

Supporting Information:
High-resolution infrared action spectroscopy of the
fundamental vibrational band of CN^+

José L. Doménech^a, Oskar Asvany^b, Charles R. Markus^{b,c}, Stephan
Schlemmer^b, Sven Thorwirth^b

^a*Instituto de Estructura de la Materia (IEM-CSIC), Serrano 123, E28006 Madrid, Spain*

^b*I. Physikalisches Institut, Universität zu Köln, Zùlpicher Str. 77, D50937 Köln,
Germany*

^c*Department of Chemistry, University of Illinois, Urbana, IL 61801, USA*

Truncated variant of isotope invariant fit file

The global fit was performed using Pickett's SPFIT program (Pickett 1991, *J. Mol. Spectrosc.* 148, 371) and the data summarized in Thorwirth et al. (2019, *Astrophys. J. Lett.* 882, L6) complemented with the new high resolution infrared data from the present study. Lines 1 to 192 are combination differences derived from the electronic spectra given in Douglas and Routly (1954, *Astrophys. J.* 119, 303), lines 193 to 210 are taken from Thorwirth et al. (2019, *Astrophys. J. Lett.* 882, L6) and lines 211 to 220 from the present study. Lines from 207 to 213 are concerned with the C^{15}N^+ species, all other lines are from the C^{14}N^+ species.

