

**Rotational lines ( $\text{cm}^{-1}$ ) in doublet and quartet  
bands of the **NbS** radical.**

**NbS**     $c^2\Pi_{1/2} \rightarrow a^2\Delta_{3/2}$  rotational lines.

(0,0)

$J$	$R_{cc}(J)$	$P_{cc}(J)$	$Q_{fc}(J)$	$R_{ff}(J)$	$P_{ff}(J)$	$Q_{cf}(J)$	$J$
0.5							0.5
1.5							1.5
2.5							2.5
3.5					5903.6400		3.5
4.5		5903.4443			5903.2607		4.5
5.5		5903.0671			5902.8573		5.5
6.5		5902.6732			5902.4334		6.5
7.5		5902.2835			5902.0075		7.5
8.5		5901.8557			5901.5421		8.5
9.5		5901.4378			5901.0796		9.5
10.5		5900.9936			5900.6073		10.5
11.5		5900.5315			5900.1016		11.5
12.5		5900.0483			5899.5961	5903.8990	12.5
13.5		5899.5900			5899.0903	5903.7148	13.5
14.5		5899.0707			5898.5626	5903.5272	14.5
15.5		5898.5626			5898.0190	5903.3203	15.5
16.5		5898.0190	5902.5184		5897.4489	5903.0671	16.5
17.5		5897.4707	5902.2180		5896.8441	5902.8573	17.5
18.5		5896.9226	5901.9534		5896.2663	5902.5772	18.5
19.5		5896.3441	5901.6279		5895.6691	5902.2835	19.5
20.5		5895.7581	5901.3261		5895.0441	5902.0075	20.5
21.5		5895.1504	5900.9843		5894.3990	5901.7533	21.5
22.5	5908.6589	5894.5373	5900.6424		5893.7461	5901.4378	22.5
23.5	5908.6306	5893.8907	5900.2625		5893.0816	5901.1127	23.5
24.5	5908.6009	5893.2463	5899.8794	5907.7117	5892.4099	5900.7740	24.5
25.5	5908.5464	5892.5961	5899.5179	5907.6118	5891.7071	5900.4221	25.5
26.5	5908.4804	5891.9013	5899.0903	5907.4985	5890.9774	5900.0483	26.5
27.5	5908.3994	5891.2194	5898.6767	5907.3924	5890.2678	5899.6683	27.5
28.5	5908.3096	5890.5082	5898.2540	5907.2442	5889.5439	5899.2614	28.5
29.5	5908.1964	5889.7922	5897.7950	5907.1032	5888.7624	5898.8469	29.5
30.5	5908.0736	5889.0376	5897.3143	5906.9439	5888.0017	5898.4147	30.5
31.5	5907.9389	5888.3030	5896.8441	5906.7929	5887.2140	5897.9697	31.5
32.5	5907.7869	5887.5470	5896.3441	5906.5970	5886.4152	5897.5144	32.5
33.5	5907.6118	5886.7417	5895.8532	5906.3868	5885.5775	5897.0365	33.5
34.5	5907.4375	5885.9457	5895.3030	5906.1704	5884.7496	5896.5463	34.5
35.5	5907.2442	5885.1643	5894.7686	5905.9326	5883.9156	5896.0488	35.5
36.5	5907.0195	5884.3323	5894.2060	5905.6948	5883.0520	5895.5305	36.5
37.5	5906.7929	5883.4911	5893.6398	5905.4066	5882.1848	5894.9960	37.5
38.5	5906.5583	5882.6461	5893.0549	5905.1316	5881.2685	5894.4558	38.5
39.5	5906.2976	5881.7800	5892.4630	5904.8586	5880.3838	5893.8907	39.5
40.5	5906.0246	5880.8915	5891.8550	5904.5475	5879.4761	5893.3082	40.5
41.5	5905.7489	5880.0376	5891.2194	5904.2192	5878.5486	5892.7181	41.5
42.5	5905.4431	5879.0909	5890.5801	5903.8844	5877.5953	5892.1072	42.5
43.5	5905.1316	5878.1629	5889.9254	5903.5272	5876.6328	5891.4933	43.5
44.5	5904.7918	5877.2226	5889.2487	5903.1622	5875.6506	5890.8567	44.5
45.5	5904.4488	5876.2682	5888.5732	5902.7678	5874.6390	5890.2064	45.5
46.5	5904.0889	5875.2902	5887.8723	5902.3677	5873.6679	5889.5439	46.5
47.5	5903.7148	5874.3015	5887.1414	5901.9534	5872.6366	5888.8643	47.5
48.5	5903.3272	5873.3122	5886.4152	5901.5421	5871.5962	5888.1716	48.5
49.5	5902.9309	5872.3083	5885.6650	5901.0796	5870.5391	5887.4615	49.5
50.5	5902.5184	5871.2738	5884.9065	5900.6424	5869.4717	5886.7417	50.5
51.5	5902.0716	5870.2196	5884.1328	5900.1684	5868.4071	5886.0022	51.5
52.5	5901.6279	5869.1998	5883.3409	5899.6853	5867.3001	5885.2437	52.5
53.5	5901.1507	5868.0624	5882.5297	5899.1720	5866.1905	5884.4766	53.5
54.5	5900.6912	5867.0063	5881.7146	5898.6767	5865.0695	5883.6986	54.5
55.5	5900.1896	5865.9082	5880.8915	5898.1405	5863.9054	5882.9032	55.5
56.5	5899.6853	5864.8048	5880.0376	5897.5904	5862.7962	5882.0868	56.5
57.5	5899.1720	5863.6795	5879.1658	5897.0365	5861.6109	5881.2685	57.5
58.5	5898.6384	5862.5266	5878.2778	5896.4579	5860.4308	5880.4318	58.5
59.5	5898.0664	5861.3695	5877.3947	5895.8532	5859.2384	5879.5712	59.5
60.5	5897.5144	5860.1866	5876.4944	5895.2579	5858.0179	5878.7041	60.5
61.5	5896.9327	5859.0079	5875.5646	5894.6359	5856.7825	5877.8173	61.5
62.5	5896.3441	5857.7887	5874.6390	5894.0114	5855.5503	5876.9197	62.5
63.5	5895.7317	5856.5896	5873.6679	5893.3381	5854.2835	5876.0071	63.5

**NbS**     $c^2\Pi_{1/2} \rightarrow a^2\Delta_{3/2}$  rotational lines.

(0,0)

$J$	$R_{cc}(J)$	$P_{cc}(J)$	$Q_{fc}(J)$	$R_{ff}(J)$	$P_{ff}(J)$	$Q_{cf}(J)$	$J$
64.5	5895.1084	5855.3504	5872.6983	5892.6818	5853.0171	5875.0791	64.5
65.5	5894.4558	5854.1096	5871.7176	5892.0136	5851.7122	5874.1320	65.5
66.5	5893.8115	5852.8425	5870.7217	5891.3075	5850.4155	5873.1770	66.5
67.5	5893.1540	5851.5679	5869.7153	5890.6141	5849.1169	5872.2046	67.5
68.5	5892.4630	5850.2849	5868.6681	5889.8790	5847.7950	5871.2205	68.5
69.5	5891.7639	5848.9374	5867.6425	5889.1409	5846.4266	5870.2196	69.5
70.5	5891.0455	5847.6552	5866.5872	5888.3892	5845.0755	5869.1998	70.5
71.5	5890.3233	5846.3352	5865.5092	5887.6082	5843.6845	5868.1679	71.5
72.5	5889.5761	5844.9748	5864.4290	5886.8278	5842.3254	5867.1296	72.5
73.5	5888.8229	5843.6100	5863.3210	5886.0430	5840.9044	5866.0649	73.5
74.5	5888.0536	5842.2288	5862.1974	5885.2437	5839.4958	5864.9911	74.5
75.5	5887.2636	5840.8324	5861.0802	5884.3942	5838.0675	5863.9054	75.5
76.5	5886.4651	5839.4299	5859.9296	5883.5518	5836.5865	5862.7962	76.5
77.5	5885.6650	5838.0137	5858.7743	5882.6975	5835.1344	5861.6747	77.5
78.5	5884.8252	5836.5865	5857.5891	5881.8301	5833.6665	5860.5458	78.5
79.5	5883.9784	5835.1344	5856.4026	5880.9300	5832.1724	5859.3956	79.5
80.5	5883.1189	5833.6665	5855.1910	5880.0376	5830.6702	5858.2335	80.5
81.5	5882.2421	5832.1724	5853.9779	5879.0909	5829.1395	5857.0591	81.5
82.5	5881.3538	5830.6702	5852.7397	5878.1629	5827.5969	5855.8697	82.5
83.5	5880.4318	5829.1786	5851.4832	5877.2226	5826.0344	5854.6591	83.5
84.5	5879.5226	5827.6590	5850.2216	5876.2682	5824.4852	5853.4401	84.5
85.5	5878.5862	5826.1213	5848.9374	5875.2902	5822.9102	5852.2060	85.5
86.5	5877.6422	5824.5665	5847.6552	5874.3015	5821.2934	5850.9529	86.5
87.5	5876.6853	5823.0026	5846.3352	5873.2910	5819.6858	5849.6915	87.5
88.5	5875.6989	5821.4125	5845.0167	5872.2614	5818.0629	5848.4131	88.5
89.5	5874.7150	5819.8239	5843.6845	5871.2205	5816.4364	5847.1192	89.5
90.5	5873.6897	5818.2113	5842.3254	5870.1712	5814.7773	5845.8072	90.5
91.5	5872.6983	5816.5644	5840.9390	5869.0978	5813.1010	5844.4883	91.5
92.5	5871.6446	5814.9480	5839.5684	5868.0254	5811.4232	5843.1456	92.5
93.5	5870.5939	5813.3192	5838.1599	5866.9091	5809.7298	5841.7944	93.5
94.5	5869.5123	5811.6247	5836.7512	5865.8074	5807.9968	5840.4296	94.5
95.5	5868.4460	5809.9489	5835.3221	5864.6675	5806.2551	5839.0476	95.5
96.5	5867.3566	5808.2530	5833.8804	5863.5281	5804.5250	5837.6500	96.5
97.5	5866.2330	5806.5483	5832.4135	5862.3707	5802.7670	5836.2373	97.5
98.5	5865.1024	5804.8104	5830.9407	5861.2057	5800.9950	5834.8115	98.5
99.5	5863.9622	5803.0820	5829.4514	5860.0078	5799.1871	5833.3700	99.5
100.5	5862.7962	5801.3151	5827.9442	5858.8241	5797.4008	5831.9130	100.5
101.5	5861.6747	5799.5486	5826.4432	5857.5891	5795.5690	5830.4488	101.5
102.5	5860.4647	5797.7692	5824.8962	5856.3577	5793.7477	5828.9628	102.5
103.5	5859.2682	5795.9661	5823.3481	5855.1051	5791.9053	5827.4622	103.5
104.5	5858.0179	5794.1416	5821.7918	5853.8351	5790.0563	5825.9557	104.5
105.5	5856.8220	5792.3195	5820.2098	5852.5507	5788.1520	5824.4298	105.5
106.5	5855.5774	5790.4608	5818.6111	5851.2556	5786.2593	5822.8769	106.5
107.5	5854.3271	5788.6263	5817.0074	5849.9538	5784.3404	5821.3198	107.5
108.5	5853.0502	5786.7575	5815.3807	5848.6202	5782.4344	5819.7526	108.5
109.5	5851.7491	5784.8685	5813.7411	5847.2633	5780.4827	5818.1682	109.5
110.5	5850.4567	5782.9719	5812.0840	5845.9066	5778.5390	5816.5644	110.5
111.5	5849.1452	5781.0547	5810.4154	5844.5584	5776.5784	5814.9480	111.5
112.5	5847.7950	5779.1244	5808.7350	5843.1456	5774.5905	5813.3192	112.5
113.5	5846.4641	5777.2161	5807.0392	5841.7944	5772.5753	5811.6739	113.5
114.5	5845.1074	5775.2271	5805.3152	5840.3399	5770.5781	5810.0042	114.5
115.5	5843.7282	5773.2536	5803.5860	5838.9164	5768.5634	5808.3383	115.5
116.5	5842.3254	5771.2636	5801.8374	5837.4724	5766.5149	5806.6515	116.5
117.5	5840.9044	5769.2563	5800.0844	5836.0171	5764.4707	5804.9448	117.5
118.5	5839.4958	5767.2380	5798.3213	5834.5372	5762.3800	5803.2289	118.5
119.5	5838.0675	5765.2196	5796.5031	5833.0506	5760.3012	5801.4964	119.5
120.5	5836.6135	5763.1744	5794.7152	5831.5339	5758.1933	5799.7518	120.5
121.5	5835.1590	5761.1196	5792.9115	5830.0079	5756.0930	5797.9860	121.5
122.5	5833.6665	5759.0408	5791.0553	5828.4465	5753.9389	5796.2071	122.5
123.5	5832.1724	5756.9601	5789.2168	5826.9285	5751.7950	5794.4158	123.5
124.5	5830.6702	5754.8452	5787.3392	5825.3631	5749.6488	5792.6091	124.5
125.5	5829.1395	5752.7435	5785.4667	5823.7537	5747.4848	5790.7827	125.5

**NbS**     $c^2\Pi_{1/2} \rightarrow a^2\Delta_{3/2}$  rotational lines.

**(0,0)**

<i>J</i>	<i>R<sub>cc</sub>(J)</i>	<i>P<sub>cc</sub>(J)</i>	<i>Q<sub>fc</sub>(J)</i>	<i>R<sub>ff</sub>(J)</i>	<i>P<sub>ff</sub>(J)</i>	<i>Q<sub>cf</sub>(J)</i>	<i>J</i>
126.5		5750.5947	5783.5732	5822.1597	5745.2890	5788.9423	126.5
127.5		5748.4369	5781.6671	5820.5525	5743.0686	5787.0912	127.5
128.5			5779.7292	5818.9115	5740.8489	5785.2249	128.5
129.5			5777.8025	5817.2650	5738.6205	5783.3360	129.5
130.5			5775.8512	5815.6174	5736.3681	5781.4306	130.5
131.5			5773.8703	5813.9371	5734.0912	5779.5109	131.5
132.5			5771.8884	5812.2352	5731.8204	5777.5668	132.5
133.5			5769.8847	5810.5436	5729.5193	5775.6000	133.5
134.5			5767.8778	5808.8246	5727.2181		134.5
135.5			5765.8477	5807.0787	5724.8903		135.5
136.5			5763.7934	5805.3152	5722.5341		136.5
137.5			5761.7398	5803.5860	5720.1920		137.5
138.5			5759.6579	5801.7743			138.5
139.5			5757.5628	5799.9868			139.5
140.5			5755.4627	5798.1709			140.5
141.5			5753.3324	5796.3518			141.5
142.5			5751.1995	5794.4868			142.5
143.5			5749.0384	5792.6492		5756.0048	143.5
144.5			5746.8603	5790.7827		5753.8765	144.5
145.5			5744.6933	5788.8884		5751.7388	145.5
146.5			5742.5032	5786.9635		5749.5958	146.5
147.5			5740.2841	5785.0634		5747.4502	147.5
148.5			5738.0590	5783.1207		5745.2890	148.5
149.5			5735.8100	5781.1565		5743.1182	149.5
150.5	5786.6604		5733.5602	5779.1941		5740.9331	150.5
151.5	5784.7593		5731.2787	5777.2161		5738.7398	151.5
152.5	5782.8391		5728.9845	5775.2271		5736.5298	152.5
153.5	5780.9181		5726.6661	5773.1955		5734.3138	153.5
154.5	5778.9720		5724.3716	5771.1682		5732.0762	154.5
155.5	5777.0208		5722.0311	5769.1283		5729.8354	155.5
156.5	5775.0426		5719.6821	5767.0446		5727.5737	156.5
157.5	5773.0600		5717.3120	5765.0002		5725.3008	157.5
158.5	5771.0810		5714.9305	5762.9005		5723.0153	158.5
159.5	5769.0657			5760.7806		5720.7149	159.5
160.5	5767.0446			5758.6705		5718.4015	160.5
161.5	5765.0002			5756.5267		5716.0706	161.5
162.5	5762.9381			5754.3409		5713.7414	162.5
163.5	5760.8785			5752.1641		5711.3884	163.5
164.5	5758.8143			5749.9564		5709.0132	164.5
165.5	5756.7297			5747.7582		5706.6351	165.5
166.5	5754.6169			5745.5405		5704.2353	166.5
167.5	5752.5120			5743.2864		5701.8410	167.5
168.5	5750.3811			5741.0439			168.5
169.5	5748.2337			5738.7398			169.5
170.5	5746.0858						170.5
171.5	5743.9633						171.5
172.5	5741.7829						172.5
173.5	5739.6044						173.5
174.5	5737.4419						174.5
175.5	5735.2570						175.5
176.5	5733.0855						176.5
177.5	5730.9068						177.5
178.5	5728.7214						178.5
179.5	5726.5456						179.5
180.5	5724.3716						180.5
181.5							181.5
182.5							182.5
183.5							183.5
184.5							184.5
185.5							185.5
186.5							186.5
187.5							187.5

**NbS**     $c^2\Pi_{3/2} \rightarrow a^2\Delta_{5/2}$  rotational lines.

(0,0)

$J$	$R_{cc}(J)$	$P_{cc}(J)$	$Q_{fc}(J)$	$R_{ff}(J)$	$P_{ff}(J)$	$Q_{cf}(J)$	$J$
14.5							14.5
15.5			5817.6153			5817.6153	15.5
16.5			5817.3794			5817.3794	16.5
17.5			5817.1137			5817.1137	17.5
18.5			5816.8479			5816.8479	18.5
19.5			5816.5644			5816.5644	19.5
20.5			5816.2247			5816.2247	20.5
21.5		5809.3553	5815.9461		5809.3553	5815.9461	21.5
22.5		5808.7350	5815.5841		5808.7350	5815.5841	22.5
23.5		5808.0824	5815.2584		5808.0824	5815.2584	23.5
24.5		5807.4038			5807.4038		24.5
25.5		5806.7304	5814.5337		5806.7304	5814.5337	25.5
26.5		5806.0279	5814.1456		5806.0279	5814.1456	26.5
27.5		5805.3152	5813.7411		5805.3152	5813.7411	27.5
28.5		5804.6002	5813.3192		5804.6002	5813.3192	28.5
29.5		5803.8547	5812.8898		5803.8547	5812.8898	29.5
30.5		5803.0820	5812.4393		5803.0820	5812.4393	30.5
31.5		5802.3262	5811.9858		5802.3262	5811.9858	31.5
32.5		5801.5378	5811.5059		5801.5378	5811.5059	32.5
33.5		5800.7553	5811.0126		5800.7553	5811.0126	33.5
34.5		5799.9493	5810.5010		5799.9493	5810.5010	34.5
35.5		5799.1175	5809.9826		5799.1175	5809.9826	35.5
36.5	5820.9534	5798.2794	5809.4493	5820.9534	5798.2794	5809.4493	36.5
37.5	5820.6856	5797.4008	5808.8961	5820.6856	5797.4008	5808.8961	37.5
38.5	5820.4430	5796.5427	5808.3383	5820.4430	5796.5427	5808.3383	38.5
39.5	5820.1541	5795.6723	5807.7594	5820.1541	5795.6723	5807.7594	39.5
40.5	5819.8617	5794.7631	5807.1585	5819.8617	5794.7631	5807.1585	40.5
41.5	5819.5598	5793.8474	5806.5483	5819.5598	5793.8474	5806.5483	41.5
42.5	5819.2401	5792.9115	5805.9210	5819.2401	5792.9115	5805.9210	42.5
43.5	5818.9115	5791.9727	5805.3152	5818.9115	5791.9727	5805.3152	43.5
44.5	5818.5524	5790.9794	5804.6407	5818.5524	5790.9794	5804.6407	44.5
45.5	5818.2113	5790.0563	5803.9780	5818.2113	5790.0563	5803.9780	45.5
46.5	5817.8263	5789.0698	5803.2911	5817.8263	5789.0698	5803.2911	46.5
47.5	5817.4479	5788.0686	5802.5920	5817.4479	5788.0686	5802.5920	47.5
48.5	5817.0074	5787.0494	5801.8809	5817.0074	5787.0494	5801.8809	48.5
49.5	5816.6448	5786.0220	5801.1613	5816.6448	5786.0220	5801.1613	49.5
50.5	5816.1792	5784.9702	5800.4159	5816.1792	5784.9702	5800.4159	50.5
51.5	5815.7239	5783.9012	5799.6619	5815.7239	5783.9012	5799.6619	51.5
52.5	5815.2584	5782.8391	5798.8980	5815.2584	5782.8391	5798.8980	52.5
53.5	5814.7773	5781.7549	5798.1086	5814.7773	5781.7549	5798.1086	53.5
54.5	5814.2807	5780.6467	5797.3118	5814.2807	5780.6467	5797.3118	54.5
55.5	5813.7808	5779.5292	5796.5031	5813.7808	5779.5292	5796.5031	55.5
56.5	5813.2570	5778.4054	5795.6723	5813.2570	5778.4054	5795.6723	56.5
57.5	5812.7155	5777.2554	5794.8311	5812.7155	5777.2554	5794.8311	57.5
58.5	5812.1585	5776.0972	5793.9745	5812.1585	5776.0972	5793.9745	58.5
59.5	5811.5878	5774.9196	5793.1036	5811.5878	5774.9196	5793.1036	59.5
60.5	5811.0126	5773.7312	5792.2196	5811.0126	5773.7312	5792.2196	60.5
61.5	5810.4154	5772.5188	5791.3245	5810.4154	5772.5188	5791.3245	61.5
62.5	5809.8046	5771.3039	5790.4088	5809.8046	5771.3039	5790.4088	62.5
63.5	5809.1866	5770.0789	5789.4754	5809.1866	5770.0789	5789.4754	63.5
64.5	5808.5516	5768.8199	5788.5373	5808.5516	5768.8199	5788.5373	64.5
65.5	5807.8893	5767.5656	5787.5766	5807.8893	5767.5656	5787.5766	65.5
66.5	5807.2106	5766.2948	5786.6047	5807.2106	5766.2948	5786.6047	66.5
67.5	5806.5483	5765.0002	5785.6150	5806.5483	5765.0002	5785.6150	67.5
68.5	5805.8485	5763.7091	5784.6212	5805.8485	5763.7091	5784.6212	68.5
69.5	5805.1438	5762.3800	5783.5989	5805.1438	5762.3800	5783.5989	69.5
70.5	5804.4055	5761.0436	5782.5760	5804.4055	5761.0436	5782.5760	70.5
71.5	5803.6776	5759.7021	5781.5363	5803.6776	5759.7021	5781.5363	71.5
72.5	5802.9169	5758.3350	5780.4827	5802.9169	5758.3350	5780.4827	72.5
73.5	5802.1479	5756.9601	5779.4001	5802.1479	5756.9601	5779.4001	73.5
74.5	5801.3681	5755.5687	5778.2966	5801.3681	5755.5687	5778.2966	74.5
75.5	5800.5685	5754.1739	5777.2161	5800.5685	5754.1739	5777.2161	75.5
76.5	5799.7518	5752.7435	5776.0972	5799.7518	5752.7435	5776.0972	76.5
77.5	5798.9274	5751.3158	5774.9768	5798.9274	5751.3158	5774.9768	77.5
78.5	5798.1086	5749.8777	5773.8268	5798.1086	5749.8777	5773.8268	78.5

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**NbS**     $c^2\Pi_{3/2} \rightarrow a^2\Delta_{5/2}$  rotational lines.

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**(0,0)**

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<i>J</i>	<i>R<sub>cc</sub>(J)</i>	<i>P<sub>cc</sub>(J)</i>	<i>Q<sub>fc</sub>(J)</i>	<i>R<sub>ff</sub>(J)</i>	<i>P<sub>ff</sub>(J)</i>	<i>Q<sub>cf</sub>(J)</i>	<i>J</i>
79.5	5797.2468	5748.4369	5772.6763	5797.2468	5748.4369	5772.6763	79.5
80.5	5796.3900	5746.9485	5771.5101	5796.3900	5746.9485	5771.5101	80.5
81.5	5795.5047	5745.4492	5770.3114	5795.5047	5745.4492	5770.3114	81.5
82.5	5794.6092	5743.9633	5769.1283	5794.6092	5743.9633	5769.1283	82.5
83.5	5793.6924	5742.4564	5767.9218	5793.6924	5742.4564	5767.9218	83.5
84.5	5792.7637	5740.9331	5766.6939	5792.7637	5740.9331	5766.6939	84.5
85.5	5791.8469	5739.3846	5765.4527	5791.8469	5739.3846	5765.4527	85.5
86.5	5790.8998	5737.8285	5764.2107	5790.8998	5737.8285	5764.2107	86.5
87.5	5789.9323	5736.2538	5762.9381	5789.9323	5736.2538	5762.9381	87.5
88.5	5788.9423		5761.6718	5788.9423		5761.6718	88.5
89.5	5787.9685		5760.3759	5787.9685		5760.3759	89.5
90.5	5786.9635		5759.0403	5786.9635		5759.0403	90.5
91.5	5785.9706		5757.7393			5757.7393	91.5
92.5	5784.9217		5756.3937			5756.3937	92.5
93.5	5783.9012		5755.0274			5755.0905	93.5
94.5	5782.8391		5753.6950			5753.6950	94.5
95.5	5781.7854		5752.3021			5752.3731	95.5
96.5	5780.7182		5750.9178			5750.9842	96.5
97.5	5779.6283		5749.5029			5749.5969	97.5
98.5	5778.5229		5748.1024			5748.1838	98.5
99.5	5777.3958		5746.6781			5746.7799	99.5
100.5	5776.2858		5745.2280			5745.3497	100.5
101.5	5775.1403		5743.7670			5743.9081	101.5
102.5	5773.9958		5742.3262			5742.4982	102.5
103.5			5740.8528			5741.0065	103.5
104.5			5739.3791			5739.5334	104.5
105.5			5737.8745			5738.0553	105.5
106.5			5736.3762			5736.5447	106.5
107.5			5734.8419			5735.0584	107.5
108.5			5733.3648			5733.5597	108.5
109.5			5731.8100			5732.0733	109.5
110.5			5730.2416			5730.5415	110.5
111.5			5728.7265			5728.9890	111.5
112.5			5727.1387			5727.4527	112.5
113.5						5725.8861	113.5
114.5						5724.3651	114.5
115.5							115.5
116.5							116.5

**NbS**     $c^2\Pi_{1/2} \rightarrow a^2\Delta_{3/2}$  rotational lines.

(1,0)

