 4	11617.48	11617.51	0.763	3
P 4	12558.30				P 3	11661.03	11661.02	0.855	-1
P 3	12578.10	12578.04	1.455	-6	P 2	11700.22			
P 2	12628.41				P 1	11731.67	11731.63	3.235	-4
R 3	12656.99				R 4	11735.44	11735.47	3.294	3
P 1	12663.55				R 3	11739.93			
R 4	12676.26	12676.32	0.774	6	R 0	11770.60			
R 0	12704.02				R 1	11778.09			
R 2	12708.95	12708.97	0.013	2	R 2	11780.77	11780.77	2.906	0
R 1	12709.97				<b>RMS = 2.8 10<sup>-2</sup> cm<sup>-1</sup></b>				
<b>RMS = 4.5 10<sup>-2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> EF → B 28-4</b>					<b>H<sub>2</sub> EF → B 28-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>-2</sup> cm <sup>-1</sup>
P 5	21326.81	21326.72	0.069	-9	P 6	20064.24	20064.24	0.121	0
P 4	21431.87	21431.87	0.240	0	P 5	20164.57			
P 3	21507.61	21507.60	0.115	-1	P 4	20263.86	20263.85	0.513	-1
R 4	21564.40	21564.40	0.077	0	P 3	20334.88	20334.92	0.073	4
P 2	21571.65	21571.62	0.135	-3	P 2	20395.32	20395.29	0.470	-3
R 3	21612.19				R 4	20396.39			
P 1	21619.88	21619.81	0.323	-7	R 3	20439.46			
R 2	21655.97				P 1	20441.11			
R 1	21668.85	21668.84	0.047	-1	R 2	20479.63	20479.67	0.318	4
R 0	21668.86	21668.84	0.047	-2	R 0	20488.86			
<b>RMS = 4.8 10<sup>-2</sup> cm<sup>-1</sup></b>					R 1	20490.07			
					<b>RMS = 2.6 10<sup>-2</sup> cm<sup>-1</sup></b>				



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## TRANSITIONS

**GK → B**

**H → B**

**I → B**

**J → B**

<b>H<sub>2</sub> GK → B 0-0</b>					<b>H<sub>2</sub> GK → B 0-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>12</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>12</sup> cm <sup>-1</sup>	
P 5	21071.88	21071.90	0.102	2	P 5	19780.95	19780.91	0.639	-4
P 4	21173.56	21173.57	0.429	1	P 4	19873.88	19873.96	0.251	8
P 3	21259.06	21259.03	0.249	-3	P 3	19952.12	19952.15	1.168	3
R 5	21279.09				R 5	19988.16			
P 2	21330.64	21330.65	0.515	1	P 2	20018.08	20018.07	0.728	-1
R 4	21355.32	21355.35	0.544	3	R 4	20055.64	20055.64	2.117	0
P 1	21386.47	21386.52	0.335	5	P 1	20070.08	20070.07	0.745	-1
R 3	21410.56	21410.57	0.391	1	R 3	20103.62	20103.61	0.535	-1
R 2	21440.29	21440.29	0.477	0	R 2	20127.73			
R 0	21446.79	21446.78	0.472	-1	R 0	20128.46	20128.45	0.922	-1
R 1	21451.40	21451.39	0.455	-1	R 1	20135.01	20135.00	0.728	-1
<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 0-2</b>					<b>H<sub>2</sub> GK → B 0-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>12</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>12</sup> cm <sup>-1</sup>	
P 7	18296.58	18296.50	1.678	-8	P 7	17087.36	17087.44	0.083	8
P 6	18417.45	18417.38	2.890	-7	P 6	17199.44	17199.42	0.066	-2
P 5	18522.90	18522.90	0.715	0	P 5	17297.07	17297.05	0.553	-2
P 4	18608.31	18608.28	1.301	-3	P 4	17375.72	17375.70	1.129	-2
P 3	18680.32	18680.30	0.436	-2	P 3	17442.19	17442.14	0.690	-5
R 5	18730.12				P 2	17499.12	17499.10	2.369	-2
P 2	18741.50	18741.48	0.569	-2	R 5	17504.28			
R 4	18790.06				P 1	17544.99			
P 1	18790.25	18790.21	0.195	-4	R 4	17557.48	17557.44	0.160	-4
R 3	18831.82	18831.84	0.487	2	R 3	17593.69			
R 0	18846.99	18846.99	0.643	0	R 0	17600.28	17600.23	0.718	-5
R 2	18851.15	18851.14	0.960	-1	R 2	17608.77	17608.76	0.806	-1
R 1	18855.18	18855.17	0.678	-1	R 1	17609.92			
<b>RMS = 4.9 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 0-4</b>					<b>H<sub>2</sub> GK → B 0-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>12</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>12</sup> cm <sup>-1</sup>	
P 7	15908.76	15908.74	4.205	-2	P 6	14857.20	14857.21	0.907	1
P 6	16012.71	16012.72	1.678	1	P 5	14940.88	14940.88	0.165	0
P 5	16103.13				P 4	15007.59	15007.62	0.381	3
P 4	16175.60	16175.61	0.152	1	P 3	15064.26			
P 3	16236.99	16237.06	0.245	7	P 2	15113.71			
P 2	16290.05				R 5	15148.10			
R 5	16310.34				P 1	15154.53			
P 1	16333.30				R 4	15189.35			
R 4	16357.36				R 0	15207.26			
R 0	16387.26	16387.17	0.109	-9	R 3	15215.77			
R 3	16388.50				R 1	15219.46			
R 1	16398.23				R 2	15223.36			
R 2	16399.70	16399.77	1.289	7	<b>RMS = 1.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 3.6 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> GK → B 0-6</b>					<b>H<sub>2</sub> GK → B 0-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	13810.16	13810.15	0.178	-1	P 4	12767.00	12767.00	0.269	0
P 4	13871.42	13871.43	0.941	1	P 3	12814.95	12814.99	0.991	4
P 3	13923.64	13923.64	0.699	0	P 2	12857.68	12857.71	14.807	3
P 2	13969.68	13969.69	3.545	1	P 1	12893.89			
P 1	14008.19	14008.19	0.223	0	R 5	12918.11			
R 5	14017.37				R 0	12944.28	12944.21	3.656	-7
R 4	14053.18	14053.19	0.120	1	R 4	12948.76			
R 0	14059.76	14059.75	0.405	-1	R 1	12958.82			
R 1	14073.12				R 3	12966.45			
R 3	14075.14				R 2	12967.33			
R 2	14079.33	14079.29	0.575	-4					
<b>RMS= 1.3 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 4.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 0-8</b>					<b>H<sub>2</sub> GK → B 0-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	11639.05				P 5	10603.47	10603.53	1.645	6
P 4	11691.73	11691.74	1.016	1	P 4	10650.07	10650.07	3.084	0
P 3	11736.32	11736.32	1.038	0	P 3	10690.23	10690.22	1.044	-1
P 2	11776.40	11776.41	0.882	1	P 2	10727.01	10727.01	2.083	0
P 1	11810.85				P 1	10759.20	10759.25	2.000	5
R 5	11846.27	11846.30	12.568	3	R 0	10807.55	10807.56	1.745	1
R 0	11860.37	11860.32	3.206	-5	R 5	10810.68			
R 4	11873.49	11873.49	4.417	0	R 1	10824.13	10824.13	6.283	0
R 1	11875.78	11875.81	4.008	3	R 4	10831.82			
R 2	11886.05	11886.06	3.693	1	R 2	10836.66	10836.64	7.188	-2
R 3	11887.82	11887.84	3.278	2	R 3	10841.74	10841.65	1.855	-9
<b>RMS= 2.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 0-11</b>					<b>H<sub>2</sub> GK-B 0-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	8615.33	8615.37	1.441	4	P 5	7672.66	7672.72	0.646	6
P 4	8653.40	8653.41	2.880	1	P 4	7714.15	7714.16	3.233	1
P 3	8686.60				P 3	7717.34	7717.33	1.410	-1
P 2	8718.07	8718.07	1.855	0	P 2	7755.15	7755.15	4.431	0
P 1	8746.69	8746.75	0.675	6	P 1	7784.27	7784.28	0.817	1
R 0	8793.26	8793.29	0.553	3	R 0	7830.76	7830.75	1.187	-1
R 1	8811.62	8811.61	0.570	-1	R 1	7849.20			
R 5	8822.54				R 2	7864.80	7864.81	3.700	1
R 2	8827.72				R 3	7868.84	7868.84	0.534	0
R 4	8835.16	8835.16	1.139	0	R 5	7879.87			
R 3	8838.10	8838.06	3.316	-4	R 4	7895.90	7895.93	0.346	3
<b>RMS=3.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 1.5 10<sup>2</sup> cm<sup>-1</sup></b>				





H <sub>2</sub> GK → B 2-2					H <sub>2</sub> GK → B 2-4				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 6	20248.22	20248.23	0.338	1	P 6	17843.48	17843.47	0.866	-1
P 5	20340.08	20340.04	0.239	-4	P 2	17917.47	17917.46	0.782	-1
P 2	20368.92	20368.91	0.351	-1	P 5	17920.30	17920.32	0.786	2
P 4	20398.73	20398.71	0.379	-2	P 1	17962.69	17962.67	0.149	-2
P 1	20419.64	20419.64	0.190	0	P 4	17966.03	17966.05	0.887	2
P 3	20457.14	20457.13	0.404	-1	P 3	18013.82	18013.80	2.506	-2
R 0	20474.41	20474.40	0.160	-1	R 0	18014.68	18014.68	1.371	0
R 4	20620.83	20620.92	0.019	9	R 1	18175.05	18175.04	1.602	-1
R 1	20632.00				R 4	18188.13	18188.11	0.940	-2
R 2	20641.58				R 2	18190.13	18190.15	4.360	2
R 3	20649.00				R 3	18205.68	18205.67	0.736	0
<b>RMS = 2.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.6 10<sup>2</sup> cm<sup>-1</sup></b>				
H <sub>2</sub> GK → B 2-6					H <sub>2</sub> GK → B 2-7				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	15597.10				P 6	14470.36	14470.42	0.321	6
P 5	15627.34				P 2	14485.10			
P 1	15637.57				P 1	14523.28			
P 4	15661.85				P 5	14528.08	14528.15	0.584	7
R 0	15687.18				P 4	14557.43	14557.44	0.912	1
P 3	15700.46				R 0	14571.70			
R 1	15849.94	15849.95	1.754	1	P 3	14591.77	14591.80	0.711	3
R 2	15869.76	15869.69	4.705	-7	R 1	14735.64			
R 4	15883.95	15883.95	4.746	0	R 2	14757.75			
R 3	15892.32	15892.35	4.490	3	R 4	14779.53			
<b>RMS = 4.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 4.5 10<sup>2</sup> cm<sup>-1</sup></b>				
H <sub>2</sub> GK → B 2-8					H <sub>2</sub> GK → B 2-9				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	13403.82				P 2	12354.43	12354.47	2.983	4
P 1	13440.24				P 1	12388.58	12388.58	1.384	0
P 4	13482.16	13482.19	0.133	3	P 5	12420.65	12420.65	0.959	0
R 0	13487.79				R 0	12434.98			
P 3	13513.14	13513.09	1.260	-5	P 4	12440.49	12440.49	0.841	0
R 1	13652.60				P 3	12467.05			
R 2	13676.48	13676.43	0.970	-5	R 1	12600.95			
R 4	13704.26				R 2	12627.08	12627.08	0.789	0
R 3	13705.00	13705.01	1.242	1	R 3	12658.92			
<b>RMS = 3.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.4 10<sup>2</sup> cm<sup>-1</sup></b>				



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<b>H<sub>2</sub> GK → B 2-10</b>					<b>H<sub>2</sub> GK → B 2-11</b>					
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 2	11333.93				P 2	10345.49				
P 1	11366.96				P 1	10376.08				
R 0	11412.77				R 0	10420.68	10420.69	0.364	1	
P 4	11421.14	11421.15	0.645	1	P 5	10432.51	10432.50	2.122	-1	
P 3	11447.92				P 4	10443.83	10443.83	2.545	0	
R 1	11579.33	11579.34	1.350	1	P 3	10463.42	10463.43	1.577	1	
R 2	11606.58	11606.59	1.185	1	R 1	10588.44				
R 3	11639.78				R 2	10618.14				
R 4	11643.24				R 3	10655.28				
					R 4	10665.93	10665.90	1.068	-3	
	<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 2-13</b>					<b>H<sub>2</sub> GK → B 3-1</b>					
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 2	8454.39				P 9	21951.79	21951.79	0.494	0	
P 1	8481.78				P 8	21958.47				
R 0	8524.77				P10	21985.24	21985.24	0.588	0	
P 5	8560.04				P 7	21991.83	21991.79	0.069	-4	
P 4	8563.75	8563.77	1.318	2	P 6	22043.66				
P 3	8577.09	8577.09	0.260	0	P 5	22115.92				
R 1	8694.15	8694.12	4.213	-3	P 4	22207.54	22207.55	0.499	1	
R 2	8727.04	8727.09	0.588	5	P 3	22304.72	22304.80	0.289	8	
R 3	8768.95				P 2	22398.67				
R 4	8785.85				R 4	22432.51	22432.53	0.208	2	
					R 3	22438.59	22438.63	0.203	4	
	<b>RMS = 2.6 10<sup>2</sup> cm<sup>-1</sup></b>					R 5	22443.78	22443.77	0.092	-1
						R 2	22461.39	22461.46	0.300	7
						R 6	22470.06			
						P 1	22485.85			
						R 1	22487.61	22487.53	0.064	-8
						R 0	22509.05	22509.02	0.043	-3
						R 7	22519.29			
						R 8	22604.72			
						<b>RMS = 4.0 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 3-2</b>					<b>H<sub>2</sub> GK → B 3-3</b>					
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 8	20729.38				P 8	19529.80	19529.75	0.285	-5	
P 7	20752.20				P 7	19542.98	19543.01	0.237	3	
P 6	20794.31				P 6	19576.31	19576.30	0.496	-1	
P 5	20857.88				P 5	19632.04	19632.05	0.417	1	
P 4	20941.96				P 4	19709.38	19709.38	0.423	0	
P 3	21032.92				P 3	19794.79	19794.79	0.486	0	
P 2	21122.09	21122.16	0.397	7	P 2	19879.71	19879.72	0.627	1	
R 3	21166.79				R 3	19928.67	19928.65	0.558	-2	
R 4	21166.93	21166.92	0.350	-1	R 4	19934.35	19934.34	0.550	-1	
R 2	21184.81	21184.82	0.476	1	R 2	19942.43	19942.43	0.561	0	
R 5	21185.73	21185.79	0.130	6	R 5	19959.90	19959.93	0.485	3	
P 1	21206.02	21206.00	0.116	-2	P 1	19960.76	19960.71	0.401	-5	
R 1	21207.78	21207.79	0.457	1	R 1	19962.52	19962.52	0.552	0	
R 6	21220.72	21220.72	0.297	0	R 0	19980.86	19980.85	0.524	-1	
R 0	21227.57	21227.58	0.486	1	R 6	20002.71	20002.67	0.482	-4	
R 7	21279.65				R 7	20070.43				
R 8	21375.63	21375.61	0.215	-2	R 8	20176.05	20176.00	0.271	-5	
	<b>RMS = 3.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.6 10<sup>2</sup> cm<sup>-1</sup></b>				





<b>H<sub>2</sub> GK → B 4-6</b>					<b>H<sub>2</sub> GK → B 4-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 5	17415.19	17415.17	0.765	-2	P 5	16315.92	16316.00	1.308	8
P 4	17421.50	17421.54	0.982	4	P 4	16317.08	16317.07	0.846	-1
P 6	17437.22	17437.24	1.115	2	P 3	16328.54	16328.49	0.143	-5
P 3	17437.23	17437.24	1.115	1	P 6	16344.10	16344.11	0.732	1
P 2	17456.13	17456.12	1.162	-1	P 2	16344.13	16344.11	0.732	-2
P 1	17479.21	17479.14	0.864	-7	P 1	16364.91	16364.90	0.870	-1
R 0	17546.21	17546.20	1.346	-1	R 0	16430.73	16430.71	0.555	-2
R 1	17586.70	17586.70	0.841	0	R 1	16472.41	16472.38	0.122	-3
R 2	17629.41	17629.40	1.392	-1	R 2	16517.41			
R 3	17680.17	17680.15	1.004	-2	R 3	16571.48	16571.49	4.359	1
R 4	17757.69	17757.69	0.790	0	R 4	16653.26			
<b>RMS= 24 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → B 4-9</b>					<b>H<sub>2</sub> GK → B 4-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 4	14200.15				P 4	13180.79			
P 3	14203.82	14203.79	0.007	-3	P 3	13184.69			
P 5	14208.50				P 2	13192.96			
P 2	14213.46				P 1	13208.59			
P 1	14230.21	14230.27	2.444	6	R 0	13271.81			
R 0	14294.01	14294.06	0.293	5	R 1	13316.09	13316.10	3.133	1
R 1	14337.71				R 2	13366.23			
R 2	14386.74				R 3	13427.63	13427.65	0.443	2
R 3	14446.76				R 4	13516.97	13516.95	1.254	-2
R 4	14536.33	14536.30	0.060	-3	<b>RMS= 1.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS= 5.8 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> GK → B 4-12</b>					<b>H<sub>2</sub> GK → B 4-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 3	11230.92				P 2	10313.42			
P 2	11241.61				P 3	10313.86	10313.77	1.021	-9
P 1	11255.29	11255.34	4.496	5	P 4	10323.41			
R 0	11317.22				P 1	10323.41			
R 1	11362.79	11362.76	0.265	-3	P 5	10347.89	10347.87	6.878	-2
R 2	11414.88	11414.89	0.513	1	R 0	10383.80	10383.84	0.013	4
R 3	11473.87	11473.86	0.297	-1	R 1	10430.91			
<b>RMS= 4.0 10<sup>2</sup> cm<sup>-1</sup></b>					R 2	10486.70	10486.65	2.601	-5
					R 3	10556.80			
					R 4	10659.59			
					<b>RMS= 4.1 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> GK → B 5-3</b>					<b>H<sub>2</sub> GK → B 5-5</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	21682.19	21682.20	0.074	1	P 6	19339.95	19339.91	0.450	-4
P 5	21757.11	21757.16	0.137	5	P 5	19400.93	19400.94	0.147	1
P 4	21829.98	21829.99	0.253	1	P 4	19461.85	19461.81	0.486	-4
P 3	21896.74				P 3	19518.81			
R 5	22025.17	22025.21	0.151	4	R 5	19668.99	19668.98	0.765	-1
R 4	22040.23	22040.20	0.151	-3	R 4	19672.10	19672.07	0.557	-3
R 3	22053.74	22053.66	0.388	-8	R 1	19674.00	19673.99	0.825	-1
R 2	22063.02	22063.01	0.455	-1	R 3	19675.81	19675.81	0.556	0
R 1	22064.47	22064.45	0.210	-2	R 2	19677.62	19677.61	0.579	-1
P 1	22080.82	22080.90	0.072	8	P 1	19690.35	19690.36	0.415	1
P 2	22082.62	22082.62	0.326	0	P 2	19697.22	19697.21	0.521	-1
R 0	22183.78	22183.76	0.064	-2	R 0	19790.76	19790.68	0.063	-8
<b>RMS = 3.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> GK → -B 5-6</b>					<b>H<sub>2</sub> GK → B 5-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 7	18164.72	18164.64	0.059	-8	P 6	17122.34	17122.29	0.083	-5
P 6	18215.47	18215.45	5.059	-2	P 5	17170.94			
P 5	18270.21	18270.20	0.787	-1	P 4	17221.25	17221.18	1.731	-7
P 4	18325.68	18325.65	0.974	-3	P 3	17269.50			
P 3	18378.19	18378.17	1.705	-2	R 1	17413.37	17413.35	1.164	-2
R 1	18527.67	18527.72	0.121	5	R 2	17421.58	17421.60	1.857	2
R 2	18533.58	18533.58	0.708	0	R 3	17426.50	17426.44	0.083	-6
R 3	18535.19	18535.14	0.404	-5	P 1	17429.72	17429.70	0.351	-2
R 4	18535.93	18535.89	0.680	-4	R 4	17431.51	17431.55	1.159	4
R 5	18538.26	18538.30	0.236	4	R 5	17439.00	17439.02	0.481	2
P 1	18544.02	18544.03	0.035	1	P 2	17441.18			
P 2	18553.18				R 0	17527.78			
R 0	18643.26	18643.24	0.523	-2	<b>RMS = 4.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> GK → B 5-8</b>					<b>H<sub>2</sub> GK → B 5-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	16099.10	16099.09	0.255	-1	P 4	14084.96			
P 4	16145.99				P 3	14125.65			
P 3	16190.87				R 1	14257.05			
R 1	16330.33				R 2	14270.41	14270.39	1.752	-2
R 2	16340.30	16340.29	0.656	-1	P 1	14273.40			
P 1	16346.68				R 3	14282.65	14282.73	0.040	8
R 3	16347.87				P 2	14290.01			
R 4	16356.24	16356.19	0.180	-5	R 4	14295.22	14295.17	0.233	-5
P 2	16359.90	16359.88	0.692	-2	R 0	14368.86			
R 5	16367.16				<b>RMS = 2.6 10<sup>2</sup> cm<sup>-1</sup></b>				
R 0	16443.87								
<b>RMS = 4.4 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> G → B 5-11</b>					<b>H<sub>2</sub> GK → B 5-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	13075.38				P 4	12168.40			
P 4	13107.65	13107.71	1.461	6	P 3	12171.88			
P 3	13141.14				R 1	12303.75	12303.75	3.507	0
R 1	13266.17				R 2	12319.06	12319.00	3.256	-6
R 2	13281.97	13282.00	2.472	3	P 1	12320.10	12320.14	3.270	4
P 1	13282.52				R 3	12328.88	12328.90	1.181	2
R 3	13298.14	13298.09	3.133	-5	P 2	12338.66	12338.69	3.235	3
P 2	13301.57	13301.54	3.235	-3	R 4	12378.65	12378.62	1.352	-3
R 4	13317.91	13317.88	3.354	-3	R 0	12414.27			
R 5	13343.43	13343.37	1.978	-6					
R 0	13376.76								
	<b>RMS = 4.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.5 10<sup>2</sup> cm<sup>-1</sup></b>			
<b>H<sub>2</sub> GK → B 5-13</b>					<b>H<sub>2</sub> GK → B 6-4</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	11202.91	11202.87	3.882	-4	P 6	21591.59	21591.55	0.249	-4
P 4	11227.58	11227.58	1.313	0	P 5	21598.35	21598.35	2.626	0
P 3	11254.82	11254.83	0.633	1	P 4	21647.72	21647.72	0.341	0
R 1	11371.87				P 3	21699.62	21699.62	0.231	0
P 1	11388.22	11388.19	1.127	-3	P 2	21746.24	21746.24	0.404	0
R 2	11390.87	11390.88	0.804	1	P 1	21785.88	21785.89	0.174	1
P 2	11410.47				R 0	21843.45	21843.47	0.100	2
R 3	11411.82	11411.81	1.047	-1	R 1	21860.86	21860.83	0.142	-3
R 4	11437.83	11437.78	0.747	-5	R 2	21871.81	21871.79	0.095	-2
R 5	11470.97				R 3	21883.72			
R 0	11480.85	11480.94	0.840	9	R 4	21936.23	21936.20	0.470	-3
	<b>RMS = 3.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.5 10<sup>2</sup> cm<sup>-1</sup></b>			
<b>H<sub>2</sub> GK → B 6-6</b>					<b>H<sub>2</sub> GK → B 6-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 5	19305.38				P 5	18206.12			
P 6	19311.59	19311.65	0.285	6	P 6	18218.47	18218.43	1.750	-4
P 4	19343.54	19343.52	0.574	-2	P 4	18239.11			
P 3	19386.27	19386.26	0.431	-1	P 3	18277.58	18277.56	1.037	-2
P 2	19425.87	19425.86	0.518	-1	P 2	18313.86	18313.86	0.955	0
P 1	19460.77	19460.75	0.441	-2	P 1	18346.48	18346.49	1.312	1
R 0	19515.94	19515.94	0.514	0	R 0	18400.47	18400.48	5.689	1
R 1	19535.75	19535.74	0.401	-1	R 1	18421.45	18421.51	0.755	6
R 2	19551.44	19551.43	0.523	-2	R 2	18439.44	18439.45	0.159	1
R 3	19570.37	19570.28	0.149	-9	R 3	18461.68			
R 4	19632.06	19632.05	0.417	-1	R 4	18527.63	18527.72	0.121	9
	<b>RMS = 2.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.9 10<sup>2</sup> cm<sup>-1</sup></b>			