Table 1: Isotope invariant fit of CN⁺

	EXP.FREQ.	-	CALC.FREQ.	-	DIFF.	-	EXP.ERR.	-	EST.ERR.	-	AVG. CALC.FREQ.	-	DIFF.	-	WT.
1:	2	0	2	0	0	0	11.3200000	11.3189711	0.0010289	-0.0350000	0.0000001				
2:	3	0	3	1	0	1	18.8300000	18.8644197	-0.0344197	-0.0350000	0.0000001				
3:	4	0	4	2	0	2	26.3900000	26.4090701	-0.0190701	-0.0350000	0.0000003				
4:	5	0	5	3	0	3	33.9000000	33.9526029	-0.0526029	-0.0350000	0.0000006				
5:	6	0	6	4	0	4	41.4800000	41.4946989	-0.0146989	-0.0350000	0.0000011				
6:	7	0	7	5	0	5	49.0100000	49.0350388	-0.0250388	-0.0350000	0.0000018				
7:	8	0	8	6	0	6	56.5300000	56.5733033	-0.0433033	-0.0350000	0.0000028				
8:	9	0	9	7	0	7	64.1200000	64.1091731	0.0108269	-0.0350000	0.0000042				
9:	10	0	10	8	0	8	71.6400000	71.6423289	-0.0023289	-0.0350000	0.0000059				
10:	11	0	11	9	0	9	79.1700000	79.1724515	-0.0024515	-0.0350000	0.0000081				
11:	12	0	12	10	0	10	86.7800000	86.6992214	0.0807786	-0.0350000	0.0000107				
12:	13	0	13	11	0	11	94.2600000	94.2223195	0.0376805	-0.0350000	0.0000137				
13:	14	0	14	12	0	12	101.7600000	101.7414264	0.0185736	-0.0350000	0.0000174				
14:	15	0	15	13	0	13	109.2400000	109.2562229	-0.0162229	-0.0350000	0.0000216				
15:	16	0	16	14	0	14	116.7900000	116.7663896	0.0236104	-0.0350000	0.0000265				
16:	17	0	17	15	0	15	124.2900000	124.2716073	0.0183927	-0.0350000	0.0000320				
17:	18	0	18	16	0	16	131.7500000	131.7715567	-0.0215567	-0.0350000	0.0000382				
18:	19	0	19	17	0	17	139.2500000	139.2659184	-0.0159184	-0.0350000	0.0000452				
19:	20	0	20	18	0	18	146.8400000	146.7543732	0.0856268	-0.0350000	0.0000530				
20:	21	0	21	19	0	19	154.2600000	154.2366018	0.0233982	-0.0350000	0.0000616				
21:	22	0	22	20	0	20	161.8000000	161.7122850	0.0877150	-0.0350000	0.0000712				
22:	23	0	23	21	0	21	169.1700000	169.1811033	-0.0111033	-0.0350000	0.0000816				
23:	24	0	24	22	0	22	176.6400000	176.6427375	-0.0027375	-0.0350000	0.0000931				
24:	25	0	25	23	0	23	184.1200000	184.0968683	0.0231317	-0.0350000	0.0001055				
25:	26	0	26	24	0	24	191.5500000	191.5431765	0.0068235	-0.0350000	0.0001191				
26:	27	0	27	25	0	25	198.9800000	198.9813427	-0.0013427	-0.0350000	0.0001337				
27:	28	0	28	26	0	26	206.4500000	206.4110476	0.0389524	-0.0350000	0.0001495				
28:	29	0	29	27	0	27	213.8200000	213.8319720	-0.0119720	-0.0350000	0.0001664				
29:	30	0	30	28	0	28	221.2100000	221.2437965	-0.0337965	-0.0350000	0.0001846				
30:	31	0	31	29	0	29	228.6300000	228.6462019	-0.0162019	-0.0350000	0.0002041				
31:	32	0	32	30	0	30	235.9900000	236.0388689	-0.0488689	-0.0350000	0.0002249				
32:	33	0	33	31	0	31	243.4000000	243.4214782	-0.0214782	-0.0350000	0.0002471				
33:	34	0	34	32	0	32	250.7900000	250.7937104	-0.0037104	-0.0350000	0.0002707				
34:	35	0	35	33	0	33	258.1900000	258.1552463	0.0347537	-0.0350000	0.0002957				
35:	36	0	36	34	0	34	265.4700000	265.5057666	-0.0357666	-0.0350000	0.0003223				
36:	37	0	37	35	0	35	272.8600000	272.8449520	0.0150480	-0.0350000	0.0003503				
37:	38	0	38	36	0	36	280.2400000	280.1724833	0.0675167	-0.0350000	0.0003800				
38:	39	0	39	37	0	37	287.3900000	287.4880410	-0.0980410	-0.0350000	0.0004113				
39:	40	0	40	38	0	38	294.7700000	294.7913060	-0.0213060	-0.0350000	0.0004442				
40:	41	0	41	39	0	39	302.1200000	302.0819589	0.0380411	-0.0350000	0.0004789				
**** NEXT LINE NOT USED IN FIT															
41:	4	0	4	2	0	2	26.2700000	26.4090701	-0.1390701	-0.0350000	0.0000003				
42:	5	0	5	3	0	3	33.9200000	33.9526029	-0.0326029	-0.0350000	0.0000006				
43:	6	0	6	4	0	4	41.4500000	41.4946989	-0.0446989	-0.0350000	0.0000011				
44:	7	0	7	5	0	5	49.0600000	49.0350388	0.0249612	-0.0350000	0.0000018				
45:	8	0	8	6	0	6	56.5700000	56.5733033	-0.0033033	-0.0350000	0.0000028				
46:	9	0	9	7	0	7	64.1300000	64.1091731	0.0208269	-0.0350000	0.0000042				