$J$	$R_{cc}(J)$	$P_{cc}(J)$	$Q_{fc}(J)$	$R_{ff}(J)$	$P_{ff}(J)$	$Q_{cf}(J)$	$J$
20.5							20.5
21.5		6403.8876					21.5
22.5		6403.2613				6410.1641	22.5
23.5		6402.6059				6409.8001	23.5
24.5		6401.9343				6409.4109	24.5
25.5		6401.2296	6408.2540			6409.0385	25.5
26.5		6400.5280	6407.8059		6399.8475	6408.6495	26.5
27.5		6399.7980	6407.3626		6399.0609	6408.2227	27.5
28.5		6399.0609	6406.9050		6398.3087	6407.7779	28.5
29.5		6398.3087	6406.4069		6397.5025	6407.3282	29.5
30.5		6397.5163	6405.9045		6396.6952	6406.8610	30.5
31.5		6396.7409	6405.4090		6395.8757	6406.3700	31.5
32.5		6395.9380	6404.8855		6395.0427	6405.8858	32.5
33.5		6395.1242	6404.3450		6394.1912	6405.3602	33.5
34.5		6394.2783	6403.7812		6393.2944	6404.8412	34.5
35.5		6393.4427	6403.1958		6392.3956	6404.2778	35.5
36.5		6392.5705	6402.6059		6391.5313	6403.7197	36.5
37.5		6391.6893	6401.9971		6390.5975	6403.1445	37.5
38.5		6390.7850	6401.3825		6389.6900	6402.5478	38.5
39.5		6389.8536	6400.7185		6388.7159	6401.9343	39.5
40.5		6388.9492	6400.0823	6412.7019	6387.7253	6401.3196	40.5
41.5		6387.9940	6399.4031	6412.3366	6386.7753	6400.6675	41.5
42.5		6387.0416	6398.7030	6411.9498	6385.7575	6400.0172	42.5
43.5		6386.0290	6398.0061	6411.5461	6384.7661	6399.3435	43.5
44.5		6385.0638	6397.2876	6411.1441	6383.7196	6398.6541	44.5
45.5		6384.0638	6396.5533	6410.6990	6382.6838	6397.9385	45.5
46.5		6383.0225	6395.7909	6410.2777	6381.6243	6397.2228	46.5
47.5		6381.9989	6395.0427	6409.8001	6380.5724	6396.4898	47.5
48.5		6380.9227	6394.2479	6409.3082	6379.4850	6395.7395	48.5
49.5		6379.8655	6393.4427	6408.8194	6378.3685	6394.9755	49.5
50.5		6378.7761	6392.6438	6408.3063	6377.2578	6394.1912	50.5
51.5	6409.4009	6377.6732	6391.8018	6407.7779	6376.1043	6393.3860	51.5
52.5	6408.8853	6376.5588	6390.9527	6407.2470	6374.9435	6392.5705	52.5
53.5	6408.3607	6375.4159	6390.0877	6406.6765	6373.7898	6391.7183	53.5
54.5	6407.8316	6374.2751	6389.2077	6406.0877	6372.6137	6390.8896	54.5
55.5	6407.2470	6373.1109	6388.3092	6405.4954	6371.4011	6390.0479	55.5
56.5	6406.6765	6371.8941	6387.4122	6404.8855	6370.2025	6389.1544	56.5
57.5	6406.0877	6370.7203	6386.4744	6404.2778	6368.9643	6388.2598	57.5
58.5	6405.4804	6369.5075	6385.5242	6403.6354	6367.7234	6387.3293	58.5
59.5	6404.8412	6368.2788	6384.5734	6402.9709	6366.4744	6386.4377	59.5
60.5	6404.2358	6367.0342	6383.6000	6402.3014	6365.1915	6385.4641	60.5
61.5	6403.5494	6365.7984	6382.5896	6401.6177	6363.8880	6384.5094	61.5
62.5	6402.8903	6364.5018	6381.5976	6400.9034	6362.5891	6383.5411	62.5
63.5	6402.1974	6363.2073	6380.5724	6400.1799	6361.2682	6382.5603	63.5
64.5	6401.4996	6361.8901	6379.5404	6399.4411	6359.8949	6381.5444	64.5
65.5	6400.7830	6360.5636	6378.4642	6398.7030	6358.5578	6380.5283	65.5
66.5	6400.0418	6359.2270	6377.3969	6397.9385	6357.1716	6379.4850	66.5
67.5	6399.2794	6357.8718	6376.3171	6397.1319	6355.7931	6378.4387	67.5
68.5	6398.5216	6356.4891	6375.2183	6396.3433	6354.3805	6377.3660	68.5
69.5	6397.7449	6355.1138	6374.1037	6395.5233	6352.9711	6376.2793	69.5
70.5	6396.9300	6353.7012	6372.9558	6394.6886	6351.5348	6375.1795	70.5
71.5	6396.1188		6371.8080	6393.8317	6350.0864	6374.0663	71.5
72.5	6395.2956		6370.6438	6392.9672	6348.6083	6372.9278	72.5
73.5	6394.4393		6369.4479	6392.0855	6347.1265	6371.7741	73.5
74.5	6393.5755		6368.2475	6391.1683	6345.6024	6370.6070	74.5
75.5	6392.7036		6367.0342	6390.2856	6344.0900	6369.4479	75.5
76.5	6391.8018		6365.7984	6389.3253	6342.5626	6368.2475	76.5
77.5	6390.8954		6364.5547	6388.4001		6367.0342	77.5
78.5	6389.9662		6363.2903	6387.4122		6365.7984	78.5
79.5	6389.0128		6362.0090	6386.4377		6364.5547	79.5
80.5	6388.0615		6360.7203	6385.4641		6363.2903	80.5
81.5	6387.0886		6359.4010	6384.4523		6362.0090	81.5
82.5	6386.1214		6358.0786	6383.4153		6360.7203	82.5

**NbS**     $c^2\Pi_{1/2} \rightarrow a^2\Delta_{3/2}$  rotational lines.

**(1,0)**

$J$	$R_{cc}(J)$	$P_{cc}(J)$	$Q_{fc}(J)$	$R_{ff}(J)$	$P_{ff}(J)$	$Q_{cf}(J)$	$J$
83.5	6385.0786		6356.7426	6382.3783		6359.4010	83.5
84.5	6384.0638		6355.3828	6381.2951		6358.0786	84.5
85.5	6383.0225		6353.9848	6380.2427		6356.7426	85.5
86.5	6381.9630		6352.6123	6379.1386		6355.3828	86.5
87.5	6380.8991		6351.2103	6378.0247		6354.0100	87.5
88.5	6379.8009		6349.7627	6376.9031		6352.6123	88.5
89.5	6378.7028		6348.3202	6375.7516		6351.2103	89.5
90.5	6377.5788		6346.8649	6374.5831		6349.8014	90.5
91.5	6376.4442		6345.3864	6373.4362		6348.3627	91.5
92.5	6375.3012		6343.9050	6372.2393		6346.9070	92.5
93.5	6374.1037		6342.3918	6371.0368		6345.4300	93.5
94.5	6372.9558		6340.8771	6369.8193		6343.9501	94.5
95.5	6371.7267		6339.3388	6368.5655		6342.4532	95.5
96.5	6370.5289		6337.7844	6367.3189		6340.9407	96.5
97.5	6369.2727		6336.2037	6366.0521		6339.4016	97.5
98.5	6368.0163		6334.6182	6364.7623		6337.8474	98.5
99.5	6366.7511		6333.0244	6363.4561		6336.2740	99.5
100.5	6365.4684		6331.3894	6362.1244		6334.6939	100.5
101.5	6364.1670		6329.7602	6360.7917		6333.0815	101.5
102.5	6362.8601		6328.1185	6359.4443		6331.4839	102.5
103.5	6361.5071		6326.4460	6358.0786		6329.8496	103.5
104.5	6360.1536		6324.7509	6356.6719		6328.1761	104.5
105.5	6358.7785		6323.0536	6355.2896		6326.5244	105.5
106.5	6357.3934		6321.3411	6353.8669		6324.8381	106.5
107.5	6355.9858		6319.6178	6352.4361		6323.1393	107.5
108.5	6354.5625		6317.8633	6350.9712		6321.4103	108.5
109.5	6353.1097		6316.0849	6349.4978		6319.6526	109.5
110.5	6351.6619		6314.3229	6348.0226		6317.9125	110.5
111.5	6350.1553		6312.5072	6346.5212		6316.1076	111.5
112.5	6348.6444		6310.6875	6344.9997		6314.3229	112.5
113.5	6347.1714		6308.8723	6343.4664			113.5
114.5	6345.6413		6307.0274	6341.9155			114.5
115.5	6344.0900		6305.1522	6340.3621			115.5
116.5	6342.5247		6303.2749	6338.7552			116.5
117.5	6340.9407		6301.3829	6337.1614			117.5
118.5	6339.3083		6299.4593	6335.5528			118.5
119.5	6337.7110		6297.5094	6333.9109			119.5
120.5	6336.0605		6295.6108	6332.2885			120.5
121.5	6334.4031		6293.6155	6330.5936			121.5
122.5			6291.6403	6328.9187			122.5
123.5			6289.6473	6327.2489			123.5
124.5			6287.6458	6325.5166			124.5
125.5			6285.6208	6323.7796			125.5
126.5			6283.5865	6322.0307			126.5
127.5			6281.5302	6320.2578			127.5
128.5			6279.4725	6318.4717			128.5
129.5			6277.3906	6316.6687			129.5
130.5			6275.2680	6314.8680			130.5
131.5			6273.1244	6313.0196			131.5
132.5			6270.9887	6311.1881			132.5
133.5			6268.8349	6309.3256			133.5
134.5			6266.6563	6307.4443			134.5
135.5			6264.4548	6305.5236			135.5
136.5			6262.2524	6303.6202			136.5
137.5			6260.0122	6301.6936			137.5
138.5			6257.7907				138.5
139.5			6255.5265				139.5
140.5			6253.2542				140.5
141.5			6250.9522				141.5
142.5			6248.6416				142.5
143.5			6246.3276				143.5
144.5			6243.9907				144.5
145.5			6241.6261				145.5
146.5							146.5
147.5							147.5

NbS  $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(0,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

$J$	$R(J)$	$P(J)$	$Q(J)$	$R(J)$	$P(J)$	$Q(J)$	$J$
10.5							10.5
11.5			8443.1203				11.5
12.5			8442.9119				12.5
13.5			8442.6511				13.5
14.5			8442.4005				14.5
15.5			8442.1353			8573.2147	15.5
16.5			8441.8320			8572.8976	16.5
17.5			8441.5461			8572.6050	17.5
18.5			8441.2186			8572.2714	18.5
19.5	8447.1135		8440.8811			8571.9059	19.5
20.5	8447.0505		8440.5289	8578.1045	8565.3424	8571.5681	20.5
21.5	8446.9764		8440.1792	8578.0124	8564.6715	8571.1876	21.5
22.5	8446.8958		8439.7583	8577.9214	8563.9674	8570.7945	22.5
23.5	8446.7932		8439.3497	8577.8247	8563.2445	8570.3983	23.5
24.5	8446.6462		8438.9260	8577.6870	8562.5122	8569.9468	24.5
25.5	8446.5265		8438.4927	8577.5334	8561.7649	8569.5020	25.5
26.5	8446.3661		8437.9932	8577.3824	8560.9991	8569.0370	26.5
27.5	8446.1887		8437.5423	8577.1961	8560.2152	8568.5525	27.5
28.5	8445.9967		8437.0436	8577.0016	8559.4125	8568.0530	28.5
29.5	8445.8007		8436.5332	8576.7795	8558.5798	8567.5552	29.5
30.5	8445.5570		8436.0150	8576.5671	8557.7346	8566.9926	30.5
31.5	8445.3193		8435.4558	8576.2960	8556.8877	8566.4417	31.5
32.5	8445.0938		8434.8875	8576.0257	8556.0114	8565.8668	32.5
33.5	8444.7686	8424.1535	8434.3071	8575.7393	8555.1201	8565.2755	33.5
34.5	8444.5048	8423.2425	8433.7098	8575.4382	8554.2187	8564.6715	34.5
35.5	8444.1695	8422.3314	8433.0951	8575.1161	8553.2822	8564.0496	35.5
36.5	8443.8299	8421.3875	8432.4572	8574.7724	8552.3371	8563.4010	36.5
37.5	8443.4850	8420.4324	8431.8039	8574.4127	8551.3724	8562.7437	37.5
38.5	8443.1203	8419.4508	8431.1359	8574.0423	8550.3963	8562.0799	38.5
39.5	8442.7281	8418.4678	8430.4516	8573.6508	8549.3937	8561.3728	39.5
40.5	8442.3509	8417.4928	8429.7406	8573.2397	8548.3789	8560.6579	40.5
41.5	8441.9144	8416.4365	8428.9767	8572.8080	8547.3499	8559.9262	41.5
42.5	8441.4721	8415.3859	8428.2829	8572.3644	8546.3019	8559.1805	42.5
43.5	8441.0213	8414.3339	8427.5266	8571.9059	8545.2276	8558.4119	43.5
44.5	8440.5420	8413.2762	8426.7679	8571.4250	8544.1525	8557.6313	44.5
45.5	8440.0622	8412.1658	8425.9625	8570.9242	8543.0454	8556.8317	45.5
46.5	8439.5602	8411.0598	8425.1566	8570.3983	8541.9230	8556.0114	46.5
47.5	8439.0328	8409.9321	8424.3305	8569.8703	8540.7786	8555.1769	47.5
48.5	8438.4927	8408.7479	8423.4848	8569.3199	8539.6284	8554.3240	48.5
49.5	8437.9316	8407.6242	8422.6274	8568.7512	8538.4510	8553.4520	49.5
50.5	8437.3538	8406.4435	8421.7471	8568.1591	8537.2653	8552.5614	50.5
51.5	8436.7605	8405.2488	8420.8490	8567.5552	8536.0555	8551.6577	51.5
52.5	8436.1494	8404.0301	8419.9355	8566.9387	8534.8279	8550.7313	52.5
53.5	8435.5257	8402.8144	8419.0108	8566.2972	8533.5587	8549.7907	53.5
54.5	8434.8875	8401.5432	8418.0620	8565.6372	8532.3337	8548.8346	54.5
55.5	8434.2080	8400.2850	8417.0966	8564.9712	8531.0919	8547.8580	55.5
56.5	8433.5548	8398.9992	8416.1118	8564.2702	8529.7484	8546.8610	56.5
57.5	8432.8334	8397.6951	8415.1190	8563.5613	8528.4410	8545.8512	57.5
58.5	8432.1193	8396.3789	8414.0980	8562.8341	8527.1089	8544.8188	58.5
59.5	8431.3874	8395.0401	8413.0577	8562.0799	8525.7602	8543.7720	59.5
60.5	8430.6333	8393.6829	8412.0087	8561.3255	8524.3961	8542.7073	60.5
61.5	8429.8628	8392.3117	8410.9397	8560.5425	8523.0065	8541.6260	61.5
62.5	8429.0572	8390.9277	8409.8508	8559.7445	8521.6126	8540.5230	62.5
63.5	8428.2829	8389.5219	8408.7479	8558.9308	8520.1913	8539.4079	63.5
64.5	8427.4547	8388.1000	8407.6242	8558.0917	8518.7547	8538.2753	64.5
65.5	8426.6220	8386.6599	8406.4902	8557.2411	8517.2984	8537.1194	65.5
66.5	8425.7623	8385.1981	8405.3319	8556.3727	8515.8255	8535.9498	66.5
67.5	8424.8878	8383.7245	8404.1585	8555.4789	8514.3419	8534.7625	67.5
68.5	8424.0035	8382.2353	8402.9669	8554.5819	8512.8356	8533.5587	68.5
69.5	8423.0939	8380.7265	8401.7595	8553.6580	8511.3120	8532.3337	69.5
70.5	8422.1681	8379.2057	8400.5467	8552.7168	8509.7709	8531.0919	70.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(0,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
71.5	8421.2249	8377.6551	8399.2912	8551.7578	8508.2174	8529.8354	71.5
72.5	8420.2642	8376.0936	8398.0318	8550.7823	8506.6355	8528.5604	72.5
73.5	8419.2847	8374.5175	8396.7561	8549.7907	8505.0436	8527.2643	73.5
74.5	8418.2984	8372.9158	8395.4542	8548.7783	8503.4320	8525.9546	74.5
75.5	8417.2833	8371.3098	8394.1452	8547.7488	8501.8003	8524.6269	75.5
76.5	8416.2493	8369.6780	8392.8135	8546.7036	8500.1564	8523.2806	76.5
77.5	8415.2086	8368.0366	8391.4652	8545.6418	8498.4921	8521.9180	77.5
78.5	8414.0980	8366.3845	8390.1036	8544.5597	8496.8122	8520.5364	78.5
79.5	8413.0577	8364.6810	8388.7177	8543.4588	8495.1182	8519.1361	79.5
80.5	8411.9549	8362.9890	8387.3185	8542.3428	8493.3982	8517.7241	80.5
81.5	8410.8337	8361.2691	8385.8999	8541.2044	8491.6644	8516.2851	81.5
82.5	8409.7041	8359.5365	8384.4662	8540.0524	8489.9120	8514.8348	82.5
83.5	8408.5461	8357.7837	8383.0151	8538.8836	8488.1404	8513.3643	83.5
84.5	8407.3820	8356.0165	8381.5462	8537.6991	8486.3623	8511.8772	84.5
85.5	8406.1861	8354.2331	8380.0581	8536.4907	8484.5583	8510.3749	85.5
86.5	8404.9841	8352.4239	8378.5580	8535.2663	8482.7364	8508.8519	86.5
87.5	8403.7620	8350.6100	8377.0367	8534.0248	8480.9012	8507.3117	87.5
88.5	8402.5219	8348.7673	8375.4979	8532.7711	8479.0439	8505.7555	88.5
89.5	8401.2655	8346.9176	8373.9393	8531.4890	8477.1647	8504.1794	89.5
90.5	8399.9883	8345.0415	8372.3684	8530.1939	8475.2773	8502.5862	90.5
91.5	8398.6983	8343.1524	8370.7755	8528.8857	8473.3688	8500.9771	91.5
92.5	8397.3900	8341.2537	8369.1669	8527.5582	8471.4446	8499.3499	92.5
93.5	8396.0595	8339.3248	8367.5398	8526.2083	8469.4986	8497.7039	93.5
94.5	8394.7145	8337.3812	8365.8998	8524.8410	8467.5378	8496.0420	94.5
95.5	8393.3528	8335.4207	8364.2411	8523.4611	8465.5616	8494.3620	95.5
96.5	8391.9728	8333.4549	8362.5593	8522.0643	8463.5682	8492.6649	96.5
97.5	8390.5714	8331.4523	8360.8656	8520.6414	8461.5551	8490.9500	97.5
98.5	8389.1596	8329.4515	8359.1511	8519.2116	8459.5236	8489.2162	98.5
99.5	8387.7285	8327.4073	8357.4243	8517.7241	8457.4753	8487.4662	99.5
100.5	8386.2744	8325.3596	8355.6779	8516.2851	8455.4099	8485.6983	100.5
101.5	8384.8132	8323.3120	8353.9102	8514.8348	8453.3271	8483.9098	101.5
102.5	8383.3218	8321.2449	8352.1292	8513.2883	8451.2242	8482.1092	102.5
103.5	8381.8175	8319.1718	8350.3289	8511.7612	8449.1078	8480.2864	103.5
104.5	8380.2978	8317.0171	8348.5130	8510.2217	8446.9764	8478.4495	104.5
105.5	8378.7631	8314.8869	8346.6789	8508.6613	8444.8182	8476.5924	105.5
106.5	8377.1991	8312.7451	8344.8236	8507.0858	8442.6511	8474.7205	106.5
107.5	8375.6381	8310.5827	8342.9582	8505.4903	8440.4636	8472.8291	107.5
108.5	8374.0428	8308.3967	8341.0718	8503.8781	8438.2602	8470.9198	108.5
109.5	8372.4368	8306.1962	8339.1680	8502.2480	8436.0150	8468.9928	109.5
110.5	8370.7755	8303.9777	8337.2450	8500.6000	8433.7973	8467.0481	110.5
111.5	8369.1669	8301.7414	8335.3089	8498.9322	8431.5389	8465.0877	111.5
112.5	8367.5398	8299.4950	8333.3533	8497.2519	8429.2642	8463.1109	112.5
113.5	8365.8239	8297.2218	8331.3774	8495.5448	8426.9712	8461.1122	113.5
114.5	8364.1359	8294.9304	8329.3877	8493.8249	8424.6635	8459.0986	114.5
115.5	8362.4241	8292.6305	8327.3833	8492.0914	8422.3314	8457.0646	115.5
116.5	8360.6934	8290.3182	8325.3596	8490.3326	8419.9949	8455.0158	116.5
117.5	8358.9446	8287.9737	8323.3120	8488.5663	8417.6284	8452.9492	117.5
118.5	8357.1740	8285.6227	8321.2449	8486.7747	8415.2467	8450.8663	118.5
119.5	8355.3970	8283.2505	8319.1718	8484.9666	8412.8540	8448.7643	119.5
120.5	8353.5945	8280.8558	8317.0822	8483.1408	8410.4446	8446.6462	120.5
121.5	8351.7800	8278.4586	8314.9697	8481.2949	8408.0065	8444.5048	121.5
122.5	8349.9415	8276.0256	8312.8366	8479.4418	8405.5583	8442.3509	122.5
123.5	8348.0841	8273.5911	8310.6919	8477.5618	8403.0966	8440.1792	123.5
124.5	8346.2205	8271.1258	8308.5268	8475.6653	8400.6141	8437.9932	124.5
125.5	8344.3288	8268.6519	8306.3454	8473.7486	8398.0832	8435.7827	125.5
126.5	8342.4182	8266.1602	8304.1435	8471.8234	8395.5817	8433.5548	126.5
127.5	8340.5019	8263.6492	8301.9298	8469.8696	8393.0505	8431.3170	127.5
128.5	8338.5582	8261.1247	8299.6953	8467.9016	8390.5044	8429.0572	128.5
129.5	8336.6021	8258.5809	8297.4451	8465.9143	8387.9430	8426.7679	129.5
130.5	8334.6245	8256.0193	8295.1776	8463.9069	8385.3574	8424.4822	130.5
131.5	8332.6262	8253.4219	8292.8869	8461.8971	8382.7782	8422.1681	131.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(0,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
132.5	8330.6257	8250.8485	8290.5861	8459.8588	8380.1173	8419.8416	132.5
133.5	8328.5898	8248.2433	8288.2686	8457.8034	8377.4782	8417.4928	133.5
134.5	8326.5458	8245.5966	8285.9248	8455.7310	8374.8141	8415.1190	134.5
135.5	8324.4828	8242.9520	8283.5725	8453.6394	8372.1425	8412.7457	135.5
136.5	8322.3971	8240.2903	8281.1983	8451.5304	8369.4534	8410.3447	136.5
137.5	8320.3021	8237.6022	8278.8086	8449.3978	8366.7433	8407.9282	137.5
138.5	8318.1877	8234.9114	8276.3985	8447.2596	8364.0132	8405.4885	138.5
139.5	8316.0512	8232.1893	8273.9777	8445.0938	8361.2691	8403.0367	139.5
140.5	8313.9055	8229.4511	8271.5379	8442.9119	8358.5051	8400.5467	140.5
141.5	8311.7391	8226.7070	8269.0736	8440.7177	8355.7325	8398.0832	141.5
142.5	8309.5555	8223.9459	8266.5968	8438.4927	8352.9392	8395.5817	142.5
143.5	8307.3368	8221.1495	8264.1002	8436.2753	8350.1195	8393.0505	143.5
144.5	8305.1298	8218.3553	8261.5898	8434.0192	8347.2851	8390.5044	144.5
145.5	8302.8788	8215.5368	8259.0635	8431.7506	8344.4372	8387.9430	145.5
146.5	8300.6300	8212.7008	8256.5192	8429.4691	8341.5770	8385.3737	146.5
147.5	8298.3519	8209.8434	8253.9478	8427.1672	8338.6953	8382.7782	147.5
148.5	8296.0716	8206.9706	8251.3670	8424.8436	8335.7866	8380.1705	148.5
149.5	8293.7528	8204.0867	8248.7722	8422.4988	8332.8702	8377.5433	149.5
150.5	8291.4279	8201.1696	8246.1545	8420.1349	8329.9340	8374.8974	150.5
151.5	8289.0795	8198.2555	8243.5205	8417.7735	8326.9835	8372.2350	151.5
152.5	8286.7192	8195.3113	8240.8733	8415.3859	8324.0164	8369.5543	152.5
153.5	8284.3335	8192.3450	8238.1984	8412.9660	8321.0221	8366.8522	153.5
154.5	8281.9412	8189.3726	8235.5158	8410.5462	8318.0197	8364.1359	154.5
155.5	8279.5256	8186.3956	8232.8195	8408.0922	8314.9697	8361.3982	155.5
156.5	8277.0925	8183.3836	8230.1023	8405.6311	8311.9595	8358.6512	156.5
157.5	8274.6512	8180.3654	8227.3515	8403.1526	8308.8993	8355.8833	157.5
158.5	8272.1735	8177.3195	8224.6025	8400.6611	8305.8378	8353.1005	158.5
159.5	8269.6855	8174.2468	8221.8342	8398.1780	8302.7390	8350.2508	159.5
160.5	8267.1923	8171.1918	8219.0416	8395.5817	8299.6339	8347.4748	160.5
161.5	8264.6887	8168.0857	8216.2358	8393.0505	8296.5022	8344.6329	161.5
162.5	8262.1334	8164.9635	8213.4221	8390.5044	8293.3618	8341.7753	162.5
163.5	8259.5907	8161.8413	8210.5736	8387.8948	8290.1984	8338.9038	163.5
164.5	8257.0117	8158.6916	8207.7064		8287.0276	8336.0140	164.5
165.5	8254.4211	8155.5429	8204.8284	8382.6627	8283.8298	8333.1070	165.5
166.5	8251.8021	8152.3642	8201.9521	8380.0581	8280.6103	8330.1794	166.5
167.5	8249.1825	8149.1515	8199.0301	8377.3622	8277.3760	8327.2343	167.5
168.5	8246.5464	8145.9463	8196.0945	8374.6932	8274.1385	8324.2703	168.5
169.5	8243.8855	8142.7142	8193.1510	8372.0012	8270.8772	8321.2930	169.5
170.5	8241.1857	8139.4733	8190.1940	8369.2875	8267.5828	8318.2971	170.5
171.5	8238.5039	8136.1989	8187.2100	8366.5595	8264.2904	8315.2821	171.5
172.5	8235.7589	8132.9201	8184.2147	8363.8115	8260.9895	8312.2504	172.5
173.5	8233.0663	8129.6248	8181.1982	8361.0430	8257.6568	8309.2063	173.5
174.5	8230.3099	8126.3062	8178.1626	8358.2662	8254.2858	8306.1363	174.5
175.5	8227.5500	8122.9749	8175.1178	8355.4605	8250.9282	8303.0546	175.5
176.5	8224.7716	8119.6211	8172.0539	8352.6523	8247.5422	8299.9501	176.5
177.5	8221.9647	8116.2544	8168.9680	8349.8134	8244.1593	8296.8320	177.5
178.5	8219.1412	8112.8674	8165.8676	8346.9176	8240.7331	8293.6940	178.5
179.5	8216.3065	8109.4614	8162.7433	8344.0816	8237.2839	8290.5489	179.5
180.5	8213.4221	8106.0425	8159.6081	8341.2025	8233.8251	8287.3725	180.5
181.5	8210.5736	8102.6102	8156.4517	8338.2977	8230.3607	8284.1875	181.5
182.5	8207.7064	8099.1488	8153.2810	8335.3677	8226.8457	8280.9729	182.5
183.5	8204.8284	8095.6462	8150.0876	8332.4210	8223.3660	8277.7567	183.5
184.5	8201.8715		8146.8903	8329.4515	8219.8349	8274.5151	184.5
185.5	8198.9013		8143.6650	8326.4891	8216.3065	8271.2526	185.5
186.5	8195.9714		8140.4259	8323.5029	8212.7465	8267.9770	186.5
187.5	8192.9836		8137.1651	8320.4852	8209.1545	8264.6887	187.5
188.5	8189.9871		8133.8952	8317.4588	8205.5774	8261.3674	188.5
189.5	8187.0159		8130.5939	8314.4052	8201.9521	8258.0475	189.5
190.5	8183.9233		8127.3343	8311.3477	8198.3359	8254.6955	190.5
191.5	8180.9085		8123.9733	8308.2700	8194.6947	8251.3670	191.5
192.5	8177.8308		8120.6183	8305.1712	8191.0282	8247.9524	192.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