<b>H<sub>2</sub> GK → B 6-8</b>					<b>H<sub>2</sub> GK → B 6-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 5	17134.28				P 3	16152.86	16152.94	0.178	8
P 4	17163.85	17163.92	0.536	7	P 2	16183.19	16183.22	1.154	3
P 3	17198.95				P 1	16211.78	16211.87	0.201	9
P 2	17232.59	17232.57	0.304	-2	R 0	16263.74			
P 1	17263.44	17263.40	0.365	-4	R 1	16286.75			
R 0	17316.55	17316.56	0.672	1	R 2	16308.77	16308.77	0.194	0
R 1	17338.41				R 3	16336.96			
R 2	17358.16	17358.13	1.867	-3					
R 3	17383.05	17383.03	0.567	-2					
R 4	17452.37								
	<b>RMS= 3.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 4.8 10<sup>2</sup> cm<sup>-1</sup></b>			
<b>H<sub>2</sub> GK → B 6-12</b>					<b>H<sub>2</sub> GK → B 6-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 5	13167.88	13167.86	0.913	-2	P 5	12238.09			
P 3	13179.97				P 4	12245.44			
P 4	13186.26	13186.26	0.900	0	P 3	12262.90	12262.98	1.207	8
P 2	13211.34	13211.37	0.453	3	P 2	12283.15	12283.19	2.097	4
P 1	13236.86				P 1	12304.98	12304.98	1.021	0
R 0	13286.95				R 0	12353.54			
R 1	13311.83				R 1	12379.95			
R 2	13336.92				R 2	12408.73	12408.75	3.065	2
R 3	13364.06	13364.05	0.884	-1	R 3	12446.99			
R 4	13474.78	13474.76	0.519	-2	R 4	12533.96			
	<b>RMS= 2.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 3.9 10<sup>2</sup> cm<sup>-1</sup></b>			
<b>H<sub>2</sub> H-B 0-1</b>					<b>H<sub>2</sub> H-B 0-2</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
P 2	21384.54	21384.54	0.357	0	P 2	20107.96	20107.94	0.388	-2
P 3	21392.45	21392.46	0.152	1	P 1	20119.00			
P 1	21398.84	21398.85	0.238	1	P 3	20120.65	20120.62	0.369	-3
P 4	21417.38	21417.39	0.443	1	P 4	20151.81	20151.80	0.378	-1
P 5	21484.49	21484.53	0.532	4	R 0	20213.44	20213.42	0.297	-2
R 0	21494.92	21494.94	0.337	2	P 5	20226.45			
R 1	21575.34	21575.34	0.190	0	R 1	20295.51	20295.48	0.275	-3
P 6	21585.46	21585.40	0.505	-6	P 6	20336.11			
R 2	21671.24	21671.25	0.331	1	R 2	20394.65	20394.61	0.432	-4
R 3	21807.17	21807.17	0.164	0	R 3	20535.37			
R 4	21974.31	21974.23	0.166	-8	R 4	20708.73			
	<b>RMS= 3.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.6 10<sup>2</sup> cm<sup>-1</sup></b>			

H <sub>2</sub> H-B 0-3				H <sub>2</sub> H-B 0-4				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 2	18865.58				P 2	17656.51		
P 1	18873.75	18873.81	0.214	6	P 1	17662.05		
P 3	18882.52				P 3	17677.32		
P 4	18919.23				P 4	17719.10	0.868	0
R 0	18966.73				R 0	17753.72	0.265	0
P 5	19000.61				P 5	17806.67	0.677	2
R 1	19050.25				R 1	17838.56	0.121	-9
P 6	19118.11	19118.14	0.474	3	P 6	17931.37	0.683	2
R 2	19152.27	19152.25	0.357	-2	R 2	17943.20	0.768	-3
R 3	19297.24				R 3	18092.05		
R 4	19476.15				R 4	18276.02	0.837	-1
<b>RMS = 4.3 10<sup>2</sup> cm<sup>-1</sup></b>				<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
H <sub>2</sub> H-B 0-5				H <sub>2</sub> H-B 0-6				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 2	16480.17				P 2	15336.14		
P 1	16483.28				P 1	15336.94		
P 3	16504.59				P 3	15363.97		
P 4	16551.09				P 4	15414.93		
R 0	16573.72	16573.67	3.601	-5	R 0	15426.21		
P 5	16644.43				R 1	15513.45		
R 1	16659.79				P 5	15513.71	0.019	7
R 2	16766.87				R 2	15622.83		
P 6	16775.87	16775.80	0.166	-7	P 6	15651.38	0.290	2
R 3	16919.32				R 3	15778.69	3.247	1
R 4	17108.01	17107.94	0.174	-7	R 4	15971.85	1.836	8
<b>RMS = 4.6 10<sup>2</sup> cm<sup>-1</sup></b>				<b>RMS = 4.7 10<sup>2</sup> cm<sup>-1</sup></b>				
H <sub>2</sub> H-B 0-7				H <sub>2</sub> H-B 0-8				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 1	14222.65				P 1	13139.60		
P 2	14224.13	14224.20	1.787	7	P 2	13142.86		
R 0	14310.74				R 0	13226.82	0.933	6
R 1	14399.15	14399.11	0.040	-4	R 1	13316.11	3.133	-1
R 2	14510.83				R 2	13429.55	0.872	-7
<b>RMS = 6.8 10<sup>2</sup> cm<sup>-1</sup></b>				<b>RMS = 3.8 10<sup>2</sup> cm<sup>-1</sup></b>				
H <sub>2</sub> H-B 1-3				H <sub>2</sub> H-B 1-4				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>
P 3	21142.27				P 2	19936.69	0.620	1
P 2	21145.76	21145.74	0.151	-2	P 3	19937.07		
P 4	21160.73	21160.64	1.635	-9	P 1	19956.02	0.415	-2
P 1	21167.71				P 4	19960.61	0.130	7
R 0	21246.91	21246.90	0.018	-1	R 0	20033.90	0.819	-4
R 1	21310.00	21310.07	0.123	7	R 1	20098.31	0.239	-4
R 2	21393.78				R 2	20184.71	0.273	-2
<b>RMS = 8.4 10<sup>2</sup> cm<sup>-1</sup></b>				<b>RMS = 3.2 10<sup>2</sup> cm<sup>-1</sup></b>				



<b>H<sub>2</sub> H-B 1-6</b>					<b>H<sub>2</sub> H-B 1-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 2	17616.32	17616.32	1.534	0	P 2	14373.64			
P 3	17623.72				P 1	14381.92	14381.90	0.936	
P 1	17630.91	17630.88	1.508	-3	P 3	14390.31			
P 4	17656.43				P 4	14435.08			
R 0	17706.39	17706.39	0.646	0	R 0	14454.19	14454.26	1.040	
R 1	17773.20	17773.15	0.578	-5	R 1	14524.20	14524.21	0.434	
R 2	17864.34	17864.33	0.422	-1	R 2	14621.67	14621.62	0.080	
<b>RMS = 24 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 15 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> H-B 1-12</b>					<b>H<sub>2</sub> H-B 1-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 2	11401.79	11401.81	1.149	2	P 2	10473.60			
P 1	11406.99	11406.94	2.471	-5	P 1	10475.12	10475.21	0.124	
P 3	11417.41				P 3	10500.35			
R 0	11477.40				R 0	10543.99	10543.99	3.389	
P 4	11499.16	11499.23	0.807	7	P 4	10558.33			
R 1	11549.28	11549.20	0.305	-8	R 1	10617.40			
R 2	11649.81				R 2	10721.63	10721.58	1.011	
<b>RMS = 54 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 29 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> H-B 2-4</b>					<b>H<sub>2</sub> H-B 2-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 2	21978.29	21978.26	0.127	-3	P 2	19657.92			
P 3	21998.76	21998.84	0.221	8	P 1	19676.46	19676.50	0.434	
P 1	22001.57				P 3	19685.41			
P 4	22005.90	22005.90	0.128	0	P 4	19701.72			
P 5	22017.13	22017.15	1.588	2	P 5	19724.16			
P 6	22070.53	22070.45	1.226	-8	R 0	19748.00	19747.99	0.328	
R 0	22075.50				P 6	19790.54			
R 1	22160.00	22160.00	3.177	0	R 1	19834.89			
R 2	22230.00				R 2	19909.63			
R 3	22302.50				R 3	19989.14	19989.08	0.219	
R 4	22415.18	22415.24	1.050	6	R 4	20111.00	20110.98	0.330	
<b>RMS = 44 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 37 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> H-B 2-7</b>					<b>H<sub>2</sub> H-B 2-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 2	18545.92	18545.89	0.571	-3	P 2	17464.64	17464.62	1.212	
P 1	18562.16	18562.07	0.258	-9	P 1	17479.12	17479.13	0.960	
P 3	18576.72	18576.76	3.049	4	P 3	17498.09			
P 4	18597.30	18597.27	3.304	-3	P 4	17522.03	17522.04	0.897	
P 5	18624.90	18624.82	0.105	-8	R 0	17548.61	17548.59	0.891	
R 0	18632.52				P 5	17553.06			
P 6	18697.42	18697.40	0.310	-2	R 1	17637.55			
R 1	18720.59				R 2	17716.35	17716.30	1.075	
R 2	18797.62	18797.60	2.112	-2	R 3	17801.82			
R 3	18880.45	18880.45	0.358	0	R 4	17931.31	17931.39	0.683	
R 4	19006.58	19006.54	0.276	-4	<b>RMS = 34 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 36 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> H-B 2-11</b>					<b>H<sub>2</sub> H-B 2-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	14406.31	14406.37	0.439	6	P 2	13443.39			
P 1	14414.96				P 1	13452.54	13452.47	1.200	-7
P 3	14448.36				P 3	13479.10	13479.12	0.387	2
R 0	14481.50	14481.59	2.029	9	R 0	13519.01			
P 4	14483.70				P 4	13544.44	13544.47	1.005	3
P 5	14529.33	14529.35	0.475	2	R 1	13610.97			
R 1	14573.39				R 2	13695.10			
R 2	14658.02	14657.97	0.988	-5	R 3	13782.84			
R 3	14752.10				R 4	13953.73			
R 4	14892.98				<b>RMS= 5.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS= 6.9 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> I<sup>+</sup> → B 0-0+</b>					<b>H<sub>2</sub> I<sup>+</sup> → B 0-1+</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	21815.60	21815.60	0.491	0	P 2	20503.04	20503.03	0.443	-1
P 3	21847.59	21847.59	0.487	0	P 3	20540.64	20540.66	0.203	2
P 4	21884.66	21884.66	0.504	0	P 4	20584.98	20584.99	0.125	1
P 5	21930.33	21930.32	0.461	-1	R 0	20613.41	20613.47	0.083	6
R 0	21931.74	21931.75	0.452	1	P 5	20639.39			
P 6	21972.34	21972.35	0.420	1	P 6	20691.41			
R 1	22039.93				R 1	20723.54			
P 7	22045.25				P 7	20775.39			
R 2	22151.39				R 2	20838.83			
P 8	22172.91				P 8	20914.94			
R 3	22269.01				R 3	20962.07			
R 4	22379.94				R 4	21080.26			
R 5	22518.27				R 5	21227.33			
R 6	22707.45				R 6	21426.53	21426.57	0.164	4
<b>RMS= 0.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> I<sup>+</sup> → B 0-2</b>					<b>H<sub>2</sub> I<sup>+</sup> → B 0-3</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	19226.45	19226.44	0.643	-1	P 2	17984.07	17984.06	11.266	-1
P 3	19268.84	19268.82	0.491	-2	P 3	18030.72	18030.71	0.979	-1
P 4	19319.41	19319.40	0.526	-1	R 0	18085.23	18085.21	0.188	-2
R 0	19331.94	19331.92	0.518	-2	P 4	18086.82	18086.81	0.924	-1
P 5	19381.35	19381.34	0.446	-1	P 5	18155.51			
P 6	19442.07	19442.07	0.366	0	R 1	18198.45	18198.42	3.630	-3
R 1	19443.71	19443.69	0.248	-2	P 6	18224.06	18224.06	2.187	0
P 7	19535.75	19535.74	0.401	-1	R 2	18319.87			
R 2	19562.25	19562.24	0.268	-1	P 7	18326.53			
P 8	19685.85				R 3	18452.14			
R 3	19690.27	19690.34	0.137	7	P 8	18486.27	18486.31	0.098	4
R 4	19814.69	19814.68	0.203	-1	R 4	18582.10	18582.11	2.135	1
R 5	19969.29				R 5	18743.45			
R 6	20177.18				R 6	18959.17	18959.15	0.422	-2
<b>RMS= 1.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 1.5 10<sup>2</sup> cm<sup>-1</sup></b>				

$H_2 \Gamma^+ \rightarrow B \ 0-4$					$H_2 \Gamma^+ \rightarrow B \ 0-5$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	16775.00	16775.04	0.166	4	P 2	15598.67			
P 3	16825.52	16825.54	0.212	2	P 3	15652.79			
R 0	16872.21				R 0	15692.21			
P 4	16886.70	16886.69	0.785	-1	P 4	15718.69			
P 5	16961.57	16961.62	0.633	5	P 5	15799.33	15799.29	6.505	-4
R 1	16986.75				R 1	15807.98	15807.98	9.207	0
P 6	17037.33				P 6	15881.82	15881.81	4.627	-1
R 2	17110.80				R 2	15934.46	15934.48	4.502	2
P 7	17147.93				R 3	16074.22	16074.20	1.023	-2
R 3	17246.95	17246.95	0.221	0	R 4	16213.97			
R 4	17381.98				R 5	16387.27			
R 5	17549.51				R 6	16616.94			
RMS= 3.2 $10^2 cm^{-1}$					RMS= 2.3 $10^2 cm^{-1}$				
$H_2 \Gamma^+ \rightarrow B \ 0-8$					$H_2 \Gamma^+ \rightarrow B \ 0-9$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	12261.35	12261.31	2.127	-4	P 2	11211.96			
P 3	12324.85	12324.81	3.235	-4	P 3	11278.76	11278.75	0.590	-1
R 0	12345.32	12345.36	3.379	4	R 0	11292.51	11292.52	0.665	1
P 4	12402.84	12402.79	0.579	-5	P 4	11361.17			
R 1	12464.31				R 1	11412.65			
P 5	12497.50				P 5	11461.92	11461.98	0.030	6
R 2	12597.15				R 2	11547.76	11547.84	1.335	8
R 3	12746.27				R 3	11700.18			
R 4	12898.11				R 4	11856.45	11856.47	7.350	2
R 5	13085.44	13085.43	3.133	-1	R 5	12049.86			
RMS= 3.6 $10^2 cm^{-1}$					RMS= 3.7 $10^2 cm^{-1}$				
$H_2 \Gamma^+ \rightarrow B \ 0-12$					$H_2 \Gamma^+ \rightarrow B \ 1-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	7311.92	7311.98	1.796	6	P 2	21315.16	21315.18	0.485	2
R 0	7382.30				P 3	21340.30	21340.31	0.473	1
P 3	7388.80	7388.83	7.121	3	P 4	21350.84	21350.86	0.478	2
P 4	7484.43				R 0	21420.65	21420.70	1.042	5
R 1	7505.85	7505.81	0.210	-4	P 5	21463.05	21463.05	0.440	0
P 5	7601.31				P 6	21480.58	21480.58	0.371	0
R 2	7647.72				R 1	21515.17	21515.17	0.187	0
R 3	7810.22				R 2	21593.68	21593.67	0.287	-1
R 4	7979.70	7979.71	2.038	1	R 3	21771.96			
R 5	8189.25				R 4	21853.19			
RMS= 3.7 $10^2 cm^{-1}$					RMS= 2.8 $10^2 cm^{-1}$				