47:	10	0	10	8	0	8	71.6400000	71.6423289	-0.0023289	-0.0350000	0.0000059
48:	11	0	11	9	0	9	79.2000000	79.1724515	0.0275485	-0.0350000	0.0000081
49:	12	0	12	10	0	10	86.7200000	86.6992214	0.0207786	-0.0350000	0.0000107
50:	13	0	13	11	0	11	94.2200000	94.2223195	-0.0023195	-0.0350000	0.0000137
51:	14	0	14	12	0	12	101.7500000	101.7414264	0.0085736	-0.0350000	0.0000174
52:	15	0	15	13	0	13	109.2500000	109.2562229	-0.0062229	-0.0350000	0.0000216
53:	16	0	16	14	0	14	116.7600000	116.7663896	-0.0063896	-0.0350000	0.0000265
54:	17	0	17	15	0	15	124.2800000	124.2716073	0.0083927	-0.0350000	0.0000320
55:	18	0	18	16	0	16	131.7200000	131.7715567	-0.0515567	-0.0350000	0.0000382
56:	19	0	19	17	0	17	139.3000000	139.2659184	0.0340816	-0.0350000	0.0000452
57:	20	0	20	18	0	18	146.7600000	146.7543732	0.0056268	-0.0350000	0.0000530
58:	3	1	3	1	1	1	18.7000000	18.6731978	0.0268022	-0.0350000	0.0000892
59:	4	1	4	2	1	2	26.1300000	26.1413594	-0.0113594	-0.0350000	0.0001248
60:	5	1	5	3	1	3	33.6200000	33.6084035	0.0115965	-0.0350000	0.0001605
61:	6	1	6	4	1	4	41.0700000	41.0740108	-0.0040108	-0.0350000	0.0001962
62:	7	1	7	5	1	5	48.6300000	48.5378619	0.0921381	-0.0350000	0.0002319
63:	8	1	8	6	1	6	56.0000000	55.9996377	0.0003623	-0.0350000	0.0002675
64:	9	1	9	7	1	7	63.4500000	63.4590188	-0.0090188	-0.0350000	0.0003032
65:	10	1	10	8	1	8	70.9100000	70.9156858	-0.0056858	-0.0350000	0.0003389
66:	11	1	11	9	1	9	78.3800000	78.3693196	0.0106804	-0.0350000	0.0003746
67:	12	1	12	10	1	10	85.8000000	85.8196008	-0.0196008	-0.0350000	0.0004103
68:	13	1	13	11	1	11	93.2900000	93.2662102	0.0237898	-0.0350000	0.0004461
69:	14	1	14	12	1	12	100.6400000	100.7088283	-0.0688283	-0.0350000	0.0004818
70:	15	1	15	13	1	13	108.1200000	108.1471361	-0.0271361	-0.0350000	0.0005176
71:	16	1	16	14	1	14	115.5400000	115.5808141	-0.0408141	-0.0350000	0.0005535
72:	17	1	17	15	1	15	123.0100000	123.0095430	0.0004570	-0.0350000	0.0005894
73:	18	1	18	16	1	16	130.3500000	130.4330036	-0.0830036	-0.0350000	0.0006253
74:	19	1	20	18	1	18	145.2300000	145.2628427	-0.0328427	-0.0350000	0.0006975
75:	20	1	21	19	1	19	152.6100000	152.6685825	-0.0585825	-0.0350000	0.0007337
76:	22	1	22	20	1	20	160.0800000	160.0677769	0.0122231	-0.0350000	0.0007701
77:	23	1	23	21	1	21	167.4400000	167.4601064	-0.0201064	-0.0350000	0.0008066
78:	2	1	2	0	1	0	11.2600000	11.2042380	0.0557620	-0.0700000	0.0000535
79:	3	1	3	1	1	1	18.7400000	18.6731978	0.0668022	-0.0700000	0.0000892
80:	4	1	4	2	1	2	26.2100000	26.1413594	0.0686406	-0.0700000	0.0001248
81:	5	1	5	3	1	3	33.6600000	33.6084035	0.0515965	-0.0700000	0.0001605
82:	6	1	6	4	1	4	41.1500000	41.0740108	0.0759892	-0.0700000	0.0001962
83:	7	1	7	5	1	5	48.6000000	48.5378619	0.0621381	-0.0700000	0.0002319
84:	8	1	8	6	1	6	55.9900000	55.9996377	-0.0096377	-0.0700000	0.0002675
85:	9	1	9	7	1	7	63.4100000	63.4590188	-0.0490188	-0.0700000	0.0003032
86:	10	1	10	8	1	8	70.9100000	70.9156858	-0.0056858	-0.0700000	0.0003389
87:	11	1	11	9	1	9	78.4100000	78.3693196	0.0406804	-0.0700000	0.0003746
88:	12	1	12	10	1	10	85.8900000	85.8196008	0.0703992	-0.0700000	0.0004103
89:	13	1	13	11	1	11	93.4200000	93.2662102	0.1537898	-0.0700000	0.0004461
90:	4	1	4	2	1	2	26.0200000	26.1413594	-0.1213594	-0.0700000	0.0001248
91:	5	1	5	3	1	3	33.6800000	33.6084035	0.0715965	-0.0700000	0.0001605
92:	6	1	6	4	1	4	41.1500000	41.0740108	0.0759892	-0.0700000	0.0001962
93:	7	1	7	5	1	5	48.6000000	48.5378619	0.0621381	-0.0700000	0.0002319
94:	8	1	8	6	1	6	56.0500000	55.9996377	0.0503623	-0.0700000	0.0002675
95:	9	1	9	7	1	7	63.4400000	63.4590188	-0.0190188	-0.0700000	0.0003032
96:	10	1	10	8	1	8	70.9100000	70.9156858	-0.0056858	-0.0700000	0.0003389
97:	11	1	11	9	1	9	78.3900000	78.3693196	0.0206804	-0.0700000	0.0003746
98:	12	1	12	10	1	10	85.8400000	85.8196008	0.0203992	-0.0700000	0.0004103
99:	13	1	13	11	1	11	93.2800000	93.2662102	0.0137898	-0.0700000	0.0004461