**(0,0)**

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
193.5	8174.7489		8117.2618	8302.0405	8187.3544	8244.5568	193.5
194.5	8171.6656		8113.8773	8298.8921	8183.6617	8241.1498	194.5
195.5	8168.5344		8110.4851	8295.7507	8179.9388	8237.7078	195.5
196.5	8165.4018		8107.0746	8292.5874	8176.2230	8234.2619	196.5
197.5	8162.2687		8103.6224	8289.3984		8230.7942	197.5
198.5	8159.0820		8100.1908	8286.1830		8227.3084	198.5
199.5	8155.8986		8096.7342	8282.9450		8223.8061	199.5
200.5	8152.6906		8093.2357	8279.7131		8220.2822	200.5
201.5	8149.4750		8089.7511	8276.4588		8216.7553	201.5
202.5	8146.2280		8086.2099	8273.1675		8213.2038	202.5
203.5	8142.9867		8082.6824	8269.8898		8209.6241	203.5
204.5	8139.7206		8079.1313	8266.5968		8206.0228	204.5
205.5	8136.3668		8075.5647	8263.2362		8202.3976	205.5
206.5	8133.0954		8071.9942	8259.8884		8198.7898	206.5
207.5	8129.7670		8068.3724	8256.5192		8195.1520	207.5
208.5	8126.4199		8064.7521	8253.1507		8191.4977	208.5
209.5	8123.0611		8061.1271	8249.7403		8187.8160	209.5
210.5	8119.7000		8057.4614	8246.3300		8184.1156	210.5
211.5	8116.2759		8053.7776	8242.9112		8180.4067	211.5
212.5	8112.8674		8050.1035	8239.4267		8176.6556	212.5
213.5	8109.4294		8046.3977	8235.9504		8172.9339	213.5
214.5	8105.9782		8042.6729	8232.4832		8169.1743	214.5
215.5	8102.5212		8038.9226	8228.9662		8165.4018	215.5
216.5	8099.0199		8035.1547	8225.4452		8161.5918	216.5
217.5	8095.5400		8031.3808	8221.8905		8157.7665	217.5
218.5	8092.0127		8027.5886	8218.3553		8153.9438	218.5
219.5			8023.7784	8214.7492			219.5
220.5			8019.9865	8211.1543			220.5
221.5			8016.1098	8207.5551			221.5
222.5			8012.2539	8203.9310			222.5
223.5				8200.2632			223.5
224.5			8004.4695	8196.5942			224.5
225.5			8000.5521	8192.9148			225.5
226.5			7996.6138	8189.2173			226.5
227.5			7992.6735	8185.4962			227.5
228.5			7988.7115	8181.7584			228.5
229.5			7984.7328	8178.0048			229.5
230.5			7980.7327				230.5
231.5			7976.7135				231.5
232.5			7972.6738				232.5
233.5			7968.6211				233.5
234.5							234.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(0,1)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
16.5							16.5
17.5		7878.0336					17.5
18.5		7877.4506					18.5
19.5		7876.8179					19.5
20.5		7876.1951	7882.3796	8018.7070			20.5
21.5		7875.5435	7882.0387	8018.6616		8011.8395	21.5
22.5		7874.8712	7881.6846	8018.5982		8011.4762	22.5
23.5		7874.1958	7881.3342	8018.5116		8011.1047	23.5
24.5		7873.4965	7880.8880	8018.4208		8010.6688	24.5
25.5		7872.7944	7880.5206	8018.3009		8010.2625	25.5
26.5		7872.0426	7880.0707	8018.1654		8009.8316	26.5
27.5		7871.2919	7879.6129	8018.0228		8009.3820	27.5
28.5		7870.5377	7879.1673	8017.8671		8008.9076	28.5
29.5		7869.7723	7878.7024	8017.6790		8008.4191	29.5
30.5		7868.9623	7878.1751	8017.4746		8007.9332	30.5
31.5		7868.1380	7877.6978	8017.2673		8007.4170	31.5
32.5	7887.3295	7867.3431	7877.1691	8017.0368	7997.0149	8006.8729	32.5
33.5	7887.1006	7866.4924	7876.6320	8016.8051	7996.1725	8006.3198	33.5
34.5	7886.8499	7865.6304	7876.0437	8016.5319	7995.3055	8005.7551	34.5
35.5	7886.5442	7864.7323	7875.4953	8016.2413	7994.4234	8005.1815	35.5
36.5	7886.2693	7863.8451	7874.9099	8015.9594	7993.5217	8004.6019	36.5
37.5	7885.9705	7862.9413	7874.3063	8015.6307	7992.5944	8003.9677	37.5
38.5	7885.6624	7861.9967	7873.6583	8015.3082	7991.6604	8003.3378	38.5
39.5	7885.3244	7861.0551	7873.0477	8014.9781	7990.7174	8002.6825	39.5
40.5	7884.9668	7860.0913	7872.3697	8014.5996	7989.7533	8002.0186	40.5
41.5	7884.5965	7859.1335	7871.7079	8014.2398	7988.7442	8001.3447	41.5
42.5	7884.2122	7858.1434	7871.0081	8013.8433	7987.7894	8000.6471	42.5
43.5	7883.8273	7857.1207	7870.3134	8013.4262	7986.7436	7999.9342	43.5
44.5	7883.3901	7856.0996	7869.6068	8012.9983	7985.7106	7999.1998	44.5
45.5	7882.9639	7855.0823	7868.8560	8012.5375	7984.6673	7998.4498	45.5
46.5	7882.5015	7854.0124	7868.1068	8012.0868	7983.6137	7997.6953	46.5
47.5	7882.0387	7852.9470	7867.3431	8011.6023	7982.5219	7996.9169	47.5
48.5	7881.5645	7851.8574	7866.5519	8011.1047	7981.4288	7996.1111	48.5
49.5	7881.0614	7850.7801	7865.7446	8010.6091	7980.3102	7995.3055	49.5
50.5	7880.5484	7849.6478	7864.9352	8010.0858	7979.1777	7994.4801	50.5
51.5	7880.0209	7848.4971	7864.0978	8009.5527	7978.0307	7993.6352	51.5
52.5	7879.4578	7847.3325	7863.2456	8008.9808	7976.8685	7992.7727	52.5
53.5	7878.8942	7846.1864	7862.3784	8008.4191	7975.6977	7991.8888	53.5
54.5	7878.2808	7844.9868	7861.4941	8007.8169	7974.4797	7990.9974	54.5
55.5	7877.6978	7843.7893	7860.6026	8007.2013	7973.2999	7990.0925	55.5
56.5	7877.1119	7842.5754	7859.6893	8006.5755		7989.1647	56.5
57.5	7876.4964	7841.3331	7858.7504	8005.9492	7970.8010	7988.2243	57.5
58.5	7875.8330	7840.0906	7857.8206	8005.2834	7969.5551	7987.2681	58.5
59.5	7875.1632	7838.8145	7856.8498	8004.6019	7968.2761	7986.2862	59.5
60.5	7874.4740	7837.5456	7855.8668	8003.9166	7966.9799	7985.2981	60.5
61.5	7873.8065	7836.2411	7854.8729	8003.1922	7965.6750	7984.2859	61.5
62.5	7873.0803	7834.9346	7853.8611	8002.4825	7964.3401	7983.2584	62.5
63.5	7872.3697	7833.6229	7852.8368	8001.7454	7962.9984	7982.2218	63.5
64.5	7871.6116	7832.2609	7851.7826	8000.9872	7961.6592	7981.1681	64.5
65.5	7870.8787	7830.8861	7850.7304	8000.2335	7960.2632	7980.0882	65.5
66.5	7870.0747	7829.5277	7849.6478	7999.4260	7958.8810	7978.9997	66.5
67.5	7869.2889	7828.1175	7848.5560	7998.6177	7957.4759	7977.8902	67.5
68.5	7868.4801	7826.7128	7847.4477	7997.7903	7956.0480	7976.7712	68.5
69.5	7867.6599	7825.2741	7846.3261	7996.9169	7954.6100	7975.6335	69.5
70.5	7866.8225	7823.8499	7845.1895	7996.1111	7953.1547	7974.4797	70.5
71.5	7865.9667	7822.3887	7844.0208	7995.2219	7951.6834	7973.2999	71.5
72.5	7865.0775	7820.9109	7842.8491	7994.3396	7950.1926	7972.1161	72.5
73.5	7864.2014	7819.4174	7841.6602	7993.4330	7948.6835	7970.9096	73.5
74.5	7863.2950	7817.9201	7840.4574	7992.5195	7947.1586	7969.6850	74.5
75.5	7862.3784	7816.4153	7839.2405	7991.5796	7945.6245	7968.4526	75.5
76.5	7861.4336	7814.8526	7837.9938	7990.6171	7944.0708	7967.1947	76.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(0,1)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
77.5	7860.4741	7813.3136	7836.7435	7989.6502	7942.5089	7965.9258	77.5
78.5	7859.5174	7811.7347	7835.4732	7988.6629	7940.9142	7964.6372	78.5
79.5	7858.5231	7810.1657	7834.1862	7987.6579	7939.3172	7963.3370	79.5
80.5	7857.5271	7808.5511	7832.8852	7986.6388	7937.6921	7962.0187	80.5
81.5	7856.4995	7806.9243	7831.5575	7985.6082	7936.0578	7960.6827	81.5
82.5	7855.4559	7805.2973	7830.2292	7984.5499	7934.4062	7959.3296	82.5
83.5	7854.4066	7803.6393	7828.8713	7983.4781	7932.7092	7957.9625	83.5
84.5	7853.3467	7801.9596	7827.5044	7982.3941	7931.0566	7956.5739	84.5
85.5	7852.2563	7800.2925	7826.1277	7981.2892	7929.3526	7955.1735	85.5
86.5	7851.1502	7798.5928	7824.7262	7980.1730	7927.6412	7953.7550	86.5
87.5	7850.0366	7796.8868	7823.3105	7978.9997	7925.9034	7952.3228	87.5
88.5	7848.9048	7795.1555	7821.8779	7977.8902	7924.1507	7950.8699	88.5
89.5	7847.7516	7793.4482	7820.4285	7976.7135	7922.3964	7949.4042	89.5
90.5	7846.5917	7791.5940	7818.9639	7975.5257	7920.6091	7947.9223	90.5
91.5	7845.4008	7789.8386	7817.4896	7974.3325	7918.8393	7946.4216	91.5
92.5	7844.2060	7788.0696	7815.9918	7973.1072	7916.9953	7944.9112	92.5
93.5	7843.0004	7786.2832	7814.4741	7971.8810	7915.1622	7943.3765	93.5
94.5	7841.7709	7784.4351	7812.9475	7970.6248	7913.3158	7941.8260	94.5
95.5	7840.5078	7782.5834	7811.3926	7969.3677	7911.4560	7940.2572	95.5
96.5	7839.2405	7780.7443	7809.8409	7968.0739	7909.5786	7938.6838	96.5
97.5	7837.9524	7778.8500	7808.2726	7966.7756	7907.6815	7937.0845	97.5
98.5	7836.6700	7776.9632	7806.6676	7965.4704	7905.7732	7935.4678	98.5
99.5	7835.3630	7775.0818	7805.0558	7964.1293	7903.8487	7933.8389	99.5
100.5	7834.0341	7773.1235	7803.4482	7962.7792	7901.8984	7932.1899	100.5
101.5	7832.6921	7771.1638	7801.7893	7961.3951	7899.9330	7930.5315	101.5
102.5	7831.3354	7769.2334	7800.0845	7960.0126	7897.9677	7928.8467	102.5
103.5	7829.9558	7767.2689	7798.4157	7958.6339	7895.9764	7927.1526	103.5
104.5	7828.5589	7765.2749	7796.7649	7957.2086	7893.9621	7925.4447	104.5
105.5	7827.1489	7763.2870	7795.0675	7955.7804	7891.9311	7923.7189	105.5
106.5	7825.7187	7761.2510	7793.3348	7954.3256	7889.9038	7921.9691	106.5
107.5	7824.2799	7759.2206	7791.5940	7952.8844	7887.8336	7920.2022	107.5
108.5	7822.8070	7757.1660	7789.8386	7951.3884	7885.7612	7918.4293	108.5
109.5	7821.3423	7755.0994	7788.0696	7949.8889	7883.6495	7916.6388	109.5
110.5	7819.8587	7753.0630	7786.2832	7948.3750	7881.5645	7914.8263	110.5
111.5	7818.3386	7750.9244	7784.4874	7946.8479	7879.4578	7913.0019	111.5
112.5	7816.8154	7748.7886	7782.6643	7945.3009	7877.3292	7911.1603	112.5
113.5	7815.2855	7746.6769	7780.8252	7943.7365	7875.1632	7909.3003	113.5
114.5	7813.7234	7744.5743	7778.9561	7942.1447	7872.9858	7907.4248	114.5
115.5	7812.1450	7742.3577	7777.1226	7940.5467	7870.8064	7905.5324	115.5
116.5	7810.5573	7740.2201	7775.2250	7938.9409	7868.5990	7903.6265	116.5
117.5	7808.9446	7737.9832	7773.3248	7937.3227	7866.3818	7901.7013	117.5
118.5	7807.3334	7735.8250	7771.3996	7935.6684	7864.1415	7899.7558	118.5
119.5	7805.7421	7733.5559	7769.4691	7934.0040	7861.8864	7897.8031	119.5
120.5	7804.0511	7731.3122	7767.5125	7932.3193	7859.6252	7895.8275	120.5
121.5	7802.3727	7729.0534	7765.5675	7930.6365	7857.3557	7893.8408	121.5
122.5		7726.7772	7763.5878	7928.9176	7855.0503	7891.8340	122.5
123.5		7724.4910	7761.5331	7927.2222	7852.7203	7889.8097	123.5
124.5			7759.5675	7925.4447	7850.3938	7887.7711	124.5
125.5			7757.5452	7923.6499	7848.0600	7885.7207	125.5
126.5			7755.4988	7921.9132	7845.6881	7883.6495	126.5
127.5			7753.4409	7920.1119	7843.2982	7881.5645	127.5
128.5			7751.3447	7918.3110	7840.9116	7879.4578	128.5
129.5			7749.2645	7916.4820	7838.4877	7877.3292	129.5
130.5			7747.1543	7914.6411	7836.0661	7875.2008	130.5
131.5			7745.0305	7912.7762	7833.6229	7873.0477	131.5
132.5			7742.8912	7910.9013	7831.1435	7870.8787	132.5
133.5			7740.7194	7908.9976	7828.6892	7868.6960	133.5
134.5			7738.5457	7907.0970	7826.1837	7866.4924	134.5
135.5			7736.3582	7905.1555	7823.6841	7864.2807	135.5
136.5			7734.1594	7903.2162	7821.1525	7862.0439	136.5
137.5			7731.9339	7901.2682	7818.6201	7859.7910	137.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(0,1)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
138.5			7729.6922	7899.2925	7816.0692	7857.5271	138.5
139.5			7727.4365	7897.3031	7813.4822	7855.2505	139.5
140.5			7725.1725	7895.2923	7810.8969	7852.9470	140.5
141.5			7722.8815	7893.2813	7808.2726	7850.6331	141.5
142.5			7720.5851	7891.2236	7805.6584	7848.3046	142.5
143.5			7718.2650	7889.1765	7803.0095	7845.9541	143.5
144.5			7715.9242	7887.1006	7800.3692	7843.5886	144.5
145.5			7713.5671	7885.0076	7797.6983	7841.2115	145.5
146.5			7711.2088	7882.8994	7795.0219	7838.8145	146.5
147.5			7708.8300	7880.7779	7792.3181	7836.4026	147.5
148.5			7706.4258	7878.6467	7789.5905	7833.9655	148.5
149.5			7703.9932	7876.4964	7786.8632	7831.5575	149.5
150.5			7701.5632	7874.3063	7784.1001	7829.0668	150.5
151.5			7699.1268	7872.1275	7781.3400	7826.5935	151.5
152.5			7696.6700	7869.9197	7778.5967	7824.0932	152.5
153.5			7694.2004	7867.6932	7775.7526	7821.5815	153.5
154.5			7691.6938	7865.4790	7772.9356	7819.0543	154.5
155.5			7689.1756	7863.2456	7770.1107	7816.5177	155.5
156.5			7686.6455	7860.9486	7767.2689	7813.9559	156.5
157.5			7684.0981	7858.6511	7764.3956	7811.3926	157.5
158.5			7681.5693	7856.3639	7761.5331	7808.7664	158.5
159.5			7679.0062	7854.0124	7758.6351	7806.1595	159.5
160.5			7676.3818	7851.6936	7755.7384	7803.5579	160.5
161.5			7673.7715	7849.3459	7752.7858	7800.9222	161.5
162.5			7671.1451	7846.9946	7749.8447	7798.2240	162.5
163.5			7668.4892	7844.5880	7746.8735	7795.5938	163.5
164.5			7665.8556	7842.1742	7743.9109	7792.9014	164.5
165.5			7663.1910	7839.7626	7740.9289	7790.1823	165.5
166.5			7660.4896	7837.3433	7737.8881	7787.4885	166.5
167.5			7657.7678	7834.8796	7734.8940		167.5
168.5			7655.1018	7832.4445	7731.8586	7781.9962	168.5
169.5			7652.3305	7829.9370	7728.7992	7779.2531	169.5
170.5			7649.5647	7827.4337	7725.7367	7776.4434	170.5
171.5			7646.8147	7824.9043	7722.6523	7773.6287	171.5
172.5			7644.0164	7822.3887		7770.7824	172.5
173.5			7641.2358	7819.8587		7767.9844	173.5
174.5			7638.4141	7817.2747		7765.1827	174.5
175.5			7635.5742	7814.6779		7762.2680	175.5
176.5				7812.0815		7759.4338	176.5
177.5			7629.8838	7809.4773		7756.4816	177.5
178.5			7626.9595	7806.8573		7753.5818	178.5
179.5			7624.1008	7804.1985			179.5
180.5			7621.1697	7801.5179			180.5
181.5			7618.2455	7798.8459			181.5
182.5			7615.3044	7796.1523			182.5
183.5			7612.3418	7793.4482			183.5
184.5							184.5
185.5							185.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(1,2)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

$J$	$R(J)$	$P(J)$	$Q(J)$	$R(J)$	$P(J)$	$Q(J)$	$J$
14.5							14.5
15.5						7972.8072	15.5
16.5						7972.5575	16.5
17.5						7972.2452	17.5
18.5						7971.9659	18.5
19.5						7971.6197	19.5
20.5						7971.3207	20.5
21.5						7970.9512	21.5
22.5						7970.5836	22.5
23.5						7970.2028	23.5
24.5				7977.5010		7969.7900	24.5
25.5				7977.3787		7969.3677	25.5
26.5				7977.2721		7968.9512	26.5
27.5			7838.8145	7977.1073		7968.5076	27.5
28.5			7838.3614	7976.9549		7968.0454	28.5
29.5			7837.8787	7976.7712		7967.5658	29.5
30.5			7837.4069	7976.5765		7967.0644	30.5
31.5			7836.8801	7976.3610		7966.5483	31.5
32.5				7976.1452		7966.0201	32.5
33.5			7835.8431	7975.8998		7965.4704	33.5
34.5			7835.2695	7975.6335		7964.9071	34.5
35.5			7834.6767	7975.3604		7964.3401	35.5
36.5			7834.1147	7975.0679		7963.7730	36.5
37.5			7833.5169	7974.7429		7963.1442	37.5
38.5		7821.2552	7832.8852	7974.4256		7962.5108	38.5
39.5		7820.3203	7832.2609	7974.0940		7961.8495	39.5
40.5		7819.3610	7831.6108	7973.7689		7961.1997	40.5
41.5		7818.4082	7830.9352	7973.3597		7960.5246	41.5
42.5		7817.4087	7830.2292	7972.9726		7959.8298	42.5
43.5		7816.4154	7829.5540	7972.5575		7959.1242	43.5
44.5		7815.3884	7828.8436	7972.1161		7958.4003	44.5
45.5		7814.3466	7828.1175	7971.6964		7957.6596	45.5
46.5		7813.3136	7827.3587	7971.2629		7956.9043	46.5
47.5		7812.2504	7826.5935	7970.7874		7956.1303	47.5
48.5	7840.7428	7811.1681	7825.8216	7970.2890		7955.3495	48.5
49.5	7840.2761	7810.0906	7825.0312	7969.7900		7954.5406	49.5
50.5	7839.7626	7808.9446	7824.2108	7969.2527		7953.7267	50.5
51.5	7839.2405	7807.8271	7823.3875	7968.7240		7952.8844	51.5
52.5	7838.6957	7806.6676	7822.5476	7968.1684		7952.0232	52.5
53.5	7838.1203	7805.5331	7821.6779	7967.6289		7951.1499	53.5
54.5	7837.5456	7804.3479	7820.8117	7967.0080		7950.2633	54.5
55.5	7836.9495	7803.1683	7819.9069	7966.4098		7949.4042	55.5
56.5	7836.4026	7801.9596	7819.0083	7965.7877		7948.4441	56.5
57.5	7835.7344	7800.7132	7818.0822	7965.1439		7947.5050	57.5
58.5	7835.0917	7799.4865	7817.1483	7964.4993		7946.5621	58.5
59.5	7834.4339	7798.2240	7816.1888	7963.8446		7945.5891	59.5
60.5	7833.7722	7796.9741	7815.2120	7963.1442		7944.6023	60.5
61.5	7833.0867	7795.6551	7814.2215	7962.4502		7943.6022	61.5
62.5	7832.3877	7794.3492	7813.2228	7961.7410		7942.5868	62.5
63.5	7831.6524	7793.0816	7812.2101	7960.9985		7941.5547	63.5
64.5	7830.9352	7791.7326	7811.1681	7960.2632		7940.5019	64.5
65.5	7830.1682	7790.3429	7810.1183	7959.4882		7939.4368	65.5
66.5	7829.4065		7809.0396	7958.7020	7918.3110	7938.3553	66.5
67.5	7828.6285	7787.6204	7807.9593	7957.9039	7916.8951	7937.2587	67.5
68.5	7827.8205	7786.2066	7806.8573	7957.0886	7915.4932	7936.1488	68.5
69.5	7826.9955	7784.8005	7805.7421	7956.2566	7914.0710	7935.0143	69.5
70.5	7826.1837	7783.3505	7804.6128	7955.4085	7912.6231	7933.8389	70.5
71.5	7825.3139	7781.9030	7803.4482	7954.5406	7911.1603	7932.7092	71.5
72.5	7824.4491	7780.4554	7802.3006	7953.6671	7909.6785	7931.5223	72.5
73.5	7823.5777	7778.9561	7801.1108	7952.7786	7908.1891	7930.3309	73.5
74.5	7822.6779	7777.4766	7799.9169	7951.8530	7906.6841	7929.1192	74.5

**NbS  $e^2\Phi \rightarrow a^2\Delta$  rotational lines.**

**(1,2)**

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
75.5	7821.7595	7776.0098	7798.7128	7950.9252	7905.1555	7927.8860	75.5
76.5	7820.8117	7774.4799	7797.4767	7949.9887	7903.6265	7926.6476	76.5
77.5	7819.8587	7772.8582	7796.2421	7949.0169	7902.0488	7925.3803	77.5
78.5	7818.9639	7771.3238	7794.9740	7948.0189	7900.4797	7924.1193	78.5
79.5	7817.9201	7769.7323	7793.6915	7947.0467	7898.8712	7922.8187	79.5
80.5	7816.9325	7768.1800	7792.4138	7946.0188	7897.2886	7921.5046	80.5
81.5	7815.9394	7766.5414	7791.0579	7944.9984	7895.6490	7920.2022	81.5
82.5	7814.9137	7764.9368	7789.7171	7943.9654	7894.0092	7918.8393	82.5
83.5	7813.8657	7763.2870	7788.4244	7942.9132	7892.3618	7917.4764	83.5
84.5	7812.8153	7761.6477	7787.0736	7941.8260	7890.6855	7916.1058	84.5
85.5	7811.7347	7759.9872	7785.6474	7940.7288	7888.9899	7914.7244	85.5
86.5	7810.6439	7758.2778	7784.3185	7939.6328	7887.2792	7913.3158	86.5
87.5	7809.5420	7756.5775	7782.9115	7938.5084	7885.5630	7911.8909	87.5
88.5	7808.4116	7754.8538	7781.4792	7937.3612	7883.8273	7910.4537	88.5
89.5	7807.2749		7780.0367	7936.1982	7882.0732	7908.9976	89.5
90.5	7806.1125		7778.5967	7935.0143	7880.3053	7907.5268	90.5
91.5	7804.9433		7777.1226	7933.8389	7878.5365	7906.0429	91.5
92.5	7803.7619		7775.6398	7932.6264	7876.7322	7904.5329	92.5
93.5	7802.5570		7774.1445	7931.4099	7874.9099	7903.0173	93.5
94.5	7801.3324		7772.6651	7930.1690	7873.0803	7901.4760	94.5
95.5	7800.0845			7928.9176	7871.2309	7899.9330	95.5
96.5	7798.8459		7769.5484	7927.6412	7869.3727	7898.3580	96.5
97.5	7797.5885		7767.9844	7926.3545	7867.4894	7896.7759	97.5
98.5	7796.2800		7766.3969	7925.0564	7865.5950	7895.1705	98.5
99.5	7794.9740		7764.7948	7923.7189	7863.6729	7893.5573	99.5
100.5	7793.6915		7763.1800	7922.3964	7861.7413	7891.9311	100.5
101.5	7792.3181		7761.5331	7921.0478	7859.7910	7890.2712	101.5
102.5				7919.6740	7857.8206	7888.6079	102.5
103.5	7789.5905		7758.2778	7918.3110	7855.8668	7886.9300	103.5
104.5	7788.2453		7756.5775	7916.8951	7853.8611	7885.2340	104.5
105.5	7786.8061		7754.8675	7915.4633	7851.8574	7883.5151	105.5
106.5			7753.1976	7914.0287	7849.8311	7881.7819	106.5
107.5	7783.9548		7751.4525	7912.5818	7847.8004	7880.0209	107.5
108.5			7749.7205	7911.1173	7845.7292	7878.2808	108.5
109.5	7781.0526		7747.9523	7909.6320	7843.6699	7876.4964	109.5
110.5			7746.1786	7908.1358	7841.5674	7874.7099	110.5
111.5			7744.3965	7906.6029	7839.4427	7872.9005	111.5
112.5			7742.5890	7905.0788	7837.3433	7871.0691	112.5
113.5			7740.7696	7903.5387	7835.1863	7869.2204	113.5
114.5			7738.9381	7901.9759	7833.0552	7867.3431	114.5
115.5			7737.1014	7900.3866	7830.8861	7865.4790	115.5
116.5			7735.2127	7898.7860	7828.6892	7863.5952	116.5
117.5			7733.3400	7897.1784	7826.5044	7861.6921	117.5
118.5			7731.4361	7895.5442	7824.2799	7859.7648	118.5
119.5			7729.5060	7893.8932	7822.0514	7857.8206	119.5
120.5			7727.5784	7892.2318	7819.7966	7855.8668	120.5
121.5			7725.6377	7890.5546	7817.5147	7853.8611	121.5
122.5			7723.6949	7888.8623	7815.2668	7851.9170	122.5
123.5				7887.1482	7812.9475	7849.9022	123.5
124.5			7719.6894	7885.4250	7810.6439	7847.8845	124.5
125.5			7717.6994	7883.6495	7808.2726	7845.8482	125.5
126.5			7715.6496	7881.9263	7805.9766	7843.7893	126.5
127.5			7713.5671	7880.1355	7803.6172	7841.7330	127.5
128.5			7711.5677		7801.2324	7839.6417	128.5
129.5			7709.4719	7876.5298	7798.8459	7837.5456	129.5
130.5			7707.3560	7874.7099	7796.4259	7835.4284	130.5
131.5			7705.2838	7872.9005	7793.9855	7833.2936	131.5
132.5			7703.1708	7871.0081	7791.5940	7831.1435	132.5
133.5			7701.0257	7869.1346	7789.0919	7828.9732	133.5
134.5			7698.8294	7867.2542	7786.6392	7826.7971	134.5
135.5			7696.7033	7865.3365	7784.1001	7824.5987	135.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(1,2)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
136.5			7694.5231	7863.4213	7781.6383	7822.3887	136.5
137.5			7692.2973	7861.4941		7820.1529	137.5
138.5			7690.0971	7859.5174	7776.5878	7817.9201	138.5
139.5			7687.8865	7857.5271	7774.0300	7815.6499	139.5
140.5			7685.6318	7855.5698	7771.4738	7813.3761	140.5
141.5			7683.3560	7853.5579		7811.0759	141.5
142.5			7681.0809	7851.5395	7766.2978	7808.7664	142.5
143.5			7678.7747	7849.5084	7763.6839	7806.4452	143.5
144.5			7676.4652	7847.4477	7761.0505	7804.1084	144.5
145.5			7674.1484	7845.4008	7758.3975	7801.7490	145.5
146.5			7671.7885	7843.2982	7755.7384	7799.3653	146.5
147.5			7669.4329	7841.2115	7753.0630	7796.9741	147.5
148.5				7839.0771		7794.5912	148.5
149.5		7664.6569		7836.9495		7792.1478	149.5
150.5		7662.2627		7834.7908		7789.7171	150.5
151.5				7832.6280		7787.2593	151.5
152.5				7830.4317		7784.8005	152.5
153.5				7828.2516		7782.3061	153.5
154.5				7826.0341		7779.8229	154.5
155.5				7823.7965		7777.2687	155.5
156.5				7821.5815		7774.7559	156.5
157.5				7819.3020		7772.2041	157.5
158.5				7817.0258		7769.6349	158.5
159.5				7814.7322		7767.0521	159.5
160.5				7812.4156		7764.4669	160.5
161.5				7810.0906		7761.8559	161.5
162.5				7807.7168		7759.2206	162.5
163.5				7805.3955		7756.5775	163.5
164.5				7803.0095		7753.8982	164.5
165.5				7800.6169		7751.2372	165.5
166.5				7798.2240		7748.5356	166.5
167.5				7795.7806		7745.8331	167.5
168.5				7793.3348		7743.1121	168.5
169.5				7790.8873		7740.3556	169.5
170.5				7788.4244		7737.6208	170.5
171.5				7785.9286		7734.8455	171.5
172.5						7732.0572	172.5
173.5				7780.9123		7729.2523	173.5
174.5				7778.3524		7726.4505	174.5
175.5						7723.6084	175.5
176.5				7773.2426		7720.7455	176.5
177.5						7717.8937	177.5
178.5						7714.9805	178.5
179.5						7712.1336	179.5
180.5						7709.1846	180.5
181.5						7706.2621	181.5
182.5						7703.3201	182.5
183.5						7700.3570	183.5
184.5						7697.3731	184.5
185.5							185.5
186.5							186.5
187.5						7688.3448	187.5
188.5						7685.3202	188.5
189.5						7682.2557	189.5
190.5						7679.1848	190.5
191.5						7676.0978	191.5
192.5						7673.0090	192.5
193.5						7669.8782	193.5
194.5						7666.7312	194.5
195.5						7663.5929	195.5
196.5							196.5
197.5							197.5

NbS  $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(1,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