$H_2 \text{ I}^+ \rightarrow B \quad 1-3$					$H_2 \text{ I}^+ \rightarrow B \quad 1-4$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$
P 2	20072.78	20072.77	0.505	-1	P 2	18863.71	18863.70	0.504	-1
P 3	20102.18	20102.16	0.797	-2	P 3	18896.98	18896.97	0.412	-1
P 4	20118.26	20118.25	0.492	-1	P 4	18918.14	18918.20	0.099	6
R 0	20173.94	20173.91	0.429	-3	R 0	18960.92	18960.91	0.456	-1
P 5	20237.21	20237.22	0.347	1	P 5	19043.27	19043.30	0.415	3
P 6	20262.57	20262.58	0.394	1	R 1	19058.22	19058.22	0.432	0
R 1	20269.91	20269.88	0.953	-3	P 6	19075.84	19075.86	0.343	2
R 2	20351.31	20351.31	0.188	0	R 2	19142.23	19142.23	0.552	0
R 3	20533.84				R 3	19328.64	19328.64	0.331	0
R 4	20620.61				R 4	19420.49	19420.50	0.357	1
RMS= 2.1 $10^2 \text{cm}^{-1}$					RMS= 1.7 $10^2 \text{cm}^{-1}$				
$H_2 \text{ I}^+ \rightarrow B \quad 1-5$					$H_2 \text{ I}^+ \rightarrow B \quad 1-7$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$
P 2	17687.37	17687.36	0.940	-1	P 2	15431.34			
P 3	17724.25	17724.24	0.911	-1	P 3	15474.94			
P 4	17750.13	17750.11	1.099	-2	P 4	15509.53			
R 0	17780.92	17780.89	0.505	-3	R 0	15517.94			
R 1	17879.44	17879.51	0.032	7	R 1	15618.81			
P 5	17881.03	17881.05	0.778	2	P 5	15651.04	15651.00	0.066	-4
P 6	17920.33	17920.32	0.786	-1	R 2	15709.86			
R 2	17965.90				R 3	15906.60	15906.61	4.705	1
R 3	18155.91	18155.82	0.590	-9	R 4	16011.89	16011.92	1.324	3
R 4	18252.48	18252.43	0.856	-5	RMS= 1.4 $10^2 \text{cm}^{-1}$				
RMS= 3.7 $10^2 \text{cm}^{-1}$									
$H_2 \text{ I}^+ \rightarrow B \quad 1-9$					$H_2 \text{ I}^+ \rightarrow B \quad 1-10$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$
P 2	13300.67	13300.65	3.294	-2	P 2	12280.16	12280.19	2.442	3
P 3	13350.22				P 3	12331.09	12331.04	3.528	-5
R 0	13381.22				R 0	12359.01	12359.03	2.610	2
P 4	13392.60				P 4	12373.24	12373.25	1.070	1
R 1	13484.11	13484.19	0.884	8	R 1	12462.49	12462.43	1.273	-7
P 5	13543.62	13543.57	3.133	-5	R 2	12558.69			
R 2	13579.19				R 3	12762.75			
R 3	13781.88				R 4	12875.60	12875.61	1.562	1
R 4	13894.95	13894.93	1.383	-2	RMS= 3.4 $10^2 \text{cm}^{-1}$				
RMS= 3.9 $10^2 \text{cm}^{-1}$									
$H_2 \text{ I}^+ \rightarrow B \quad 1-12$					$H_2 \text{ I}^+ \rightarrow B \quad 1-13$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$
P 2	10328.81				P 2	9400.63			
P 3	10377.32	10377.32	0.603	0	P 3	9460.26			
R 0	10404.43	10404.38	1.580	-5	R 0	9471.01			
P 4	10456.68	10456.59	0.960	-9	P 4	9515.86	9515.86	0.861	0
R 1	10509.19	10509.27	0.884	8	R 1	9577.31			
R 2	10607.34	10607.34	1.973	0	R 2	9679.15	9679.14	3.359	-1
P 5	10612.80	10612.83	0.012	3	R 3	9891.92	9891.89	5.110	-3
R 3	10808.98				R 4	10018.21			
R 4	10959.03	10959.04	3.270	1	RMS= 3.4 $10^2 \text{cm}^{-1}$				
RMS= 3.9 $10^2 \text{cm}^{-1}$									

$H_2 \Gamma^+ \rightarrow B \quad 2-3$					$H_2 \Gamma^+ \rightarrow B \quad 2-5$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	21952.45	21952.46	0.292	1	P 2	19567.05			
R 0	22053.61	22053.66	0.388	5	R 0	19660.59	19660.58	1.571	-1
P 3	22097.56				P 3	19719.64	19719.65	0.583	1
P 4	22110.79	22110.81	0.404	2	P 4	19742.66	19742.66	1.036	0
P 6	22141.26	22141.25	0.302	-1	P 5	19797.50			
P 5	22153.68	22153.67	0.076	-1	P 6	19799.02	19799.01	0.443	-1
R 1	22265.29	22265.26	0.056	-3	R 1	19874.83			
R 2	22343.84	22343.78	0.260	-6	R 2	19958.43			
R 3	22450.31				R 3	20072.38			
R 4	22499.30				R 4	20131.17			
RMS = $3.6 \times 10^2 cm^{-1}$					RMS = $0.9 \times 10^2 cm^{-1}$				
$H_2 \Gamma^+ \rightarrow B \quad 2-6$					$H_2 \Gamma^+ \rightarrow B \quad 2-7$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	18423.01	18423.00	1.462	-1	P 2	17311.01	17311.07	0.919	6
R 0	18513.09	18513.06	0.661	-3	R 0	17397.61	17397.58	1.128	-3
P 3	18579.01	18578.95	3.868	-6	P 3	17470.32	17470.31	0.771	-1
P 4	18606.49	18606.44	1.517	-5	P 4	17502.07	17502.05	1.578	-2
P 5	18666.78				P 5	17567.51			
P 6	18674.53	18674.53	0.282	0	P 6	17581.41	17581.40	1.075	-1
R 1	18728.49	18728.47	0.534	-2	R 1	17614.19			
R 2	18814.40	18814.39	0.404	-1	R 2	17702.39	17702.34	0.230	-5
R 3	18931.76				R 3	17823.07			
R 4	18995.00	18994.99	0.441	-1	R 4	17890.57			
RMS = $4.8 \times 10^2 cm^{-1}$					RMS = $3.0 \times 10^2 cm^{-1}$				
$H_2 \Gamma^+ \rightarrow B \quad 2-8$					$H_2 \Gamma^+ \rightarrow B \quad 2-10$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	16229.73				P 2	14159.83	14159.84	0.494	1
R 0	16313.70				R 0	14238.68	14238.68	0.553	0
P 3	16391.69				P 3	14326.47			
P 4	16426.80	16426.79	0.235	-1	P 4	14365.78	14365.78	0.534	0
R 1	16531.15				R 1	14457.88			
R 2	16621.12				R 2	14551.22			
R 3	16744.44	16744.52	0.109	8	R 3	14679.22			
R 4	16815.31	16815.32	0.114	1	R 4	14754.28	14754.19	0.674	-9
RMS = $3.8 \times 10^2 cm^{-1}$					RMS = $4.8 \times 10^2 cm^{-1}$				
$H_2 \Gamma^+ \rightarrow B \quad 2-11$					$H_2 \Gamma^+ \rightarrow B \quad 2-12$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	13171.40	13171.40	0.691	0	P 2	12208.48	12208.49	1.015	1
R 0	13246.59				R 0	12284.10	12284.10	1.052	0
P 3	13341.97	13342.03	1.221	6	P 3	12372.71	12372.70	0.886	-1
P 4	13388.47				P 4	12449.21	12449.23	1.031	2
R 1	13466.99	13467.02	3.059	3	R 1	12504.57			
P 5	13471.95				P 5	12529.28	12529.28	1.044	0
R 2	13562.79				R 2	12599.87			
R 3	13694.72	13694.75	1.512	3	R 3	12725.46			
R 4	13776.97	13776.97	0.234	0	R 4	12837.72	12837.73	0.944	1
RMS = $3.8 \times 10^2 cm^{-1}$					RMS = $0.9 \times 10^2 cm^{-1}$				

$H_2 \Gamma^+ \rightarrow B \quad 2-13$					$H_2 \Gamma^+ \rightarrow B \quad 3-5$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	11280.30	11280.27	4.207	-3	P 5	21353.24	21353.17	2.258	-7
R 0	11350.68				P 4	21386.92	21386.94	0.515	2
P 3	11455.64	11455.67	1.700	3	P 3	21397.73	21397.72	0.199	-1
P 4	11508.39				P 2	21403.56	21403.56	0.147	0
R 1	11572.70				R 0	21497.11			
P 5	11599.48				R 1	21552.92			
R 2	11671.68	11671.59	0.453	-9	R 2	21602.70	21602.75	1.534	5
R 3	11808.39	11808.48	0.797	9	R 3	21628.12	21628.05	0.079	-7
R 4	11896.90	11896.91	3.426	1					
<b>RMS = <math>3.8 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>5.5 \times 10^2 cm^{-1}</math></b>				
$H_2 \Gamma^+ \rightarrow B \quad 3-6$					$H_2 \Gamma^+ \rightarrow B \quad 3-7$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	20222.51	20222.50	1.058	-1	P 2	19147.53	19147.48	3.283	-5
P 4	20250.76	20250.75	0.385	-1	P 3	19148.41	19148.41	0.478	0
P 3	20257.10				R 0	19234.13			
P 2	20259.53	20259.52	0.366	-1	R 1	19292.28	19292.25	0.168	-3
R 0	20349.61				R 2	19346.66	19346.63	0.606	-3
R 1	20406.58				R 3	19378.81	19378.74	0.358	-7
R 2	20458.66								
R 3	20487.50	20487.56	0.006	6					
<b>RMS = <math>1.4 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>4.7 \times 10^2 cm^{-1}</math></b>				
$H_2 \Gamma^+ \rightarrow B \quad 3-9$					$H_2 \Gamma^+ \rightarrow B \quad 3-13$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	17016.86	17016.85	0.923	-1	P 2	13116.82	13116.77	0.368	-5
P 3	17023.70	17023.67	0.224	-3	P 3	13133.73	13133.67	0.132	-6
P 4	17029.40	17029.40	1.597	0	R 0	13187.20			
R 0	17097.40	17097.36	0.075	-4	R 1	13250.79			
R 1	17157.59				R 2	13315.95	13315.99	3.875	4
R 2	17215.99				R 3	13364.13	13364.05	0.585	-8
R 3	17254.09	17254.12	1.187	3					
<b>RMS = <math>1.8 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>4.5 \times 10^2 cm^{-1}</math></b>				
$H_2 \Gamma \rightarrow B \quad 0-0$					$H_2 \Gamma \rightarrow B \quad 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	21827.97	21827.98	0.497	1	Q 1	20514.14	20514.16	0.186	2
Q 1	21830.53	21830.53	0.502	0	Q 2	20515.41	20515.44	0.331	3
Q 3	21837.39	21837.39	0.467	0	Q 3	20530.45	20530.46	0.199	1
Q 4	21862.72	21862.72	0.466	0	Q 4	20563.04			
Q 5	21905.70	21905.72	0.439	2	Q 5	20614.76	20614.76	0.083	0
Q 6	21967.12	21967.12	0.419	0	Q 6	20686.20	20686.17	0.048	-3
Q 7	22047.09	22047.10	0.426	1	Q 7	20777.23			
Q 8	22145.52	22145.54	0.354	2	Q 8	20887.55			
Q 9	22263.24	22263.24	0.462	0	Q 9	21017.76			
Q10	22395.79	22395.80	0.237	1	Q10	21163.19	21163.19	0.173	0
<b>RMS = <math>1.1 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>2.0 \times 10^2 cm^{-1}</math></b>				

$H_2 \Gamma \rightarrow B \quad 0-2$					$H_2 \Gamma \rightarrow B \quad 0-3$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	19234.31	19234.29	0.499	-2	Q 1	17989.05	17989.03	0.956	-2
Q 2	19238.83	19238.82	0.601	-1	Q 2	17996.45	17996.44	0.901	-1
Q 3	19258.65	19258.64	0.537	-1	Q 3	18020.52	18020.53	2.065	1
Q 4	19297.46	19297.46	0.520	0	Q 4	18064.88	18064.88	1.061	0
Q 5	19356.72	19356.73	0.360	1	Q 5	18130.88	18130.86	0.755	-2
Q 6	19436.86	19436.84	0.571	-2	Q 6	18218.85	18218.87	2.070	2
Q 7	19537.59	19537.58	0.298	-1	Q 7	18328.37	18328.39	0.784	2
Q 8	19658.46	19658.42	0.441	-4	Q 8	18458.88	18458.87	0.379	-1
Q 9	19800.20				Q 9	18610.64			
Q10	19957.07	19957.06	0.262	-1					
RMS= $1.6 \times 10^2 cm^{-1}$					RMS= $1.4 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B \quad 0-4$					$H_2 \Gamma \rightarrow B \quad 0-5$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	16777.35				Q 1	15598.58			
Q 2	16787.38	16787.39	0.924	1	Q 2	15611.04			
Q 3	16815.33	16815.32	0.114	-1	Q 3	15642.60			
Q 4	16864.76	16864.77	0.189	1	Q 4	15696.75			
Q 5	16936.94	16936.91	0.089	-3	Q 5	15774.70	15774.70	3.200	0
Q 6	17032.12	17032.13	0.935	1	Q 6	15876.61	15876.62	4.719	1
Q 7	17149.77	17149.83	0.826	6					
RMS= $3.4 \times 10^2 cm^{-1}$					RMS= $1.0 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B \quad 0-6$					$H_2 \Gamma \rightarrow B \quad 0-8$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	14452.24				Q 1	12254.91	12254.87	2.317	-4
Q 2	14467.01	14467.06	0.806	5	Q 2	12273.73			
Q 3	14501.97				Q 3	12314.65	12314.65	3.796	0
Q 4	14560.58	14560.62	0.338	4	Q 4	12380.89			
					Q 5	12472.87	12472.82	3.235	-5
RMS= $4.4 \times 10^2 cm^{-1}$					RMS= $3.7 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B \quad 1-1$					$H_2 \Gamma \rightarrow B \quad 1-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	22613.37				Q 1	21333.53	21333.53	0.451	0
Q 2	22620.68	22620.65	0.083	-3	Q 2	21344.09	21344.10	0.504	1
Q 3	22637.47	22637.40	0.068	-7	Q 3	21365.67	21365.68	0.516	1
Q 4	22666.87	22666.90	0.148	3	Q 4	21401.29	21401.30	0.507	1
					Q 5	21452.70	21452.74	0.384	4
					Q 6	21520.88	21520.89	0.368	1
RMS= $4.1 \times 10^2 cm^{-1}$					RMS= $1.7 \times 10^2 cm^{-1}$				

$H_2 \Gamma \rightarrow B$ 1-3					$H_2 \Gamma \rightarrow B$ 1-4				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	20088.28	20088.28	0.412	0	Q 1	18876.58	18876.57	0.491	-1
Q 2	20101.71	20101.70	0.585	-1	Q 2	18892.64	18892.63	0.583	-1
Q 3	20127.55	20127.61	0.250	6	Q 3	18922.35	18922.35	0.667	0
Q 4	20168.71	20168.70	0.382	-1	Q 4	18968.59	18968.58	0.587	-1
Q 5	20226.86	20226.85	0.259	-1	Q 5	19032.92	19032.93	1.623	1
Q 6	20302.87	20302.84	0.283	-3	Q 6	19116.14	19116.13	0.532	-1
RMS = $2.5 \times 10^2 cm^{-1}$					RMS = $0.9 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B$ 1-5					$H_2 \Gamma \rightarrow B$ 1-6				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	17697.81	17697.81	0.859	0	Q 1	16551.47	16551.39	0.079	-8
Q 2	17716.31	17716.30	1.075	-1	Q 2	16572.27	16572.26	11.696	-1
Q 3	17749.62	17749.62	1.262	0	Q 3	16609.00	16608.96	0.044	-4
Q 4	17800.58	17800.56	0.863	-2	Q 4	16664.41	16664.41	0.568	0
Q 5	17870.68	17870.72	0.962	4	Q 5	16739.96	16740.02	0.331	6
Q 6	17960.63	17960.64	0.568	1	Q 6	16836.15	16836.11	0.158	-4
RMS = $1.7 \times 10^2 cm^{-1}$					RMS = $2.0 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B$ 1-9					$H_2 \Gamma \rightarrow B$ 1-10				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	13302.48	13302.54	3.189	6	Q 1	12280.86	12280.87	3.111	1
Q 2	13329.60	13329.59	3.189	-1	Q 2	12309.10	12309.09	3.294	-1
RMS = $4.0 \times 10^2 cm^{-1}$					Q 3	12356.46	12356.47	3.354	1
					RMS = $1.2 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B$ 1-12					$H_2 \Gamma \rightarrow B$ 1-13				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	10327.56				Q 1	9395.68			
Q 2	10357.75	10357.75	3.318	0	Q 2	9429.56	9429.51	0.645	-5
Q 3	10402.69	10402.74	3.159	5	Q 3	9485.63			
Q 4	10507.13	10507.15	2.512	2	Q 4	9566.31	9566.31	1.892	0
RMS = $3.0 \times 10^2 cm^{-1}$					RMS = $1.2 \times 10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow B$ 2-3					$H_2 \Gamma \rightarrow B$ 2-5				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	22030.49	22030.52	0.526	3	Q 1	19640.02	19640.00	0.952	-2
Q 2	22046.33	22046.34	0.516	1	Q 2	19660.93	19660.91	1.807	-2
Q 3	22072.41	22072.42	0.457	1	Q 3	19694.48	19694.47	0.972	-1
Q 4	22110.37	22110.37	0.544	0	Q 4	19742.23	19742.20	1.140	-3
Q 5	22161.47	22161.45	3.135	-2	Q 5	19805.29	19805.32	0.933	3
Q 6	22226.46	22226.44	0.532	-2	Q 6	19884.22	19884.22	1.014	0
RMS = $2.1 \times 10^2 cm^{-1}$					RMS = $2.1 \times 10^2 cm^{-1}$				



<b>H<sub>2</sub> Γ → B 2-6</b>					<b>H<sub>2</sub> Γ → B 2-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
Q 1	18493.68	18493.69	0.609	1	Q 1	17379.39	17379.36	0.772	-3
Q 2	18516.89	18516.88	0.935	-1	Q 2	17404.89	17404.88	1.130	-1
Q 3	18553.86				Q 3	17445.17	17445.16	1.030	-1
Q 4	18606.07	18606.08	1.732	1	Q 4	17501.64	17501.62	1.705	-2
Q 5	18674.57	18674.53	0.282	-4	Q 5	17575.30	17575.30	0.229	0
Q 6	18759.73	18759.71	0.387	-1	Q 6	17666.61	17666.59	0.504	-2
<b>RMS = 1.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> Γ → B 2-10</b>					<b>H<sub>2</sub> Γ → B 2-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
Q 1	14223.07	14223.03	0.786	-4	Q 1	13232.19	13232.14	0.727	-5
Q 2	14253.72	14253.68	0.994	-4	Q 2	13265.28	13265.34	0.727	6
Q 3	14301.32				Q 3	13316.81	13316.77	3.893	-4
Q 4	14365.35	14365.36	0.655	1	<b>RMS = 4.6 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 3.1 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> Γ → B 3-5</b>					<b>H<sub>2</sub> Γ → B 3-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
Q 1	21407.18	21407.20	0.412	2	Q 1	20260.84	20260.87	0.534	3
Q 2	21427.53	21427.54	0.505	1	Q 2	20283.49	20283.54	0.138	5
Q 3	21458.79	21458.79	0.292	0	Q 3	20318.17	20318.18	0.381	1
Q 4	21501.60	21501.62	0.370	2	Q 4	20365.43	20365.42	0.595	-1
Q 5	21556.45	21556.49	0.371	4	Q 5	20425.73	20425.79	0.229	6
<b>RMS = 2.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> Γ → B 3-7</b>					<b>H<sub>2</sub> Γ → B 3-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
Q 1	19146.54	19146.50	0.147	-4	Q 1	18063.50	18063.51	2.086	1
Q 2	19171.49	19171.49	0.613	0	Q 2	18090.21	18090.20	0.865	-1
Q 3	19209.48	19209.45	0.279	-3	Q 3	18130.85	18130.86	0.755	1
Q 4	19261.01	19261.00	0.497	-1	Q 4	18185.75	18185.74	0.875	-1
Q 5	19326.47	19326.44	0.290	-3	<b>RMS = 0.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 2.1 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> Γ → B 3-9</b>					<b>H<sub>2</sub> Γ → B 3-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	
Q 1	17011.85				Q 1	15990.23			
Q 2	17040.82	17040.76	0.608	-6	Q 2	16020.32			
Q 3	17084.76	17084.71	0.094	-5	Q 3	16065.63	16065.63	0.222	0
Q 4	17144.08	17144.09	0.477	1	Q 4	16124.72	16124.69	1.039	-3
<b>RMS = 4.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				