99:	14	1	14	12	1	12	100.8100000	100.7088283	0.1011717	-0.0700000	0.0004818
100:	15	1	15	13	1	13	108.1300000	108.1471361	-0.0171361	-0.0700000	0.0005176
101:	16	1	16	14	1	14	115.6100000	115.5808141	0.0291859	-0.0700000	0.0005535
102:	17	1	17	15	1	15	122.9600000	123.0095430	-0.0495430	-0.0700000	0.0005894
103:	18	1	18	16	1	16	130.3900000	130.4330036	-0.0430036	-0.0700000	0.0006253
104:	19	1	19	17	1	17	137.7000000	137.8508766	-0.1508766	-0.0700000	0.0006614
105:	5	1	5	3	1	3	33.4700000	33.6084035	-0.1384035	-0.2000000	0.0001605
106:	6	1	6	4	1	4	40.7100000	41.0740108	-0.3640108	-0.2000000	0.0001962
107:	7	1	7	5	1	5	48.4900000	48.5378619	-0.0478619	-0.2000000	0.0002319
108:	8	1	8	6	1	6	55.8800000	55.9996377	-0.1196377	-0.2000000	0.0002675
109:	9	1	9	7	1	7	63.2000000	63.4590188	-0.2590188	-0.2000000	0.0003032
110:	10	1	10	8	1	8	70.7600000	70.9156858	-0.1556858	-0.2000000	0.0003389
111:	11	1	11	9	1	9	78.2500000	78.3693196	-0.1193196	-0.2000000	0.0003746
112:	12	1	12	10	1	10	85.6400000	85.8196008	-0.1796008	-0.2000000	0.0004103
113:	13	1	13	11	1	11	93.0400000	93.2662102	-0.2262102	-0.2000000	0.0004461
114:	10	2	10	8	2	8	70.1500000	70.1511934	-0.0011934	-0.1500000	0.0013569
115:	11	2	11	9	2	9	77.6200000	77.5243543	0.0956457	-0.1500000	0.0014997
116:	12	2	12	10	2	10	84.7700000	84.8941626	-0.1241626	-0.1500000	0.0016425
117:	13	2	13	11	2	11	92.2800000	92.2602991	0.0197009	-0.1500000	0.0017853
118:	14	2	14	12	2	12	99.5200000	99.6224444	-0.1024444	-0.1500000	0.0019281
119:	15	2	15	13	2	13	106.9400000	106.9802792	-0.0402792	-0.1500000	0.0020709
120:	16	2	16	14	2	14	113.9800000	114.3334843	-0.3534843	-0.1500000	0.0022137
***** NEXT LINE NOT USED IN FIT											
121:	17	2	17	15	2	15	120.7600000	121.6817403	-0.9217403	-0.1500000	0.0023564
122:	4	2	4	2	2	2	25.9000000	25.8597043	0.0402957	-0.1500000	0.0005000
123:	5	2	5	3	2	3	33.1300000	33.2462755	-0.1162755	-0.1500000	0.0006428
124:	6	2	6	4	2	4	40.7100000	40.6314099	0.0785901	-0.1500000	0.0007856
125:	7	2	7	5	2	5	47.9800000	48.0147882	-0.0347882	-0.1500000	0.0009285
126:	8	2	8	6	2	6	55.4300000	55.3960910	0.0339090	-0.1500000	0.0010713
127:	9	2	9	7	2	7	62.7700000	62.7749992	-0.0049992	-0.1500000	0.0012141
128:	10	2	10	8	2	8	70.1600000	70.1511934	0.0088066	-0.1500000	0.0013569
129:	11	2	11	9	2	9	77.4800000	77.5243543	-0.0443543	-0.1500000	0.0014997
130:	12	2	12	10	2	10	84.9400000	84.8941626	0.0458374	-0.1500000	0.0016425
131:	13	2	13	11	2	11	92.2100000	92.2602991	-0.0502991	-0.1500000	0.0017853
132:	15	3	15	13	3	13	106.1000000	105.7556523	0.3443477	-0.1500000	0.0046722
133:	16	3	16	14	3	14	113.3000000	113.0244003	0.2755997	-0.1500000	0.0049944
134:	17	3	17	15	3	15	120.5000000	120.2881994	0.2118006	-0.1500000	0.0053165
135:	18	3	18	16	3	16	127.8800000	127.5467301	0.3332699	-0.1500000	0.0056386
136:	19	3	19	17	3	17	135.1400000	134.7996731	0.3403269	-0.1500000	0.0059607
137:	20	3	20	18	3	18	142.2600000	142.0467093	0.2132907	-0.1500000	0.0062827
138:	21	3	21	19	3	19	149.5400000	149.2875192	0.2524808	-0.1500000	0.0066048
139:	22	3	22	20	3	20	156.7800000	156.5217837	0.2582163	-0.1500000	0.0069268
140:	3	1	3	3	0	3	2000.5000000	2000.5292003	-0.0292003	-0.1000000	0.0000810
141:	4	1	4	4	0	4	2000.3300000	2000.3762228	-0.0462228	-0.1000000	0.0001380
142:	5	1	5	5	0	5	2000.1300000	2000.1850009	-0.0550009	-0.1000000	0.0002213
143:	6	1	6	6	0	6	1999.9100000	1999.9555347	-0.0455347	-0.1000000	0.0003253
144:	7	1	7	7	0	7	1999.6700000	1999.6878241	-0.0178241	-0.1000000	0.0004485
145:	8	1	8	8	0	8	1999.3000000	1999.3818691	-0.0818691	-0.1000000	0.0005901
146:	9	1	9	9	0	9	1998.9800000	1999.0376697	-0.0576697	-0.1000000	0.0007499
147:	10	1	10	10	0	10	1998.5500000	1998.6552260	-0.1052260	-0.1000000	0.0009278
148:	11	1	11	11	0	11	1998.0500000	1998.2345379	-0.1845379	-0.1000000	0.0011236
149:	12	1	12	12	0	12	1997.5800000	1997.7756054	-0.1956054	-0.1000000	0.0013373