$J$	$R(J)$	$P(J)$	$Q(J)$	$R(J)$	$P(J)$	$Q(J)$	$J$
6.5							6.5
7.5			8957.4849				7.5
8.5			8957.3332				8.5
9.5			8957.1502				9.5
10.5			8956.9316			9089.2231	10.5
11.5			8956.7502			9089.0356	11.5
12.5			8956.5273			9088.7940	12.5
13.5			8956.2491			9088.5619	13.5
14.5			8956.0039			9088.2813	14.5
15.5			8955.7367			9087.9800	15.5
16.5			8955.4029			9087.6642	16.5
17.5			8955.0727			9087.3472	17.5
18.5			8954.7286		9081.3973	9087.0088	18.5
19.5	8960.6020		8954.3687	9092.8464	9080.7523	9086.6355	19.5
20.5	8960.5177	8947.8494	8954.0100	9092.7652	9080.0541	9086.2470	20.5
21.5	8960.4290	8947.1204	8953.6255	9092.6613	9079.3776	9085.8469	21.5
22.5	8960.3069	8946.3971	8953.1873	9092.5307	9078.6187	9085.4268	22.5
23.5	8960.1876	8945.6584	8952.7574	9092.4031	9077.8859	9084.9964	23.5
24.5	8960.0224	8944.8931	8952.3124	9092.2484	9077.1320	9084.5395	24.5
25.5	8959.8527	8944.1351	8951.8295	9092.0640	9076.3498	9084.0621	25.5
26.5	8959.6190	8943.3340	8951.3487	9091.8705	9075.5654	9083.5646	26.5
27.5	8959.4452	8942.5346	8950.8311	9091.6610	9074.7327	9083.0469	27.5
28.5	8959.2299	8941.6946	8950.2989	9091.4327	9073.8814	9082.5161	28.5
29.5	8958.9832	8940.8406	8949.7610	9091.1787	9073.0941	9081.9728	29.5
30.5	8958.7049	8939.9882	8949.1962	9090.9159	9072.1710	9081.3973	30.5
31.5	8958.4314	8939.0885	8948.6138	9090.6205	9071.2868	9080.8015	31.5
32.5	8958.1122	8938.1820	8948.0082	9090.3175	9070.3810	9080.2025	32.5
33.5	8957.8339	8937.2674	8947.3829	9090.0030	9069.4450	9079.5690	33.5
34.5	8957.4849	8936.3271	8946.7485	9089.6576	9068.5094	9078.9261	34.5
35.5	8957.1266	8935.3687	8946.0982	9089.2741	9067.5335	9078.2565	35.5
36.5	8956.7502	8934.3887	8945.4099	9088.9112	9066.5389	9077.5817	36.5
37.5	8956.3523	8933.3944	8944.7255	9088.5072	9065.5544	9076.8806	37.5
38.5	8955.9291	8932.3623	8944.0119	9088.0867	9064.5269	9076.1642	38.5
39.5	8955.5146	8931.3387	8943.2844	9087.6642	9063.4857	9075.4186	39.5
40.5	8955.0727	8930.3036	8942.5346	9087.1938	9062.4495	9074.6661	40.5
41.5	8954.6045	8929.2112	8941.7660	9086.7199	9061.3572	9073.8814	41.5
42.5	8954.1173	8928.1331	8940.9770	9086.2470	9060.2622	9073.0941	42.5
43.5	8953.6255	8927.0250	8940.1706	9085.7149	9059.1421	9072.2840	43.5
44.5	8953.0950	8925.8819	8939.3446	9085.1891	9058.0084	9071.4485	44.5
45.5	8952.5600	8924.7804	8938.5070	9084.6314	9056.8524	9070.5935	45.5
46.5	8951.9906	8923.5969	8937.6473	9084.0621	9055.6864	9069.7171	46.5
47.5	8951.4187	8922.4024	8936.7684	9083.4847	9054.5003	9068.8414	47.5
48.5	8950.7961	8921.2121	8935.8712	9082.8701	9053.2739	9067.9330	48.5
49.5	8950.2129	8919.9757	8934.9749	9082.2483	9052.0775	9067.0019	49.5
50.5	8949.5508	8918.7535	8934.0140	9081.6038	9050.8360	9066.0614	50.5
51.5	8948.9205	8917.4859	8933.0677	9080.9462	9049.5486	9065.1003	51.5
52.5	8948.2485	8916.2367	8932.1026	9080.2641	9048.2712	9064.1165	52.5
53.5	8947.5500	8914.9391	8931.1011	9079.5690	9046.9798	9063.1116	53.5
54.5	8946.8554	8913.6360	8930.0972	9078.8478	9045.6502	9062.0988	54.5
55.5	8946.0982	8912.3117	8929.0748	9078.0999	9044.3094	9061.0611	55.5
56.5	8945.4099	8910.9320	8928.0322	9077.3361	9042.9547	9060.0019	56.5
57.5	8944.6197	8909.6029	8926.9625	9076.5679	9041.5889	9058.9264	57.5
58.5	8943.8122	8908.2193	8925.8819	9075.7861	9040.1829	9057.8342	58.5
59.5	8943.0306	8906.8195	8924.7804	9074.9751	9038.7840	9056.7244	59.5
60.5	8942.2194	8905.3843	8923.6569	9074.1358	9037.3335	9055.5880	60.5
61.5	8941.3697	8903.9689	8922.4930	9073.2846	9035.8807	9054.4389	61.5
62.5	8940.5032	8902.4946	8921.3595	9072.4175	9034.4294	9053.2739	62.5
63.5	8939.6525	8901.0217	8920.1901	9071.5314	9032.9398	9052.0775	63.5
64.5	8938.7468	8899.5405	8918.9909	9070.5935	9031.4225	9050.8738	64.5
65.5	8937.8333	8898.0165	8917.7797	9069.7171	9029.9200	9049.6545	65.5
66.5	8936.9065	8896.4982	8916.5497	9068.7573	9028.3545	9048.4084	66.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(1,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
67.5	8935.9529	8894.9475	8915.3140	9067.7926	9026.7990	9047.1464	67.5
68.5	8934.9749	8893.3713	8914.0321	9066.8134	9025.2233	9045.8580	68.5
69.5	8934.0140	8891.7953	8912.7488	9065.8185	9023.6187	9044.5680	69.5
70.5	8932.9985	8890.1784	8911.4431	9064.7817	9021.9987	9043.2416	70.5
71.5	8931.9646	8888.5734	8910.1195	9063.7433	9020.3614	9041.9071	71.5
72.5	8930.9229	8886.9153	8908.7721	9062.6952	9018.7031	9040.5559	72.5
73.5	8929.8719	8885.2589	8907.4155	9061.6159	9017.0457	9039.1792	73.5
74.5	8928.7941	8883.5762	8906.0452	9060.5261	9015.3460	9037.7812	74.5
75.5	8927.6869	8881.8938	8904.6407	9059.4154	9013.6368	9036.3772	75.5
76.5	8926.5765	8880.1765	8903.2298	9058.2796	9011.8882	9034.9412	76.5
77.5	8925.4415	8878.4470	8901.8048	9057.1305	9010.1523	9033.4939	77.5
78.5	8924.2453	8876.6900	8900.3342	9055.9599	9008.3881	9032.0275	78.5
79.5	8923.1063	8874.9247	8898.8691	9054.7695	9006.5998	9030.5382	79.5
80.5	8921.9124	8873.1369	8897.3814	9053.5614	9004.8021	9029.0349	80.5
81.5	8920.7079	8871.3536	8895.8665	9052.3349	9002.9757	9027.5107	81.5
82.5	8919.4750	8869.5089	8894.3419	9051.0922	9001.1379	9025.9631	82.5
83.5	8918.2349	8867.6603	8892.7986	9049.8301	8999.2762	9024.4051	83.5
84.5	8916.9700	8865.8027	8891.2329	9048.5458	8997.3934	9022.8229	84.5
85.5	8915.6798	8863.9181	8889.6490	9047.2487	8995.4974	9021.2278	85.5
86.5	8914.3801	8862.0142	8888.0453	9045.9310	8993.5830	9019.6093	86.5
87.5	8913.0590	8860.1026	8886.4308	9044.5680	8991.6436	9017.9716	87.5
88.5	8911.7186	8858.1623	8884.7949	9043.2416	8989.7020	9016.3203	88.5
89.5	8910.3547	8856.2142	8883.1296	9041.8553	8987.7310	9014.6432	89.5
90.5	8908.9717	8854.2347	8881.4602	9040.4568	8985.7404	9012.9522	90.5
91.5	8907.5689	8852.2676	8879.7702	9039.0418	8983.7311	9011.2424	91.5
92.5	8906.1543	8850.2386	8878.0510	9037.6103	8981.6976	9009.5073	92.5
93.5	8904.7350	8848.2037	8876.3257	9036.1563	8979.6527	9007.7618	93.5
94.5	8903.2779	8846.1154	8874.5749	9034.6953	8977.5956	9005.9899	94.5
95.5	8901.8048	8844.1238	8872.8035	9033.1991	8975.5090	9004.2108	95.5
96.5	8900.3342	8842.0113	8871.0260	9031.6907	8973.4068	9002.4039	96.5
97.5	8898.8275	8839.9213	8869.2137	9030.1869	8971.2946	9000.5798	97.5
98.5	8897.2861	8837.8174	8867.3905	9028.6213	8969.1473	8998.7368	98.5
99.5	8895.7432	8835.6436	8865.5468	9027.0551	8966.9947	8996.8775	99.5
100.5	8894.1700	8833.5054	8863.6930	9025.4698	8964.8489	8994.9972	100.5
101.5	8892.6016	8831.3290	8861.8116	9023.8670	8962.6359	8993.0929	101.5
102.5	8890.9818	8829.1367	8859.9155	9022.2529	8960.4290	8991.1830	102.5
103.5	8889.3655	8826.9234	8858.0000	9020.6082	8958.1873	8989.2494	103.5
104.5	8887.7257	8824.6901	8856.0634	9018.9439	8955.9291	8987.2941	104.5
105.5	8886.0837	8822.4447	8854.1091	9017.2721	8953.6948	8985.3188	105.5
106.5	8884.4024	8820.1770	8852.1397	9015.5819	8951.3789	8983.3302	106.5
107.5	8882.7146	8817.9010	8850.1472	9013.8604	8949.0773	8981.3191	107.5
108.5	8880.9917	8815.5775	8848.1429	9012.1274	8946.7485	8979.2879	108.5
109.5	8879.2858	8813.2665	8846.1154	9010.3686	8944.4058	8977.2425	109.5
110.5	8877.4996	8810.9083	8844.0641	9008.6053	8942.0457	8975.1708	110.5
111.5	8875.7416	8808.5666	8842.0113	9006.8009	8939.6525	8973.0895	111.5
112.5	8873.9576	8806.1905	8839.9213	9004.9940	8937.2674	8970.9909	112.5
113.5	8872.1527	8803.7953	8837.8174	9003.1709	8934.8435	8968.8629	113.5
114.5	8870.3217	8801.3725	8835.7014	9001.3222	8932.4117	8966.7227	114.5
115.5	8868.4748	8798.9413	8833.5656	8999.4608	8929.9484	8964.5613	115.5
116.5	8866.6050	8796.4969	8831.4050	8997.5750	8927.4656	8962.3844	116.5
117.5	8864.7345	8794.0403	8829.2328	8995.6805	8924.9889	8960.1876	117.5
118.5	8862.8351	8791.5531	8827.0381	8993.7455	8922.4930	8957.9696	118.5
119.5	8860.9069	8789.0403	8824.8279	8991.7998	8919.9757	8955.7367	119.5
120.5	8858.9699	8786.5079	8822.5905	8989.8499	8917.4371	8953.4854	120.5
121.5	8857.0222	8783.9724	8820.3443	8987.8628	8914.8417	8951.2099	121.5
122.5	8855.0348	8781.4114	8818.0788	8985.8677	8912.2746	8948.9205	122.5
123.5	8853.0420	8778.8257	8815.7851	8983.8483	8909.6656	8946.6110	123.5
124.5	8851.0288	8776.2330	8813.4907	8981.8138	8907.0489	8944.2850	124.5
125.5	8849.0059	8773.6148	8811.1662	8979.7632	8904.4049	8941.9421	125.5
126.5	8846.9613	8770.9909	8808.8224	8977.6840	8901.7470	8939.5689	126.5
127.5	8844.8894	8768.3341	8806.4595	8975.5985	8899.0772	8937.1840	127.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(1,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
128.5	8842.8049	8765.6599	8804.0670	8973.4866	8896.3713	8934.7849	128.5
129.5	8840.6858	8762.9803	8801.6784	8971.3635	8893.6576	8932.3623	129.5
130.5	8838.5779	8760.2574	8799.2640	8969.2037	8890.9248	8929.9209	130.5
131.5	8836.4260	8757.5272	8796.8372	8967.0287	8888.1702	8927.4656	131.5
132.5	8834.2668	8754.7785	8794.3770	8964.8489	8885.4094	8924.9889	132.5
133.5	8832.0823	8752.0204	8791.9009	8962.6359	8882.6153	8922.4930	133.5
134.5	8829.8780	8749.2492	8789.4144	8960.4290	8879.7702	8919.9757	134.5
135.5	8827.6646	8746.4462	8786.9144	8958.1873	8876.9806	8917.4371	135.5
136.5	8825.4235	8743.6331	8784.3792	8955.9291	8874.1424	8914.8884	136.5
137.5	8823.1771	8740.7828	8781.8346	8953.6255	8871.2841	8912.3117	137.5
138.5	8820.8978	8737.9364	8779.2656	8951.3487	8868.4052	8909.7245	138.5
139.5	8818.6045	8735.0607	8776.6851	8949.0259	8865.4760	8907.1197	139.5
140.5	8816.2900	8732.1917	8774.0867	8946.6725	8862.5922	8904.4949	140.5
141.5	8813.9669	8729.2632	8771.4672	8944.3208	8859.6480	8901.8445	141.5
142.5	8811.6242	8726.3297	8768.8259	8941.9421	8856.6899	8899.1820	142.5
143.5	8809.2546	8723.3811	8766.1766	8939.5689	8853.7221	8896.4982	143.5
144.5	8806.8578	8720.4090	8763.4921	8937.1095	8850.7263	8893.7958	144.5
145.5	8804.4610	8717.4355	8760.8005	8934.7129	8847.7421	8891.0704	145.5
146.5	8802.0344	8714.4286	8758.0859	8932.2623	8844.7099	8888.3344	146.5
147.5	8799.5835	8711.4069	8755.3615	8929.7934	8841.6660	8885.5764	147.5
148.5	8797.1305	8708.3773	8752.6080	8927.3021	8838.5779	8882.8014	148.5
149.5	8794.6706	8705.3092	8749.8336	8924.7804	8835.5043	8880.0114	149.5
150.5	8792.1364	8702.2696	8747.0497	8922.2648	8832.4051	8877.1892	150.5
151.5	8789.6217	8699.1545	8744.2429	8919.7350	8829.2681	8874.3601	151.5
152.5	8787.0999	8696.0345	8741.4158	8917.1674	8826.1408	8871.5080	152.5
153.5	8784.5381	8692.9030	8738.5869	8914.5614	8822.9805	8868.6375	153.5
154.5	8781.9577	8689.7514	8735.7131	8911.9750	8819.8234	8865.7508	154.5
155.5	8779.3699	8686.5985	8732.8381	8909.3631	8816.6094	8862.8351	155.5
156.5	8776.7502	8683.4102	8729.9411	8906.7091	8813.4158	8859.9155	156.5
157.5	8774.1610	8680.1888	8727.0319	8904.0576	8810.1471	8856.9722	157.5
158.5	8771.4672	8676.9771	8724.0873	8901.3875	8806.9149	8854.0095	158.5
159.5	8768.8259	8673.7335	8721.1390	8898.6903	8803.6509	8851.0288	159.5
160.5	8766.1459	8670.4901	8718.1637	8895.9688	8800.3542	8848.0222	160.5
161.5	8763.4417	8667.2024	8715.1642	8893.2435	8797.0544	8845.0073	161.5
162.5	8760.7157	8663.9053	8712.1689	8890.4801	8793.7225	8841.9718	162.5
163.5	8757.9472	8660.5947	8709.1336	8887.7257	8790.3805	8838.9210	163.5
164.5	8755.1968	8657.2604	8706.0892	8884.9425	8787.0325	8835.8363	164.5
165.5	8752.4209	8653.9141	8703.0080	8882.1135	8783.6509	8832.7374	165.5
166.5	8749.5998	8650.5509	8699.9408	8879.2858	8780.2647	8829.6271	166.5
167.5	8746.7959	8647.1503	8696.8329	8876.4385	8776.8353	8826.4961	167.5
168.5	8743.9578	8643.7651	8693.7329	8873.5714	8773.4092	8823.3499	168.5
169.5	8741.1128	8640.3445	8690.5741	8870.6819	8769.9500	8820.1770	169.5
170.5	8738.2344	8636.8667	8687.4167	8867.7913	8766.4845	8816.9913	170.5
171.5	8735.3274	8633.4254	8684.2414	8864.8636	8762.9803	8813.7833	171.5
172.5	8732.4239	8629.9629	8681.0475	8861.9115	8759.4850	8810.5535	172.5
173.5	8729.4939	8626.4449	8677.8292	8858.9699	8755.9513	8807.3158	173.5
174.5	8726.5494	8622.9341	8674.5996	8855.9693	8752.3995	8804.0670	174.5
175.5	8723.5940	8619.3999	8671.3484	8852.9838	8748.8410	8800.7779	175.5
176.5	8720.5903	8615.8538	8668.0809	8849.9578	8745.2550	8797.4641	176.5
177.5	8717.5793	8612.2852	8664.7918	8846.9206	8741.6751	8794.1637	177.5
178.5	8714.5627	8608.6860	8661.4984	8843.8841	8738.0473	8790.8177	178.5
179.5	8711.5251	8605.0825	8658.1883	8840.8098	8734.4063	8787.4597	179.5
180.5	8708.4680	8601.4618	8654.8202	8837.7165	8730.7480	8784.1146	180.5
181.5	8705.3884	8597.8121	8651.4444	8834.5949	8727.0801	8780.6927	181.5
182.5	8702.2696	8594.1661	8648.0809	8831.4703	8723.3811	8777.2809	182.5
183.5	8699.1545	8590.4766	8644.6826	8828.3214	8719.6614	8773.8521	183.5
184.5	8696.0345	8586.7570	8641.2639	8825.1536	8715.9417	8770.3945	184.5
185.5	8692.8680	8583.0546	8637.8173	8821.9691	8712.1689	8766.9522	185.5
186.5	8689.6585	8579.3299	8634.3946	8818.7703	8708.4176	8763.4534	186.5
187.5	8686.5113	8575.5706	8630.8889	8815.5393		8759.9493	187.5
188.5	8683.2834	8571.7957	8627.4078	8812.2886		8756.4271	188.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(1,0)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
189.5	8680.0533	8568.0024	8623.9060	8809.0213		8752.8785	189.5
190.5	8676.8024	8564.2094	8620.3599	8805.7310		8749.3276	190.5
191.5	8673.5643	8560.3734	8616.8253	8802.4547		8745.7524	191.5
192.5	8670.2496	8556.5289	8613.2540	8799.1461		8742.1514	192.5
193.5	8666.9418	8552.6673	8609.6807	8795.7901		8738.5251	193.5
194.5	8663.6178	8548.7783	8606.0671	8792.4324		8734.9010	194.5
195.5	8660.2860		8602.4467	8789.0691		8731.2597	195.5
196.5	8656.9127		8598.8129	8785.6612		8727.5759	196.5
197.5	8653.5163		8595.1345	8782.2462		8723.8795	197.5
198.5	8650.1247		8591.4899	8778.8257		8720.1789	198.5
199.5	8646.7179		8587.7697	8775.3386		8716.4452	199.5
200.5	8643.2898		8584.0547	8771.8977		8712.6965	200.5
201.5	8639.8274		8580.3161	8768.4067		8708.9291	201.5
202.5	8636.3562		8576.5672	8764.8946		8705.1450	202.5
203.5	8632.8486		8572.8080	8761.3734		8701.3362	203.5
204.5	8629.3450		8569.0370	8757.8213		8697.5261	204.5
205.5	8625.8011		8565.2070	8754.2792		8693.6869	205.5
206.5	8622.2587		8561.3728	8750.7128		8689.8243	206.5
207.5	8618.7018		8557.5482	8747.1164		8685.9575	207.5
208.5	8615.0826		8553.6580	8743.4590		8682.0448	208.5
209.5	8611.5127		8549.7907	8739.8163		8678.1398	209.5
210.5	8607.8763		8545.9257	8736.1823		8674.1784	210.5
211.5	8604.2493		8541.9733	8732.4948		8670.2496	211.5
212.5	8600.5623		8538.0474	8728.7869		8666.2703	212.5
213.5	8596.8932		8534.0776	8725.0891		8662.2877	213.5
214.5			8530.0981	8721.3451		8658.2821	214.5
215.5			8526.1203	8717.5793		8654.2752	215.5
216.5			8522.1066	8713.8069		8650.2340	216.5
217.5			8518.0839	8710.0443		8646.1482	217.5
218.5			8514.0422	8706.2338		8642.0622	218.5
219.5			8509.9538	8702.4002		8637.9612	219.5
220.5			8505.8756	8698.5737		8633.8539	220.5
221.5			8501.7545	8694.7027		8629.7207	221.5
222.5			8497.6348	8690.7955		8625.5552	222.5
223.5			8493.5063	8686.9164		8621.3709	223.5
224.5			8489.3637	8682.9856		8617.1839	224.5
225.5			8485.1657	8679.0300		8612.9767	225.5
226.5			8480.9764	8675.0858		8608.7394	226.5
227.5			8476.7470	8671.1103		8604.4871	227.5
228.5			8472.5343	8667.1087		8600.2184	228.5
229.5			8468.2657	8663.0892		8595.9472	229.5
230.5			8464.0090	8659.0555		8591.6301	230.5
231.5			8459.7025	8655.0014		8587.3038	231.5
232.5			8455.4099				232.5
233.5			8451.0826				233.5
234.5			8446.7340				234.5
235.5							235.5
236.5							236.5

NbS  $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(2,1)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

$J$	$R(J)$	$P(J)$	$Q(J)$	$R(J)$	$P(J)$	$Q(J)$	$J$
5.5							5.5
6.5		8907.8449					6.5
7.5		8907.4155	8909.7245				7.5
8.5		8906.9513	8909.5626				8.5
9.5		8906.4702	8909.3631				9.5
10.5		8905.9987	8909.1827				10.5
11.5		8905.4779	8908.9717			9041.3237	11.5
12.5		8904.9240	8908.7436			9041.0699	12.5
13.5		8904.4049	8908.4969			9040.8212	13.5
14.5		8903.7945	8908.2193			9040.5559	14.5
15.5		8903.2298	8907.9292			9040.2948	15.5
16.5		8902.6098	8907.6222			9039.9709	16.5
17.5		8902.0351	8907.2959		9034.3004	9039.6393	17.5
18.5		8901.3875	8906.9513		9033.6591	9039.3155	18.5
19.5		8900.7145	8906.5965		9032.9981	9038.9236	19.5
20.5		8900.0312	8906.2373		9032.3237	9038.5388	20.5
21.5		8899.3546	8905.8184		9031.6208	9038.1667	21.5
22.5		8898.6355	8905.4092		9030.8995	9037.7077	22.5
23.5		8897.8910	8904.9674		9030.1869	9037.2971	23.5
24.5	8912.2257	8897.1607	8904.5239		9029.4377	9036.8544	24.5
25.5	8912.0369	8896.3713	8904.0576		9028.6213	9036.3772	25.5
26.5	8911.8590	8895.6024	8903.5607		9027.8504	9035.8807	26.5
27.5	8911.6534	8894.7551	8903.0587	9043.9583	9027.0551	9035.3741	27.5
28.5	8911.4431	8893.9486	8902.5250	9043.7136	9026.2498	9034.8335	28.5
29.5	8911.2068	8893.0986	8901.9783	9043.4905	9025.3775	9034.2863	29.5
30.5	8910.9320	8892.2511	8901.4301	9043.2416	9024.5159	9033.7232	30.5
31.5	8910.6288	8891.3672	8900.8471	9042.9338	9023.6187	9033.1356	31.5
32.5	8910.3547	8890.4468	8900.2579	9042.6077	9022.7302	9032.5354	32.5
33.5	8910.0286	8889.5192	8899.6365	9042.3171	9021.7885	9031.9168	33.5
34.5	8909.6729	8888.6138	8899.0011	9041.9930	9020.8759	9031.2689	34.5
35.5	8909.3440	8887.6428	8898.3596	9041.5889	9019.9059	9030.5984	35.5
36.5	8908.9717	8886.6845	8897.6671	9041.2205	9018.9439	9029.9200	36.5
37.5	8908.5676	8885.6669	8896.9698	9040.8212	9017.8884	9029.2254	37.5
38.5	8908.1640	8884.6842	8896.2754	9040.3954	9016.9207	9028.5172	38.5
39.5	8907.7485	8883.6655	8895.5436	9039.9709	9015.8864	9027.7836	39.5
40.5	8907.2959	8882.6153	8894.7926	9039.5185	9014.8438	9027.0279	40.5
41.5	8906.8195	8881.5349	8894.0382	9039.0418	9013.7591	9026.2498	41.5
42.5	8906.3472	8880.4415	8893.2435	9038.5388	9012.6592	9025.4698	42.5
43.5	8905.8331	8879.3488	8892.4425	9038.0456	9011.5537	9024.6511	43.5
44.5	8905.3092	8878.2134	8891.6305	9037.5140	9010.4474	9023.7805	44.5
45.5	8904.7792	8877.0963	8890.7727	9036.9869	9009.2786	9022.9808	45.5
46.5	8904.2115	8875.9517	8889.9289	9036.3772	9008.1197	9022.1090	46.5
47.5	8903.6476	8874.7712	8889.0656	9035.8129	9006.9031	9021.2278	47.5
48.5	8903.0587	8873.5714	8888.1702	9035.2112	9005.7415	9020.3445	48.5
49.5	8902.4454	8872.3564	8887.2530	9034.5932	9004.5514	9019.4066	49.5
50.5	8901.8048	8871.1269	8886.3094	9033.9568	9003.2758	9018.4643	50.5
51.5	8901.1483	8869.8720	8885.3489	9033.3077	9002.0253	9017.5105	51.5
52.5	8900.4904	8868.6032	8884.4024	9032.6215	9000.7349	9016.5309	52.5
53.5	8899.7956	8867.3250	8883.4201	9031.9168	8999.4608	9015.5481	53.5
54.5	8899.0772	8866.0123	8882.4083	9031.2045	8998.1307	9014.5199	54.5
55.5	8898.3596	8864.6974	8881.3964	9030.4734	8996.7973	9013.4902	55.5
56.5	8897.6179	8863.3786	8880.3571	9029.7232	8995.4974	9012.4389	56.5
57.5	8896.8822	8861.9958	8879.2858	9028.9459	8994.0894	9011.3758	57.5
58.5	8896.0925	8860.6160	8878.2134	9028.1655	8992.7011	9010.2683	58.5
59.5	8895.2974	8859.2212	8877.0963	9027.3643	8991.2946	9009.1729	59.5
60.5	8894.4827	8857.8149	8875.9987	9026.5294	8989.8499	9008.0501	60.5
61.5	8893.6576	8856.3894	8874.8608	9025.6803	8988.4076	9006.9031	61.5
62.5	8892.7986	8854.9486	8873.7164	9024.8167	8986.9635	9005.7415	62.5
63.5	8891.9079	8853.4505	8872.5363	9023.9384	8985.4693	9004.5514	63.5
64.5	8891.0408	8851.9777	8871.3536	9023.0306	8983.9799	9003.3545	64.5
65.5	8890.1242	8850.4683	8870.1467	9022.1090	8982.4525	9002.1389	65.5