$H_2 \Gamma \rightarrow B \quad 3-12$					$H_2 \Gamma \rightarrow B \quad 3-13$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	14036.93				Q 1	13105.05	13105.05	3.620	0
Q 2	14068.97	14069.04	0.794	7	Q 2	13140.78			
Q 3	14111.86	14111.93	0.183	7	Q 3	13194.80			
	<b>RMS = <math>7.1 \times 10^2 cm^{-1}</math></b>				Q 4	13267.34	13267.27	0.267	-7
					Q 5	13358.43	13358.48	2.441	5
						<b>RMS = <math>3.47 \times 10^2 cm^{-1}</math></b>			
$H_2 J^+ \rightarrow B \quad 0-0$					$H_2 J^+ \rightarrow B \quad 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	22102.07	22102.07	0.433	0	P 3	20795.12			
P 4	22188.21	22188.21	0.450	0	P 4	20888.53			
R 1	22294.41	22294.41	0.139	0	R 1	20978.02			
P 5	22304.77	22304.80	0.289	3	P 5	21013.83	21013.92	0.115	9
P 6	22421.53	22421.52	0.283	-1	P 6	21140.61	21140.60	0.187	-1
R 2	22454.94	22454.96	0.064	2	R 2	21142.38	21142.40	0.114	2
R 3	22643.45	22643.46	0.062	1	R 3	21336.50	21336.42	0.138	-8
R 4	22829.13				R 4	21529.46	21529.49	0.361	3
	<b>RMS = <math>1.6 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>5.2 \times 10^2 cm^{-1}</math></b>			
$H_2 J^+ \rightarrow B \quad 0-2$					$H_2 J^+ \rightarrow B \quad 0-3$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	19523.33	19523.32	0.414	-1	P 3	18285.20	18285.18	0.272	-2
P 4	19622.95	19622.91	1.908	-4	P 4	18390.37	18390.38	5.001	1
R 1	19698.19				R 1	18452.93			
P 5	19755.79	19755.81	0.311	2	P 5	18529.95			
R 2	19865.80	19865.80	0.391	0	R 2	18623.42	18623.47	0.764	5
P 6	19891.26	19891.33	0.110	7	P 6	18673.26	18673.27	0.272	1
R 3	20064.71				R 3	18826.58			
R 4	20263.88	20263.85	0.513	-3	R 4	19031.30	19031.28	0.869	-2
	<b>RMS = <math>3.7 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.8 \times 10^2 cm^{-1}</math></b>			
$H_2 J^+ \rightarrow B \quad 0-4$					$H_2 J^+ \rightarrow B \quad 0-5$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	17080.00	17080.01	0.173	1	P 3	15907.27	15907.28	4.403	1
P 4	17190.25	17190.16	0.126	-9	P 4	16022.24	16022.32	1.856	8
R 1	17241.24				R 1	16062.46			
P 5	17336.01				R 2	16238.01			
R 2	17414.35	17414.31	0.079	-4	R 3	16448.65			
P 6	17486.53				R 4	16663.17			
R 3	17621.38					<b>RMS = <math>4.6 \times 10^2 cm^{-1}</math></b>			
R 4	17831.17	17831.21	5.917	4					
	<b>RMS = <math>3.51 \times 10^2 cm^{-1}</math></b>								

$H_2 J^+ \rightarrow B$ 0-7					$H_2 J^+ \rightarrow B$ 0-9				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	13657.96				P 3	11533.24	11533.23	3.354	-1
P 4	13781.65	13781.64	1.466	-1	P 4	11664.71			
R 1	13801.83				R 1	11667.13	11667.15	0.354	2
P 5	13943.78				P 5	11836.36	11836.37	20.563	1
R 2	13981.97	13982.00	1.117	3	R 2	11851.30	11851.30	3.758	0
P 6	14113.41	14113.45	0.085	4	R 3	12074.62	12074.54	0.598	-8
R 3	14199.34				R 4	12305.64	12305.64	3.189	0
R 4	14422.57								
<b>RMS = <math>1.9 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.7 \times 10^2 cm^{-1}</math></b>				
$H_2 J^+ \rightarrow B$ 1-4					$H_2 J^+ \rightarrow B$ 1-5				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	19264.66				P 3	18091.93	18091.87	0.372	-6
P 4	19339.12	19339.08	0.174	-4	P 4	18171.11	18171.07	2.005	-4
R 1	19425.89	19425.86	0.518	-3	R 1	18247.12			
R 2	19563.21	19563.20	0.343	-1	P 5	18260.57			
R 3	19708.19	19708.14	0.537	-5	P 6	18374.98	18374.99	3.832	1
R 4	19875.14				R 2	18386.88	18386.89	2.766	1
<b>RMS = <math>3.4 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>2.2 \times 10^2 cm^{-1}</math></b>				
$H_2 J^+ \rightarrow B$ 1-11					$H_2 J^+ \rightarrow B$ 1-12				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	11714.26				P 3	10745.00	10745.05	0.714	5
P 4	11816.92				R 1	10876.87			
R 1	11839.28	11839.30	12.886	2	P 4	10877.66	10877.66	0.212	0
P 5	11935.02				P 5	10992.35	10992.39	4.216	4
R 2	11991.23	11991.32	0.578	9	R 2	11028.32	11028.24	1.169	-8
R 3	12157.79	12157.77	1.230	-2	R 3	11188.53			
R 4	12352.94	12352.91	3.235	-3	R 4	11413.68	11413.64	1.033	-4
<b>RMS = <math>2.3 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>4.7 \times 10^2 cm^{-1}</math></b>				
$H_2 J^+ \rightarrow B$ 2-6					$H_2 J^+ \rightarrow B$ 2-7				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	19017.58				P 3	17908.89			
P 4	19071.58	19071.65	0.376	7	P 4	17967.15			
P 5	19158.10				R 1	18052.77			
R 1	19167.06				P 5	18058.83	18058.81	0.167	-2
P 6	19204.89	19204.98	0.335	9	P 6	18111.77			
R 2	19279.48	19279.51	0.313	3	R 2	18167.48			
R 3	19423.08				R 3	18314.39	18314.39	0.914	0
R 4	19525.36	19525.30	0.341	-6	R 4	18420.93	18420.94	2.605	1
<b>RMS = <math>6.9 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>0.5 \times 10^2 cm^{-1}</math></b>				

$H_2 J^+ \rightarrow B$ 2-9					$H_2 J^+ \rightarrow B$ 2-11			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	15784.18	15784.14	3.318	-4	P 3	13780.54		
P 4	15850.22	15850.24	9.722	2	P 4	13853.56	13853.51	0.139
R 1	15918.07	15918.07	4.691	0	R 1	13905.56		
P 5	15951.41	15951.40	4.377	-1	P 5	13963.27		
R 2	16036.81				R 2	14027.87	14027.89	0.504
R 3	16189.67				R 3	14186.03		
R 4	16304.00				R 4	14307.34		
RMS = $2.0 \times 10^2 cm^{-1}$					RMS = $2.9 \times 10^2 cm^{-1}$			
$H_2 J^+ \rightarrow B$ 2-12					$H_2 J^- \rightarrow B$ 2-13			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 3	12811.28	12811.28	0.947	0	P 3	11894.21	11894.23	3.679
P 4	12914.30	12914.29	1.006	-1	P 4	11973.48	11973.42	2.474
R 1	12943.15	12943.12	3.035	-3	R 1	12011.27		
P 5	13020.59	13020.60	0.438	1	P 5	12090.80	12090.77	1.029
R 2	13064.96	13064.99	1.091	3	R 2	12136.77		
R 3	13216.78	13216.80	0.959	2	R 3	12299.71	12299.75	3.294
R 4	13368.08	13368.10	0.728	2	R 4	12427.26		
RMS = $2.1 \times 10^2 cm^{-1}$					RMS = $4.3 \times 10^2 cm^{-1}$			
$H_2 J^- \rightarrow B$ 0-1					$H_2 J^- \rightarrow B$ 0-2			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	20893.75				Q 2	19617.17	19617.09	1.835
Q 3	21001.93	21001.90	0.103	-3	Q 3	19730.13	19730.15	0.473
Q 4	21132.32	21132.34	0.279	2	Q 4	19866.74	19866.65	0.235
Q 5	21282.20	21282.27	0.102	7	Q 5	20024.16		
Q 6	21449.84	21449.82	0.207	-2	Q 6	20200.49	20200.50	0.100
RMS = $3.2 \times 10^2 cm^{-1}$					RMS = $6.9 \times 10^2 cm^{-1}$			
$H_2 J^- \rightarrow B$ 0-3					$H_2 J^- \rightarrow B$ 0-6			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	18374.79	18374.84	3.334	5	Q 2	14845.35	14845.34	1.627
Q 3	18492.00	18492.02	1.776	2	Q 3	14973.46	14973.37	0.035
Q 4	18634.16	18634.10	0.076	-6	RMS = $1.3 \times 10^2 cm^{-1}$			
Q 5	18798.32	18798.28	3.705	-4				
Q 6	18982.49	18982.48	0.810	-1				
RMS = $4.0 \times 10^2 cm^{-1}$								

$H_2 J^- \rightarrow B$ 0-9					$H_2 J^- \rightarrow B$ 1-2				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	11602.68	11602.72	0.130	4	Q 2	21809.43	21809.43	0.469	0
Q 3	11740.05	11740.13	1.210	8	Q 3	21901.07	21901.05	0.264	-2
Q 4	11908.50	11908.57	2.732	7	Q 4	22014.90	22014.92	0.225	2
RMS = $7.4 \times 10^2 cm^{-1}$					Q 5	22147.92	22147.97	0.224	5
					RMS = $2.5 \times 10^2 cm^{-1}$				
$H_2 J^- \rightarrow B$ 1-3					$H_2 J^- \rightarrow B$ 1-4				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	20567.05	20567.09	0.036	4	Q 2	19357.98	19357.96	0.408	-2
Q 3	20662.95	20662.93	0.058	-2	Q 3	19457.75	19457.74	0.377	-1
RMS = $2.8 \times 10^2 cm^{-1}$					Q 4	19582.19	19582.15	0.064	-4
					Q 5	19728.15	19728.19	0.498	4
					RMS = $3.0 \times 10^2 cm^{-1}$				
$H_2 J^- \rightarrow B$ 1-5					$H_2 J^- \rightarrow B$ 1-7				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	18181.64				Q 2	15925.60	15925.61	8.859	1
Q 3	18285.02				Q 3	16035.71	16035.68	3.827	-3
Q 4	18414.19	18414.14	0.540	-5	RMS = $1.7 \times 10^2 cm^{-1}$				
Q 5	18565.90	18565.97	0.262	7					
RMS = $5.6 \times 10^2 cm^{-1}$									
$H_2 J^- \rightarrow B$ 1-8					$H_2 J^- \rightarrow B$ 2-4				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	14844.33	14844.29	0.211	-4	Q 2	21426.98	21426.99	0.216	1
Q 3	14957.08				Q 3	21506.41			
RMS = $4.0 \times 10^2 cm^{-1}$					Q 4	21607.26	21607.27	0.047	1
					RMS = $0.7 \times 10^2 cm^{-1}$				
$H_2 J^- \rightarrow B$ 2-5					$H_2 J^- \rightarrow B$ 2-9				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	20250.65	20250.71	0.125	6	Q 2	15863.94	15863.95	4.517	1
Q 3	20333.68				Q 3	15959.65	15959.67	1.831	2
Q 4	20439.25	20439.20	0.061	-5	Q 4	16081.72	16081.65	0.307	-7
RMS = $5.5 \times 10^2 cm^{-1}$					RMS = $1.9 \times 10^2 cm^{-1}$				
$H_2 J^- \rightarrow B$ 2-12									
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$					
Q 2	12892.09	12892.08	1.184	-1					
Q 3	12986.75	12986.75	1.397	0					
Q 4	13145.80	13145.81	0.967	1					
RMS = $0.5 \times 10^2 cm^{-1}$									

## TRANSITIONS

**GK→C**

**H→C**

**I→C**

**J→C**

$H_2 \text{ GK} \rightarrow C^+ \text{ 0-0}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 0-1}$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	11844.09	11844.11	9.574	2	P 4	9783.33		
R 5	12051.30				P 3	9944.59	9944.56	2.391
P 4	12057.28				R 4	9965.09	9965.11	2.624
P 3	12233.79	12233.76	2.085	-3	P 2	10075.32	10075.32	2.199
R 4	12239.04	12239.07	0.859	3	R 3	10096.09		
P 2	12374.46	12374.48	0.492	2	P 1	10171.24	10171.23	5.044
R 3	12385.29	12385.29	1.220	0	R 2	10184.97	10184.96	2.680
P 1	12476.75	12476.78	1.126	3	R 1	10236.17		
R 2	12484.11	12484.11	1.048	0				
R 1	12541.68	12541.67	1.097	-1				
	<b>RMS = <math>2.0 \times 10^2 cm^{-1}</math></b>							<b>RMS = <math>1.5 \times 10^2 cm^{-1}</math></b>
$H_2 \text{ GK} \rightarrow C^+ \text{ 0-2}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 1-0}$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	7441.80	7441.76	0.003	-4	P 5	12004.32	12004.37	0.199
P 4	7618.31	7618.31	0.145	0	P 4	12190.42		
R 5	7649.01	7648.97	0.510	-4	P 3	12367.79		
P 3	7797.78				R 5	12386.27	12386.26	0.987
R 4	7800.07				R 4	12467.33	12467.33	1.033
P 2	7911.82				P 2	12529.28	12529.28	1.044
R 3	7949.28	7949.24	2.190	-4	R 3	12545.53	12545.52	1.050
P 1	8000.15				R 2	12617.25	12617.25	1.066
R 2	8021.47				P 1	12660.58	12660.56	0.947
R 1	8065.08	8065.02	4.612	-6	R 1	12675.68	12675.68	1.048
	<b>RMS = <math>4.8 \times 10^2 cm^{-1}</math></b>							<b>RMS = <math>1.1 \times 10^2 cm^{-1}</math></b>
$H_2 \text{ GK} \rightarrow C^+ \text{ 1-1}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 1-2}$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 6	9559.45	9559.47	1.918	2	P 5	7602.03	7602.10	0.442
P 5	9711.30				P 4	7751.45	7751.43	3.860
P 4	9916.47				R 6	7922.20		
R 6	10030.35	10030.35	1.694	0	P 3	7931.78		
P 3	10078.58	10078.64	3.566	6	R 5	7983.98		
R 5	10093.25				R 4	8028.35		
R 4	10193.37	10193.37	3.062	0	P 2	8066.64		
P 2	10230.14				R 3	8109.52	8109.58	2.766
R 3	10256.32	10256.34	0.989	2	R 2	8154.61		
R 2	10318.11	10318.11	4.047	0	P 1	8183.97	8184.00	1.715
P 1	10355.07	10355.10	5.139	3	R 1	8199.07	8199.12	0.690
R 1	10370.17	10370.17	1.238	0				
	<b>RMS = <math>3.1 \times 10^2 cm^{-1}</math></b>							<b>RMS = <math>4.2 \times 10^2 cm^{-1}</math></b>

$\text{H}_2 \text{ GK} \rightarrow \text{C}^+ \text{ 2-0}$					$\text{H}_2 \text{ GK} \rightarrow \text{C}^+ \text{ 2-1}$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$
P 5	13661.27				P 5	11368.25	11368.23	0.297	-2
P 4	13847.71	13847.71	1.033	0	P 4	11573.76			
P 2	14001.88	14001.82	0.267	-6	P 2	11702.75	11702.75	0.494	0
P 3	14010.61	14010.57	0.473	-4	P 3	11721.41			
R 4	14069.81	14069.80	0.240	-1	R 4	11795.86	11795.87	1.088	1
P 1	14106.14	14106.11	0.061	-3	P 1	11800.62	11800.61	0.981	-1
R 3	14202.47				R 3	11913.27	11913.27	1.066	0
R 2	14274.53				R 2	11975.40	11975.40	1.126	0
R 1	14318.50				R 1	12012.99	12013.00	1.160	1
<b>RMS = 29 <math>10^2 \text{cm}^{-1}</math></b>					<b>RMS = 1.0 <math>10^2 \text{cm}^{-1}</math></b>				
$\text{H}_2 \text{ GK} \rightarrow \text{C}^+ \text{ 2-2}$					$\text{H}_2 \text{ GK} \rightarrow \text{C}^+ \text{ 3-0}$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$
P 4	9408.74				P 4	14390.94			
P 2	9539.25	9539.25	1.627	0	P 3	14586.39	14586.30	0.352	-9
P 3	9574.60				R 4	14615.91	14615.91	0.468	0
P 1	9629.53				R 3	14720.27	14720.28	1.776	1
R 4	9630.84	9630.84	0.615	0	P 2	14755.04			
R 3	9766.46	9766.43	0.650	-3	R 2	14817.76	14817.78	0.435	2
R 2	9811.90				P 1	14892.52			
R 1	9841.90	9841.90	0.379	0	R 1	14894.28			
<b>RMS = 1.6 <math>10^2 \text{cm}^{-1}</math></b>					<b>RMS = 3.3 <math>10^2 \text{cm}^{-1}</math></b>				
$\text{H}_2 \text{ GK} \rightarrow \text{C}^+ \text{ 3-1}$					$\text{H}_2 \text{ GK} \rightarrow \text{C}^+ \text{ 3-2}$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$
P 4	12116.99	12116.99	1.118	0	P 6	9599.88	9599.94	2.273	6
P 3	12297.19	12297.20	3.775	1	P 5	9776.77	9776.75	0.833	-2
R 4	12341.95	12341.95	1.059	0	P 4	9951.97	9951.96	3.331	-1
R 3	12431.06	12431.06	1.000	0	R 6	10026.28	10026.26	3.063	-2
P 2	12455.91	12455.91	2.012	0	R 5	10104.63	10104.65	0.137	2
R 2	12518.63	12518.63	1.100	0	P 3	10150.38	10150.47	0.374	9
P 1	12587.01	12587.02	1.047	1	R 4	10176.94	10176.93	3.180	-1
R 1	12588.77	12588.78	1.074	1	R 3	10284.26	10284.26	1.761	0
<b>RMS = 0.8 <math>10^2 \text{cm}^{-1}</math></b>					<b>RMS = 2.4 <math>10^2 \text{cm}^{-1}</math></b>				
					P 2	10292.41			
					R 2	10355.13	10355.13	8.423	0
					P 1	10415.92			
					R 1	10417.68	10417.66	1.044	-2



$H_2 \text{ GK} \rightarrow C^+ \text{ 4-0}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 4-1}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 4	15607.36	15607.34	1.085	-2	P 6	13035.67	13035.67	0.959	0
P 3	15747.37				P 5	13156.09	13156.10	1.065	0
P 2	15860.91	15860.89	4.648	-2	P 4	13333.41	13333.42	1.170	1
R 4	15943.55	15943.53	2.345	-2	P 3	13458.17	13458.16	1.176	-1
P 1	15947.77	15947.74	3.780	-3	P 2	13561.78	13561.78	1.452	0
R 3	15990.32				P 1	13642.26	13642.25	1.462	-1
R 2	16034.19				R 4	13669.59			
R 1	16055.27	16055.25	1.502	-2	R 3	13701.11	13701.10	1.152	-1
<b>RMS = <math>1.1 \times 10^2 cm^{-1}</math></b>					R 2	13735.05	13735.06	1.388	1
					R 1	13749.75	13749.76	0.634	1
					<b>RMS = <math>0.8 \times 10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^+ \text{ 4-2}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 4-3}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 6	10927.52	10927.47	1.271	-5	P 2	9352.98	9353.00	1.128	2
P 5	11046.82	11046.83	7.113	1	P 1	9439.12	9439.12	3.506	0
P 4	11168.39				R 2	9526.26	9526.25	1.762	-1
P 3	11311.37				R 1	9546.62	9546.67	1.737	5
P 2	11398.28	11398.28	1.190	0	<b>RMS = <math>2.2 \times 10^2 cm^{-1}</math></b>				
P 1	11471.16	11471.20	3.637	4					
R 4	11504.58	11504.57	0.936	-1					
R 3	11554.31	11554.29	0.876	-2					
R 2	11571.55	11571.55	1.216	0					
R 1	11578.66	11578.66	0.872	0					
<b>RMS = <math>2.3 \times 10^2 cm^{-1}</math></b>									
$H_2 \text{ GK} \rightarrow C^+ \text{ 5-0}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 5-1}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	16304.13				P 6	13813.92	13813.92	0.246	0
P 4	16511.54	16511.49	0.729	-5	P 5	14011.11			
R 5	16572.19	16572.23	9.329	4	P 4	14237.58			
P 3	16688.34	16688.39	0.646	5	R 5	14279.17			
R 4	16721.79				P 3	14399.13	14399.11	0.040	-2
R 3	16845.34				R 4	14447.84	14447.81	0.658	-3
R 2	16938.36				R 3	14556.13			
P 2	16957.96				R 2	14639.23	14639.23	1.018	0
R 1	16996.23	16996.23	0.846	0	P 2	14658.83	14658.82	1.115	-1
P 1	17012.58				R 1	14690.72			
<b>RMS = <math>5.0 \times 10^2 cm^{-1}</math></b>					P 1	14707.07	14707.09	0.254	2
					<b>RMS = <math>1.5 \times 10^2 cm^{-1}</math></b>				