150:	13	1	13	13	0	13	1997.2900000	1997.2784285	0.0115715	-0.1000000	0.0015690			
151:	14	1	14	14	0	14	1996.7400000	1996.7430073	-0.0030073	-0.1000000	0.0018185			
152:	15	1	15	15	0	15	1996.1400000	1996.1693417	-0.0293417	-0.1000000	0.0020859			
153:	16	1	16	16	0	16	1995.4800000	1995.5574317	-0.0774317	-0.1000000	0.0023711			
154:	17	1	17	17	0	17	1994.9100000	1994.9072774	0.0027226	-0.1000000	0.0026742			
155:	18	1	18	18	0	18	1994.1700000	1994.2188786	-0.0488786	-0.1000000	0.0029952			
156:	19	1	19	19	0	19	1993.4500000	1993.4922355	-0.0422355	-0.1000000	0.0033339			
157:	3	1	3	3	0	3	2000.6500000	2000.5292003	0.1207997	-0.1000000	0.0000810			
158:	4	1	4	4	0	4	2000.4400000	2000.3762228	0.0637772	-0.1000000	0.0001380			
159:	5	1	5	5	0	5	2000.2400000	2000.1850009	0.0549991	-0.1000000	0.0002213			
160:	6	1	6	6	0	6	2000.0300000	1999.9555347	0.0744653	-0.1000000	0.0003253			
161:	7	1	7	7	0	7	1999.6700000	1999.6878241	-0.0178241	-0.1000000	0.0004485			
162:	8	1	8	8	0	8	1999.3300000	1999.3818691	-0.0518691	-0.1000000	0.0005901			
163:	9	1	9	9	0	9	1998.9500000	1999.0376697	-0.0876697	-0.1000000	0.0007499			
164:	10	1	10	10	0	10	1998.5500000	1998.6552260	-0.1052260	-0.1000000	0.0009278			
165:	11	1	11	11	0	11	1998.1900000	1998.2345379	-0.0445379	-0.1000000	0.0011236			
166:	12	1	12	12	0	12	1997.7200000	1997.7756054	-0.0556054	-0.1000000	0.0013373			
167:	13	1	13	13	0	13	1997.2500000	1997.2784285	-0.0284285	-0.1000000	0.0015690			
168:	3	2	3	3	1	3	1968.2600000	1968.1806873	0.0793127	-0.2000000	0.0400736			
169:	4	2	4	4	1	4	1967.7100000	1968.0197415	-0.3097415	-0.2000000	0.0400612			
170:	5	2	5	5	1	5	1967.8200000	1967.8185593	0.0014407	-0.2000000	0.0400472			
171:	6	2	6	6	1	6	1967.4800000	1967.5771406	-0.0971406	-0.2000000	0.0400329			
172:	7	2	7	7	1	7	1967.3000000	1967.2954855	0.0045145	-0.2000000	0.0400194			
173:	8	2	8	8	1	8	1966.9500000	1966.9735939	-0.0235939	-0.2000000	0.0400083			
174:	9	2	9	9	1	9	1966.5800000	1966.6114660	-0.0314660	-0.2000000	0.0400014			
175:	10	2	10	10	1	10	1966.1000000	1966.2091015	-0.1091015	-0.2000000	0.0400005			
176:	11	2	11	11	1	11	1965.5500000	1965.7665006	-0.2165006	-0.2000000	0.0400079			
177:	12	2	12	12	1	12	1965.0400000	1965.2836633	-0.2436633	-0.2000000	0.0400259			
178:	13	2	13	13	1	13	1964.7700000	1964.7605895	0.0094105	-0.2000000	0.0400571			
179:	14	2	14	14	1	14	1964.2300000	1964.1972793	0.0327207	-0.2000000	0.0401042			
180:	15	2	15	15	1	15	1963.2900000	1963.5937327	-0.3037327	-0.2000000	0.0401703			
181:	17	2	17	17	1	17	1962.1600000	1962.2659300	-0.1059300	-0.2000000	0.0403720			
182:	3	2	3	3	1	3	1968.4700000	1968.1806873	0.2893127	-0.2000000	0.0400736			
183:	4	2	4	4	1	4	1968.2200000	1968.0197415	0.2002585	-0.2000000	0.0400612			
184:	5	2	5	5	1	5	1967.9200000	1967.8185593	0.1014407	-0.2000000	0.0400472			
185:	6	2	6	6	1	6	1967.7100000	1967.5771406	0.1328594	-0.2000000	0.0400329			
186:	7	2	7	7	1	7	1967.3100000	1967.2954855	0.0145145	-0.2000000	0.0400194			
187:	8	2	8	8	1	8	1967.0300000	1966.9735939	0.0564061	-0.2000000	0.0400083			
188:	9	2	9	9	1	9	1966.8700000	1966.6114660	0.2585340	-0.2000000	0.0400014			
189:	10	2	10	10	1	10	1966.3500000	1966.2091015	0.1408985	-0.2000000	0.0400005			
190:	11	2	11	11	1	11	1965.8100000	1965.7665006	0.0434994	-0.2000000	0.0400079			
191:	12	2	12	12	1	12	1965.4000000	1965.2836633	0.1163367	-0.2000000	0.0400259			
192:	13	2	13	13	1	13	1964.7200000	1964.7605895	-0.0405895	-0.2000000	0.0400571			
193:	1	20	0	0	20	1	113110.50940	113110.50984	-0.00044	0.00330	0.00151			
194:	1	20	2	0	20	1	113112.76120	113112.75694	0.00426	0.00190	0.00126			
195:	1	20	1	0	20	1	113114.24180	113114.23848	0.00332	0.00210	0.00139			
196:	2	20	1	1	20	1	226218.72350	226218.72486	-0.00136	0.00190	0.00146			
197:	2	20	1	1	20	2	226220.20990	226220.20641	0.00349	0.00310	0.00194			
198:	2	20	3	1	20	2	226221.14760	226221.11384	0.03376	0.00280	0.00168	226221.14952	-0.00192	0.6512
199:	2	20	2	1	20	1	226221.14760	226221.21613	-0.06853	0.00280	0.00168	226221.14952	-0.00192	0.3488
200:	2	20	1	1	20	0	226222.44740	226222.45351	-0.00611	0.01000	0.00169			
201:	2	20	2	1	20	2	226222.68920	226222.69767	-0.00847	0.01000	0.00199			