**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(2,1)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
66.5	8889.1953	8848.9459	8868.9253	9021.1755	8980.9220	9000.9068	66.5
67.5	8888.2621	8847.4021	8867.6603	9020.2186	8979.3830	8999.6446	67.5
68.5	8887.3005	8845.8316	8866.4048	9019.2408	8977.8063	8998.3690	68.5
69.5	8886.3094	8844.2425	8865.1403	9018.2478	8976.2049	8997.0729	69.5
70.5	8885.2831	8842.6527	8863.8321	9017.2368	8974.6016	8995.7722	70.5
71.5	8884.2640	8841.0464	8862.5118	9016.2025	8972.9586	8994.4262	71.5
72.5	8883.2294	8839.4153	8861.1788	9015.1465	8971.2946	8993.0929	72.5
73.5	8882.1918	8837.7498	8859.8164	9014.0740	8969.6571	8991.7171	73.5
74.5	8881.1020	8836.0823	8858.4458	9012.9522	8967.9774	8990.3284	74.5
75.5	8880.0114	8834.3835	8857.0613	9011.8882	8966.2824	8988.9280	75.5
76.5	8878.9126	8832.6899	8855.6498	9010.7627	8964.5613	8987.5038	76.5
77.5	8877.7890	8830.9617	8854.2347	9009.6129	8962.8140	8986.0616	77.5
78.5	8876.6126	8829.2328	8852.7673	9008.4600	8961.0559	8984.6030	78.5
79.5	8875.4681	8827.4554	8851.2961	9007.2722	8959.2802	8983.1193	79.5
80.5	8874.2770	8825.6641	8849.8161	9006.0615	8957.4849	8981.6271	80.5
81.5	8873.0613	8823.8599	8848.3244	9004.8453	8955.6738	8980.1061	81.5
82.5	8871.8382	8822.0885	8846.8023	9003.6066	8953.8224	8978.5718	82.5
83.5	8870.6168	8820.2207	8845.2643	9002.3548	8951.9906	8977.0190	83.5
84.5	8869.3469	8818.3622	8843.6989	9001.0746	8950.1107	8975.4465	84.5
85.5	8868.0805	8816.4877	8842.1273	8999.7814	8948.2485	8973.8584	85.5
86.5	8866.7656	8814.6019	8840.5350	8998.4725	8946.3225	8972.2554	86.5
87.5	8865.4523	8812.6835	8838.9210	8997.1492	8944.4058	8970.6246	87.5
88.5	8864.1061	8810.7638	8837.2817	8995.8223	8942.4540	8968.9735	88.5
89.5	8862.7516	8808.8224	8835.6436	8994.4262	8940.5032	8967.3108	89.5
90.5	8861.3838	8806.8578	8833.9665	8993.0371	8938.5070	8965.6222	90.5
91.5	8859.9875	8804.8639	8832.2802	8991.6436	8936.5037	8963.9184	91.5
92.5	8858.5815	8802.8515	8830.5859	8990.1951	8934.5071	8962.2011	92.5
93.5	8857.1426	8800.8449	8828.8501	8988.7588	8932.4535	8960.4290	93.5
94.5	8855.6976	8798.8021	8827.1073	8987.2941	8930.3889	8958.7049	94.5
95.5	8854.2347	8796.7365	8825.3503	8985.8204	8928.3394	8956.9316	95.5
96.5	8852.7673	8794.6706	8823.5704	8984.3100	8926.2419	8955.1371	96.5
97.5	8851.2961	8792.5950	8821.7760	8982.7909	8924.1344	8953.3127	97.5
98.5	8849.7435	8790.4651	8819.9606	8981.2612	8922.0088	8951.4811	98.5
99.5	8848.2037	8788.3431	8818.1164		8919.8595	8949.6337	99.5
100.5	8846.6329	8786.1878	8816.2900	8978.1243	8917.6976	8947.7671	100.5
101.5	8845.0611	8784.0358	8814.3858	8976.5335	8915.5063	8945.8766	101.5
102.5	8843.4726	8781.8346	8812.5107	8974.9312	8913.3177	8943.9784	102.5
103.5	8841.8530	8779.6349	8810.6029	8973.2859	8911.0933	8942.0457	103.5
104.5	8840.2295	8777.4237	8808.6683	8971.6426	8908.8532	8940.1016	104.5
105.5	8838.5779	8775.1874	8806.7322	8969.9776	8906.5965	8938.1399	105.5
106.5	8836.9086	8772.9170	8804.7758	8968.3077	8904.3309	8936.1556	106.5
107.5	8835.2100	8770.6558	8802.7810	8966.5782	8902.0351	8934.1611	107.5
108.5	8833.5054	8768.3720	8800.7779	8964.8489	8899.7199	8932.1349	108.5
109.5	8831.7870	8766.0367	8798.7744	8963.1119	8897.3814	8930.0972	109.5
110.5	8830.0381	8763.7136	8796.7365	8961.3376	8895.0552	8928.0322	110.5
111.5	8828.2746	8761.3734	8794.6706	8959.5909	8892.6807	8925.9706	111.5
112.5	8826.4961	8758.9900	8792.5950	8957.7764	8890.2796	8923.8811	112.5
113.5	8824.6901	8756.6009	8790.5074	8955.9291	8887.8814	8921.7664	113.5
114.5	8822.8633	8754.1969	8788.3821	8954.1173	8885.4565	8919.6337	114.5
115.5	8821.0481	8751.7934	8786.2624	8952.2713	8883.0342	8917.4859	115.5
116.5	8819.2084	8749.3276	8784.1146	8950.3991	8880.5431	8915.3140	116.5
117.5	8817.3072	8746.9017	8781.9577	8948.4908	8878.0510	8913.1416	117.5
118.5	8815.4280	8744.4054	8779.7619	8946.6110	8875.5933	8910.9320	118.5
119.5	8813.4907	8741.8677	8777.5582	8944.6759	8873.0613	8908.7112	119.5
120.5	8811.5762	8739.4006	8775.3386	8942.7013	8870.5344	8906.4702	120.5
121.5	8809.6315	8736.8749	8773.1068	8940.7327	8867.9886	8904.2115	121.5
122.5	8807.6661	8734.3048	8770.8348	8938.7468	8865.3979	8901.9281	122.5
123.5	8805.6679	8731.7509	8768.5626	8936.7684	8862.8351	8899.6365	123.5
124.5	8803.6936	8729.1666	8766.2741	8934.7129	8860.2167	8897.3108	124.5
125.5	8801.6784	8726.5494	8763.9514	8932.6687	8857.5823	8894.9774	125.5
126.5	8799.5835	8723.9446	8761.6339	8930.6197	8854.9486	8892.6363	126.5

NbS  $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

(2,1)

$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

$J$	$R(J)$	$P(J)$	$Q(J)$	$R(J)$	$P(J)$	$Q(J)$	$J$
127.5	8797.5516	8721.2831	8759.2698	8928.5357	8852.2975	8890.2796	127.5
128.5	8795.4863	8718.6267	8756.8919	8926.4215	8849.5956	8887.8814	128.5
129.5	8793.3900	8715.9417	8754.5124	8924.2997	8846.9206	8885.4565	129.5
130.5	8791.2584	8713.2631	8752.1076	8922.1735	8844.1901	8883.0342	130.5
131.5	8789.1222	8710.5401	8749.6877		8841.4575	8880.5849	131.5
132.5	8786.9730	8707.8115	8747.2483	8917.8451	8838.6971	8878.1190	132.5
133.5	8784.8078	8705.0514	8744.7875	8915.6519	8835.9181	8875.6448	133.5
134.5	8782.6162	8702.2696	8742.2951	8913.4414	8833.1054	8873.1369	134.5
135.5	8780.3947	8699.5056	8739.7919	8911.2068	8830.3341	8870.6168	135.5
136.5	8778.1686	8696.6869	8737.2670	8908.9717	8827.4973	8868.0805	136.5
137.5	8775.9170	8693.8660	8734.7488	8906.7091	8824.6522	8865.5468	137.5
138.5	8773.6611	8691.0221	8732.1917	8904.4049	8821.7760	8862.9525	138.5
139.5	8771.3905	8688.1494	8729.6266	8902.1021	8818.8988	8860.3593	139.5
140.5	8769.0845	8685.2750	8727.0319	8899.7956	8815.9917	8857.7437	140.5
141.5	8766.7556	8682.3914	8724.4299	8897.4626	8813.0880	8855.1043	141.5
142.5	8764.4119	8679.4752	8721.7947	8895.0552	8810.1471	8852.4648	142.5
143.5	8762.0738	8676.5503	8719.1413	8892.6807	8807.1818	8849.8161	143.5
144.5	8759.6882	8673.6091	8716.5119	8890.2796	8804.2161	8847.0992	144.5
145.5	8757.2775	8670.6060	8713.8069	8887.8831	8801.2137	8844.4015	145.5
146.5	8754.8773		8711.0942	8885.4565	8798.2329	8841.6660	146.5
147.5	8752.4209		8708.3773	8882.9808	8795.1722	8838.9210	147.5
148.5	8750.0067		8705.6480	8880.5431	8792.1364	8836.1750	148.5
149.5	8747.5351		8702.8929	8878.0510	8789.0691	8833.4002	149.5
150.5	8745.0230		8700.1229	8875.5033	8785.9839	8830.5859	150.5
151.5	8742.5324		8697.3247	8872.9947	8782.8914	8827.7907	151.5
152.5	8739.9947		8694.4988	8870.4337	8779.7619	8824.9534	152.5
153.5	8737.4582		8691.6693	8867.8759	8776.6248	8822.0885	153.5
154.5	8734.9010		8688.8234	8865.2668	8773.4733	8819.2260	154.5
155.5	8732.3191		8685.9575	8862.6579	8770.2727	8816.3482	155.5
156.5	8729.7098		8683.0809	8860.0653	8767.0944	8813.4158	156.5
157.5	8727.0801		8680.1888	8857.4109	8763.8797	8810.4958	157.5
158.5	8724.4299		8677.2472	8854.7582	8760.6631	8807.5497	158.5
159.5	8721.7947		8674.3178	8852.0775	8757.4144	8804.5830	159.5
160.5	8719.1413		8671.3484	8849.3809	8754.1406	8801.5959	160.5
161.5	8716.4452		8668.3823	8846.6495	8750.8266	8798.6002	161.5
162.5	8713.7153		8665.3631	8843.9426	8747.5351	8795.5820	162.5
163.5	8710.9990		8662.3502	8841.1733	8744.2429	8792.5391	163.5
164.5	8708.2423		8659.3255	8838.3915	8740.8789	8789.4737	164.5
165.5	8705.4771		8656.2675	8835.5971	8737.5261	8786.4079	165.5
166.5	8702.6884		8653.2292		8734.1245	8783.3085	166.5
167.5	8699.8756		8650.1080	8829.9616	8730.7480	8780.1960	167.5
168.5	8697.0469		8646.9947	8827.1073	8727.3030	8777.0781	168.5
169.5	8694.2033		8643.8653	8824.2281	8723.8795	8773.9156	169.5
170.5	8691.3541		8640.7460	8821.3492	8720.4090	8770.7472	170.5
171.5	8688.4657		8637.5711	8818.4610	8716.9611	8767.5522	171.5
172.5	8685.5627		8634.3946	8815.5393	8713.4809	8764.3616	172.5
173.5	8682.6493		8631.1853	8812.5895	8709.9503	8761.1205	173.5
174.5	8679.7201		8627.9732	8809.6315	8706.4302	8757.8887	174.5
175.5			8624.7398	8806.6229	8702.8929	8754.6247	175.5
176.5			8621.4833	8803.6509	8699.3266	8751.3430	176.5
177.5			8618.1953		8695.7482	8748.0631	177.5
178.5			8614.9157			8744.7425	178.5
179.5			8611.6158			8741.4158	179.5
180.5			8608.2761			8738.0473	180.5
181.5			8604.9450			8734.6689	181.5
182.5			8601.5661			8731.2597	182.5
183.5			8598.1967			8727.8768	183.5
184.5			8594.7874			8724.4299	184.5
185.5			8591.3573			8720.9933	185.5
186.5			8587.9166			8717.5385	186.5
187.5			8584.4706			8714.0642	187.5

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**NbS**     $e^2\Phi \rightarrow a^2\Delta$  rotational lines.

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**(2,1)**

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$e^2\Phi_{5/2} \rightarrow a^2\Delta_{3/2}$

$e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
188.5						8710.5687	188.5
189.5						8707.0386	189.5
190.5						8703.4993	190.5
191.5						8699.9408	191.5
192.5						8696.3704	192.5
193.5							193.5
194.5						8689.1703	194.5
195.5						8685.5251	195.5
196.5						8681.8793	196.5
197.5							197.5
198.5							198.5
199.5							199.5
200.5							200.5
201.5						8663.3600	201.5
202.5						8659.6270	202.5
203.5						8655.8327	203.5
204.5						8652.0420	204.5
205.5						8648.2198	205.5
206.5						8644.3850	206.5
207.5						8640.5397	207.5
208.5						8636.6665	208.5
209.5						8632.7737	209.5
210.5						8628.8642	210.5
211.5						8624.9474	211.5
212.5						8621.0022	212.5
213.5						8617.0376	213.5
214.5						8613.0757	214.5
215.5						8609.0597	215.5
216.5						8605.0371	216.5
217.5						8601.0247	217.5
218.5						8596.9505	218.5
219.5						8592.8821	219.5
220.5						8588.7936	220.5
221.5						8584.6832	221.5
222.5						8580.5545	222.5
223.5						8576.4042	223.5
224.5						8572.2714	224.5
225.5						8568.0530	225.5
226.5						8563.8582	226.5
227.5						8559.6370	227.5
228.5						8555.4077	228.5
229.5						8551.1477	229.5
230.5						8546.8610	230.5
231.5						8542.5786	231.5
232.5						8538.2753	232.5
233.5						8533.9384	233.5
234.5						8529.5889	234.5
235.5							235.5
236.5							236.5

**NbS**  $e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$  rotational lines.

(3,2)				(3,1)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
19.5							19.5
20.5				9553.6957			20.5
21.5				9553.5627			21.5
22.5				9553.4117	9539.6182		22.5
23.5				9553.2370	9538.8544		23.5
24.5				9553.0479	9538.0730	9545.4225	24.5
25.5				9552.8937	9537.2638	9544.9070	25.5
26.5			8988.9851	9552.6366	9536.4414	9544.3908	26.5
27.5			8988.4896	9552.3820	9535.5879	9543.8560	27.5
28.5			8987.9574	9552.1313	9534.7468	9543.2824	28.5
29.5			8987.3983	9551.8609	9533.8356	9542.7055	29.5
30.5			8986.8363	9551.5365	9532.9633		30.5
31.5			8986.2576	9551.2283	9532.0307	9541.4892	31.5
32.5			8985.6573	9550.8874	9531.0705	9540.8384	32.5
33.5			8985.0619	9550.5299	9530.1257	9540.1816	33.5
34.5			8984.3953	9550.1538	9529.1504	9539.4898	34.5
35.5			8983.7311	9549.7498	9528.1370	9538.8130	35.5
36.5			8983.0618	9549.3467	9527.1414	9538.0730	36.5
37.5			8982.3637	9548.8787	9526.0821	9537.3363	37.5
38.5			8981.6271	9548.4341	9525.0425	9536.5731	38.5
39.5			8980.9220	9547.9501	9523.9453	9535.8094	39.5
40.5			8980.1776	9547.4431	9522.8427	9535.0063	40.5
41.5			8979.3830	9546.9036	9521.7484	9534.1842	41.5
42.5			8978.6312	9546.3957	9520.5842	9533.3322	42.5
43.5			8977.8301	9545.8354	9519.4395	9532.4821	43.5
44.5			8977.0190	9545.2518	9518.2653	9531.6234	44.5
45.5			8976.1641	9544.6442	9517.0722	9530.7153	45.5
46.5			8975.3059	9544.0382	9515.8440	9529.7932	46.5
47.5			8974.4230	9543.4204	9514.6322	9528.8607	47.5
48.5			8973.4866	9542.7283	9513.3657	9527.9056	48.5
49.5			8972.5999	9542.0468	9512.1173	9526.9260	49.5
50.5			8971.6703	9541.3888	9510.7833	9525.9353	50.5
51.5			8970.7071	9540.6686	9509.5255	9524.9195	51.5
52.5			8969.7470	9539.9167	9508.1517	9523.8631	52.5
53.5			8968.7628	9539.1322	9506.7968	9522.8427	53.5
54.5			8967.7553	9538.3896	9505.4172	9521.7484	54.5
55.5			8966.7227	9537.6138	9504.0291	9520.6505	55.5
56.5			8965.6765	9536.7661	9502.6215	9519.5420	56.5
57.5			8964.6320	9535.9252	9501.1936	9518.4141	57.5
58.5			8963.5490	9535.0760	9499.7402	9517.2592	58.5
59.5			8962.4427	9534.1842	9498.2833	9516.0918	59.5
60.5			8961.3179	9533.3090	9496.8022	9514.8915	60.5
61.5			8960.1876	9532.4239	9495.2444	9513.6766	61.5
62.5			8959.0347	9531.4887	9493.7342	9512.4395	62.5
63.5			8957.8339	9530.5165	9492.1776	9511.1935	63.5
64.5			8956.6608	9529.5145	9490.5978	9509.9254	64.5
65.5			8955.4282	9528.5297	9489.0233	9508.6202	65.5
66.5			8954.2146	9527.5125	9487.4296	9507.3131	66.5
67.5			8952.9631	9526.4872	9485.7907	9505.9806	67.5
68.5			8951.7048	9525.4489	9484.1416	9504.6453	68.5
69.5			8950.3991	9524.3517	9482.4594	9503.2662	69.5
70.5			8949.1214	9523.2672	9480.7864	9501.8684	70.5
71.5			8947.7807	9522.1762	9479.0757	9500.4536	71.5
72.5			8946.4602	9521.0246	9477.3336	9499.0250	72.5
73.5			8945.0876	9519.8610	9475.6033	9497.5812	73.5
74.5			8943.7189	9518.6763	9473.8560	9496.1096	74.5
75.5			8942.3278	9517.4926	9472.0526	9494.6265	75.5
76.5			8940.9007	9516.2915	9470.2613	9493.1082	76.5
77.5			8939.4725	9515.0743	9468.4332	9491.5876	77.5
78.5			8938.0288	9513.7866	9466.5839	9490.0449	78.5
79.5			8936.5567	9512.5275	9464.7163	9488.4735	79.5
80.5			8935.0684	9511.2590	9462.8318	9486.8919	80.5
81.5			8933.5575	9509.9254	9460.9527	9485.2767	81.5
82.5			8932.0334	9508.6202	9458.9971	9483.6462	82.5

**NbS**  $e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$  rotational lines.

(3,2)				(3,1)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
83.5			8930.4928	9507.2793	9457.0600	9482.0063	83.5
84.5			8928.9308	9505.8724	9455.0932	9480.3439	84.5
85.5			8927.3490	9504.4894	9453.1137	9478.6519	85.5
86.5			8925.7538	9503.0739	9451.1154	9476.9495	86.5
87.5			8924.1344	9501.6519	9449.1024	9475.2037	87.5
88.5			8922.4930	9500.1879	9447.0977	9473.4837	88.5
89.5			8920.8530	9498.7257	9444.9747	9471.7151	89.5
90.5			8919.1709	9497.2291	9442.9262	9469.9183	90.5
91.5			8917.4859	9495.7448	9440.8169	9468.1215	91.5
92.5			8915.7671	9494.1815	9438.6987	9466.3031	92.5
93.5			8914.0321	9492.6422	9436.5672	9464.4595	93.5
94.5			8912.3117	9491.0590	9434.4221	9462.5949	94.5
95.5			8910.5194	9489.5022	9432.2226	9460.7147	95.5
96.5			8908.7436	9487.8536	9430.0292	9458.8050	96.5
97.5			8906.9513	9486.2717	9427.8099	9456.8786	97.5
98.5			8905.1243	9484.6239	9425.5744	9454.9320	98.5
99.5			8903.2780	9482.9275	9423.3284	9452.9804	99.5
100.5			8901.4301	9481.2168	9421.0465	9450.9930	100.5
101.5			8899.5405	9479.5352	9418.7384	9448.9853	101.5
102.5			8897.6671	9477.8186	9416.4355	9446.9896	102.5
103.5			8895.7432	9476.0824	9414.1116	9444.9300	103.5
104.5			8893.7958	9474.2809	9411.7517	9442.8975	104.5
105.5			8891.8532	9472.4957	9409.3628	9440.7980	105.5
106.5			8889.8740	9470.6909	9406.9689	9438.6987	106.5
107.5			8887.8831	9468.8812	9404.5726	9436.5672	107.5
108.5			8885.8888	9467.0225	9402.1342	9434.4221	108.5
109.5			8883.8897	9465.1355	9399.6800	9432.2821	109.5
110.5			8881.8446	9463.2630	9397.2229	9430.0802	110.5
111.5			8879.7702	9461.3475	9394.7193	9427.8901	111.5
112.5			8877.7061	9459.4342	9392.2079	9425.6720	112.5
113.5			8875.5933	9457.4775	9389.6810	9423.4344	113.5
114.5			8873.4984	9455.5311	9387.1452	9421.1700	114.5
115.5			8871.3536	9453.5449	9384.5512	9418.8979	115.5
116.5			8869.2137	9451.5215	9381.9713	9416.6017	116.5
117.5			8867.0072	9449.4983	9379.3416	9414.2837	117.5
118.5			8864.8636	9447.4289	9376.7278	9411.9551	118.5
119.5			8862.6388	9445.3927	9374.0858	9409.6081	119.5
120.5			8860.4088	9443.2997	9371.4078	9407.2146	120.5
121.5			8858.1623	9441.1806	9368.7149	9404.8101	121.5
122.5			8855.9043	9439.0786	9366.0045	9402.3880	122.5
123.5			8853.6165	9436.9260	9363.2968	9399.9770	123.5
124.5			8851.2961	9434.7650	9360.5389	9397.5147	124.5
125.5			8849.0059	9432.5921	9357.7731	9395.0342	125.5
126.5			8846.6495	9430.3561		9392.5528	126.5
127.5			8844.3054	9428.2061		9390.0290	127.5
128.5			8841.9718	9425.9014		9387.4970	128.5
129.5			8839.5607	9423.6596		9384.9295	129.5
130.5			8837.1543	9421.3456		9382.3801	130.5
131.5			8834.7366	9419.0720		9379.7694	131.5
132.5				9416.7265		9377.1622	132.5
133.5				9414.3942		9374.5264	133.5
134.5				9412.0343		9371.8546	134.5
135.5				9409.6475		9369.2015	135.5
136.5				9407.2146		9366.5205	136.5
137.5				9404.8101		9363.7976	137.5
138.5				9402.3880		9361.0564	138.5
139.5				9399.9090		9358.3050	139.5
140.5				9397.4525		9355.5450	140.5
141.5				9394.9205		9352.7549	141.5
142.5				9392.4128		9349.9454	142.5
143.5						9347.1328	143.5
144.5						9344.2686	144.5
145.5						9341.4054	145.5
146.5						9338.4994	146.5

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**NbS**  $e^2\Phi_{7/2} \rightarrow a^2\Delta_{5/2}$  rotational lines.