$H_2 \text{ GK} \rightarrow C^+ \text{ 5-2}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 5-3}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$	
P 6	11705.77	11705.71	1.140	-6	R 2	10430.43	10430.43	2.502	0
P 5	11901.84	11901.82	1.091	-2	P 2	10450.03	10450.03	2.116	0
P 4	12072.57	12072.57	1.113	0	R 1	10487.59	10487.57	1.540	-2
R 5	12169.90	12169.88	1.100	-2	P 1	10503.94			
P 3	12252.33	12252.30	0.948	-3	<b>RMS= 0.6 <math>10^2 cm^{-1}</math></b>				
R 4	12282.82	12282.78	1.074	-4					
R 3	12409.33	12409.34	1.370	1					
R 2	12475.73	12475.74	1.066	1					
P 2	12495.33	12495.33	1.074	0					
R 1	12519.62	12519.63	1.085	1					
P 1	12535.98	12535.98	0.991	0					
<b>RMS= 2.4 <math>10^2 cm^{-1}</math></b>									
$H_2 \text{ GK} \rightarrow C^+ \text{ 6-0}$					$H_2 \text{ GK} \rightarrow C^+ \text{ 6-2}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$	
P 3	17696.42				P 6	12801.89	12801.82	0.661	-7
P 2	17830.64	17830.61	7.980	-3	P 5	12937.02			
R 3	17880.51	17880.57	0.360	6	P 4	13090.43	13090.42	1.036	-1
P 1	17929.34				P 3	13260.41	13260.41	0.927	0
R 2	17956.22				P 2	13368.01	13368.10	0.536	9
R 1	18004.31	18004.34	0.177	3	R 4	13378.95	13378.90	1.058	-5
<b>RMS= 2.0 <math>10^2 cm^{-1}</math></b>					R 3	13444.51	13444.48	0.340	-3
					P 1	13452.73	13452.74	1.448	1
					R 2	13493.59	13493.58	0.983	-1
					R 1	13527.70	13527.70	1.180	0
					<b>RMS= 3.6 <math>10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^+ \text{ 6-3}$					$H_2 \text{ GK} \rightarrow C^- \text{ 0-0 -}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$	
P 2	11322.72				Q 6	11714.40	11714.47	0.932	7
P 1	11420.69	11420.72	0.274	3	Q 5	11953.41	11953.43	1.004	2
R 2	11448.29	11448.29	1.392	0	Q 4	12152.57	12152.57	1.147	0
R 1	11495.67				Q 3	12306.50	12306.51	1.084	1
<b>RMS= 0.9 <math>10^2 cm^{-1}</math></b>					Q 2	12421.38	12421.37	1.094	-1
					Q 1	12499.43	12499.43	1.092	0
					<b>RMS= 2.9 <math>10^2 cm^{-1}</math></b>				

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$H_2 \text{ GK} \rightarrow C^- \text{ 0-1 -}$					$H_2 \text{ GK} \rightarrow C^- \text{ 0-2 -}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
Q 6	9470.85	9470.84	0.725	-1	Q 6	7359.55	7359.62	2.474	7
Q 5	9691.46				Q 5	7562.47			
Q 4	9875.19	9875.18	0.699	-1	Q 4	7731.15	7731.19	4.546	4
Q 3	10016.69	10016.72	3.255	3	Q 3	7860.50			
Q 2	10122.18	10122.17	1.314	-1	Q 2	7956.80			
Q 1	10193.94	10193.91	3.466	-3	Q 1	8022.43			
<b>RMS= 2.5 <math>10^2 cm^{-1}</math></b>					<b>RMS= 5.2 <math>10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^- \text{ 0-3 -}$					$H_2 \text{ GK} \rightarrow C^- \text{ 1-0}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
Q 3	5835.31	5835.30	5.459	-1	Q 6	12049.38	12049.36	0.731	-2
Q 2	5922.61	5922.66	0.746	5	Q 5	12181.69	12181.70	1.061	1
Q 1	5982.20				Q 4	12312.81	12312.84	3.608	3
<b>RMS= 2.0 <math>10^2 cm^{-1}</math></b>					Q 3	12439.64	12439.64	1.077	0
					Q 2	12555.38	12555.37	1.064	-1
					Q 1	12654.25	12654.26	1.093	1
<b>RMS= 2.0 <math>10^2 cm^{-1}</math></b>					<b>RMS= 2.0 <math>10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^- \text{ 1-1}$					$H_2 \text{ GK} \rightarrow C^- \text{ 1-2}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
Q 5	9919.74	9919.75	0.891	1	Q 6	7694.53	7694.52	1.764	-1
Q 4	10035.43	10035.43	3.434	0	Q 5	7790.75			
Q 3	10149.84	10149.83	2.582	-1	Q 4	7891.38			
Q 2	10256.17				Q 3	7993.64	7993.70	1.525	6
Q 1	10348.76	10348.79	5.158	3	Q 2	8090.80			
<b>RMS= 1.9 <math>10^2 cm^{-1}</math></b>					Q 1	8177.25	8177.24	5.293	-1
<b>RMS= 1.9 <math>10^2 cm^{-1}</math></b>					<b>RMS= 2.8 <math>10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^- \text{ 2-0}$					$H_2 \text{ GK} \rightarrow C^- \text{ 2-1}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
Q 5	13784.17	13784.19	1.236	2	Q 5	11522.23	11522.24	1.045	1
Q 4	13969.75	13969.69	3.005	-6	Q 4	11692.37	11692.39	1.201	2
Q 3	14096.93				Q 3	11807.12	11807.12	1.351	0
Q 1	14126.86	14126.86	0.205	0	Q 1	11821.36			
Q 2	14198.20				Q 2	11899.00	11899.01	1.107	1
<b>RMS= 5.1 <math>10^2 cm^{-1}</math></b>					<b>RMS= 1.2 <math>10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^- \text{ 2-2}$					$H_2 \text{ GK} \rightarrow C^- \text{ 3-0}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
Q 4	9548.33	9548.29	3.468	-4	Q 6	14170.02	14169.99	0.033	-3
Q 1	9649.85	9649.84	4.087	-1	Q 5	14330.27	14330.27	0.699	0
Q 3	9650.92	9650.91	4.692	-1	Q 4	14487.55	14487.53	0.970	-2
Q 2	9733.62	9733.59	0.115	-3	Q 3	14640.16	14640.17	1.080	1
<b>RMS= 2.2 <math>10^2 cm^{-1}</math></b>					Q 2	14773.98	14773.98	0.540	0
					Q 1	14880.02	14880.01	0.327	-1
<b>RMS= 2.2 <math>10^2 cm^{-1}</math></b>					<b>RMS= 1.0 <math>10^2 cm^{-1}</math></b>				

$H_2 \text{ GK} \rightarrow C^- \text{ 3-1}$					$H_2 \text{ GK} \rightarrow C^- \text{ 4-0}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 7	11782.82	11782.82	0.559	0	Q 4	15757.60	15757.59	2.560	-1
Q 6	11926.46	11926.40	0.613	-6	Q 3	15856.58	15856.62	6.234	4
Q 5	12068.32	12068.33	1.135	1	Q 2	15934.97	15935.00	4.472	3
Q 4	12210.17	12210.18	1.344	1	Q 1	15985.89	15985.91	1.491	2
Q 3	12350.35	12350.35	4.132	0	<b>RMS = <math>3.4 \times 10^2 cm^{-1}</math></b>				
Q 2	12474.78	12474.78	1.150	0					
Q 1	12574.53	12574.53	1.065	0					
<b>RMS = <math>1.7 \times 10^2 cm^{-1}</math></b>									
$H_2 \text{ GK} \rightarrow C^- \text{ 4-1}$					$H_2 \text{ GK} \rightarrow C^- \text{ 4-2}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	13395.96	13396.01	0.202	5	Q 5	11266.97	11266.96	0.653	-1
Q 4	13480.22	13480.22	1.126	0	Q 4	11336.17	11336.16	0.898	-1
Q 3	13566.78	13566.78	1.225	0	Q 3	11410.58	11410.57	1.801	-1
Q 2	13635.76	13635.76	1.265	0	Q 2	11470.39	11470.39	1.156	0
Q 1	13680.40	13680.40	1.315	0	Q 1	11508.88	11508.88	1.619	0
<b>RMS = <math>0.9 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>0.7 \times 10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^- \text{ 4-3}$					$H_2 \text{ GK} \rightarrow C^- \text{ 5-1}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 3	9385.39	9385.41	5.806	2	Q 6	13991.74	13991.77	2.338	3
Q 2	9436.20	9436.21	0.331	1	Q 5	14174.21			
Q 1	9468.66	9468.66	4.262	0	Q 4	14335.24	14335.22	0.341	-2
<b>RMS = <math>1.5 \times 10^2 cm^{-1}</math></b>					Q 3	14470.95	14470.95	0.692	0
					Q 2	14576.72	14576.73	0.409	1
					Q 1	14777.45			
					<b>RMS = <math>2.7 \times 10^2 cm^{-1}</math></b>				
$H_2 \text{ GK} \rightarrow C^- \text{ 5-2}$					$H_2 \text{ GK} \rightarrow C^- \text{ 6-2}$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 6	11880.44	11880.39	3.078	-5	Q 5	13141.34	13141.30	0.969	-4
Q 5	12045.22	12045.19	1.079	-3	Q 4	13226.37	13226.28	0.675	-9
Q 4	12191.19	12191.22	2.279	3	Q 3	13332.61	13332.60	0.990	-1
Q 3	12314.75	12314.75	3.585	0	Q 2	13419.43	13419.43	0.960	0
Q 2	12411.35	12411.36	1.071	1	Q 1	13478.62	13478.62	1.314	0
Q 1	12605.93	12605.93	0.804	0	<b>RMS = <math>3.8 \times 10^2 cm^{-1}</math></b>				
<b>RMS = <math>3.2 \times 10^2 cm^{-1}</math></b>									
$H_2 \text{ GK} \rightarrow C^- \text{ 6-3}$									
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$					
Q 4	11213.15	11213.09	1.034	-6					
Q 3	11307.43								
Q 2	11385.24	11385.24	0.624	0					
Q 1	11438.39	11438.33	1.600	-6					
<b>RMS = <math>5.4 \times 10^2 cm^{-1}</math></b>									

$H_2 H \rightarrow C^+ 0-0$					$H_2 H \rightarrow C^+ 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	13547.63	13547.65	1.257	2	P 6	11249.83	11249.82	0.527	-1
P 4	13600.79	13600.79	1.775	0	P 5	11254.62			
P 3	13674.12	13674.12	1.438	0	P 4	11326.83	11326.81	0.153	-2
P 2	13740.91	13740.91	1.454	0	P 3	11384.91			
P 1	13805.50	13805.50	1.379	0	P 2	11441.78	11441.78	0.241	0
R 1	13982.01	13982.00	1.117	-1	P 1	11499.99			
R 2	14027.61	14027.58	0.843	-3	R 1	11676.50			
R 3	14088.84	14088.85	0.868	1	R 2	11728.47	11728.54	0.688	7
R 4	14157.71				R 3	11799.64	11799.59	0.132	-5
RMS = $1.0 \times 10^2 cm^{-1}$					R 4	11883.75	11883.78	6.901	3
					RMS = $3.4 \times 10^2 cm^{-1}$				
$H_2 H \rightarrow C^+ 1-1$					$H_2 H \rightarrow C^+ 1-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 4	13568.34	13568.31	1.008	-3	P 3	11497.86	11497.84	0.689	-2
P 3	13644.66	13644.66	1.888	0	P 2	11558.46	11558.46	1.341	0
P 2	13721.96	13721.96	1.385	0	P 1	11622.87	11622.86	1.003	-1
P 1	13793.96	13793.96	1.307	0	R 1	11765.15	11765.16	0.766	1
R 1	13936.25				R 2	11806.48	11806.47	1.130	-1
R 2	13969.98	13969.98	1.661	0	RMS = $1.0 \times 10^2 cm^{-1}$				
RMS = $1.2 \times 10^2 cm^{-1}$									
$H_2 H \rightarrow C^+ 2-0$					$H_2 H \rightarrow C^+ 2-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 4	17887.58				P 3	15706.35			
P 3	17995.56	17995.60	0.826	4	P 2	15763.56	15763.59	3.212	3
P 2	18062.70				P 1	15839.51	15839.47	5.744	-4
P 1	18145.02				R 1	15997.94			
R 4	18296.86	18296.78	0.347	-8	R 3	16010.09	16010.18	0.904	9
R 3	18299.29				R 2	16015.27			
R 1	18303.45	18303.43	1.110	-2	RMS = $4.1 \times 10^2 cm^{-1}$				
R 2	18314.40	18314.39	0.914	-1					
RMS = $3.7 \times 10^2 cm^{-1}$									
$H_2 H \rightarrow C^+ 2-2$					$H_2 H \rightarrow C^+ 2-3$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 6	13280.84	13280.80	0.908	-4	P 2	11554.77	11554.77	1.190	0
P 5	13355.80	13355.74	0.955	-6	P 1	11636.38	11636.34	0.595	-4
P 4	13448.61	13448.63	1.263	2	R 1	11794.81	11794.80	0.276	-1
P 3	13559.55	13559.55	1.155	0	R 2	11806.48	11806.47	1.130	-1
P 2	13600.07	13600.07	2.681	0	RMS = $1.8 \times 10^2 cm^{-1}$				
P 1	13668.42	13668.39	1.138	-3					
R 1	13826.84	13826.85	2.023	1					
R 2	13851.77	13851.79	1.462	2					
R 4	13857.89	13857.89	1.247	0					
R 3	13863.29	13863.28	0.730	-1					
RMS = $2.2 \times 10^2 cm^{-1}$									

$H_2 H \rightarrow C^- 0-0$					$H_2 H \rightarrow C^- 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 3	13850.00	13850.01	1.471	1	Q 3	11560.20	11560.20	1.114	0
Q 4	13856.12	13856.12	2.651	0	Q 1	11560.40	11560.43	2.781	3
Q 2	13861.71	13861.71	1.467	0	Q 2	11562.51	11562.51	0.422	0
Q 1	13865.89	13865.89	1.390	0	Q 4	11578.74	11578.66	0.615	-8
Q 5	13872.07	13872.09	1.322	2	Q 5	11610.12	11610.14	0.464	2
<b>RMS = <math>0.8 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>3.3 \times 10^2 cm^{-1}</math></b>				
$H_2 H \rightarrow C^- 0-2$					$H_2 H \rightarrow C^- 1-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	9388.89				Q 2	16121.46	16121.49	1.394	3
Q 2	9397.13				Q 1	16146.07	16146.15	0.214	8
Q 3	9404.00	9403.99	2.876	-1	<b>RMS = <math>4.3 \times 10^2 cm^{-1}</math></b>				
Q 4	9434.69	9434.68	0.892	-1	<b>RMS = <math>0.7 \times 10^2 cm^{-1}</math></b>				
$H_2 H \rightarrow C^- 1-1$					$H_2 H \rightarrow C^- 1-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 3	13801.70	13801.70	1.474	0	Q 2	11656.88	11656.88	1.065	0
Q 2	13822.25	13822.25	1.490	0	Q 1	11669.07	11669.00	0.478	-7
Q 1	13840.58	13840.58	1.422	0	<b>RMS = <math>3.8 \times 10^2 cm^{-1}</math></b>				
<b>RMS = <math>0.3 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.9 \times 10^2 cm^{-1}</math></b>				
$H_2 H \rightarrow C^- 1-3$					$H_2 H \rightarrow C^- 2-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 3	9620.32	9620.35	3.469	3	Q 2	18183.14	18183.19	1.118	5
Q 2	9622.69	9622.69	0.384	0	Q 1	18187.67	18187.64	1.059	-3
Q 1	9628.84	9628.83	6.210	-1	<b>RMS = <math>3.7 \times 10^2 cm^{-1}</math></b>				
<b>RMS = <math>1.9 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.0 \times 10^2 cm^{-1}</math></b>				
$H_2 H \rightarrow C^- 2-1$					$H_2 H \rightarrow C^- 2-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 4	15789.19	15789.25	5.622	6	Q 5	13620.28	13620.29	1.193	1
Q 3	15846.99	15847.06	2.338	7	Q 4	13645.15	13645.15	1.161	0
Q 1	15882.18	15882.21	6.964	3	Q 3	13690.79	13690.81	1.439	2
Q 2	15883.94	15883.95	4.746	1	Q 1	13710.66	13710.67	1.607	1
<b>RMS = <math>4.4 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.0 \times 10^2 cm^{-1}</math></b>				
<b>RMS = <math>4.4 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.0 \times 10^2 cm^{-1}</math></b>				

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$H_2 H \rightarrow C^- 2-3$									
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $10^{+2}cm^{-1}$					
Q 4	11631.93	11631.88	2.265	-5					
Q 3	11665.60	11665.63	1.246	3					
Q 1	11670.44	11670.44	1.105	0					
Q 2	11684.38	11684.38	1.711	0					
<b>RMS = <math>3.2 \cdot 10^2 cm^{-1}</math></b>									
$H_2 I^+ \rightarrow C^+ 0-0$					$H_2 I^+ \rightarrow C^+ 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $x10^{+2}cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $x10^{+2}cm^{-1}$
P 5	12702.53	12702.53	0.913	0	P 6	10355.79	10355.75	1.871	-4
P 4	12768.38	12768.39	1.039	1	P 5	10409.52			
P 3	12822.31	12822.32	1.058	1	P 4	10494.43	10494.44	2.670	1
P 2	12859.41	12859.41	3.053	0	P 3	10533.11	10533.06	0.538	-5
R 1	13130.21	13130.23	0.373	2	P 2	10560.28	10560.27	4.269	-1
R 2	13195.21	13195.21	1.012	0	R 1	10824.69	10824.73	1.929	4
R 3	13243.74	13243.74	0.923	0	R 2	10896.07	10896.08	0.823	1
R 4	13263.66				R 3	10954.54	10954.53	3.200	-1
R 5	13290.47				R 4	10989.71	10989.69	1.937	-2
<b>RMS = <math>0.5 \cdot 10^2 cm^{-1}</math></b>					R 5	10997.45	10997.47	1.239	2
					R 6	11090.90			
					<b>RMS = <math>2.1 \cdot 10^2 cm^{-1}</math></b>				
$H_2 I^+ \rightarrow C^+ 1-0$					$H_2 I^+ \rightarrow C^+ 1-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $x10^{+2}cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $x10^{+2}cm^{-1}$
P 5	14784.23	14784.22	0.598	-1	P 6	12394.30	12394.33	0.982	3
P 4	14799.82	14799.81	1.473	-1	P 5	12491.21	12491.22	0.731	1
P 3	14893.78	14893.76	0.887	-2	P 4	12525.87	12525.86	1.098	-1
P 2	14948.12	14948.10	0.589	-2	P 3	12604.57	12604.57	1.057	0
R 1	15201.67				P 2	12648.98	12648.98	1.054	0
R 2	15226.64				R 1	12896.16	12896.16	1.047	0
R 4	15302.17				R 2	12927.51	12927.51	1.032	0
R 3	15325.44				R 4	13028.22	13028.23	0.973	1
<b>RMS = <math>1.0 \cdot 10^2 cm^{-1}</math></b>					R 3	13036.23	13036.25	0.953	2
					<b>RMS = <math>1.4 \cdot 10^2 cm^{-1}</math></b>				
$H_2 I^+ \rightarrow C^+ 1-2$					$H_2 I^+ \rightarrow C^+ 2-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $x10^{+2}cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $x10^{+2}cm^{-1}$
P 6	10286.15	10286.14	1.567	-1	P 6	14272.98	14272.99	1.738	1
P 4	10360.85	10360.83	2.123	-2	P 5	14407.68	14407.68	1.401	0
P 5	10381.94	10381.91	0.510	-3	P 4	14518.40	14518.40	1.101	0
P 3	10457.77	10457.85	0.900	8	P 2	14528.65	14528.65	1.170	0
P 2	10485.48	10485.48	4.336	0	P 3	14599.96	14599.95	0.899	-1
R 1	10725.06	10725.11	0.140	5	R 1	14891.54			
R 2	10764.01	10764.02	0.670	1	R 4	14906.90	14906.90	0.188	0
R 4	10863.20				R 2	14920.04	14920.11	0.194	7
R 3	10889.43				R 3	14952.70			
<b>RMS = <math>2.6 \cdot 10^2 cm^{-1}</math></b>					<b>RMS = <math>1.4 \cdot 10^2 cm^{-1}</math></b>				