202:	3 20 2 2 20 2	339317.61740	339317.61189	0.00551	0.00440	0.00211			
203:	3 20 4 2 20 3	339319.82030	339319.80400	0.01630	0.00690	0.00269	339319.82648	-0.00618	0.5912
204:	3 20 3 2 20 2	339319.82030	339319.85899	-0.03869	0.00690	0.00269	339319.82648	-0.00618	0.4088
205:	3 20 2 2 20 1	339320.08180	339320.10316	-0.02136	0.01000	0.00221			
206:	3 20 3 2 20 3	339321.43790	339321.44282	-0.00492	0.00420	0.00272			
207:	1 40 1 0 40 0	109651.83040	109651.82870	0.00170	0.00140	0.00074			
208:	2 40 2 1 40 1	219299.15680	219299.16042	-0.00362	0.00150	0.00103			
209:	3 40 3 2 40 2	328937.49980	328937.49820	0.00160	0.00160	0.00137			
210:	4 40 4 3 40 3	438562.35410	438562.34507	0.00903	0.00950	0.00400			
211:	2 41 2 1 40 1	1977.5251100	1977.5250618	0.0000482	-0.0001700	0.0001125			
212:	3 41 3 2 40 2	1981.0727500	1981.0727963	-0.0000463	-0.0001700	0.0000983			
213:	4 41 4 3 40 3	1984.5836100	1984.5836119	-0.0000019	-0.0001700	0.0001153			
214:	2 1 2 3 0 3	1989.3251400	1989.3254412	-0.0003012	-0.0001600	0.0000623			
215:	1 1 1 2 0 2	1993.1746900	1993.1744946	0.0001954	-0.0001600	0.0000726			
216:	0 1 0 1 0 1	1996.9857300	1996.9856229	0.0001071	-0.0001600	0.0000832			
217:	1 1 1 0 0 0	2004.4933300	2004.4934657	-0.0001357	-0.0001600	0.0000726			
218:	2 1 2 1 0 1	2008.1899300	2008.1898609	0.0000691	-0.0001600	0.0000623			
219:	3 1 3 2 0 2	2011.8477300	2011.8476925	0.0000375	-0.0001700	0.0000810			
220:	4 1 4 3 0 3	2015.4668500	2015.4668007	0.0000493	-0.0001900	0.0001380			