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**(3,2)**

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**(3,1)**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
147.5						9335.6093	147.5
148.5						9332.6737	148.5
149.5						9329.7322	149.5
150.5						9326.7680	150.5
151.5						9323.7826	151.5
152.5						9320.7604	152.5
153.5						9317.7439	153.5
154.5						9314.7063	154.5
155.5						9311.6247	155.5
156.5						9308.5368	156.5
157.5						9305.4106	157.5
158.5						9302.3122	158.5
159.5						9299.1713	159.5
160.5						9296.0174	160.5
161.5						9292.8156	161.5
162.5						9289.6064	162.5
163.5						9286.4131	163.5
164.5						9283.1526	164.5
165.5						9279.9062	165.5
166.5							166.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)				(0,1)			
J	R(J)	P(J)	Q(J)	R(J)	P(J)	Q(J)	J
4.5							4.5
5.5					8699.8004		5.5
6.5					8699.3950	8701.3362	6.5
7.5					8698.9398	8701.1897	7.5
8.5					8698.5196	8701.0828	8.5
9.5					8698.0300	8700.9037	9.5
10.5					8697.5536	8700.7350	10.5
11.5					8697.0708	8700.5352	11.5
12.5					8696.5596	8700.3316	12.5
13.5					8696.0345	8700.1229	13.5
14.5			9258.1224		8695.4714	8699.8489	14.5
15.5			9257.8149		8694.9093	8699.5861	15.5
16.5			9257.5363		8694.3352	8699.3266	16.5
17.5			9257.2128		8693.7329	8699.0338	17.5
18.5			9256.9009		8693.1145	8698.7198	18.5
19.5			9256.5519		8692.4899	8698.3869	19.5
20.5			9256.1457		8691.8404	8698.0588	20.5
21.5			9255.7741		8691.1708	8697.6913	21.5
22.5			9255.3812		8690.4895	8697.2916	22.5
23.5			9254.9640		8689.8048	8696.9131	23.5
24.5			9254.5111		8689.0642	8696.4968	24.5
25.5			9254.0546		8688.3512	8696.0688	25.5
26.5		9245.5464	9253.5528		8687.6111	8695.6295	26.5
27.5		9244.7661	9253.0745		8686.8332	8695.1504	27.5
28.5		9243.9379	9252.5680		8686.0468	8694.7027	28.5
29.5		9243.0868	9252.0274		8685.2435	8694.2033	29.5
30.5	9261.0192	9242.2357	9251.4869		8684.4267	8693.6869	30.5
31.5	9260.7541	9241.3710	9250.9129		8683.6114	8693.1592	31.5
32.5	9260.4449	9240.4828	9250.3177		8682.7576	8692.6110	32.5
33.5	9260.1664	9239.5866	9249.7272	8702.4832	8681.9010	8692.0500	33.5
34.5	9259.8486	9238.6518	9249.1019	8702.1820	8681.0034	8691.4582	34.5
35.5	9259.5115	9237.7193	9248.4564	8701.9319	8680.1053	8690.8586	35.5
36.5	9259.1664	9236.7446	9247.8176	8701.6078	8679.1995	8690.2446	36.5
37.5	9258.7763	9235.7799	9247.1305	8701.2824	8678.2795	8689.6125	37.5
38.5	9258.3704	9234.7771	9246.4395	8700.9375	8677.3288	8688.9624	38.5
39.5	9257.9778	9233.7689	9245.7275	8700.5729	8676.3654	8688.3039	39.5
40.5	9257.5363	9232.7405	9244.9891	8700.1879	8675.3922	8687.6111	40.5
41.5	9257.1113	9231.6797	9244.2460	8699.8004	8674.3807	8686.9164	41.5
42.5	9256.6196	9230.6201	9243.4933	8699.3950	8673.3693	8686.2182	42.5
43.5	9256.1457	9229.5385	9242.6900	8698.9398	8672.3206	8685.4872	43.5
44.5	9255.6511	9228.4396	9241.8913	8698.5196	8671.2768	8684.7299	44.5
45.5	9255.1344	9227.3297	9241.0769	8698.0300	8670.1932	8683.9700	45.5
46.5	9254.5989	9226.1868	9240.2366	8697.5536	8669.1198	8683.1937	46.5
47.5	9254.0546	9225.0065	9239.3809	8697.0708	8668.0438	8682.3914	47.5
48.5	9253.4818	9223.8489	9238.5212	8696.5596	8666.9031	8681.5670	48.5
49.5	9252.8877	9222.6422	9237.6114	8696.0345	8665.7702	8680.7344	49.5
50.5	9252.2865	9221.4362	9236.7123	8695.4714	8664.6072	8679.9014	50.5
51.5	9251.6632	9220.2044	9235.7799	8694.9093	8663.4547	8679.0300	51.5
52.5	9251.0218	9218.9675	9234.8443	8694.3164	8662.2877	8678.1398	52.5
53.5	9250.3177	9217.6983	9233.8789	8693.7329	8661.0740	8677.2472	53.5
54.5	9249.6894	9216.4133	9232.8950	8693.1145	8659.8509	8676.3359	54.5
55.5	9248.9682	9215.1177	9231.8942	8692.4899	8658.6129	8675.3922	55.5
56.5	9248.2709	9213.8010	9230.8757	8691.8404	8657.3636	8674.4495	56.5
57.5	9247.5330	9212.4583	9229.8465	8691.1708	8656.1074	8673.4909	57.5
58.5	9246.7734	9211.0983	9228.7976	8690.4895	8654.8202	8672.5075	58.5
59.5	9246.0051	9209.7537	9227.7194	8689.7670	8653.5163	8671.4979	59.5
60.5	9245.2138	9208.3403	9226.6248	8689.0642	8652.1784	8670.4901	60.5
61.5	9244.4125	9206.9285	9225.5211	8688.3399	8650.8710	8669.4461	61.5
62.5	9243.5847	9205.5077	9224.4052	8687.6111	8649.5174	8668.4021	62.5
63.5	9242.7429	9204.0643	9223.2566	8686.8332	8648.1428	8667.3384	63.5
64.5	9241.8913	9202.5963	9222.0991	8686.0468	8646.7563	8666.2538	64.5
65.5	9241.0066	9201.0859	9220.9246	8685.2435	8645.3576	8665.1546	65.5
66.5	9240.1252	9199.6212	9219.7198	8684.4267	8643.9438	8664.0334	66.5
67.5	9239.1964	9198.1384	9218.5013	8683.6114	8642.4983	8662.9066	67.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)				(0,1)			
<i>J</i>	<i>R</i> ( <i>J</i> )	<i>P</i> ( <i>J</i> )	<i>Q</i> ( <i>J</i> )	<i>R</i> ( <i>J</i> )	<i>P</i> ( <i>J</i> )	<i>Q</i> ( <i>J</i> )	<i>J</i>
68.5	9238.2612	9196.5751	9217.2697	8682.7576	8641.0744	8661.7513	68.5
69.5	9237.3086	9195.0226	9216.0250	8681.8793	8639.5906	8660.5947	69.5
70.5	9236.3400	9193.4654	9214.7489	8681.0034	8638.1288	8659.4016	70.5
71.5	9235.3643	9191.8766	9213.4731	8680.0865	8636.6128	8658.1883	71.5
72.5	9234.3594	9190.2704	9212.1609	8679.1852	8635.0930	8656.9821	72.5
73.5	9233.3265	9188.6466	9210.8480	8678.2470	8633.5609	8655.7516	73.5
74.5	9232.2773	9187.0077	9209.5032	8677.2972	8632.0033	8654.4968	74.5
75.5	9231.2294	9185.3526	9208.1390	8676.3359	8630.4437	8653.2292	75.5
76.5	9230.1550	9183.6589	9206.7732	8675.3356	8628.8642	8651.9507	76.5
77.5	9229.0739	9181.9868	9205.3763	8674.3360	8627.2618	8650.6538	77.5
78.5	9227.9548	9180.2645	9203.9544	8673.3041	8625.6307	8649.3280	78.5
79.5	9226.8176	9178.5489	9202.5297	8672.2922	8624.0175	8648.0095	79.5
80.5	9225.6600	9176.8016	9201.0859	8671.2199	8622.3607	8646.6487	80.5
81.5	9224.5072	9175.0317	9199.6212	8670.1668	8620.7019	8645.2804	81.5
82.5	9223.3182	9173.2543	9198.1384	8669.0735	8619.0076	8643.8886	82.5
83.5	9222.0991	9171.4564	9196.6377	8667.9925	8617.3218	8642.4983	83.5
84.5	9220.9246	9169.6205	9195.1159	8666.8465	8615.6041	8641.0744	84.5
85.5	9219.6462	9167.7954	9193.5830	8665.7223	8613.8469	8639.6554	85.5
86.5	9218.3981	9165.9500	9192.0154	8664.5706	8612.1076	8638.1807	86.5
87.5	9217.1262	9164.0797	9190.4488	8663.3904	8610.3603	8636.7246	87.5
88.5	9215.8392	9162.1801	9188.8633	8662.2229	8608.5602	8635.2407	88.5
89.5	9214.5215	9160.2846	9187.2520	8661.0210	8606.7721	8633.7413	89.5
90.5	9213.1875	9158.3434	9185.6213	8659.7948	8604.9450	8632.2224	90.5
91.5	9211.8404	9156.4039	9183.9813	8658.5449	8603.1334	8630.6823	91.5
92.5	9210.4783	9154.4764	9182.3162	8657.2938	8601.2569	8629.1357	92.5
93.5	9209.0962	9152.4747	9180.6372	8656.0212	8599.3954	8627.5608	93.5
94.5	9207.6987	9150.4779	9178.9367	8654.7478	8597.5144	8625.9789	94.5
95.5	9206.2835	9148.4727	9177.2261	8653.4322	8595.6028	8624.3862	95.5
96.5	9204.8477	9146.4268	9175.4847	8652.1261	8593.6884	8622.7820	96.5
97.5	9203.3849	9144.3818	9173.7337	8650.7789	8591.7926	8621.1327	97.5
98.5	9201.9216	9142.3138	9171.9669	8649.4231	8589.8178	8619.4812	98.5
99.5	9200.4263	9140.2351	9170.1799	8648.0563	8587.8710	8617.8232	99.5
100.5	9198.9187	9138.1155	9168.3703	8646.6487	8585.8963	8616.1398	100.5
101.5	9197.3972	9136.0070	9166.5510	8645.2804	8583.8827	8614.4263	101.5
102.5	9195.8529	9133.8754	9164.7119	8643.8653	8581.8681	8612.7079	102.5
103.5	9194.2898	9131.7207	9162.8541	8642.3962	8579.8462	8610.9747	103.5
104.5	9192.7012	9129.5461	9160.9766	8640.9531	8577.7647	8609.2316	104.5
105.5	9191.1250	9127.3417	9159.0797	8639.4885	8575.7393	8607.4556	105.5
106.5	9189.5012	9125.1421	9157.1671	8637.9950	8573.6508	8605.6821	106.5
107.5	9187.8595	9122.9152	9155.2339	8636.4811	8571.5681	8603.8730	107.5
108.5	9186.1952	9120.6590	9153.2818	8634.9750	8569.4362	8602.0591	108.5
109.5	9184.5354	9118.4064	9151.3191	8633.4254	8567.3250	8600.2184	109.5
110.5	9182.8438	9116.1226	9149.3433	8631.8781	8565.1739	8598.3762	110.5
111.5	9181.1368	9113.8459	9147.3412	8630.3087	8563.0155	8596.5112	111.5
112.5	9179.4130	9111.5176	9145.3168	8628.7182	8560.8375	8594.6275	112.5
113.5	9177.6591	9109.1911	9143.2834	8627.0691	8558.6434	8592.7310	113.5
114.5	9175.9182	9106.8204	9141.2228	8625.4816	8556.4457	8590.8103	114.5
115.5	9174.1454	9104.4685	9139.1434	8623.8595	8554.2187	8588.8750	115.5
116.5	9172.3417	9102.0932	9137.0589	8622.2178	8551.9567	8586.9281	116.5
117.5	9170.5218	9099.6815	9134.9527	8620.5274	8549.7161	8584.9652	117.5
118.5	9168.6692	9097.2676	9132.8305	8618.8288		8582.9770	118.5
119.5	9166.8257	9094.8250	9130.6766	8617.1264		8580.9788	119.5
120.5	9164.9605	9092.3706	9128.5187	8615.4114		8578.9649	120.5
121.5	9163.0713	9089.9028	9126.3446	8613.6758		8576.9268	121.5
122.5	9161.1587	9087.4055	9124.1449	8611.9173		8574.8846	122.5
123.5	9159.2457	9084.8966	9121.9279	8610.1493		8572.8080	123.5
124.5	9157.3036	9082.3600	9119.6823	8608.3621		8570.7267	124.5
125.5	9155.3438	9079.8229	9117.4302	8606.5568		8568.6176	125.5
126.5	9153.3677	9077.2527	9115.1740	8604.7314		8566.4799	126.5
127.5	9151.3839	9074.6661	9112.8788	8602.9027		8564.3624	127.5
128.5	9149.3499	9072.0603	9110.5739	8601.0247		8562.2481	128.5
129.5	9147.3412	9069.4450	9108.2484	8599.1485		8560.0805	129.5
130.5	9145.3168	9066.8134	9105.9105	8597.2799		8557.8926	130.5
131.5	9143.2181	9064.1724	9103.5506	8595.3589		8555.6874	131.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)				(0,1)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
132.5	9141.1231	9061.5167	9101.1875	8593.4444		8553.4520	132.5
133.5	9139.0237	9058.8302	9098.7697	8591.4899		8551.2383	133.5
134.5	9136.9102	9056.0938	9096.3728	8589.5338		8548.9709	134.5
135.5	9134.7634	9053.3785	9093.9403	8587.5734		8546.7036	135.5
136.5	9132.6258	9050.6730	9091.4993	8585.5797		8544.4500	136.5
137.5	9130.4490	9047.8807	9089.0356	8583.5643		8542.1486	137.5
138.5	9128.2534	9045.1175	9086.5444	8581.5667		8539.8362	138.5
139.5	9126.0349	9042.3171	9084.0621	8579.4993		8537.4872	139.5
140.5	9123.8051	9039.5185	9081.5239			8535.1884	140.5
141.5	9121.5565	9036.6898	9078.9922	8575.3739		8532.7711	141.5
142.5	9119.3147	9033.8368	9076.4328	8573.2829		8530.4003	142.5
143.5	9117.0349	9030.9731	9073.8814	8571.1876		8528.0236	143.5
144.5	9114.7300	9028.0854	9071.2868	8569.0370		8525.5998	144.5
145.5	9112.4110	9025.2233	9068.6730	8566.9387		8523.1685	145.5
146.5	9110.0421	9022.3062	9066.0614	8564.7605		8520.7330	146.5
147.5	9107.6979	9019.3551	9063.3940	8562.5827		8518.2619	147.5
148.5	9105.3392	9016.4185	9060.7328	8560.4061		8515.7969	148.5
149.5	9102.9549	9013.4392	9058.0483	8558.1748		8513.2883	149.5
150.5	9100.5490	9010.4474	9055.3550			8510.7921	150.5
151.5	9098.1164	9007.4476	9052.6499			8508.2174	151.5
152.5	9095.6962	9004.4444	9049.8997				152.5
153.5	9093.2087	9001.3941	9047.1464			8503.1373	153.5
154.5	9090.7355	8998.3033	9044.3695			8500.5293	154.5
155.5	9088.2345	8995.2630	9041.5889			8497.9703	155.5
156.5	9085.7149	8992.1451	9038.7840			8495.3611	156.5
157.5		8989.0603	9035.9699			8492.7223	157.5
158.5		8985.9259	9033.1356			8490.0742	158.5
159.5		8982.7909	9030.2761			8487.4662	159.5
160.5		8979.6150	9027.4009			8484.7457	160.5
161.5		8976.4714	9024.5159			8482.0459	161.5
162.5			9021.5872			8479.3751	162.5
163.5			9018.6259			8476.5924	163.5
164.5			9015.7021			8473.8895	164.5
165.5			9012.7267			8471.1335	165.5
166.5			9009.7521			8468.3748	166.5
167.5			9006.8009			8465.5616	167.5
168.5			9003.7569			8462.7730	168.5
169.5			9000.7349			8459.9339	169.5
170.5			8997.6724			8457.0646	170.5
171.5			8994.5948			8454.2585	171.5
172.5			8991.5054			8451.3921	172.5
173.5			8988.4076			8448.4980	173.5
174.5			8985.2867			8445.5886	174.5
175.5			8982.1147			8442.6511	175.5
176.5			8978.9665			8439.7152	176.5
177.5			8975.7874			8436.7605	177.5
178.5			8972.5999			8433.7973	178.5
179.5			8969.3978				179.5
180.5			8966.1560				180.5
181.5			8962.8799				181.5
182.5			8959.6190				182.5
183.5			8956.3523				183.5
184.5			8953.0488				184.5
185.5			8949.7128				185.5
186.5			8946.3679				186.5
187.5			8943.0306				187.5
188.5							188.5
189.5							189.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(1,2)				(1,0)			
J	R(J)	P(J)	Q(J)	R(J)	P(J)	Q(J)	J
11.5							11.5
12.5						9762.7236	12.5
13.5						9762.4907	13.5
14.5						9762.2278	14.5
15.5						9761.9076	15.5
16.5						9761.5659	16.5
17.5			8648.6278			9761.2670	17.5
18.5			8648.3317			9760.8786	18.5
19.5			8648.0095			9760.4942	19.5
20.5			8647.6595			9760.1245	20.5
21.5			8647.3029			9759.7321	21.5
22.5			8646.9497			9759.2736	22.5
23.5			8646.5442			9758.8171	23.5
24.5			8646.1267			9758.3539	24.5
25.5			8645.6986			9757.8708	25.5
26.5			8645.2804			9757.3810	26.5
27.5			8644.8255			9756.8425	27.5
28.5			8644.3277			9756.3059	28.5
29.5			8643.8653			9755.7237	29.5
30.5			8643.3427			9755.1441	30.5
31.5			8642.8129			9754.5544	31.5
32.5			8642.2886		9744.1190	9753.9274	32.5
33.5			8641.7392	9763.6786	9743.1535	9753.2922	33.5
34.5			8641.1465	9763.3587	9742.2249	9752.6264	34.5
35.5			8640.5397	9762.9620	9741.2361	9751.9597	35.5
36.5	8651.2583	8628.9541	8639.9558	9762.5638	9740.2373	9751.2509	36.5
37.5	8650.9398	8628.0072	8639.3227	9762.1447	9739.2274	9750.5406	37.5
38.5	8650.5918	8627.0691	8638.6840	9761.7280	9738.1915	9749.8155	38.5
39.5	8650.2340	8626.1200	8638.0177	9761.2670	9737.1314	9749.0600	39.5
40.5	8649.8717	8625.1417	8637.3527	9760.7811	9736.0518	9748.2718	40.5
41.5	8649.4771	8624.1415	8636.6665	9760.3045	9734.9692	9747.4850	41.5
42.5	8649.0558	8623.1357	8635.9550	9759.7991	9733.8530	9746.6872	42.5
43.5	8648.6278	8622.1086	8635.2407	9759.2454	9732.7334	9745.8365	43.5
44.5	8648.2048	8621.0752	8634.4899	9758.7261	9731.5766	9744.9875	44.5
45.5	8647.7594	8620.0209	8633.7413	9758.1270	9730.4007	9744.1190	45.5
46.5	8647.2816	8618.9429	8632.9442	9757.5632	9729.2324	9743.2373	46.5
47.5	8646.7901	8617.8232	8632.1658	9756.9505	9728.0182	9742.3247	47.5
48.5	8646.2842	8616.7306	8631.3564	9756.3059	9726.7847	9741.3948	48.5
49.5	8645.7459	8615.6041	8630.5236	9755.6892	9725.5348	9740.4556	49.5
50.5	8645.2133	8614.4590	8629.6857	9755.0016	9724.2772	9739.4873	50.5
51.5	8644.6479	8613.3138	8628.8349	9754.3152	9722.9958	9738.5081	51.5
52.5	8644.0743	8612.1076	8627.9732	9753.6238	9721.6910	9737.5095	52.5
53.5	8643.4873	8610.9394	8627.0691	9752.9138	9720.3611	9736.4844	53.5
54.5	8642.8799	8609.7368	8626.1707	9752.1690	9718.9787	9735.4476	54.5
55.5	8642.2535	8608.5249	8625.2357	9751.4006	9717.6674	9734.3822	55.5
56.5	8641.6254	8607.2801	8624.2964	9750.6336	9716.2919	9733.3237	56.5
57.5	8640.9531	8606.0102	8623.3500	9749.8155	9714.8476	9732.2070	57.5
58.5	8640.2949	8604.7314	8622.3607	9749.0272	9713.4590	9731.0963	58.5
59.5	8639.5906	8603.4563	8621.3709	9748.1686	9712.0475	9729.9630	59.5
60.5	8638.8888	8602.1328	8620.3599	9747.3207	9710.5785	9728.7980	60.5
61.5	8638.1427	8600.8307	8619.3344	9746.4523		9727.6243	61.5
62.5	8637.4346	8599.4712	8618.3176	9745.5610	9707.6110	9726.4380	62.5
63.5	8636.6665	8598.1419	8617.2397	9744.6544	9706.1083	9725.2246	63.5
64.5	8635.8818	8596.7304	8616.1398	9743.7104	9704.5679	9723.9986	64.5
65.5	8635.0930	8595.3589	8615.0826	9742.7621	9703.0117	9722.7491	65.5
66.5	8634.2763	8593.9566	8613.9795	9741.7872	9701.4476	9721.4730	66.5
67.5	8633.4254	8592.5297	8612.8460	9740.7913	9699.8618	9720.1825	67.5
68.5	8632.6082	8591.0921	8611.7045	9739.7985	9698.2587	9718.8735	68.5
69.5	8631.7517	8589.6342	8610.5614	9738.7628	9696.6393	9717.5497	69.5
70.5	8630.8889	8588.1669	8609.3718	9737.7452	9694.9967	9716.2085	70.5
71.5	8629.9966	8586.6856	8608.1927	9736.6819	9693.3339	9714.8476	71.5
72.5	8629.0811	8585.1707	8606.9903	9735.5719	9691.6478	9713.4590	72.5
73.5	8628.1675	8583.6552	8605.7558	9734.4574	9689.9158	9712.0475	73.5
74.5	8627.2163	8582.1111	8604.5112	9733.3237	9688.2328	9710.6337	74.5

**NbS** [13.8]<sub>5/2</sub> → *a*<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(1,2)				(1,0)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
75.5	8626.2639	8580.5545	8603.2632	9732.2070	9686.4891	9709.1922	75.5
76.5	8625.2815	8578.9649	8601.9941	9731.0419	9684.7368	9707.7325	76.5
77.5	8624.2964	8577.3824	8600.6988	9729.8535	9682.9506	9706.2537	77.5
78.5	8623.2989	8575.8171	8599.3954	9728.6525	9681.1308	9704.7534	78.5
79.5	8622.2587	8574.1684	8598.0671	9727.4290	9679.3483	9703.2406	79.5
80.5	8621.2270	8572.5534	8596.7304	9726.1884	9677.4989	9701.7078	80.5
81.5	8620.1551	8570.8651	8595.3589	9724.9313	9675.6449	9700.1493	81.5
82.5	8619.0862	8569.2243	8594.0123	9723.6649	9673.7793	9698.5841	82.5
83.5	8618.0027	8567.5552	8592.6152	9722.3898	9671.8805	9696.9873	83.5
84.5	8616.8888	8565.8006	8591.2173	9721.0539	9669.9689	9695.3740	84.5
85.5	8615.7783	8564.0974	8589.7878	9719.7143	9668.0642	9693.7415	85.5
86.5	8614.6359	8562.3679	8588.3480	9718.3697	9666.0831	9692.0904	86.5
87.5	8613.4780	8560.6116	8586.8794	9717.0049	9664.1384	9690.4116	87.5
88.5	8612.3042	8558.8506	8585.4244	9715.6054	9662.1636	9688.7303	88.5
89.5	8611.1177	8557.0783	8583.9362	9714.2066	9660.1524	9687.0182	89.5
90.5	8609.8842	8555.2545	8582.4412	9712.7602	9658.1191	9685.2895	90.5
91.5	8608.6860	8553.4520	8580.9076	9711.3202	9656.0850	9683.5478	91.5
92.5	8607.4440	8551.5906	8579.3768	9709.8561	9654.0285	9681.7859	92.5
93.5	8606.1840	8549.7907	8577.8247	9708.3571	9651.9323	9680.0032	93.5
94.5	8604.9107	8547.8580	8576.2449	9706.8602	9649.8346	9678.1995	94.5
95.5	8603.6170	8546.0039	8574.6625	9705.3312	9647.6845	9676.3849	95.5
96.5	8602.3141	8544.0865	8573.0557	9703.7760	9645.5806	9674.5288	96.5
97.5	8600.9769	8542.1904	8571.4250	9702.2274	9643.4319	9672.6842	97.5
98.5	8599.6613	8540.2799	8569.8001	9700.6379	9641.2581	9670.7935	98.5
99.5	8598.2834	8538.2753	8568.1591	9699.0435	9639.0619	9668.9011	99.5
100.5	8596.9053	8536.3524	8566.4799	9697.4149	9636.8596	9666.9819	100.5
101.5	8595.5349	8534.3675	8564.7873	9695.7723	9634.6234	9665.0405	101.5
102.5	8594.1244	8532.3857	8563.1074	9694.1010	9632.3656	9663.0869	102.5
103.5	8592.6960	8530.3432	8561.3728	9692.4404	9630.0985	9661.1190	103.5
104.5	8591.2576	8528.3144	8559.6370	9690.7354	9627.8215	9659.1248	104.5
105.5	8589.8178	8526.2844	8557.8926	9689.0023	9625.5077	9657.1125	105.5
106.5	8588.3274	8524.2107	8556.1234	9687.2898	9623.1854	9655.0933	106.5
107.5	8586.8345	8522.1273	8554.3240	9685.5328	9620.8477	9653.0277	107.5
108.5	8585.3495	8520.0439	8552.5614	9683.7347	9618.4589	9650.9648	108.5
109.5	8583.7968	8517.9336	8550.7313	9681.9617	9616.0919	9648.8706	109.5
110.5	8582.2676	8515.7969	8548.8716	9680.1335	9613.6763	9646.7672	110.5
111.5	8580.7069	8513.6347	8547.0204	9678.3278	9611.2631	9644.6310	111.5
112.5	8579.1319	8511.4892	8545.1769	9676.4514	9608.8156	9642.4870	112.5
113.5	8577.5334	8509.3037	8543.2811	9674.5851	9606.3751	9640.3287	113.5
114.5	8575.9196	8507.0858	8541.3900	9672.6842	9603.8871	9638.1464	114.5
115.5	8574.3123	8504.8949	8539.4669	9670.7935	9601.4126	9635.9503	115.5
116.5	8572.6652	8502.6878	8537.5389	9668.8716	9598.8900	9633.7119	116.5
117.5	8571.0208	8500.4367	8535.5929	9666.9160	9596.3438	9631.4884	117.5
118.5	8569.3199	8498.1814	8533.6560	9664.9508	9593.8076	9629.2196	118.5
119.5	8567.6552	8495.8976	8531.6397	9662.9520	9591.2197	9626.9417	119.5
120.5	8565.9389	8493.6172	8529.6490	9660.9292	9588.6240	9624.6514	120.5
121.5	8564.2094	8491.3147	8527.6181	9658.9218	9586.0062	9622.3273	121.5
122.5	8562.4864	8489.0187	8525.5998	9656.8960	9583.3929	9619.9944	122.5
123.5	8560.7078	8486.6467	8523.5476	9654.8236	9580.7432	9617.6301	123.5
124.5	8558.9308	8484.3151	8521.4743	9652.7405	9578.0806	9615.2480	124.5
125.5		8481.9458	8519.4134	9650.6406	9575.4009	9612.8671	125.5
126.5		8479.5870	8517.2984	9648.5211	9572.6807	9610.4584	126.5
127.5		8477.1647	8515.1840	9646.3794	9569.9694	9608.0215	127.5
128.5		8474.7205	8513.0529	9644.2315	9567.2186	9605.5756	128.5
129.5			8510.9192	9642.0235		9603.1118	129.5
130.5			8508.7707			9600.6123	130.5
131.5			8506.5670			9598.1117	131.5
132.5			8504.3757			9595.5752	132.5
133.5			8502.1805			9593.0293	133.5
134.5			8499.9496			9590.4861	134.5
135.5			8497.7039			9587.8636	135.5
136.5			8495.4260			9585.2906	136.5
137.5			8493.1775			9582.6701	137.5
138.5			8490.8604			9580.0243	138.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

**(1,2)**

**(1,0)**

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
139.5			8488.5663			9577.3696	139.5
140.5			8486.2281			9574.6902	140.5
141.5			8483.9098			9571.9887	141.5
142.5			8481.5266			9569.2591	142.5
143.5			8479.1766			9566.5296	143.5
144.5			8476.7470			9563.7730	144.5
145.5			8474.3750			9561.0080	145.5
146.5			8471.9577				146.5
147.5			8469.4986			9555.3855	147.5
148.5			8467.0481			9552.5576	148.5
149.5			8464.5611			9549.7045	149.5
150.5			8462.0846			9546.8300	150.5
151.5			8459.6045			9543.9482	151.5
152.5			8457.0646			9541.0467	152.5
153.5			8454.5239			9538.1212	153.5
154.5			8451.9407			9535.1520	154.5
155.5			8449.3978			9532.2135	155.5
156.5			8446.7932			9529.2020	156.5
157.5							157.5
158.5			8441.5461			9523.1817	158.5
159.5			8438.9260			9520.1383	159.5
160.5			8436.2753				160.5
161.5			8433.6167				161.5
162.5			8430.9269				162.5
163.5			8428.2266				163.5
164.5			8425.5132				164.5
165.5			8422.7626				165.5
166.5			8420.0539				166.5
167.5			8417.2833				167.5
168.5			8414.4802				168.5
169.5			8411.6901				169.5
170.5			8408.8746				170.5
171.5			8406.0122				171.5
172.5			8403.1526				172.5
173.5			8400.3331				173.5
174.5			8397.4402				174.5
175.5			8394.5369				175.5
176.5			8391.6225				176.5
177.5			8388.7177				177.5
178.5			8385.7489				178.5
179.5			8382.7782				179.5
180.5			8379.8010				180.5
181.5			8376.7959				181.5
182.5			8373.8213				182.5
183.5							183.5
184.5							184.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

**(2,1)**

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
6.5							6.5
7.5			9706.8602				7.5
8.5			9706.7066				8.5
9.5			9706.5228				9.5
10.5			9706.3384				10.5
11.5			9706.1083				11.5
12.5			9705.8810				12.5
13.5			9705.6025				13.5
14.5			9705.3312				14.5
15.5			9705.0197				15.5
16.5		9699.7255	9704.7534				16.5
17.5		9699.0950	9704.4056				17.5
18.5		9698.4560	9704.0422				18.5
19.5		9697.7640	9703.6944				19.5
20.5		9697.1389	9703.2914				20.5
21.5		9696.4095	9702.8700				21.5
22.5		9695.6764	9702.4636				22.5
23.5		9694.9371	9702.0205				23.5
24.5		9694.1575	9701.5484				24.5
25.5		9693.3891	9701.0698				25.5
26.5		9692.5802	9700.5543				26.5
27.5	9708.6138	9691.7594	9700.0440				27.5
28.5	9708.3571	9690.9325	9699.5252				28.5
29.5	9708.1023	9690.0675	9698.9343				29.5
30.5	9707.8309	9689.1814	9698.3462				30.5
31.5	9707.5390	9688.2888	9697.7640				31.5
32.5	9707.1950	9687.3737	9697.1389				32.5
33.5	9706.8602	9686.4493	9696.5033				33.5
34.5	9706.5228	9685.4776	9695.8468				34.5
35.5	9706.1083	9684.5032	9695.1760				35.5
36.5	9705.7415	9683.4821	9694.4690				36.5
37.5	9705.3312	9682.5102	9693.7415				37.5
38.5	9704.8934	9681.4505	9693.0468				38.5
39.5	9704.4574		9692.2819				39.5
40.5	9703.9951	9679.3483	9691.5303				40.5
41.5	9703.4930	9678.2585	9690.7354				41.5
42.5	9702.9540	9677.1504	9689.9158				42.5
43.5	9702.4636	9676.0341	9689.0972				43.5
44.5	9701.9079	9674.8672	9688.2328				44.5
45.5	9701.3563	9673.7085	9687.3737				45.5
46.5	9700.8070	9672.5156	9686.4891				46.5
47.5	9700.1493	9671.3219	9685.5900				47.5
48.5	9699.5252	9670.0878	9684.6817				48.5
49.5	9698.8771	9668.8716	9683.7347				49.5
50.5	9698.1969	9667.6055	9682.7752				50.5
51.5	9697.5355	9666.3135	9681.7859				51.5
52.5	9696.8523	9665.0405	9680.8005				52.5
53.5	9696.1353	9663.7069	9679.7803				53.5
54.5	9695.3740	9662.3808	9678.7360				54.5
55.5	9694.6387	9661.0191	9677.6887				55.5
56.5	9693.8631	9659.6628	9676.6041				56.5
57.5	9693.0854	9658.2377	9675.5192				57.5
58.5	9692.2819	9656.8505	9674.4023				58.5
59.5	9691.4245	9655.4373	9673.2768				59.5
60.5	9690.5724	9653.9836	9672.1200				60.5
61.5	9689.6999	9652.5272	9670.9497				61.5
62.5	9688.8183	9651.0215	9669.7629				62.5
63.5	9687.8882	9649.5122	9668.5658				63.5
64.5	9686.9344	9647.9993	9667.3384				64.5
65.5	9686.0277	9646.4508	9666.0831				65.5
66.5	9685.0565	9644.8932	9664.8293				66.5
67.5	9684.0799	9643.2956	9663.5474				67.5
68.5	9683.0609	9641.7081	9662.2377				68.5
69.5	9682.0548	9640.0774	9660.9292				69.5

**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

**(2,1)**

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
70.5	9681.0099	9638.4464	9659.6016				70.5
71.5	9679.9145	9636.8026	9658.2377				71.5
72.5	9678.8727	9635.1100	9656.8505				72.5
73.5	9677.7866	9633.4378	9655.4373				73.5
74.5	9676.6866	9631.7049	9654.0285				74.5
75.5	9675.5192	9629.9892	9652.5890				75.5
76.5	9674.3484	9628.2377	9651.1499				76.5
77.5	9673.1748	9626.4577	9649.6712				77.5
78.5	9671.9921	9624.6514	9648.1786				78.5
79.5	9670.7935	9622.9010	9646.6629				79.5
80.5	9669.5211	9621.0434	9645.1455				80.5
81.5	9668.2816	9619.1947	9643.5951				81.5
82.5	9667.0151	9617.3388	9642.0235				82.5
83.5	9665.7349		9640.4387				83.5
84.5	9664.4235		9638.8290				84.5
85.5	9663.0869		9637.2110				85.5
86.5	9661.7302		9635.5653				86.5
87.5	9660.3750		9633.9003				87.5
88.5	9658.9624		9632.2248				88.5
89.5	9657.5727		9630.5173				89.5
90.5	9656.1669		9628.8004				90.5
91.5	9654.7160		9627.0605				91.5
92.5	9653.2498		9625.3005				92.5
93.5	9651.7535		9623.5208				93.5
94.5	9650.2759		9621.7323				94.5
95.5	9648.7642		9619.9135				95.5
96.5	9647.2154		9618.0708				96.5
97.5	9645.6474		9616.2242				97.5
98.5	9644.0712		9614.3246				98.5
99.5	9642.4870		9612.4490				99.5
100.5	9640.8598		9610.5545				100.5
101.5	9639.2362		9608.6213				101.5
102.5	9637.5698		9606.6681				102.5
103.5	9635.9110		9604.7225				103.5
104.5	9634.2205		9602.7271				104.5
105.5	9632.5027		9600.7197				105.5
106.5	9630.7645		9598.6974				106.5
107.5	9629.0609		9596.6679				107.5
108.5	9627.2332		9594.6076				108.5
109.5	9625.4650		9592.5054				109.5
110.5	9623.6546		9590.4267				110.5
111.5	9621.8170		9588.2973				111.5
112.5	9619.9944		9586.1477				112.5
113.5	9618.1240		9583.9938				113.5
114.5	9616.2242		9581.8122				114.5
115.5	9614.3246		9579.6281				115.5
116.5	9612.4022		9577.4184				116.5
117.5	9610.4584		9575.1712				117.5
118.5	9608.5090		9572.9207				118.5
119.5	9606.5397		9570.6417				119.5
120.5	9604.5307		9568.3566				120.5
121.5	9602.5065		9566.0534				121.5
122.5	9600.4669		9563.7113				122.5
123.5	9598.4075		9561.3618				123.5
124.5	9596.3438		9558.9930				124.5
125.5	9594.2363		9556.6164				125.5
126.5	9592.1139		9554.2193				126.5
127.5	9589.9946		9551.7982				127.5
128.5	9587.8340		9549.3467				128.5
129.5	9585.6613		9546.8784				129.5
130.5	9583.4821		9544.3908				130.5
131.5	9581.2686		9541.9078				131.5
132.5			9539.3684				132.5
133.5			9536.8370				133.5