$\text{H}_2 \Gamma^+ \rightarrow \text{C}^+ \quad 2-2$					$\text{H}_2 \Gamma^+ \rightarrow \text{C}^+ \quad 3-2$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$
P 6	12164.83	12164.81	1.131	-2	P 5	13854.15	13854.06	0.343	-9
P 5	12298.41	12298.42	3.379	1	P 4	13997.64	13997.65	1.256	1
P 4	12353.38	12353.38	1.041	0	P 3	14131.24	14131.23	0.861	-1
P 2	12365.16	12365.15	1.114	-1	P 2	14201.67	14201.67	1.254	0
P 3	12453.15	12453.16	0.924	1	R 3	14361.64			
R 1	12720.45				R 1	14398.54			
R 4	12741.88	12741.89	0.886	1	R 2	14400.81	14400.80	0.738	-1
R 2	12756.54	12756.54	1.044	0					
R 3	12805.90								
<b>RMS = <math>0.8 \times 10^2 \text{cm}^{-1}</math></b>					<b>RMS = <math>2.5 \times 10^2 \text{cm}^{-1}</math></b>				
$\text{H}_2 \Gamma \rightarrow \text{C}^- \quad 0-0$					$\text{H}_2 \Gamma \rightarrow \text{C}^- \quad 0-1$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$
P 6	12341.00	12341.02	3.621	2	P 6	10097.45	10097.45	3.869	0
P 5	12460.81	12460.80	1.838	-1	P 5	10198.86	10198.85	2.352	-1
P 4	12579.40	12579.39	1.066	-1	P 4	10302.02			
P 3	12694.18	12694.18	1.050	0	P 3	10404.37	10404.37	1.845	0
P 2	12800.51	12800.50	1.033	0	P 2	10501.30	10501.31	1.398	1
R 6	12955.41	12955.39	0.827	-2	R 1	10691.27	10691.27	1.310	0
R 5	12972.81	12972.81	0.915	0	R 2	10700.51	10700.50	1.580	-1
R 4	12986.39	12986.40	0.964	1	R 3	10705.85	10705.85	2.120	0
R 3	12995.66	12995.66	0.976	0	R 4	10709.01	10709.02	2.398	1
R 1	12996.76	12996.77	1.008	1	R 5	10710.87	10710.86	1.384	-1
R 2	12999.71	12999.71	0.940	0	R 6	10711.85	10711.79	0.159	-6
<b>RMS = <math>0.8 \times 10^2 \text{cm}^{-1}</math></b>					<b>RMS = <math>1.0 \times 10^2 \text{cm}^{-1}</math></b>				
$\text{H}_2 \Gamma \rightarrow \text{C}^- \quad 1-1$					$\text{H}_2 \Gamma \rightarrow \text{C}^- \quad 1-2$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$		Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^{+2} \text{cm}^{-1}$
P 7	12082.98	12083.00	1.159	2	P 5	10173.69	10173.70	3.514	1
P 6	12193.43	12193.35	0.607	-8	P 4	10265.00	10265.00	2.849	0
P 5	12302.69	12302.68	1.041	-1	P 3	10353.44	10353.43	5.273	-1
P 4	12409.05	12409.04	1.376	1	P 2	10435.15	10435.15	1.839	0
P 3	12509.64	12509.64	1.119	0	R 1	10625.02	10625.02	4.023	0
P 2	12600.53	12600.53	1.064	0	R 2	10642.16	10642.15	2.371	-1
R 5	12794.89	12794.88	0.903	-1	R 3	10653.48	10653.49	3.823	1
R 1	12796.54	12796.54	1.101	0	R 4	10660.94	10660.99	1.371	4
R 4	12804.99	12805.04	0.959	5	R 5	10665.90	10665.88	1.485	-2
R 2	12807.53	12807.53	1.034	0					
R 3	12809.68	12809.68	1.010	0					
<b>RMS = <math>2.4 \times 10^2 \text{cm}^{-1}</math></b>					<b>RMS = <math>1.2 \times 10^2 \text{cm}^{-1}</math></b>				



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$H_2 \Gamma \rightarrow C^- \quad 2-1$					$H_2 \Gamma \rightarrow C^- \quad 2-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 7	14006.56	14006.56	0.639	0	P 6	12016.74	12016.83	0.576	9
P 6	14128.04				P 5	12115.35	12115.36	1.123	1
P 5	14244.34	14244.34	0.907	0	P 4	12209.86	12209.86	1.322	0
P 4	14353.91	14353.91	2.477	0	P 3	12298.06	12298.06	1.093	0
P 3	14454.26	14454.26	1.040	0	P 2	12377.36	12377.36	1.113	0
P 2	14542.74	14542.74	1.178	0	R 1	12569.64	12569.64	1.056	0
R 5	14718.47	14718.46	0.610	-1	R 2	12587.02	12587.02	1.047	0
R 4	14739.60	14739.60	0.779	0	R 5	12589.48	12589.49	0.984	1
R 1	14741.15	14741.16	1.017	1	R 3	12595.14	12595.14	1.063	0
R 3	14751.34	14751.34	0.743	0	R 4	12595.55	12595.55	1.101	0
R 2	14752.39	14752.39	0.631	0					
<b>RMS = <math>0.5 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>2.1 \times 10^2 cm^{-1}</math></b>				
$H_2 \Gamma \rightarrow C^- \quad 2-3$					$H_2 \Gamma \rightarrow C^- \quad 3-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 4	10196.64	10196.62	5.355	-2	P 6	15879.20	15879.22	9.080	2
P 3	10272.87	10272.88	3.620	1	P 5	16003.71	16003.79	2.041	8
P 2	10343.18	10343.18	2.250	0	P 4	16118.22	16118.30	1.037	8
R 1	10529.42	10529.42	3.744	0	P 3	16220.86			
R 2	10552.83				P 2	16309.90			
R 3	10569.95	10569.97	3.507	2	R 4	16490.76			
R 4	10582.33	10582.30	2.712	-3	R 1	16507.75	16507.71	1.287	-4
<b>RMS = <math>1.7 \times 10^2 cm^{-1}</math></b>					R 3	16510.71			
					R 2	16516.70			
					<b>RMS = <math>4.3 \times 10^2 cm^{-1}</math></b>				
$H_2 \Gamma \rightarrow C^- \quad 3-2$					$H_2 \Gamma \rightarrow C^- \quad 3-3$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 4	13974.17	13974.17	0.961	0	P 4	11960.95	11960.94	1.118	-1
P 3	14064.66	14064.63	0.894	-3	P 3	12039.47	12039.48	1.267	1
P 2	14144.52	14144.50	0.712	-2	P 2	12110.33	12110.34	1.113	1
R 1	14336.24	14336.23	1.317	-1	R 1	12296.02	12296.01	1.102	-1
R 4	14346.72	14346.79	0.302	7	R 2	12317.14	12317.14	6.835	0
R 2	14351.33	14351.31	0.609	-2	R 3	12329.32	12329.34	1.107	2
R 3	14354.51	14354.50	0.905	-1	R 4	12333.50	12333.51	1.016	1
<b>RMS = <math>2.4 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>0.7 \times 10^2 cm^{-1}</math></b>				

$H_2 \Gamma^+ \rightarrow C^- \quad 0-0$					$H_2 \Gamma^+ \rightarrow C^- \quad 0-1$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	12978.03	12978.06	0.693	3	Q 1	10678.89		
Q 1	12984.39	12984.39	1.008	0	Q 2	10710.70		
Q 2	13009.91	13009.91	1.166	0	Q 5	10716.08	10716.07	0.895
Q 4	13011.02	13011.00	0.932	-2	Q 3	10727.80	10727.79	2.156
Q 3	13017.60	13017.60	0.874	0	Q 4	10733.64	10733.63	0.737
RMS = $1.6 \cdot 10^2 cm^{-1}$					RMS = $0.6 \cdot 10^2 cm^{-1}$			
$H_2 \Gamma^+ \rightarrow C^- \quad 0-2$					$H_2 \Gamma^+ \rightarrow C^- \quad 1-1$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	8507.38				Q 5	12754.59	12754.60	0.952
Q 2	8545.33	8545.33	0.461	0	Q 3	12759.23	12759.23	1.030
Q 3	8571.60				Q 1	12767.60	12767.61	1.046
Q 5	8587.09	8587.07	1.315	-2	Q 2	12782.16	12782.11	0.685
Q 4	8589.59				Q 4	12815.34	12815.36	1.041
Q 6	8598.72	8598.72	2.851	0	RMS = $2.3 \cdot 10^2 cm^{-1}$			
RMS = $1.3 \cdot 10^2 cm^{-1}$								
$H_2 \Gamma^+ \rightarrow C^- \quad 1-2$					$H_2 \Gamma^+ \rightarrow C^- \quad 2-0$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	10596.09	10596.17	0.835	8	Q 5	16895.22	16895.21	0.710
Q 3	10603.03	10603.03	1.643	0	Q 1	16952.77	16952.77	0.036
Q 2	10616.79	10616.79	1.390	0	Q 4	17009.19		
Q 5	10625.60	10625.64	0.825	4	Q 3	17041.57		
Q 4	10671.29				Q 2	17076.75		
RMS = $4.1 \cdot 10^2 cm^{-1}$					RMS = $0.9 \cdot 10^2 cm^{-1}$			
$H_2 \Gamma^+ \rightarrow C^- \quad 2-2$					$H_2 \Gamma^+ \rightarrow C^- \quad 2-3$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	12475.76	12475.74	1.066	-2	Q 1	10435.54	10435.54	6.209
Q 5	12504.28	12504.30	0.717	2	Q 2	10573.98	10573.97	0.182
Q 4	12587.76				RMS = $1.1 \cdot 10^2 cm^{-1}$			
Q 3	12595.56	12595.55	1.101	-1				
Q 2	12612.17							
RMS = $1.8 \cdot 10^2 cm^{-1}$								
$H_2 \Gamma^+ \rightarrow C^- \quad 3-0$					$H_2 \Gamma^+ \rightarrow C^- \quad 3-3$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 4	18564.93	18564.88	0.231	-5	Q 4	12130.28	12130.33	1.140
Q 3	18685.83	18685.77	0.806	-6	Q 3	12214.64	12214.68	0.256
Q 2	18754.84				Q 2	12256.07	12256.08	1.813
Q 1	18789.28	18789.30	0.861	2	Q 1	12272.05	12272.06	1.037
RMS = $4.6 \cdot 10^2 cm^{-1}$					RMS = $2.9 \cdot 10^2 cm^{-1}$			

$H_2 \Gamma \rightarrow C^+ \quad 0-0$					$H_2 \Gamma \rightarrow C^+ \quad 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	12677.90	12677.91	1.013	1	Q 6	10350.57	10350.53	6.542	-4
Q 4	12746.44	12746.44	0.960	0	Q 5	10384.88			
Q 3	12812.12				Q 4	10472.49			
Q 2	12871.79	12871.81	0.985	2	Q 3	10522.92			
Q 1	12920.81	12920.81	1.008	0	Q 2	10572.65	10572.65	0.620	0
RMS= 13 $10^2 cm^{-1}$					Q 1	10615.29	10615.30	1.038	1
RMS= 13 $10^2 cm^{-1}$					RMS= 38 $10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow C^+ \quad 1-0$					$H_2 \Gamma \rightarrow C^+ \quad 1-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	14773.88	14773.97	0.540	9	Q 6	12434.60	12434.60	0.873	0
Q 4	14850.27				Q 5	12480.87	12480.91	0.829	4
Q 3	14919.14	14919.13	0.309	-1	Q 4	12576.32	12576.34	3.360	2
Q 2	14977.05	14977.04	0.108	-1	Q 3	12629.94			
Q 1	15020.04				Q 2	12677.92	12677.91	1.013	-1
RMS= 7.0 $10^2 cm^{-1}$					Q 1	12714.52	12714.53	1.102	1
RMS= 7.0 $10^2 cm^{-1}$					RMS= 2.4 $10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow C^+ \quad 1-2$					$H_2 \Gamma \rightarrow C^+ \quad 2-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	10514.42	10514.42	2.238	0	Q 3	16864.01	16864.00	0.649	-1
Q 1	10543.43	10543.43	0.671	0	Q 2	16921.67			
RMS= 0.3 $10^2 cm^{-1}$					Q 1	16962.25	16962.19	0.192	-6
RMS= 0.3 $10^2 cm^{-1}$					RMS= 2.9 $10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow C^+ \quad 2-1$					$H_2 \Gamma \rightarrow C^+ \quad 2-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 6	14358.18	14358.17	0.510	-1	Q 6	12250.03	12249.99	0.807	-4
Q 5	14415.48	14415.49	0.222	1	Q 5	12306.20	12306.20	3.189	0
Q 4	14517.97	14517.97	1.269	0	Q 4	12352.95	12352.91	3.235	-4
Q 3	14574.80	14574.80	1.236	0	Q 3	12428.00			
Q 2	14622.54	14622.54	1.045	0	Q 2	12459.04	12459.04	1.125	0
Q 1	14656.73				Q 1	12485.64	12485.68	0.756	4
RMS= 0.7 $10^2 cm^{-1}$					RMS= 2.8 $10^2 cm^{-1}$				
RMS= 0.7 $10^2 cm^{-1}$					RMS= 2.8 $10^2 cm^{-1}$				
$H_2 \Gamma \rightarrow C^+ \quad 2-3$					$H_2 I^- \rightarrow C^+ \quad 3-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	10413.74	10413.74	2.802	0	Q 3	18628.32	18628.31	1.401	-1
Q 1	10453.60	10453.59	2.440	-1	Q 2	18688.27			
RMS= 0.7 $10^2 cm^{-1}$					Q 1	18729.40	18729.43	0.290	3
RMS= 0.7 $10^2 cm^{-1}$					RMS= 1.6 $10^2 cm^{-1}$				

$\text{H}_2 \text{ I}^- \rightarrow \text{C}^+ \text{ 3-1}$					$\text{H}_2 \text{ I}^- \rightarrow \text{C}^+ \text{ 3-2}$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$	
Q 4	16277.34	16277.33	1.072	-1	Q 5	14057.37	14057.30	0.275	-7
Q 3	16339.11				Q 4	14112.32	14112.31	0.738	-1
Q 2	16389.13	16389.13	1.090	0	Q 3	14192.31	14192.31	0.362	0
Q 1	16423.89				Q 2	14225.64	14225.62	1.098	-2
					Q 1	14252.80	14252.78	0.620	-2
<b>RMS = 0.7 <math>10^2 \text{cm}^{-1}</math></b>					<b>RMS = 2.3 <math>10^2 \text{cm}^{-1}</math></b>				
$\text{H}_2 \text{ I}^- \rightarrow \text{C}^+ \text{ 3-3}$									
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$					
Q 2	12180.34	12180.34	1.312	0					
Q 1	12220.76	12220.75	1.176	-1					
<b>RMS = 0.5 <math>10^2 \text{cm}^{-1}</math></b>									
$\text{H}_2 \text{ J}^+ \rightarrow \text{C}^+ \text{ 0-0}$					$\text{H}_2 \text{ J}^+ \rightarrow \text{C}^+ \text{ 0-1}$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$	
P 4	13071.93	13071.93	1.002	0	P 5	10783.95	10783.96	0.783	1
P 3	13076.80	13076.80	0.562	0	P 3	10787.59	10787.57	15.600	-2
P 5	13076.97				P 4	10797.98	10797.98	1.803	0
R 1	13384.69	13384.69	1.244	0	P 6	10804.98	10804.99	1.443	1
R 2	13498.75	13498.75	1.278	0	R 1	11079.18	11079.13	0.125	-5
R 3	13618.18	13618.20	1.222	3	R 2	11199.62			
R 4	13712.86	13712.85	1.654	-1	R 3	11328.97	11328.95	0.806	-2
					R 4	11438.90	11438.88	0.410	-2
<b>RMS = 1.1 <math>10^2 \text{cm}^{-1}</math></b>					<b>RMS = 2.0 <math>10^2 \text{cm}^{-1}</math></b>				
$\text{H}_2 \text{ J}^+ \rightarrow \text{C}^+ \text{ 1-1}$					$\text{H}_2 \text{ J}^+ \rightarrow \text{C}^+ \text{ 1-2}$				
	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$	Calc $\text{cm}^{-1}$	Obs $\text{cm}^{-1}$	W	O-C $\times 10^2 \text{cm}^{-1}$	
P 5	12870.76	12870.72	8.885	-4	P 4	10781.83	10781.82	2.456	-1
P 4	12946.85	12946.85	1.022	0	P 3	10825.44	10825.44	1.095	0
P 3	12972.25	12972.25	1.034	0	R 1	11092.74			
R 1	13263.83	13263.84	0.912	1	R 2	11184.99	11184.99	0.977	0
R 2	13348.49	13348.49	1.196	0	R 3	11268.97			
R 3	13415.78	13415.71	0.938	-7	R 4	11317.85			
R 4	13482.87	13482.94	0.631	7					
<b>RMS = 3.6 <math>10^2 \text{cm}^{-1}</math></b>					<b>RMS = 0.3 <math>10^2 \text{cm}^{-1}</math></b>				

$H_2 J^+ \rightarrow C^+ 2-2$					$H_2 J^- \rightarrow C^- 0-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 6	12695.19	12695.18	0.800	-1	P 6	13008.45	13008.44	1.041	-1
P 5	12789.73	12789.68	0.934	-5	P 5	13030.08	13030.08	0.968	0
P 4	12818.47	12818.46	0.794	-1	P 4	13050.89			
P 3	12891.72	12891.72	1.094	0	P 3	13072.52	13072.52	0.853	0
R 1	13159.02	13159.02	1.251	0	R 1	13375.10	13375.10	1.238	0
R 2	13221.63	13221.61	1.084	-2	R 2	13471.19	13471.19	1.217	0
R 4	13272.25	13272.23	0.948	-2	R 3	13564.94	13564.93	1.183	-1
R 3	13297.22	13297.22	0.961	0	R 4	13653.83	13653.84	1.270	1
<b>RMS= 2.1 10<sup>2</sup> cm<sup>-1</sup></b>					R 5	13736.45	13736.44	1.131	-1
					<b>RMS= 0.5 10<sup>2</sup> cm<sup>-1</sup></b>				
$H_2 J^- \rightarrow C^- 0-1$					$H_2 J^- \rightarrow C^- 1-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 7	10762.59	10762.63	0.518	4	P 5	12916.29	12916.30	0.986	1
P 6	10764.89				P 4	12944.45	12944.45	1.054	0
P 5	10768.13				P 3	12974.97	12974.97	1.085	0
P 4	10773.50	10773.51	0.885	1	R 1	13261.87	13261.87	1.342	0
P 3	10782.71	10782.64	0.842	-7	R 2	13342.93	13342.93	1.573	0
R 1	11069.61	11069.60	1.386	-1	R 3	13423.29	13423.29	1.105	0
R 2	11171.99				R 4	13500.21	13500.19	0.866	-2
R 3	11275.13				<b>RMS= 1.04 10<sup>2</sup> cm<sup>-1</sup></b>				
R 4	11376.45	11376.45	0.037	0					
R 5	11474.50								
<b>RMS= 4.0 10<sup>2</sup> cm<sup>-1</sup></b>									
$H_2 J^- \rightarrow C^- 1-2$					$H_2 J^- \rightarrow C^- 2-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 6	10777.36	10777.41	0.864	5	P 5	12812.36	12812.37	1.023	1
P 5	10787.30	10787.30	2.369	0	P 4	12849.06	12849.05	1.016	-1
P 4	10800.40	10800.40	1.166	0	P 3	12887.78	12887.77	1.054	-1
P 3	10818.77	10818.81	1.476	4	R 1	13159.36	13159.36	1.099	0
R 1	11090.35	11090.35	2.144	0	R 2	13226.21	13226.24	1.694	3
R 2	11177.56				R 3	13292.15	13292.14	1.324	-1
R 3	11267.09				<b>RMS= 1.7 10<sup>2</sup> cm<sup>-1</sup></b>				
R 4	11356.17								
<b>RMS= 2.3 10<sup>2</sup> cm<sup>-1</sup></b>									
$H_2 J^- \rightarrow C^- 2-3$					$H_2 J^+ \rightarrow C^- 0-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 4	10835.84	10835.82	3.815	-2	Q 2	13264.39	13264.39	0.983	0
P 3	10862.60	10862.62	4.206	2	Q 3	13321.15	13321.14	1.169	-1
R 1	11119.14	11119.12	3.411	-2	Q 4	13385.46	13385.48	0.808	2
R 2	11192.03	11192.03	0.399	0	Q 5	13427.22	13427.20	0.917	-2
R 3	11266.97	11266.96	0.653	-1	<b>RMS= 1.3 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS= 1.9 10<sup>2</sup> cm<sup>-1</sup></b>									