2 Lines rejected from fit

NORMALIZED DIAGONAL:

1	1.00000E+00	2	4.46574E-01	3	1.14622E-03	4	3.04270E-02	5	1.00000E+00	6	1.32638E-03
7	9.55469E-01	8	8.14953E-01	9	1.30082E-02						

MARQUARDT PARAMETER = 0, TRUST EXPANSION = 1.00

NEW PARAMETER (EST. ERROR) -- CHANGE THIS ITERATION

1	1000000	Y01*1	56832.336(77)	0.000
2	2000000	Y02*1	-0.1994200(271)	0.0000000
3	1000000	Y11*1/2	-271.704(142)	-0.000
4	0	Y10*1/2	30473660(461)	0
5	0	DY10*1/2(N	1671(143)	0
6	0	Y20*1/4	-121178(150)	-0
7	1100100020020	3eq00/2	7.4490(49)	0.0000
8	100000020020	C00	4.13(65)E-03	0.00E-03
9	1000000	Y21*1/4	-3.733(68)	0.000

MICROWAVE AVG = -0.001591 MHz, IR AVG = -0.00306

MICROWAVE RMS = 0.007094 MHz, IR RMS = 0.10430

END OF ITERATION 2 OLD, NEW RMS ERROR= 1.00355 1.00355