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**NbS** [13.8]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

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**(2,1)**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
134.5			9534.2948				134.5
135.5			9531.6997				135.5
136.5			9529.0636				136.5
137.5			9526.4872				137.5
138.5			9523.8631				138.5
139.5			9521.2083				139.5
140.5			9518.4805				140.5
141.5			9515.8440				141.5
142.5			9513.1279				142.5
143.5			9510.4270				143.5
144.5			9507.6281				144.5
145.5			9504.8721				145.5
146.5			9502.0725				146.5
147.5			9499.2584				147.5
148.5			9496.4277				148.5
149.5			9493.6080				149.5
150.5			9490.7442				150.5
151.5			9487.8199				151.5
152.5			9484.9351				152.5
153.5			9482.0063				153.5
154.5			9479.0757				154.5
155.5			9476.0824				155.5
156.5			9473.1159				156.5
157.5			9470.1103				157.5
158.5			9467.0906				158.5
159.5			9464.0249				159.5
160.5			9460.9857				160.5
161.5			9457.8751				161.5
162.5			9454.8323				162.5
163.5			9451.7208				163.5
164.5			9448.5556				164.5
165.5			9445.3927				165.5
166.5			9442.2356				166.5
167.5			9438.9959				167.5
168.5			9435.7938				168.5
169.5			9432.5829				169.5
170.5			9429.3160				170.5
171.5			9426.0411				171.5
172.5			9422.7541				172.5
173.5			9419.4050				173.5
174.5			9416.1095				174.5
175.5			9412.7358				175.5
176.5			9409.3628				176.5
177.5			9406.0011				177.5
178.5			9402.5646				178.5
179.5			9399.1300				179.5
180.5			9395.7360				180.5
181.5			9392.2282				181.5
182.5			9388.7377				182.5
183.5							183.5
184.5							184.5

**NbS** [14.0]<sub>1/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)

<i>J</i>	<i>R</i> <sub>aa</sub> ( <i>J</i> )	<i>P</i> <sub>aa</sub> ( <i>J</i> )	<i>Q</i> <sub>ba</sub> ( <i>J</i> )	<i>R</i> <sub>bb</sub> ( <i>J</i> )	<i>P</i> <sub>bb</sub> ( <i>J</i> )	<i>Q</i> <sub>ab</sub> ( <i>J</i> )	<i>J</i>
27.5							27.5
28.5			9482.0063				28.5
29.5		9472.2163	9481.4717				29.5
30.5		9471.3643	9480.8920				30.5
31.5		9470.4514	9480.3439				31.5
32.5		9469.5449	9479.7024				32.5
33.5		9468.6055	9479.0757		9468.9776	9478.6519	33.5
34.5		9467.6280	9478.4886		9468.0450	9478.0104	34.5
35.5		9466.6784	9477.8186		9467.0906	9477.3063	35.5
36.5		9465.6947	9477.1547		9466.1119	9476.6233	36.5
37.5		9464.6468	9476.4628		9465.1355	9475.9244	37.5
38.5		9463.6403	9475.7476		9464.0783	9475.2037	38.5
39.5		9462.5949	9475.0293		9463.0831	9474.4460	39.5
40.5		9461.5316	9474.2809		9462.0423	9473.6741	40.5
41.5		9460.4070	9473.4837		9460.9527	9472.9271	41.5
42.5		9459.3305	9472.7186		9459.8705	9472.1099	42.5
43.5		9458.2251	9471.9357		9458.8050	9471.2852	43.5
44.5		9457.0600	9471.1076		9457.6281	9470.4514	44.5
45.5		9455.9410	9470.2613		9456.5162	9469.6157	45.5
46.5		9454.7492	9469.3849		9455.3432	9468.7328	46.5
47.5		9453.5449	9468.5192		9454.1497	9467.8322	47.5
48.5		9452.3472	9467.6280		9452.9804	9466.9138	48.5
49.5		9451.1152	9466.7197		9451.7805	9466.0053	49.5
50.5		9449.8885	9465.7936		9450.5370	9465.0525	50.5
51.5		9448.6121	9464.8202		9449.2677	9464.0783	51.5
52.5		9447.3141	9463.8335		9447.9988	9463.0831	52.5
53.5		9446.0382	9462.8318		9446.6791	9462.0759	53.5
54.5			9461.8578		9445.3927	9461.0577	54.5
55.5		9443.3439	9460.8257		9444.0554	9460.0141	55.5
56.5		9441.9840	9459.7834		9442.6984	9458.9304	56.5
57.5		9440.6013	9458.6893		9441.3080	9457.8751	57.5
58.5		9439.1364	9457.6281		9439.9691	9456.7926	58.5
59.5		9437.7772	9456.5162		9438.5635	9455.6659	59.5
60.5		9436.3514	9455.3868		9437.1383	9454.5130	60.5
61.5		9434.8536	9454.2837		9435.6625	9453.3631	61.5
62.5		9433.3972	9453.1137		9434.2432	9452.1719	62.5
63.5		9431.8659	9451.8917		9432.7734	9450.9930	63.5
64.5		9430.3561	9450.7007		9431.2622	9449.8034	64.5
65.5		9428.8843	9449.4983		9429.7498	9448.5556	65.5
66.5		9427.3082	9448.2655		9428.2061	9447.3141	66.5
67.5			9446.9896		9426.6720	9446.0382	67.5
68.5		9424.1371	9445.7373		9425.0753	9444.7564	68.5
69.5			9444.4235		9423.4867	9443.4548	69.5
70.5		9420.9322	9443.1391		9421.8615	9442.1219	70.5
71.5		9419.2744	9441.7700		9420.2264	9440.7980	71.5
72.5		9417.6141	9440.4464		9418.6144	9439.4159	72.5
73.5		9415.9276	9439.0786		9416.9123	9438.0211	73.5
74.5		9414.2044	9437.6735		9415.2512	9436.6234	74.5
75.5		9412.5003	9436.2758		9413.5441	9435.2120	75.5
76.5		9410.7517	9434.8536		9411.8189	9433.7639	76.5
77.5		9408.9826	9433.4106		9410.0646	9432.2821	77.5
78.5		9407.2146	9431.9615		9408.3007	9430.8642	78.5
79.5			9430.4752		9406.5137	9429.3160	79.5
80.5		9403.5643	9428.9570		9404.7136	9427.8099	80.5
81.5		9401.7699	9427.4279		9402.8862	9426.2632	81.5
82.5		9399.9090	9425.9014		9401.0366	9424.7314	82.5
83.5		9398.0242	9424.3321		9399.1984	9423.1449	83.5
84.5		9396.1623	9422.7541		9397.3477	9421.5571	84.5
85.5		9394.2260	9421.1700		9395.3912	9419.9448	85.5
86.5		9392.2999	9419.5464		9393.5216	9418.3178	86.5
87.5		9390.3572	9417.9138		9391.5748	9416.6670	87.5
88.5		9388.3998	9416.2534		9389.6461	9414.9890	88.5
89.5		9386.3824	9414.5746		9387.6601	9413.3151	89.5
90.5		9384.4119	9412.8857		9385.6734	9411.6068	90.5

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**NbS**     $[14.0]_{1/2} \rightarrow a^2\Delta_{3/2}$     rotational lines.

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**(0,0)**

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$J$	$R_{aa}(J)$	$P_{aa}(J)$	$Q_{ba}(J)$	$R_{bb}(J)$	$P_{bb}(J)$	$Q_{ab}(J)$	$J$
91.5		9382.3801	9411.1748		9383.6664	9409.8766	91.5
92.5		9380.3306	9409.4317		9381.6328	9408.1411	92.5
93.5		9378.2393	9407.6584		9379.5752	9406.3629	93.5
94.5		9376.2004	9405.8920		9377.5076	9404.5726	94.5
95.5		9374.0636	9404.1315		9375.3995	9402.7792	95.5
96.5		9371.9615	9402.3128		9373.3222	9400.9677	96.5
97.5		9369.8449	9400.4989		9371.2212	9399.1300	97.5
98.5		9367.6699	9398.6564		9369.0612	9397.2750	98.5
99.5		9365.4620	9396.7744		9366.8969	9395.3912	99.5
100.5		9363.2643	9394.9205		9364.6881		100.5
101.5			9392.9644		9362.5075	9391.5748	101.5
102.5		9358.8209	9391.0517		9360.3093	9389.6461	102.5
103.5		9356.5579	9389.1298		9358.0247		103.5
104.5			9387.1452		9355.8133		104.5
105.5			9385.1462		9353.5388		105.5
106.5			9383.1651		9351.2279		106.5
107.5			9381.1422		9348.9253		107.5
108.5			9379.0976		9346.6097		108.5
109.5			9377.0270		9344.2686		109.5
110.5			9374.9533		9341.8843		110.5
111.5			9372.8408		9339.5046		111.5
112.5			9370.7318		9337.0717		112.5
113.5			9368.5984		9334.6736		113.5
114.5							114.5
115.5			9364.2614				115.5
116.5			9362.0399				116.5
117.5			9359.8469				117.5
118.5			9357.6146				118.5
119.5			9355.3418				119.5
120.5			9353.0671				120.5
121.5			9350.7982				121.5
122.5			9348.4605				122.5
123.5			9346.1467				123.5
124.5							124.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)		(1,1)		(0,1)			
J	R(J)	P(J)	R(J)	P(J)	R(J)	P(J)	J
8.5							8.5
9.5						10089.6160	9.5
10.5						10089.1554	10.5
11.5						10088.6606	11.5
12.5		10646.4568				10088.1707	12.5
13.5		10645.9284					13.5
14.5		10645.3914				10087.1503	14.5
15.5		10644.8419				10086.6204	15.5
16.5		10644.2749				10086.0233	16.5
17.5		10643.6678				10085.4731	17.5
18.5		10643.0761				10084.9321	18.5
19.5		10642.4340				10084.3184	19.5
20.5		10641.8045				10083.6942	20.5
21.5		10641.1536				10083.0792	21.5
22.5		10640.4818				10082.4185	22.5
23.5		10639.7967				10081.7710	23.5
24.5	10654.3205	10639.0928				10081.0944	24.5
25.5	10654.2164	10638.3718				10080.4086	25.5
26.5	10654.0976	10637.6429				10079.7113	26.5
27.5	10653.9504	10636.8947				10078.9772	27.5
28.5	10653.7938	10636.0828			10095.9228	10078.2584	28.5
29.5	10653.6055	10635.3384			10095.7765	10077.5032	29.5
30.5	10653.4175	10634.5378			10095.6178	10076.7379	30.5
31.5	10653.2143	10633.7214			10095.4450	10075.9559	31.5
32.5	10652.9890	10632.8913			10095.2658	10075.1805	32.5
33.5	10652.7460	10632.0359			10095.0661	10074.3606	33.5
34.5	10652.4909	10631.1710			10094.8520	10073.5372	34.5
35.5	10652.2116	10630.2880	10609.9174		10094.6137	10072.6900	35.5
36.5	10651.9250	10629.3927	10609.6149		10094.3702	10071.8433	36.5
37.5	10651.6182	10628.4812	10609.3421		10094.1111	10070.9732	37.5
38.5	10651.3002	10627.5513	10608.9917		10093.8275	10070.0890	38.5
39.5	10650.9547	10626.5999	10608.6496		10093.5410	10069.1893	39.5
40.5	10650.6020	10625.6012	10608.3049		10093.2458	10068.2760	40.5
41.5	10650.2355	10624.6606	10607.9264		10092.9200	10067.3446	41.5
42.5	10649.8465	10623.6689	10607.5412		10092.5678	10066.3956	42.5
43.5	10649.4424	10622.6575	10607.1532		10092.2297	10065.4513	43.5
44.5	10649.0198	10621.6325	10606.7231		10091.8628	10064.4586	44.5
45.5	10648.5822	10620.5843	10606.2904		10091.4811	10063.4755	45.5
46.5	10648.1319	10619.5213	10605.8211		10091.0781	10062.4675	46.5
47.5	10647.6592	10618.4462	10605.3578		10090.6678	10061.4571	47.5
48.5	10647.1740	10617.3554	10604.8853		10090.2452	10060.4241	48.5
49.5	10646.6747	10616.2494	10604.3454		10089.7928	10059.3774	49.5
50.5	10646.1580	10615.1232	10603.8616		10089.3408	10058.3111	50.5
51.5	10645.6210	10613.9810	10603.3386		10088.8656	10057.2370	51.5
52.5	10645.0696	10612.8251	10602.8201		10088.3734	10056.1252	52.5
53.5	10644.5022	10611.6505	10602.2248		10087.8740	10055.0335	53.5
54.5	10643.9156	10610.4636	10601.6138		10087.3565	10053.9030	54.5
55.5	10643.3185	10609.2591	10601.0585		10086.8251	10052.7611	55.5
56.5	10642.7005	10608.0369	10600.4353		10086.2726	10051.6077	56.5
57.5	10642.0690	10606.7990	10599.8079		10085.6831	10050.4248	57.5
58.5	10641.4215	10605.5440	10599.1542		10085.1289	10049.2526	58.5
59.5	10640.7546	10604.2742	10598.4755		10084.5366	10048.0586	59.5
60.5	10640.0748	10602.9879	10597.8160		10083.9286	10046.8491	60.5
61.5	10639.3753	10601.6841	10597.1182		10083.3068	10045.6105	61.5
62.5	10638.6637	10600.3631			10082.6714	10044.3689	62.5
63.5	10637.9293	10599.0305	10595.6553		10082.0238	10043.1081	63.5
64.5	10637.1845	10597.6770	10594.9278		10081.3401	10041.8348	64.5
65.5	10636.4183	10596.3147	10594.1697	10554.1726	10080.6527	10040.5396	65.5
66.5	10635.6374	10594.9278	10593.3968	10552.8445	10079.9543	10039.2416	66.5
67.5	10634.8445			10551.4460	10079.2419	10037.9207	67.5
68.5	10634.0303	10592.1112	10591.7957	10550.0399	10078.5091	10036.5810	68.5
69.5	10633.2015	10590.6774			10077.7691	10035.2420	69.5
70.5	10632.3561	10589.2323	10590.1262	10547.1702	10077.0033	10033.8800	70.5
71.5	10631.4949	10587.7629	10589.2323	10545.7073	10076.2324	10032.4971	71.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)			(1,1)		(0,1)		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
72.5	10630.6152	10586.2824	10588.3973	10544.2213	10075.4405	10031.1151	72.5
73.5	10629.7209	10584.7864	10587.4992	10542.7237	10074.6333	10029.6949	73.5
74.5	10628.8133	10583.2733	10586.6041	10541.2226	10073.8105	10028.2747	74.5
75.5	10627.8875	10581.7453	10585.6768	10539.6899	10072.9742	10026.8319	75.5
76.5	10626.9405	10580.1961		10538.1705	10072.1251	10025.3804	76.5
77.5	10625.9816	10578.6365	10583.7819	10536.6038	10071.2560	10023.9076	77.5
78.5	10625.0051	10577.0581	10582.8116	10535.0351	10070.3771	10022.4313	78.5
79.5	10624.0115	10575.4639	10581.8345	10533.4950	10069.4737	10020.9332	79.5
80.5	10622.9991	10573.8532	10580.7607	10531.8489	10068.5646	10019.4174	80.5
81.5	10621.9777	10572.2268	10579.8094	10530.2186	10067.6388	10017.8871	81.5
82.5	10620.9355	10570.5823	10578.7385	10528.5718	10066.6962	10016.3486	82.5
83.5	10619.8771	10568.9258	10577.7066	10526.9247	10065.7373	10014.7867	83.5
84.5	10618.8024	10567.2502	10576.6140	10525.2723	10064.7627	10013.2112	84.5
85.5	10617.7112	10565.5617	10575.5386	10523.5768	10063.7787	10011.6248	85.5
86.5	10616.6016	10563.8532	10574.4425	10521.8808	10062.7694	10010.0232	86.5
87.5	10615.4816	10562.1282	10573.3143		10061.7577	10008.4034	87.5
88.5	10614.3392	10560.3879		10518.4162	10060.7210	10006.7649	88.5
89.5	10613.1835	10558.6298	10571.0335	10516.6891	10059.6748	10005.1223	89.5
90.5	10612.0104	10556.8593	10569.8545	10514.9188	10058.6103	10003.4631	90.5
91.5	10610.8258	10555.0726	10568.6744	10513.1446	10057.5279	10001.7810	91.5
92.5	10609.6149	10553.2680	10567.5029	10511.3450	10056.4343	10000.0895	92.5
93.5	10608.3946	10551.4460		10509.4836	10055.3305	9998.3768	93.5
94.5	10607.1532	10549.6105	10565.0194	10507.6828	10054.2058	9996.6589	94.5
95.5	10605.9000	10547.7580	10563.7742	10505.8555	10053.0601	9994.9210	95.5
96.5	10604.6294	10545.8893	10562.4844	10503.9992	10051.9041	9993.1632	96.5
97.5	10603.3386	10544.0030	10561.2171		10050.7413	9991.4037	97.5
98.5	10602.0372	10542.0985	10559.9151	10500.2309	10049.5512	9989.6148	98.5
99.5	10600.7142	10540.1858	10558.6298		10048.3659	9987.8262	99.5
100.5	10599.3812	10538.2531	10557.2731	10496.3828	10047.1360	9986.0135	100.5
101.5	10598.0245	10536.3014	10555.9308	10494.4402	10045.9113	9984.1908	101.5
102.5	10596.6537	10534.3348	10554.5686		10044.6637	9982.3515	102.5
103.5	10595.2693	10532.3544	10553.1844	10490.5125	10043.4044	9980.4853	103.5
104.5	10593.8643	10530.3548	10551.7869	10488.4849	10042.1240	9978.6065	104.5
105.5	10592.4479	10528.3500	10550.3537	10486.4898	10040.8481	9976.7121	105.5
106.5	10591.0116	10526.3165	10548.9274	10484.4943	10039.5262	9974.8046	106.5
107.5	10589.5586	10524.2660	10547.4738	10482.4598	10038.2010	9972.8958	107.5
108.5	10588.0895	10522.1939	10546.0349	10480.3780	10036.8576	9970.9786	108.5
109.5	10586.6041	10520.1123	10544.5535	10478.3051	10035.5040	9969.0306	109.5
110.5	10585.1049	10518.0186	10543.0490	10476.2402	10034.1404	9967.0635	110.5
111.5	10583.5864	10515.9104	10541.5414	10474.1353	10032.7575	9965.0897	111.5
112.5	10582.0541	10513.7857	10540.0245	10472.0038	10031.3619	9963.1014	112.5
113.5	10580.5021	10511.6432	10538.4684	10469.8495	10029.9513	9961.0890	113.5
114.5	10578.9350	10509.4836	10536.9154	10467.7578	10028.5162	9959.0762	114.5
115.5	10577.3499	10507.3065	10535.3438	10465.5620	10027.0398	9957.0385	115.5
116.5	10575.7539	10505.1113	10533.7390	10463.3360	10025.6186	9954.9812	116.5
117.5	10574.1374	10502.9053	10532.1303	10461.1892	10024.1428	9952.9173	117.5
118.5	10572.5040	10500.6821	10530.4764	10458.9651	10022.6593	9950.8294	118.5
119.5	10570.8521	10498.4318		10456.7307	10021.1551	9948.7407	119.5
120.5	10569.1880	10496.1821	10527.2138	10454.4780	10019.6335	9946.6352	120.5
121.5	10567.5029	10493.9101	10525.5574	10452.1857	10018.0944	9944.4874	121.5
122.5	10565.8049	10491.6234	10523.8432	10449.9182	10016.5504	9942.3648	122.5
123.5	10564.0903	10489.3179		10447.6621	10014.9816	9940.2059	123.5
124.5	10562.3608	10486.9914	10520.4219	10445.3282	10013.4002	9938.0479	124.5
125.5	10560.6122	10484.6565	10518.6833	10443.0072	10011.8157	9935.8593	125.5
126.5	10558.8461	10482.3053	10516.8914	10440.6727	10010.1992	9933.6556	126.5
127.5	10557.0715	10479.9343	10515.1265	10438.2700	10008.5671	9931.4423	127.5
128.5	10555.2721	10477.5527	10513.3634	10435.9336	10006.9279	9929.2124	128.5
129.5	10553.4562	10475.1450		10433.5081		9926.9706	129.5
130.5	10551.6291	10472.7262		10431.1143	10003.5959	9924.7004	130.5
131.5	10549.7782	10470.2919		10428.7003	10001.9201	9922.4289	131.5
132.5	10547.9184	10467.8453		10426.2498	10000.1592	9920.1464	132.5
133.5	10546.0349	10465.3685		10423.8096	9998.4970	9917.8327	133.5
134.5	10544.1402	10462.8921		10421.3306	9996.7643	9915.5207	134.5
135.5	10542.2295	10460.3972		10418.8188	9995.0249	9913.1899	135.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(0,0)			(1,1)		(0,1)		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
136.5	10540.2918	10457.8794		10416.3266	9993.2742	9910.8466	136.5
137.5	10538.3509	10455.3483		10413.8171		9908.4733	137.5
138.5	10536.3862	10452.8020		10411.2523	9989.6780	9906.0970	138.5
139.5	10534.4088	10450.2423			9987.8262	9903.7066	139.5
140.5	10532.4112	10447.6621			9986.0135	9901.2973	140.5
141.5	10530.3928	10445.0589			9984.1908	9898.8733	141.5
142.5	10528.3500	10442.4519			9982.3515	9896.4315	142.5
143.5	10526.3165	10439.8270			9980.4853	9893.9537	143.5
144.5	10524.2660	10437.1735			9978.6065	9891.5219	144.5
145.5	10522.1939	10434.5153			9976.7121	9889.0364	145.5
146.5	10520.1123	10431.8432			9974.8046	9886.5369	146.5
147.5	10518.0186	10429.1527			9972.8608	9884.0262	147.5
148.5	10515.8653	10426.4448			9970.9148	9881.4966	148.5
149.5	10513.7147	10423.7169			9968.9454	9878.9843	149.5
150.5	10511.5545	10420.9767			9966.9859	9876.4051	150.5
151.5	10509.3751	10418.2203			9964.9912	9873.8321	151.5
152.5	10507.1898	10415.4519			9962.9782	9871.2452	152.5
153.5	10504.9706	10412.6596			9960.9574	9868.6386	153.5
154.5	10502.7517	10409.8515			9958.9321	9866.0225	154.5
155.5	10500.5146	10407.0356			9956.8665	9863.3884	155.5
156.5	10498.2444	10404.1914			9954.7958	9860.7474	156.5
157.5	10495.9780	10401.3360			9952.7193	9858.0853	157.5
158.5	10493.6758	10398.4646			9950.6209	9855.4229	158.5
159.5	10491.3700	10395.5917			9948.4748	9852.7273	159.5
160.5	10489.0444	10392.6792			9946.3949	9849.9932	160.5
161.5	10486.7038	10389.7597			9944.2451	9847.3041	161.5
162.5	10484.3425	10386.8256			9942.0771	9844.5652	162.5
163.5	10481.9588	10383.8767			9939.9087	9841.8275	163.5
164.5	10479.5677	10380.9119			9937.7100	9839.0596	164.5
165.5	10477.1757	10377.9284			9935.5356	9836.2679	165.5
166.5	10474.7428	10374.9225			9933.2947	9833.4774	166.5
167.5	10472.2950	10371.9117			9931.0650	9830.6811	167.5
168.5	10469.8494	10368.8778			9928.8032	9827.8478	168.5
169.5	10467.3672	10365.8356			9926.5345	9825.0109	169.5
170.5	10464.8740	10362.7688			9924.2494	9822.1614	170.5
171.5	10462.3714	10359.6902			9921.9667	9819.2872	171.5
172.5	10459.8420	10356.5930			9919.6482	9816.4005	172.5
173.5	10457.2981	10353.4761			9917.3201	9813.4971	173.5
174.5	10454.7546	10350.3478			9914.9706	9810.6012	174.5
175.5	10452.1648	10347.2099			9912.6218	9807.6717	175.5
176.5	10449.5659	10344.0330			9910.2478	9804.7282	176.5
177.5	10446.9155	10340.8598			9907.8440	9801.7683	177.5
178.5	10444.3428	10337.6262			9905.4492	9798.7720	178.5
179.5	10441.6852	10334.4527			9902.9890	9795.8039	179.5
180.5	10439.0128	10331.2067			9900.5729	9792.7534	180.5
181.5	10436.3223				9898.1168	9789.7708	181.5
182.5	10433.6131	10324.6996			9895.6257	9786.7302	182.5
183.5		10321.4196			9893.0645		183.5
184.5		10318.1054			9890.5376		184.5
185.5					9888.0708		185.5
186.5					9885.4943		186.5
187.5					9882.8927		187.5
188.5					9880.3026		188.5
189.5	10414.5711						189.5
190.5	10411.7261						190.5
191.5	10408.8707	10294.9018					191.5
192.5	10406.0137	10291.4473					192.5
193.5	10403.1241	10287.9936					193.5
194.5	10400.2219	10284.5293					194.5
195.5	10397.3155	10281.0643					195.5
196.5	10394.3790	10277.5721					196.5
197.5	10391.4471	10274.0600					197.5
198.5	10388.4923	10270.5345					198.5
199.5	10385.5195	10267.0104					199.5

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**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