$H_2 J^+ \rightarrow C^- 1-1$					$H_2 J^+ \rightarrow C^- 1-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	13149.84	13149.83	0.941	-1	Q 2	10984.46	10984.46	1.607	0
Q 3	13180.21	13180.21	0.994	0	Q 3	11024.01	11024.01	2.242	0
Q 4	13194.88				<b>RMS = 0.3 10<sup>2</sup> cm<sup>-1</sup></b>				
Q 5	13209.24	13209.20	0.521	-4					
<b>RMS = 1.7 10<sup>2</sup> cm<sup>-1</sup></b>									
$H_2 J^+ \rightarrow C^- 1-3$					$H_2 J^+ \rightarrow C^- 2-0$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	8950.28	8950.24	0.484	-3	Q 5	17425.58			
<b>RMS = 3.2 10<sup>2</sup> cm<sup>-1</sup></b>					Q 4	17500.51	17500.58	0.875	7
					Q 3	17506.66			
					Q 2	17515.32	17515.30	0.757	-2
					<b>RMS = 5.1 10<sup>2</sup> cm<sup>-1</sup></b>				
$H_2 J^+ \rightarrow C^- 2-2$					$H_2 J^+ \rightarrow C^- 2-3$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	13034.64	13034.64	0.960	0	Q 2	11016.56	11016.55	1.578	-1
Q 2	13050.74	13050.75	0.585	1	Q 3	11035.47	11035.45	1.752	-2
Q 3	13060.65	13060.64	1.019	-1	Q 4	11065.86	11065.86	1.324	0
Q 4	13079.08	13079.08	1.008	0	<b>RMS = 0.8 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 1.1 10<sup>2</sup> cm<sup>-1</sup></b>									
$H_2 J^- \rightarrow C^+ 0-0$					$H_2 J^- \rightarrow C^+ 0-1$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 2	13250.13	13250.13	1.281	0	Q 2	10950.99	10950.99	3.547	0
Q 3	13283.60	13283.60	1.162	0	Q 3	10994.40	10994.39	0.595	-1
Q 4	13315.72	13315.72	1.311	0	Q 4	11041.76	11041.76	1.413	0
Q 5	13345.34	13345.35	1.175	1	<b>RMS = 0.6 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 0.4 10<sup>2</sup> cm<sup>-1</sup></b>									
$H_2 J^- \rightarrow C^+ 1-1$									
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$					
Q 2	13143.25	13143.25	0.321	0					
Q 3	13165.34	13165.34	0.316	0					
Q 5	13176.09								
Q 4	13189.92	13189.93	0.295	1					
<b>RMS = 0.5 10<sup>2</sup> cm<sup>-1</sup></b>									

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## TRANSITIONS

$$\mathbf{B'} \rightarrow \mathbf{EF}$$

$$\mathbf{D} \rightarrow \mathbf{EF}$$

$H_2 B' \rightarrow E \ 0-0$					$H_2 B' \rightarrow E \ 0-1$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{13} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 8	10516.067	10516.073	3.020	6	P 1	11102.49		
P 7	10645.526	10645.526	3.897	0	P 2	11128.90	11128.86	0.318
P 6	10768.450	10768.449	4.018	-1	R 0	11165.53	11165.46	0.832
P 5	10883.873	10883.873	4.245	0	P 3	11193.65		
P 4	10990.746	10990.751	4.118	5	R 1	11254.77	11254.83	0.633
P 3	11088.055	11088.056	4.310	1	P 4	11296.10	11296.17	0.954
P 2	11174.858	11174.859	4.121	1	R 2	11381.56		
P 1	11250.322	11250.321	4.185	-1	P 5	11435.26	11435.30	3.150
R 0	11364.628	11364.630	3.343	2	R 3	11544.97		
R 6	11398.694	11398.693	1.551	-1	R 4	11743.68		
R 1	11402.602	11402.605	3.974	3	R 5	11976.03	11975.96	0.304
R 5	11424.636	11424.638	3.002	2	<b>RMS = <math>5.2 \times 10^2 cm^{-1}</math></b>			
R 2	11427.515	11427.509	3.918	-6				
R 4	11438.322	11438.327	2.242	5				
R 3	11439.368	11439.370	3.475	2				
<b>RMS = <math>2.9 \times 10^3 cm^{-1}</math></b>								
$H_2 B' \rightarrow E \ 0-2$					$H_2 B' \rightarrow E \ 0-3$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 1	9907.70				P 5	8614.99	8614.98	5.968
P 2	9934.61				P 4	8701.04	8701.04	5.091
R 0	9970.56				P 3	8781.42	8781.41	5.724
P 3	10000.11				P 2	8857.77	8857.80	2.759
R 1	10059.98				P 1	8924.51	8924.52	5.426
P 4	10103.56				R 0	9034.67	9034.67	4.886
R 2	10187.26	10187.31	1.087	5	R 1	9076.79	9076.79	7.597
R 3	10351.42	10351.40	5.264	-2	R 2	9110.43	9110.43	5.566
R 4	10551.14	10551.14	0.395	0	R 3	9132.73	9132.73	5.476
<b>RMS = <math>2.6 \times 10^2 cm^{-1}</math></b>					R 4	9148.62	9148.62	4.217
					R 5	9155.75	9155.79	3.166
					<b>RMS = <math>1.3 \times 10^2 cm^{-1}</math></b>			
$H_2 B' \rightarrow EF \ 0-4$					$H_2 B' \rightarrow EF \ 0-5$			
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 1	8767.69	8767.68	0.582	-1	P 1	7688.40	7688.42	2.270
P 2	8794.38				P 2	7715.53		
R 0	8830.46	8830.47	0.950	1	R 0	7751.18	7751.21	0.218
P 3	8862.24	8862.22	6.012	-2	P 3	7781.46	7781.51	0.092
R 1	8919.97				R 1	7840.68		
P 4	8965.94				P 4	7885.60		
R 2	9047.04				R 2	7968.19		
P 5	9107.08	9107.06	0.584	-2	P 5	8027.02		
R 3	9213.56				R 3	8132.77		
R 4	9413.52				P 6	8204.13	8204.19	4.433
R 5	9647.84				R 4	8333.18		
<b>RMS = <math>1.8 \times 10^2 cm^{-1}</math></b>					R 5	8567.78	8567.77	3.805
					R 6	8834.37		
					<b>RMS = <math>3.9 \times 10^2 cm^{-1}</math></b>			



<b>H<sub>2</sub> B' → EF 0-6</b>					<b>H<sub>2</sub> B' → EF 0-7</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 5	6595.26	6595.25	0.499	-1	P 7	6532.94	6532.93	4.892	-1
P 4	6622.26				P 1	6620.69	6620.70	0.113	1
P 3	6635.61	6635.63	1.673	2	P 2	6626.43			
P 2	6839.27	6839.23	5.987	-4	R 0	6690.85	6690.90	0.635	5
P 1	6872.93	6872.90	0.480	-3	R 1	6772.97	6772.98	0.175	1
R 0	6969.82	6969.84	7.202	2	P 6	6833.21	6833.20	6.029	-1
R 3	6986.92	6986.91	0.897	-1	P 3	6840.84			
R 1	7025.21	7025.21	1.619	0	R 2	6879.09			
R 4	7069.84				P 4	6905.69	6905.76	12.110	7
R 2	7091.92	7091.91	4.719	-2	P 5	7029.11	7029.13	9.048	2
R 5	7136.03				R 3	7192.16	7192.19	4.989	3
<b>RMS = 2.8 10<sup>2</sup> cm<sup>-1</sup></b>					R 4	7353.27			
					R 6	7463.45			
					R 5	7569.88			
					<b>RMS = 3.8 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> B' → EF 0-9</b>					<b>H<sub>2</sub> B' → EF 0-10</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 2	5055.45	5055.46	1.200	1	P 2	4486.87			
P 1	5063.28				P 1	4487.32			
P 3	5073.98	5074.00	0.861	2	P 3	4508.46			
P 4	5124.36				P 4	4549.14			
R 0	5144.50	5144.49	2.882	-1	R 0	4563.26	4563.25	6.281	-1
P 5	5212.00	5212.05	5.588	5	R 1	4639.60	4639.65	1.704	5
R 1	5215.57				R 2	4739.52			
R 2	5308.10	5308.07	2.942	-3	R 3	4859.77			
R 3	5425.29	5425.26	5.793	-3	R 4	4996.72	4996.69	8.835	-3
R 4	5571.94				<b>RMS = 2.4 10<sup>2</sup> cm<sup>-1</sup></b>				
R 5	5752.77								
<b>RMS = 3.5 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> B' → E 1-0</b>					<b>H<sub>2</sub> B' → E 1-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
P 6	12582.40	12582.41	3.882	0	P 1	12982.53	12982.54	0.902	1
P 5	12718.21	12718.21	0.965	0	P 2	13003.93			
P 4	12842.36	12842.36	1.017	0	R 0	13040.55	13040.63	1.441	8
P 3	12953.42	12953.42	0.855	0	P 3	13059.02			
P 2	13049.89	13049.96	0.609	7	R 1	13120.14			
P 1	13130.36				P 4	13147.71	13147.79	0.147	8
R 0	13239.66	13239.66	0.991	0	R 2	13233.17	13233.14	0.710	-3
R 4	13252.28	13252.27	0.936	1	P 5	13269.60			
R 1	13267.97	13267.97	1.255	1	R 3	13379.30			
R 3	13273.70	13273.71	1.300	1	R 4	13557.63			
R 2	13279.13	13279.13	1.020	0	<b>RMS = 5.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 1.7 10<sup>2</sup> cm<sup>-1</sup></b>									

<b>H<sub>2</sub> B' → E 1-3</b>					<b>H<sub>2</sub> B' → E 1-4</b>					
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		
P 5	10449.326	10449.325	4.768	-1	P 1	10647.73				
P 4	10552.655	10552.656	4.534	1	P 2	10669.41	10669.33	0.084		
P 3	10646.781	10646.781	4.701	0	R 0	10705.49		-8		
P 2	10732.800	10732.799	4.639	-1	P 3	10727.61	10727.61	2.889	0	
P 1	10804.554	10804.554	4.481	0	R 1	10785.34	10785.28	3.969	-6	
R 0	10909.698	10909.700	4.308	2	P 4	10817.55				
R 1	10942.158	10942.159	4.480	1	R 2	10898.65	10898.68	0.980	3	
R 2	10962.043	10962.046	4.336	3	P 5	10941.42				
R 4	10962.570	10962.566	3.699	-4	R 3	11047.89				
R 3	10967.067	10967.067	4.247	0	P 6	11098.58	11098.66	0.755	8	
					R 4	11227.47				
	<b>RMS= 1.8 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 4.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> B' → EF 1-6</b>					<b>H<sub>2</sub> B' → EF 1-7</b>					
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		
R 0	8844.844	8844.848	2.982	4	P 1	8500.73	8500.73	7.647	0	
R 1	8890.573	8890.574	6.175	1	P 2	8501.46	8501.48	14.987	2	
P 1	8752.969	8752.969	5.712	0	R 0	8565.88	8565.87	2.972	1	
R 2	8943.539	8943.539	14.167	0	R 1	8638.34	8638.34	5.905	0	
P 2	8714.296	8714.297	5.906	1	P 6	8647.16				
R 3	8821.259	8821.260	6.502	1	P 3	8706.21	8706.21	6.046	0	
P 3	8500.973	8500.971	6.396	-2	R 2	8730.70	8730.71	5.229	1	
R 4	8883.794	8883.790	3.504	-4	P 4	8757.31	8757.31	3.348	0	
P 5	8429.599	8429.599	5.968	0	P 5	8863.45	8863.49	5.500	4	
					R 3	9026.49	9026.50	5.890	1	
	<b>RMS= 1.6 10<sup>3</sup> cm<sup>-1</sup></b>					R 4	9167.22	9167.23	0.970	1
						<b>RMS= 1.6 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> B' → EF 1-8</b>					<b>H<sub>2</sub> B' → EF 1-10</b>					
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		
P 1	7611.24	7611.27	4.045	3	P 2	6361.89				
P 2	7624.22	7624.23	0.432	1	P 1	6367.36	6367.36	1.871	0	
P 3	7667.79	7667.79	2.237	0	P 3	6373.82	6373.83	2.366	1	
R 0	7673.85				P 4	6400.76				
P 4	7741.99				R 0	6438.29				
R 1	7748.84				P 5	6442.34	6442.41	3.370	7	
P 5	7844.46	7844.46	5.514	0	R 1	6504.97	6504.97	7.065	0	
R 2	7853.47				R 2	6591.14				
R 3	7988.07	7988.07	2.430	0	R 3	6694.11	6694.09	3.576	-2	
R 4	8151.91				R 4	6810.67				
						<b>RMS= 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				
	<b>RMS= 1.8 10<sup>2</sup> cm<sup>-1</sup></b>									



<b>H<sub>2</sub> B' → EF 2-8</b>					<b>H<sub>2</sub> B' → EF 2-9</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 1	9327.87	9327.86	6.439	-1	P 2	8644.386	8644.387	5.647	1
P 2	9338.13	9338.13	0.911	0	P 3	8647.575	8647.574	5.936	-1
P 3	9376.02	9376.02	3.035	0	P 1	8659.962	8659.964	5.753	2
R 0	9387.76	9387.68	0.937	-8	P 4	8675.259	8675.264	4.776	5
P 4	9441.28				P 5	8733.147	8733.150	4.431	3
R 1	9457.07	9457.07	5.786	0	R 0	8733.440	8733.439	5.675	-1
P 5	9531.27				R 1	8789.160	8789.163	5.459	3
R 2	9552.75	9552.75	2.472	0	R 2	8859.000	8858.994	5.172	-6
R 3	9674.88	9674.88	4.387	0	R 3	8946.437	8946.437	5.264	0
R 4	9822.61	9822.61	4.756	0	R 4	9056.594	9056.592	2.354	-2
R 5	9992.61	9992.56	0.792	-5	R 5	9194.490	9194.486	6.405	-4
<b>RMS= 1.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> B' → EF 2-10</b>					<b>H<sub>2</sub> B' → E 2-11</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>3</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	8075.805	8075.807	6.403	2	P 1	7340.99	7340.99	8.811	0
P 3	8082.051	8082.051	6.372	0	P 2	7341.91	7341.91	4.406	0
P 1	8084.000	8084.001	6.643	1	P 3	7364.75	7364.75	11.912	0
P 4	8100.038	8100.041	5.922	3	R 0	7405.31	7405.31	2.786	0
P 5	8129.148	8129.148	5.891	0	P 4	7408.44	7408.42	6.913	-2
R 0	8152.200	8152.203	1.187	3	R 1	7470.19	7470.23	0.487	4
R 1	8213.198	8213.199	5.870	1	P 5	7470.28	7470.27	3.409	-1
R 2	8290.419	8290.410	5.534	-9	R 2	7556.52	7556.52	2.660	0
R 3	8380.914	8380.913	5.998	-1	R 3	7663.61	7663.62	6.665	1
R 4	8481.373	8481.368	2.491	-5	R 4	7789.77	7789.79	1.925	2
R 5	8590.491	8590.496	4.475	5	R 5	7931.62	7931.61	2.812	-1
<b>RMS=3.6 10<sup>3</sup> cm<sup>-1</sup></b>					<b>RMS= 0.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> B' → EF 2-12</b>					<b>H<sub>2</sub> B' → EF 2-13</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>		Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>2</sup> cm <sup>-1</sup>
P 2	6621.82				P 2	5948.78			
P 1	6625.60				P 1	5953.05	5953.05	3.766	0
P 3	6639.09	6639.09	0.778	0	P 3	5963.79	5963.83	4.765	4
P 4	6678.69	6678.75	0.258	6	P 4	5998.22			
R 0	6692.51				R 0	6019.88			
P 5	6741.59	6741.58	5.401	-1	R 1	6082.25	6082.25	4.008	0
R 1	6754.80				R 2	6163.39			
R 2	6836.44	6836.39	3.431	-5	R 3	6262.65	6262.66	0.309	1
R 3	6937.95				R 4	6379.55	6379.59	0.674	4
R 4	7060.02				<b>RMS= 2.6 10<sup>2</sup> cm<sup>-1</sup></b>				
R 5	7202.93				<b>RMS= 2.7 10<sup>2</sup> cm<sup>-1</sup></b>				

$H_2 B' \rightarrow EF$ 2-14					$H_2 B' \rightarrow EF$ 2-18				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$
P 1	5260.44	5260.47	0.306	3	P 1	2688.07	2688.07	15.786	0
P 2	5260.98	5260.99	0.875	1	P 2	2697.65	2697.68	5.669	3
P 3	5282.87	5282.86	2.378	-1	P 3	2731.88	2731.88	29.699	0
R 0	5324.84				R 0	2747.69			
P 4	5325.24	5325.24	1.393	0	P 4	2787.99	2787.98	4.274	-1
P 5	5386.74	5386.76	1.407	2	R 1	2817.27	2817.27	30.717	0
R 1	5389.64	5389.60	6.739	-4	P 5	2861.47	2861.46	10.935	-1
R 2	5475.59				R 2	2912.26	2912.30	2.873	4
R 3	5581.74				R 3	3030.74	3030.75	18.651	1
R 4	5706.57				R 4	3169.32			
R 5	5848.08				R 5	3322.82			
RMS = $3.3 \times 10^2 cm^{-1}$					RMS = $0.9 \times 10^2 cm^{-1}$				
$H_2 B' \rightarrow EF$ 3-3					$H_2 B' \rightarrow EF$ 3-4				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$
P 5	13644.37	13644.37	2.012	0	P 1	13895.63	13895.60	0.795	-3
P 4	13768.44	13768.44	1.312	0	P 2	13912.01			
P 3	13878.67	13878.67	1.424	0	R 0	13948.09	13948.10	1.593	1
P 2	13975.40	13975.41	1.465	1	P 3	13959.50	13959.47	0.377	-3
P 1	14052.45				R 1	14017.23	14017.18	0.499	-5
R 0	14152.30	14152.25	0.662	-5	P 4	14033.34	14033.28	0.685	-6
R 3	14162.12	14162.15	0.982	3	R 2	14114.44	14114.44	0.963	0
R 1	14174.05	14174.03	0.785	-2	P 5	14136.47			
R 2	14177.83	14177.82	0.466	-1	R 3	14242.94			
RMS = $1.8 \times 10^2 cm^{-1}$					RMS = $3.0 \times 10^2 cm^{-1}$				
$H_2 B' \rightarrow EF$ 3-5					$H_2 B' \rightarrow EF$ 3-6				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^3 cm^{-1}$
P 1	12816.34				P 5	11624.649	11624.652	2.068	3
P 2	12833.16	12833.21	0.122	5	P 4	11689.665	11689.670	1.178	5
R 0	12868.81	12868.80	9.679	-1	P 3	11732.862	11732.867	1.824	5
P 3	12878.71	12878.68	0.412	-3	P 2	11956.899	11956.900	1.214	1
R 1	12937.94				P 1	12000.867	12000.871	1.919	4
P 4	12953.00				R 3	12016.308	12016.310	1.150	2
R 2	13035.59	13035.67	0.661	8	R 0	12087.448	12087.448	1.145	0
P 5	13056.40	13056.34	0.022	-6	R 1	12122.462	12122.462	1.408	0
R 3	13162.16				R 2	12159.325	12159.330	0.607	5
RMS = $2.9 \times 10^2 cm^{-1}$					RMS = $3.3 \times 10^3 cm^{-1}$				
$H_2 B' \rightarrow EF$ 3-7					$H_2 B' \rightarrow EF$ 3-8				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^3 cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^2 cm^{-1}$
P 2	11744.062	11744.062	1.226	0	P 1	10859.14	10859.13	3.977	-1
P 1	11748.633	11748.634	1.825	1	P 2	10866.83	10866.83	4.551	0
R 0	11808.480	11808.476	1.133	-4	P 3	10899.68	10899.68	3.777	0
R 1	11870.228	11870.235	1.183	7	R 0	10916.45	10916.39	3.238	-6
P 3	11938.097	11938.099	1.108	2	P 4	10957.78	10957.77	5.599	-1
R 2	11946.488	11946.489	1.127	1	R 1	10980.73	10980.73	4.445	0
R 3	12221.543				P 5	11039.51	11039.54	2.865	3
RMS = $3.4 \times 10^3 cm^{-1}$					RMS = $2.2 \times 10^2 cm^{-1}$				

$H_2 B' \rightarrow EF$ 3-9					$H_2 B' \rightarrow EF$ 3-10				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 3	10171.23	10171.23	5.044	0	P 2	9604.50	9604.53	4.408	3
P 2	10173.08	10173.14	3.132	6	P 3	9605.71	9605.72	4.431	1
P 1	10191.22	10191.22	4.766	0	P 1	9615.26	9615.32	1.128	6
P 4	10191.76	10191.77	5.055	1	P 4	9616.54	9616.54	3.164	0
P 5	10241.39	10241.39	5.958	0	P 5	9637.39	9637.39	4.123	0
R 0	10262.13	10262.13	4.127	0	R 0	9680.89			
R 1	10312.82	10312.82	4.785	0	R 1	9736.86			
R 2	10375.50	10375.51	3.511	1	R 2	9806.92			
R 3	10454.68	10454.68	3.660	0	R 3	9889.16	9889.19	0.436	3
RMS = $1.9 \times 10^2 cm^{-1}$					RMS = $2.3 \times 10^2 cm^{-1}$				
$H_2 B' \rightarrow EF$ 3-11					$H_2 B' \rightarrow EF$ 3-12				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{13} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 2	8870.600	8870.603	2.894	3	P 2	8150.51	8150.52	5.664	1
P 1	8872.251	8872.250	1.986	-1	P 1	8156.86	8156.87	6.066	1
P 3	8888.406	8888.402	3.613	-4	P 3	8162.75	8162.74	4.170	-1
P 4	8924.942	8924.942	1.764	0	P 4	8195.19	8195.19	3.679	0
R 0	8934.001	8934.002	0.153	1	R 0	8221.20	8221.20	6.027	0
P 5	8978.518				P 5	8249.83	8249.83	3.421	0
R 1	8993.846	8993.848	4.786	2	R 1	8278.46	8278.46	6.590	0
R 2	9073.026	9073.035	2.017	9	R 2	8352.94	8352.94	4.869	0
R 3	9171.852	9171.855	3.271	3	R 3	8446.19	8446.23	5.163	4
RMS = $3.5 \times 10^3 cm^{-1}$					RMS = $1.3 \times 10^2 cm^{-1}$				
$H_2 B' \rightarrow EF$ 3-13					$H_2 B' \rightarrow -EF$ 3-14				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 2	7477.47	7477.47	7.266	0	P 2	6789.67	6789.67	9.650	0
P 1	7484.31	7484.31	8.423	0	P 1	6791.70	6791.66	8.895	-4
P 3	7487.45	7487.45	12.552	0	P 3	6806.53	6806.53	14.459	0
P 4	7514.72	7514.73	6.502	0	P 4	6841.74	6841.74	7.834	0
R 0	7548.57	7548.57	5.471	0	R 0	6853.53	6853.53	3.618	0
P 5	7561.12	7561.11	6.581	-1	P 5	6894.98	6894.98	11.431	0
R 1	7605.91				R 1	6913.30	6913.30	11.065	0
R 2	7679.90	7679.89	5.954	-1	R 2	6992.10	6992.09	15.493	-1
R 3	7770.89	7770.89	6.848	0	R 3	7089.98	7089.98	9.123	0
RMS = $0.4 \times 10^2 cm^{-1}$					RMS = $1.3 \times 10^2 cm^{-1}$				
$H_2 B' \rightarrow E$ 3-16					$H_2 B' \rightarrow E$ 3-17				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{12} cm^{-1}$
P 2	5418.88	5418.87	0.353	-1	P 2	4789.54	4789.54	7.692	0
P 1	5421.41	5421.40	0.529	-1	P 1	4791.30	4791.30	11.310	0
P 3	5436.23	5436.22	37.825	-1	P 3	4806.48	4806.47	9.752	-1
P 4	5474.71				P 4	4841.85	4841.86	1.852	1
R 0	5483.70				R 0	4852.89	4852.88	1.407	-1
P 5	5536.31				P 5	4896.94	4896.94	3.221	0
R 1	5543.00	5542.99	19.616	-1	R 1	4912.90	4912.89	11.974	0
R 2	5621.31	5621.31	3.560	0	R 2	4991.96	4991.96	2.308	0
R 3	5719.68				R 3	5089.92	5089.88	1.002	-4
RMS = $1.5 \times 10^2 cm^{-1}$					RMS = $0.7 \times 10^2 cm^{-1}$				



$H_2 D^+ \rightarrow EF$ 1-6					$H_2 D^+ \rightarrow EF$ 1-8				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	11270.64	11270.63	1.082	-1	P 2	10375.61	10375.53	0.838	-8
P 3	11274.46	11274.44	1.879	-2	R 0	10425.24			
P 4	11278.14	11278.15	1.002	1	P 3	10441.27	10441.25	1.182	-2
P 2	11465.68	11465.69	0.134	1	R 1	10522.32			
R 0	11596.23	11596.31	1.541	8	P 4	10546.26	10546.28	0.108	2
R 3	11662.30	11662.24	0.959	-6	R 2	10657.73	10657.66	0.019	-7
R 1	11664.06	11664.05	0.902	-1	P 5	10685.50	10685.49	1.415	-1
R 2	11747.80	11747.82	0.703	2	R 3	10829.11	10829.12	4.448	1
<b>RMS= 4.1 <math>10^2 cm^{-1}</math></b>					<b>RMS= 2.9 <math>10^2 cm^{-1}</math></b>				
$H_2 D^+ \rightarrow EF$ 1-9					$H_2 D^+ \rightarrow EF$ 1-10				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	9681.86				P 2	9113.28			
P 3	9712.83	9712.80	2.954	-3	P 3	9147.30	9147.27	1.602	-3
R 0	9770.92				R 0	9189.68			
P 4	9780.24	9780.25	1.741	1	P 4	9205.02	9205.00	0.851	-2
R 1	9854.41				R 1	9278.45			
P 5	9887.38	9887.37	3.492	-1	P 5	9283.38	9283.36	3.328	-2
R 2	9963.98				R 2	9395.40			
R 3	10100.67	10100.67	0.587	0	R 3	9535.14	9535.20	3.203	6
<b>RMS= 4.1 <math>10^2 cm^{-1}</math></b>					<b>RMS= 3.6 <math>10^2 cm^{-1}</math></b>				
$H_2 D^+ \rightarrow EF$ 2-6					$H_2 D^+ \rightarrow EF$ 2-7				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 5	13351.58	13351.56	0.963	-2	P 2	13348.72			
P 4	13367.09	13367.07	1.085	-2	R 0	13413.14	13413.12	1.630	-2
P 3	13368.11	13368.10	0.728	-1	R 1	13505.47	13505.49	1.213	2
P 2	13561.56	13561.55	2.966	-1	P 3	13573.34	13573.36	1.235	2
R 0	13692.11	13692.09	1.451	-2	R 2	13623.91	13623.90	1.087	-1
R 3	13743.24	13743.21	1.245	-3	P 4	13650.52	13650.51	1.192	-1
R 1	13757.71	13757.73	1.449	2	P 5	13785.43	13785.41	1.236	-2
R 2	13836.75	13836.74	1.475	-1	R 3	13948.47	13948.45	1.426	-2
<b>RMS= 1.6 <math>10^2 cm^{-1}</math></b>					<b>RMS= 1.6 <math>10^2 cm^{-1}</math></b>				
$H_2 D^+ \rightarrow EF$ 2-8					$H_2 D^+ \rightarrow EF$ 2-9				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	12471.49	12471.48	3.155	-1	P 2	11777.74	11777.79	0.309	5
R 0	12521.11	12521.19	0.726	8	P 3	11806.48	11806.47	1.130	-1
P 3	12534.92	12534.93	1.189	1	R 0	11866.79	11866.82	3.212	3
R 1	12615.98				P 4	11869.19	11869.15	3.235	-4
P 4	12635.20				R 1	11948.06	11948.07	1.368	1
R 2	12746.67				P 5	11968.32	11968.32	1.030	0
P 5	12766.44	12766.42	0.913	-2	R 2	12052.93	12052.87	0.684	-6
R 3	12910.05				R 3	12181.61	12181.70	0.718	9
<b>RMS= 2.8 <math>10^2 cm^{-1}</math></b>					<b>RMS= 3.5 <math>10^2 cm^{-1}</math></b>				



$H_2 D^+ \rightarrow EF \ 2-10$					$H_2 D^+ \rightarrow EF \ 2-11$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	11209.16	11209.15	0.041	-1	P 2	10475.26	10475.22	0.216	-4
P 3	11240.96	11240.94	3.682	-2	P 3	10523.65	10523.68	1.169	3
R 0	11285.55	11285.54	1.757	-1	R 0	10538.66	10538.63	0.729	-3
R 1	11372.10	11372.12	0.712	2	R 1	10629.09	10629.10	2.127	1
R 2	11484.34	11484.38	0.408	4	R 2	10750.45			
R 3	11616.08	11616.11	2.837	3	R 3	10898.78			
<b>RMS= 2.2 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 2.2 10<sup>2</sup> cm<sup>-1</sup></b>				
$H_2 D^+ \rightarrow EF \ 2-12$					$H_2 D^+ \rightarrow EF \ 2-13$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
P 2	9755.18				P 2	9082.13			
P 3	9797.99	9798.00	2.950	1	P 3	9122.69	9122.71	0.357	2
R 0	9825.86				R 0	9153.23			
P 4	9872.61	9872.61	0.728	0	P 4	9192.14			
R 1	9913.70				R 1	9241.15	9241.15	6.265	0
P 5	9976.76	9976.75	6.284	-1	P 5	9288.04	9288.03	1.834	-1
R 2	10030.36	10030.35	1.694	-1	R 2	9357.32			
R 3	10173.12	10173.14	3.497	2	R 3	9497.82	9497.77	0.452	-5
<b>RMS= 1.3 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS= 1.5 10<sup>2</sup> cm<sup>-1</sup></b>				
$H_2 D^- \rightarrow EF \ 0-0$					$H_2 D^- \rightarrow EF \ 0-2$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 7	13592.11	13592.11	1.017	0	Q 1	12360.82	12360.80	2.627	-2
Q 6	13619.76	13619.75	0.953	-1	Q 2	12454.50			
Q 5	13644.10	13644.10	1.711	0	Q 3	12593.89			
Q 4	13664.89	13664.89	1.372	0	Q 4	12777.71	12777.64	0.443	-7
Q 3	13681.84	13681.84	1.540	0	<b>RMS= 2.9 10<sup>2</sup> cm<sup>-1</sup></b>				
Q 2	13694.75	13694.75	1.512	0					
Q 1	13703.44	13703.44	1.495	0					
<b>RMS= 0.3 10<sup>2</sup> cm<sup>-1</sup></b>									
$H_2 D^- \rightarrow EF \ 0-3$					$H_2 D^- \rightarrow EF \ 0-4$				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 4	11375.19	11375.20	1.103	1	Q 1	11220.81			
Q 3	11375.20	11375.20	1.103	0	Q 2	11314.27			
Q 5	11375.21	11375.20	1.103	-1	Q 3	11456.03	11456.09	0.506	6
Q 1	11377.63	11377.64	1.966	1	Q 4	11640.09			
Q 2	11377.66	11377.64	1.966	-2	Q 5	11867.31	11867.26	3.235	-5
<b>RMS= 1.5 10<sup>2</sup> cm<sup>-1</sup></b>					Q 6	12135.93			
					Q 7	12442.91	12442.91	2.076	0
					<b>RMS= 3.9 10<sup>2</sup> cm<sup>-1</sup></b>				

$H_2 D^- \rightarrow EF$ 0-5					$H_2 D^- \rightarrow EF$ 0-6				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	10141.52				Q 3	9229.39			
Q 2	10235.42				Q 4	9296.41	9296.38	1.316	-3
Q 3	10375.24				Q 1	9326.05			
Q 4	10559.75				Q 2	9359.16	9359.18	1.494	2
Q 5	10787.24	10787.29	1.735	5	<b>RMS = <math>2.5 \times 10^2 cm^{-1}</math></b>				
Q 6	11055.44								
Q 7	11362.82	11362.76	0.265	-6					
<b>RMS = <math>5.0 \times 10^2 cm^{-1}</math></b>									
$H_2 D^- \rightarrow EF$ 0-7					$H_2 D^- \rightarrow EF$ 0-11				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	9073.81	9073.77	6.475	-4	Q 1	6197.43			
Q 2	9146.32				Q 2	6272.86	6272.81	1.043	-5
Q 3	9434.63	9434.68	0.892	5	Q 3	6384.94	6384.92	0.458	-2
Q 7	9479.53	9479.46	0.009	-7	<b>RMS = <math>4.2 \times 10^2 cm^{-1}</math></b>				
Q 4	9579.84								
Q 6	9684.52								
Q 5	9789.34								
<b>RMS = <math>4.1 \times 10^2 cm^{-1}</math></b>									
$H_2 D^- \rightarrow EF$ 1-0					$H_2 D^- \rightarrow EF$ 1-1				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	15824.24	15824.25	6.224	1	Q 1	15778.35	15778.36	3.133	1
Q 4	15860.08	15860.09	4.891	1	Q 2	15865.39	15865.39	8.679	0
Q 3	15889.22	15889.15	4.615	-7	<b>RMS = <math>0.4 \times 10^2 cm^{-1}</math></b>				
Q 2	15911.35	15911.38	6.229	3					
Q 1	15926.18	15926.21	4.627	3					
<b>RMS = <math>3.3 \times 10^2 cm^{-1}</math></b>									
$H_2 D^- \rightarrow EF$ 1-3					$H_2 D^- \rightarrow EF$ 1-4				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 5	13555.36	13555.31	1.188	-5	Q 1	13443.55	13443.53	0.219	-2
Q 4	13570.38	13570.37	1.211	-1	Q 2	13530.87	13530.87	1.775	0
Q 3	13582.58	13582.58	1.267	0	Q 3	13663.40			
Q 2	13594.26	13594.24	1.231	-2	Q 4	13835.28			
Q 1	13600.38	13600.38	1.363	0	Q 5	14047.45	14047.53	0.377	8
<b>RMS = <math>2.2 \times 10^2 cm^{-1}</math></b>					<b>RMS = <math>3.3 \times 10^2 cm^{-1}</math></b>				
$H_2 D^- \rightarrow EF$ 1-5					$H_2 D^- \rightarrow EF$ 1-6				
	Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$		Calc $cm^{-1}$	Obs $cm^{-1}$	W	O-C $\times 10^{+2} cm^{-1}$
Q 1	12364.27	12364.21	0.896	-6	Q 3	11436.77	11436.77	1.136	0
Q 2	12452.02				Q 4	11491.60	11491.62	0.209	2
Q 3	12582.62	12582.63	3.189	1	Q 5	11535.63	11535.56	0.032	-7
<b>RMS = <math>2.7 \times 10^2 cm^{-1}</math></b>					Q 1	11548.79	11548.79	1.322	0
					Q 2	11575.76	11575.73	1.325	-3
					<b>RMS = <math>1.9 \times 10^2 cm^{-1}</math></b>				

<b>H<sub>2</sub> D<sup>-</sup> → EF 1-7</b>					<b>H<sub>2</sub> D<sup>-</sup> → EF 1-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
Q 1	11296.56	11296.51	2.171	-5	Q 1	10407.06	10407.02	1.839	-4
Q 2	11362.92	11362.83	0.030	-9	Q 2	10485.69			
Q 3	11642.00	11642.00	1.444	0	Q 3	10603.58	10603.53	1.645	-5
Q 4	11775.03				Q 4	10759.72	10759.68	3.166	-4
Q 5	11969.48	11969.55	0.313	7	Q 5	10950.49	10950.54	3.379	5
<b>RMS = 3.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 4.3 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> D<sup>-</sup> → EF 1-9</b>					<b>H<sub>2</sub> D<sup>-</sup> → EF 1-12</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
Q 1	9739.15	9739.14	0.825	-1	Q 1	7704.78	7704.84	3.763	6
Q 2	9791.94				Q 2	7769.38	7769.35	0.111	-3
Q 3	9875.14	9875.18	0.699	4	Q 3	7866.65			
<b>RMS = 2.5 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 5.7 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> D<sup>-</sup> → EF 2-0</b>					<b>H<sub>2</sub> D<sup>-</sup> → EF 2-1</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
Q 4	17926.84	17926.77	1.221	-7	Q 1	17871.82			
Q 3	17967.78	17967.82	0.895	4	Q 2	17952.87			
Q 2	17998.83				Q 3	18073.38			
Q 1	18019.64	18019.70	2.627	6	Q 4	18232.19	18232.28	0.612	9
<b>RMS = 5.8 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 4.9 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> D<sup>-</sup> → EF 2-5</b>					<b>H<sub>2</sub> D<sup>-</sup> → EF 2-6</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
Q 1	14457.73	14457.73	1.058	0	Q 3	13515.33	13515.33	1.213	0
Q 2	14539.50	14539.48	0.229	-2	Q 4	13558.36	13558.35	1.142	-1
Q 3	14661.18	14661.18	0.231	0	Q 5	13587.71	13587.69	1.178	-2
<b>RMS = 1.0 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 1.2 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> D<sup>-</sup> → EF 2-7</b>					<b>H<sub>2</sub> D<sup>-</sup> → EF 2-8</b>				
	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	Calc cm <sup>-1</sup>	Obs cm <sup>-1</sup>	W	O-C x10 <sup>+2</sup> cm <sup>-1</sup>	
Q 1	13390.02	13390.01	1.297	-1	Q 1	12500.52			
Q 2	13450.40	13450.38	1.208	-2	Q 2	12573.17	12573.12	0.995	-5
Q 3	13720.57	13720.57	1.429	0	Q 3	12682.15	12682.14	0.534	-1
Q 4	13841.79	13841.75	2.251	-4	Q 4	12826.48			
Q 5	14021.56	14021.53	0.416	-3	Q 5	13002.57	13002.57	0.788	0
<b>RMS = 2.5 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.2 10<sup>2</sup> cm<sup>-1</sup></b>				

<b>H<sub>2</sub> D<sup>-</sup> → EF 2-9</b>					<b>H<sub>2</sub> D<sup>-</sup> → EF 2-10</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>
Q 1	11832.61	11832.66	6.775	5	Q 1	11256.65	11256.65	1.509	0
Q 2	11879.42	11879.38	3.035	-4	Q 2	11310.84	11310.81	0.989	-3
Q 3	11953.71				Q 3	11388.18	11388.19	1.127	1
Q 4	12060.46	12060.38	0.226	-8	<b>RMS = 1.8 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 5.0 10<sup>2</sup> cm<sup>-1</sup></b>									
<b>H<sub>2</sub> D<sup>+</sup> → EF 2-11</b>					<b>H<sub>2</sub> D<sup>+</sup> → EF 2-12</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>
Q 1	10513.64	10513.64	2.560	0	Q 1	9798.25	9798.24	1.999	-1
Q 2	10576.94	10576.96	4.269	2	Q 2	9856.86			
Q 3	10670.88				Q 3	9945.22	9945.25	3.312	3
Q 4	10793.64	10793.64	12.560	0	Q 4	10063.89			
Q 5	10941.58	10941.55	3.673	-3	Q 5	10212.89	10212.93	0.153	4
<b>RMS = 1.6 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 2.4 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> D<sup>+</sup> → EF 2-13</b>					<b>H<sub>2</sub> D<sup>+</sup> → EF 2-14</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>
Q 1	9125.70				Q 1	8433.09	8433.08	0.176	-1
Q 2	9183.81				Q 2	8496.01	8496.06	19.780	5
Q 3	9269.92	9269.98	2.496	6	Q 3	8589.00			
Q 4	9383.42				Q 4	8710.44			
Q 5	9524.17	9524.15	4.318	-2	Q 5	8858.04	8858.03	20.420	-1
<b>RMS = 4.1 10<sup>2</sup> cm<sup>-1</sup></b>					<b>RMS = 3.1 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>H<sub>2</sub> D<sup>+</sup> → EF 2-15</b>					<b>H<sub>2</sub> D<sup>+</sup> → EF 2-16</b>				
	<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>		<b>Calc cm<sup>-1</sup></b>	<b>Obs cm<sup>-1</sup></b>	<b>W</b>	<b>O-C x10<sup>+2</sup>cm<sup>-1</sup></b>
Q 1	7733.22				Q 1	7062.79	7062.77	0.933	-2
Q 2	7797.49				Q 2	7125.22	7125.21	4.824	-1
Q 3	7893.48	7893.53	0.154	5	Q 3	7218.71	7218.69	2.390	-1
Q 4	8020.52	8020.55	6.714	3	<b>RMS = 1.3 10<sup>2</sup> cm<sup>-1</sup></b>				
<b>RMS = 2.7 10<sup>2</sup> cm<sup>-1</sup></b>									