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**(0,0)**

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**(1,1)**

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**(0,1)**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
200.5	10382.5207	10263.4589					200.5
201.5	10379.5151	10259.9057					201.5
202.5	10376.4798	10256.3291					202.5
203.5	10373.4488	10252.7482					203.5
204.5	10370.3731	10249.1120					204.5
205.5		10245.4751					205.5
206.5		10241.8341					206.5
207.5		10238.1789					207.5
208.5		10234.4981					208.5
209.5		10230.7810					209.5
210.5		10227.0237					210.5
211.5		10223.2772					211.5
212.5							212.5
213.5							213.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(1,2)		(2,3)		(1,0)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
12.5							12.5
13.5						11161.8869	13.5
14.5						11161.3411	14.5
15.5						11160.7729	15.5
16.5						11160.1802	16.5
17.5						11159.5752	17.5
18.5						11158.9468	18.5
19.5		10045.8075				11158.2964	19.5
20.5		10045.2047			11170.3972	11157.6810	20.5
21.5		10044.5726			11170.3205	11156.9619	21.5
22.5		10043.9430			11170.2352	11156.2651	22.5
23.5		10043.2903			11170.1256		23.5
24.5		10042.6188			11169.9983	11154.8274	24.5
25.5		10041.9286			11169.8617	11154.0757	25.5
26.5	10057.6089	10041.2343			11169.7126	11153.3064	26.5
27.5	10057.4571	10040.5396			11169.5292	11152.5163	27.5
28.5	10057.3863	10039.7814			11169.3428	11151.7419	28.5
29.5	10057.2370	10039.0454			11169.1254	11150.9245	29.5
30.5	10057.0681	10038.2602			11168.8978	11150.0837	30.5
31.5	10056.9305	10037.5099			11168.6555	11149.2657	31.5
32.5	10056.7497	10036.7020			11168.3904	11148.3723	32.5
33.5	10056.5518	10035.9177			11168.1036	11147.4772	33.5
34.5	10056.3125	10035.0860			11167.8087	11146.5726	34.5
35.5	10056.1252	10034.2683			11167.5003	11145.6575	35.5
36.5	10055.8645	10033.3970			11167.1662	11144.7169	36.5
37.5	10055.5954	10032.5468			11166.8177	11143.7632	37.5
38.5	10055.3305	10031.6624			11166.4515	11142.7851	38.5
39.5	10055.0335	10030.7832			11166.0786	11141.7944	39.5
40.5	10054.7373	10029.8661			11165.6643	11140.7923	40.5
41.5	10054.4174	10028.9365			11165.2446	11139.7628	41.5
42.5	10054.0834	10028.0022			11164.8078	11138.7225	42.5
43.5	10053.7363	10027.0398			11164.3495	11137.6704	43.5
44.5	10053.3745	10026.0784			11163.8780	11136.5903	44.5
45.5	10052.9477	10025.0979			11163.3901	11135.4909	45.5
46.5	10052.6001	10024.0979	10012.7801		11162.8741	11134.3872	46.5
47.5	10052.1984	10023.0862	10012.3774		11162.3634	11133.2529	47.5
48.5	10051.7646	10022.0814	10011.9686		11161.8191	11132.1053	48.5
49.5	10051.3248	10021.0179	10011.5594		11161.2617	11130.9537	49.5
50.5	10050.8710	10019.9574	10011.1261		11160.6450	11129.7652	50.5
51.5		10018.8919	10010.6677		11160.0906	11128.5613	51.5
52.5	10049.9299	10017.8055	10010.1992		11159.4535	11127.3539	52.5
53.5	10049.4184	10016.6934	10009.7058		11158.8450	11126.1208	53.5
54.5	10048.9111	10015.5798	10009.1766		11158.2046	11124.8749	54.5
55.5	10048.3659	10014.4487	10008.6883	9974.8933	11157.5363	11123.6059	55.5
56.5	10047.8295	10013.2943	10008.1660	9973.7659	11156.8559	11122.3192	56.5
57.5	10047.2719	10012.1354	10007.6179	9972.6255	11156.1447	11121.0128	57.5
58.5	10046.6992	10010.9616	10007.0669	9971.4544	11155.4434	11119.6962	58.5
59.5	10046.1129	10009.7673	10006.4923	9970.3174	11154.7060	11118.3632	59.5
60.5	10045.5155	10008.5671	10005.9106	9969.0981	11153.9563	11117.0037	60.5
61.5	10044.8926	10007.3417	10005.3021	9967.8984	11153.1876	11115.6358	61.5
62.5	10044.2558	10006.1082	10004.6802	9966.6803	11152.4011	11114.2376	62.5
63.5	10043.6062	10004.8547	10004.0513	9965.4501	11151.5796		63.5
64.5	10042.9411	10003.5959		9964.1977	11150.7710		64.5
65.5	10042.2695	10002.3031	10002.7632	9962.9459	11149.9332	11109.9772	65.5
66.5	10041.5635	10001.0055	10002.0558	9961.6590	11149.0752	11108.5047	66.5
67.5	10040.8481	9999.6997	10001.3844	9960.4068	11148.2018	11107.0505	67.5
68.5	10040.1226	9998.3768	10000.6644	9959.0762	11147.3091	11105.5428	68.5
69.5	10039.4043	9997.0359	9999.9490	9957.7522	11146.4041	11104.0369	69.5
70.5	10038.6389	9995.6784	9999.2141	9956.4104	11145.4756	11102.5132	70.5
71.5	10037.8718	9994.3110	9998.4970	9955.0611	11144.5331	11100.9649	71.5
72.5	10037.0907	9992.9242	9997.6901	9953.6885	11143.5685	11099.4020	72.5
73.5	10036.2833	9991.5215	9996.8858	9952.3050	11142.5826	11097.8245	73.5
74.5	10035.5040	9990.1069	9996.1285	9950.9298	11141.5905	11096.2279	74.5
75.5	10034.6406	9988.6781	9995.3025	9949.5132	11140.5818	11094.5887	75.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(1,2)			(2,3)		(1,0)		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
76.5	10033.8018	9987.2315	9994.4713	9948.1089	11139.5483	11092.9591	76.5
77.5	10032.9433	9985.7746	9993.6508	9946.6352	11138.4973	11091.3305	77.5
78.5	10032.0648	9984.3080	9992.7554	9945.1885	11137.4345	11089.6668	78.5
79.5	10031.1755	9982.8120	9991.9351	9943.7247	11136.3487	11087.9826	79.5
80.5	10030.2590	9981.3052	9991.0224	9942.2378	11135.2473	11086.2795	80.5
81.5	10029.3507	9979.7906	9990.1069	9940.7746	11134.1274	11084.5664	81.5
82.5	10028.4162	9978.2571	9989.1997	9939.2154	11132.9903	11082.7587	82.5
83.5	10027.4728	9976.7121	9988.2697	9937.7100	11131.8305	11081.0644	83.5
84.5	10026.5007	9975.1459	9987.3154	9936.1429	11130.6663	11079.3039	84.5
85.5	10025.5155	9973.5644	9986.3459	9934.6092	11129.4731	11077.5129	85.5
86.5	10024.5242	9971.9696	9985.3759	9933.0259	11128.2633	11075.7007	86.5
87.5	10023.5199	9970.3708	9984.3974	9931.4423	11127.0423	11073.8936	87.5
88.5	10022.4888	9968.7390	9983.3944	9929.8422	11125.8004	11072.0107	88.5
89.5	10021.4554	9967.1023	9982.3515	9928.2234	11124.5333	11070.1773	89.5
90.5	10020.3969	9965.4501	9981.3052	9926.6122	11123.2604	11068.3165	90.5
91.5	10019.3288	9963.7864	9980.3047	9924.9465	11121.9850	11066.4274	91.5
92.5	10018.2321	9962.1070	9979.2092	9923.2880	11120.6562	11064.5265	92.5
93.5	10017.1430	9960.4068	9978.1294	9921.6091	11119.3223	11062.5907	93.5
94.5	10016.0277	9958.6980	9977.0372	9919.9248	11117.9772	11060.6254	94.5
95.5	10014.8980	9956.9672	9975.9220	9918.2261	11116.6126	11058.6899	95.5
96.5	10013.7558	9955.2341	9974.8046	9916.4977	11115.2146	11056.7083	96.5
97.5	10012.5894	9953.4742	9973.6460	9914.7656	11113.8229	11054.6973	97.5
98.5	10011.4153	9951.7011	9972.4931	9913.0256	11112.4109		98.5
99.5	10010.1992	9949.9209	9971.3288	9911.2504	11110.9793	11050.6694	99.5
100.5	10009.0216	9948.1089	9970.1362	9909.4760	11109.5183	11048.6308	100.5
101.5	10007.7939	9946.3065	9968.9454	9907.6804	11108.0541	11046.5530	101.5
102.5	10006.5648	9944.4874	9967.7125	9905.8747	11106.5684	11044.4717	102.5
103.5	10005.3021	9942.6332	9966.4912	9904.0470	11105.0544	11042.3868	103.5
104.5	10004.0513	9940.7746	9965.2381	9902.2204	11103.5351	11040.2667	104.5
105.5	10002.7632	9938.9008	9963.9779	9900.3585	11102.0057	11038.1340	105.5
106.5	10001.4700	9937.0031	9962.6952	9898.4931	11100.4070	11035.9659	106.5
107.5	10000.1592	9935.1097	9961.4106	9896.5940	11098.8556	11033.8078	107.5
108.5	9998.8365	9933.1897	9960.0942	9894.7075	11097.2754	11031.5907	108.5
109.5	9997.4961	9931.2650	9958.7746	9892.8058	11095.6687	11029.4561	109.5
110.5	9996.1285	9929.3088	9957.4245	9890.8674	11094.0228	11027.1967	110.5
111.5	9994.7651	9927.3445	9956.0807	9888.9239	11092.3803	11024.9551	111.5
112.5	9993.3758	9925.3711	9954.7203	9886.9738	11090.7430		112.5
113.5	9991.9752	9923.3799	9953.3186	9885.0063	11089.0116	11020.4239	113.5
114.5	9990.5618	9921.3758	9951.9198	9883.0167	11087.3311	11018.1460	114.5
115.5	9989.1421	9919.3588	9950.4931	9881.0087	11085.6003	11015.8253	115.5
116.5	9987.6890	9917.3201	9949.0553		11083.8592	11013.5441	116.5
117.5	9986.2314	9915.2644	9947.6043		11082.1246	11011.1791	117.5
118.5	9984.7533	9913.1899	9946.1178		11080.3548	11008.8149	118.5
119.5	9983.2614	9911.1193	9944.6305		11078.5673	11006.4336	119.5
120.5	9981.7550	9909.0260	9943.1159		11076.7666	11004.0331	120.5
121.5	9980.2247	9906.9103	9941.5752		11074.9412	11001.6423	121.5
122.5	9978.6983	9904.7917			11073.0455	10999.1925	122.5
123.5	9977.1278	9902.6625			11071.2474	10996.7373	123.5
124.5	9975.5756	9900.5003			11069.3701	10994.2958	124.5
125.5	9973.9961	9898.3322			11067.4708	10991.8172	125.5
126.5	9972.3868	9896.1507			11065.5595	10989.3071	126.5
127.5	9970.7937	9893.9537			11063.6363	10986.7985	127.5
128.5	9969.1485	9891.7467			11061.6679	10984.2649	128.5
129.5	9967.5221	9889.5114			11059.7179	10981.7075	129.5
130.5	9965.8664	9887.2620			11057.7368	10979.1459	130.5
131.5	9964.1977	9885.0063			11055.7177	10976.5699	131.5
132.5	9962.4998	9882.7330			11053.7113	10973.9680	132.5
133.5	9960.8037	9880.4590			11051.6852	10971.3399	133.5
134.5	9959.0762	9878.1584			11049.6414	10968.7033	134.5
135.5	9957.3672	9875.8440			11047.5231		135.5
136.5	9955.6073	9873.5029			11045.4663	10963.3829	136.5
137.5	9953.8425	9871.1617			11043.3676	10960.6786	137.5
138.5	9952.0721	9868.8103			11041.2380	10957.9752	138.5
139.5	9950.2759	9866.4291			11039.1179	10955.2515	139.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(1,2)			(2,3)		(1,0)		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
140.5	9948.4748	9864.0391			11036.9403	10952.5095	140.5
141.5	9946.6352	9861.6413			11034.7711	10949.7576	141.5
142.5	9944.8048	9859.2391			11032.5993	10946.9636	142.5
143.5	9942.9588	9856.7819			11030.3432	10944.1783	143.5
144.5	9941.0951	9854.3425			11028.1215	10941.3696	144.5
145.5	9939.2154	9851.8713			11025.8598	10938.5800	145.5
146.5		9849.4047					146.5
147.5	9935.3883	9846.9053				10932.8168	147.5
148.5	9933.4540	9844.3504					148.5
149.5	9931.5153	9841.8275					149.5
150.5	9929.5366	9839.2816					150.5
151.5	9927.5636	9836.7689					151.5
152.5	9925.5482	9834.1960					152.5
153.5		9831.6064					153.5
154.5		9829.0028					154.5
155.5							155.5
156.5							156.5
157.5							157.5
158.5							158.5
159.5							159.5
160.5							160.5
161.5							161.5
162.5							162.5
163.5							163.5
164.5	9900.9781	9802.7326					164.5
165.5	9898.7271	9799.9440					165.5
166.5	9896.5833	9797.1409					166.5
167.5	9894.3096	9794.3396					167.5
168.5	9892.1085	9791.5310					168.5
169.5	9889.8324	9788.7113					169.5
170.5	9887.5722	9785.8820					170.5
171.5	9885.3027	9783.0357					171.5
172.5	9883.0167	9780.1906					172.5
173.5	9880.7167	9777.3089					173.5
174.5	9878.3971	9774.4261					174.5
175.5	9876.0558	9771.5242					175.5
176.5	9873.7232	9768.6123					176.5
177.5	9871.3553	9765.6997					177.5
178.5		9762.7550					178.5
179.5		9759.7991					179.5
180.5		9756.8425					180.5
181.5		9753.8595					181.5
182.5		9750.8540					182.5
183.5		9747.8092					183.5
184.5		9744.8195					184.5
185.5		9741.7558					185.5
186.5		9738.6847					186.5
187.5		9735.6617					187.5
188.5							188.5
189.5							189.5

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**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

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(2,1)

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
14.5							14.5
15.5		11115.3183					15.5
16.5		11114.7177					16.5
17.5		11114.0906					17.5
18.5		11113.4975					18.5
19.5		11112.8724					19.5
20.5		11112.1790					20.5
21.5							21.5
22.5	11124.7289	11110.8211					22.5
23.5	11124.6232	11110.1117					23.5
24.5	11124.5333	11109.3655					24.5
25.5	11124.3778	11108.6399					25.5
26.5	11124.2331	11107.8834					26.5
27.5	11124.0367	11107.1002					27.5
28.5	11123.8337	11106.2898					28.5
29.5	11123.6059	11105.4821					29.5
30.5	11123.4029	11104.6504					30.5
31.5	11123.1474	11103.8140					31.5
32.5	11122.8536	11102.9410					32.5
33.5	11122.6156	11102.0567					33.5
34.5	11122.3192	11101.1458					34.5
35.5	11121.9850	11100.2502					35.5
36.5	11121.6804	11099.3117					36.5
37.5	11121.3133	11098.3800					37.5
38.5	11120.9550	11097.3741					38.5
39.5	11120.5634	11096.4040					39.5
40.5	11120.1721	11095.3791					40.5
41.5	11119.7456	11094.3815					41.5
42.5	11119.3223	11093.3384					42.5
43.5	11118.8649	11092.2761					43.5
44.5	11118.3632	11091.2511					44.5
45.5	11117.9025	11090.1243					45.5
46.5	11117.3988	11089.0116					46.5
47.5	11116.8830	11087.8846					47.5
48.5	11116.3314	11086.7435					48.5
49.5	11115.7713	11085.6003					49.5
50.5	11115.2146	11084.4391					50.5
51.5	11114.5899	11083.2108					51.5
52.5	11113.9958	11082.0067					52.5
53.5	11113.3617	11080.8046					53.5
54.5	11112.7371	11079.5280					54.5
55.5	11112.0698	11078.2710					55.5
56.5		11076.9788					56.5
57.5	11110.6902	11075.7007					57.5
58.5	11109.9772	11074.3699					58.5
59.5	11109.2201	11073.0455					59.5
60.5	11108.5046	11071.6811					60.5
61.5	11107.7230	11070.3252					61.5
62.5	11106.9214	11068.9386					62.5
63.5	11106.1289	11067.5255					63.5
64.5	11105.3374	11066.1137					64.5
65.5	11104.4757	11064.6779					65.5
66.5	11103.6382	11063.2085					66.5
67.5	11102.7536	11061.7455					67.5
68.5	11101.8614	11060.2627					68.5
69.5	11100.9649	11058.7544					69.5
70.5	11100.0378	11057.2325					70.5
71.5	11099.0940	11055.7176					71.5
72.5	11098.1347	11054.1538					72.5
73.5	11097.1897	11052.5572					73.5
74.5	11096.1556	11050.9704					74.5
75.5	11095.1468	11049.3652					75.5
76.5	11094.1039	11047.7375					76.5
77.5	11093.0799	11046.0862					77.5

**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

(2,1)

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
78.5	11092.0214	11044.4717					78.5
79.5	11090.9286	11042.7533					79.5
80.5	11089.8566	11041.0404					80.5
81.5	11088.7179	11039.3379					81.5
82.5	11087.5789	11037.6278					82.5
83.5	11086.4369	11035.8686					83.5
84.5	11085.2555	11034.1020					84.5
85.5	11084.0822	11032.2887					85.5
86.5	11082.8505	11030.5033					86.5
87.5	11081.6530	11028.7124					87.5
88.5	11080.4279	11026.8712					88.5
89.5	11079.1823	11025.0315					89.5
90.5	11077.8865	11023.1498					90.5
91.5	11076.5868	11021.2587					91.5
92.5	11075.2823	11019.3495					92.5
93.5	11073.9399	11017.4396					93.5
94.5	11072.6156	11015.5108					94.5
95.5	11071.2474	11013.5441					95.5
96.5	11069.8728	11011.5598					96.5
97.5	11068.4453	11009.5724					97.5
98.5	11067.0495	11007.5822					98.5
99.5	11065.6392	11005.5606					99.5
100.5	11064.1769	11003.5342					100.5
101.5	11062.7001	11001.4531					101.5
102.5	11061.2235	10999.3608					102.5
103.5	11059.7179	10997.2820					103.5
104.5	11058.2347	10995.1741					104.5
105.5	11056.6548	10993.0409					105.5
106.5	11055.0881	10990.8921					106.5
107.5	11053.5234	10988.7422					107.5
108.5	11051.9332	10986.5495					108.5
109.5	11050.3272	10984.3401					109.5
110.5	11048.7014	10982.1432					110.5
111.5	11047.0257	10979.8854					111.5
112.5	11045.3758	10977.6420					112.5
113.5	11043.6833	10975.3430					113.5
114.5	11041.9561	10973.0778					114.5
115.5	11040.2667	10970.7738					115.5
116.5	11038.5138	10968.4453					116.5
117.5	11036.7545						117.5
118.5	11034.9815	10963.7368					118.5
119.5		10961.3537					119.5
120.5							120.5
121.5							121.5
122.5							122.5
123.5							123.5
124.5							124.5
125.5							125.5
126.5							126.5
127.5							127.5
128.5							128.5
129.5							129.5
130.5							130.5
131.5							131.5
132.5	11008.8149						132.5
133.5	11006.7718						133.5
134.5	11004.7106						134.5
135.5	11002.6506						135.5
136.5	11000.5354	10918.8063					136.5
137.5	10998.4178	10916.1067					137.5
138.5	10996.3091	10913.3901					138.5
139.5	10994.1641	10910.7197					139.5
140.5	10991.9575	10907.9294					140.5
141.5	10989.8211	10905.1552					141.5

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**NbS** [15.2]<sub>3/2</sub> → a<sup>2</sup>Δ<sub>3/2</sub> rotational lines.

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**(2,1)**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
142.5	10987.5950	10902.3895					142.5
143.5	10985.4270	10899.5873					143.5
144.5	10983.2066	10896.7866					144.5
145.5	10980.9492	10893.9385					145.5
146.5	10978.6881	10891.1270					146.5
147.5	10976.4047	10888.2746					147.5
148.5	10974.1302	10885.3937					148.5
149.5	10971.8005	10882.4974					149.5
150.5	10969.4534	10879.5980					150.5
151.5	10967.1073	10876.6887					151.5
152.5	10964.6964	10873.7283					152.5
153.5	10962.3533	10870.7679					153.5
154.5		10867.7840					154.5
155.5		10864.7894					155.5
156.5		10861.7791					156.5
157.5		10858.7318					157.5
158.5							158.5
159.5							159.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(0,0)		(0,1)		(1,2)a			
J	R(J)	P(J)	R(J)	P(J)	R(J)	P(J)	J
6.5							6.5
7.5				11108.9140			7.5
8.5				11108.5047		11065.0528	8.5
9.5				11108.0541		11064.6187	9.5
10.5				11107.5661		11064.1769	10.5
11.5				11107.0505		11063.7153	11.5
12.5				11106.5684		11063.2085	12.5
13.5						11062.7002	13.5
14.5				11105.5428		11062.1839	14.5
15.5						11061.6288	15.5
16.5				11104.4173			16.5
17.5				11103.8419		11060.4992	17.5
18.5		11662.6959		11103.2657		11059.8976	18.5
19.5		11662.0528		11102.6784		11059.2321	19.5
20.5		11661.4004		11102.0057		11058.6899	20.5
21.5	11674.1099	11660.7372	11114.7968	11101.3775		11058.0329	21.5
22.5	11674.0377	11660.0529	11114.7177	11100.7241		11057.3700	22.5
23.5	11673.9364	11659.3445	11114.6429	11100.0378		11056.7083	23.5
24.5	11673.8356	11658.6273	11114.5899	11099.3117		11055.9753	24.5
25.5	11673.7070	11657.8968	11114.4707	11098.6588		11055.3231	25.5
26.5	11673.5658	11657.1487	11114.3563	11097.9361		11054.6066	26.5
27.5	11673.4019	11656.3720	11114.2376	11097.1897		11053.8721	27.5
28.5	11673.2254	11655.5859	11114.0906	11096.4437	11070.6686	11053.1130	28.5
29.5	11673.0257	11654.7841	11113.9188	11095.6687	11070.5177		29.5
30.5	11672.8124	11653.9682	11113.7357	11094.8946	11070.3252	11051.5706	30.5
31.5	11672.5838	11653.1302	11113.5556	11094.1039	11070.1773	11050.7417	31.5
32.5	11672.3445	11652.2727	11113.3617	11093.2854	11069.9549	11049.9229	32.5
33.5	11672.0737	11651.4037	11113.1277	11092.4537	11069.6607	11049.1298	33.5
34.5	11671.7931	11650.5204	11112.8724	11091.6127	11069.4882	11048.2895	34.5
35.5	11671.4995	11649.6160	11112.6305	11090.7430	11069.1622		35.5
36.5	11671.1833	11648.6920	11112.3649	11089.8566	11068.9386	11046.5530	36.5
37.5	11670.8498	11647.7571	11112.0698	11089.0116	11068.6902	11045.6225	37.5
38.5	11670.4973	11646.8011	11111.7668	11088.0692	11068.3165	11044.7864	38.5
39.5	11670.1380	11645.8331	11111.4502	11087.1455		11043.8502	39.5
40.5	11669.7530	11644.8406	11111.1167	11086.1990	11067.6969	11042.8857	40.5
41.5	11669.3614	11643.8384	11110.7707	11085.2555	11067.3924	11041.9561	41.5
42.5	11668.9442	11642.8152	11110.4052	11084.2781	11066.9654	11041.0404	42.5
43.5	11668.5120	11641.7788	11109.9772	11083.2917	11066.6140	11040.0385	43.5
44.5	11668.0608	11640.7218	11109.6280	11082.2873		11039.0307	44.5
45.5	11667.5933	11639.6487	11109.2201	11081.2766	11065.8563	11038.0210	45.5
46.5	11667.1168	11638.5607	11108.7932	11080.2381	11065.3739	11036.9403	46.5
47.5	11666.6074	11637.4480	11108.3429	11079.1823	11064.9808	11035.9659	47.5
48.5	11666.0999	11636.3299	11107.8834	11078.1232	11064.5265	11034.8855	48.5
49.5	11665.5580	11635.1913	11107.4135	11077.0482	11064.0674	11033.8078	49.5
50.5	11665.0042	11634.0310	11106.9214	11075.9490	11063.5701	11032.7287	50.5
51.5	11664.4351	11632.8577	11106.4111	11074.8314	11063.0784	11031.5907	51.5
52.5	11663.8453	11631.6712	11105.8887	11073.7054	11062.5529	11030.5033	52.5
53.5	11663.2481	11630.4615	11105.3374	11072.5640	11062.0443	11029.3565	53.5
54.5	11662.6237	11629.2371	11104.7895	11071.3993	11061.4230	11028.1970	54.5
55.5	11661.9883	11627.9978	11104.2187	11070.2215	11060.8896	11027.0300	55.5
56.5	11661.3338	11626.7368	11103.6382	11069.0428	11060.3193	11025.8598	56.5
57.5	11660.6654	11625.4645	11103.0392	11067.8322	11059.7179	11024.6480	57.5
58.5	11659.9753	11624.1705	11102.4185	11066.6140	11059.1059	11023.4280	58.5
59.5	11659.2732	11622.8618	11101.7875	11065.3739	11058.4652	11022.1614	59.5
60.5	11658.5505	11621.5349	11101.1458	11064.1151	11057.8292	11020.9799	60.5
61.5	11657.8128	11620.1944	11100.4563	11062.8500	11057.1692	11019.6865	61.5
62.5	11657.0546	11618.8348	11099.7928	11061.5713	11056.4795		62.5
63.5	11656.2804	11617.4584	11099.0940	11060.2627	11055.8305	11017.1131	63.5
64.5	11655.4918	11616.0652	11098.3800	11058.9532	11055.0881	11015.7782	64.5
65.5	11654.6838	11614.6542	11097.6516	11057.6275	11054.3633	11014.5127	65.5
66.5	11653.8587	11613.2271	11096.9057	11056.2855	11053.6195	11013.1241	66.5
67.5	11653.0189	11611.7841	11096.1556	11054.9177	11052.8635	11011.7907	67.5
68.5	11652.1641	11610.3244	11095.3791	11053.5234	11052.0912	11010.4165	68.5
69.5	11651.2839	11608.8466	11094.5887	11052.0912	11051.3376	11009.0034	69.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(0,0)			(0,1)		(1,2)a		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
70.5	11650.3951	11607.3520	11093.7771	11050.7417	11050.4929	11007.5822	70.5
71.5	11649.4886	11605.8428	11092.9591	11049.3125	11049.6990	11006.2101	71.5
72.5	11648.5572	11604.3136	11092.1111	11047.8687	11048.8618	11004.7423	72.5
73.5	11647.6164	11602.7688	11091.2511	11046.4096	11048.0206	11003.3330	73.5
74.5	11646.6551	11601.2082	11090.3896	11044.9472	11047.1478	11001.8504	74.5
75.5	11645.6796	11599.6285	11089.5009	11043.4493	11046.2583	11000.3430	75.5
76.5	11644.6813	11598.0339	11088.5974	11041.9561	11045.3758	10998.9033	76.5
77.5	11643.6937	11596.4185	11087.6810	11040.4388	11044.4717	10997.3814	77.5
78.5	11642.6432	11594.7924	11086.7434	11038.8949	11043.5326	10995.8782	78.5
79.5	11641.5949	11593.1464	11085.7952	11037.3450	11042.5573	10994.2958	79.5
80.5	11640.5384	11591.4826	11084.8317	11035.7704	11041.6245	10992.7649	80.5
81.5	11639.4556	11589.8066	11083.8592	11034.1967	11040.6630	10991.1842	81.5
82.5	11638.3575	11588.1110	11082.8505	11032.5993	11039.6461	10989.5774	82.5
83.5	11637.2429	11586.3928	11081.8363	11030.9875	11038.6571	10987.9879	83.5
84.5	11636.1117	11584.6607	11080.8046	11029.3565	11037.6278	10986.3826	84.5
85.5	11634.9638	11582.9152	11079.7623	11027.7135	11036.6001	10984.7357	85.5
86.5	11633.7971	11581.1498	11078.7021	11026.0544	11035.5416	10983.0996	86.5
87.5	11632.6128	11579.3730	11077.6294	11024.3814	11034.4747	10981.4230	87.5
88.5	11631.4191	11577.5706	11076.5351		11033.3862	10979.7422	88.5
89.5	11630.1993	11575.7607	11075.4254	11020.9799	11032.2887	10978.0518	89.5
90.5	11628.9670	11573.9292	11074.3016	11019.2616	11031.1623	10976.3337	90.5
91.5	11627.7182	11572.0817	11073.1614	11017.5238	11030.0260	10974.6074	91.5
92.5	11626.4496	11570.2130	11072.0107	11015.7782	11028.8733	10972.8615	92.5
93.5	11625.1625	11568.3316	11070.8338	11014.0027	11027.7135	10971.1243	93.5
94.5	11623.8653	11566.4312	11069.6607	11012.2139	11026.5183		94.5
95.5	11622.5448	11564.5157	11068.4453	11010.4165	11025.3127	10967.5269	95.5
96.5	11621.2075	11562.5841	11067.2183	11008.5997	11024.1638	10965.7157	96.5
97.5	11619.8535	11560.6412	11065.9845	11006.7718	11022.9218		97.5
98.5	11618.4833	11558.6713	11064.7337	11004.9141		10962.0829	98.5
99.5	11617.0975	11556.6852	11063.4694	11003.0590	11020.4239	10960.2321	99.5
100.5	11615.6891	11554.6846	11062.1839	11001.1721	11019.1367	10958.3370	100.5
101.5	11614.2710	11552.6686	11060.8896	10999.2877	11017.8472	10956.4933	101.5
102.5	11612.8320	11550.6334	11059.5685	10997.3814	11016.5305	10954.5767	102.5
103.5	11611.3756	11548.5877	11058.2347	10995.4484	11015.1941		103.5
104.5	11609.9047	11546.5197	11056.8928	10993.5097	11013.8687	10950.7258	104.5
105.5	11608.4140	11544.4334	11055.5322	10991.5520	11012.5746	10948.7791	105.5
106.5	11606.9041	11542.3331	11054.1538	10989.5774	11011.1791	10946.8599	106.5
107.5	11605.3816	11540.2176	11052.7625	10987.5950	11009.7647		107.5
108.5	11603.8398	11538.0785	11051.3376	10985.5875	11008.4117	10942.8441	108.5
109.5	11602.2827	11535.9250	11049.9229	10983.5695	11006.9455	10940.8317	109.5
110.5	11600.7064	11533.7570	11048.4885	10981.5380	11005.5606	10938.8333	110.5
111.5	11599.1111	11531.5718	11047.0257	10979.4763	11004.1143	10936.7848	111.5
112.5	11597.5015	11529.3738	11045.5464	10977.4254	11002.6506	10934.7226	112.5
113.5	11595.8709	11527.1524	11044.0588	10975.3430	11001.1721	10932.6714	113.5
114.5	11594.2329	11524.9218	11042.5573	10973.2411	10999.6323	10930.5706	114.5
115.5	11592.5729	11522.6631	11041.0404	10971.1243	10998.1658	10928.4725	115.5
116.5	11590.8884	11520.3930	11039.4863	10969.0004	10996.6261	10926.3468	116.5
117.5	11589.1959	11518.1068	11037.9391	10966.8529	10995.0750	10924.2118	117.5
118.5	11587.4791	11515.8020	11036.3741	10964.6964	10993.5097	10922.1004	118.5
119.5	11585.7496	11513.4839	11034.7711	10962.5217	10991.9574		119.5
120.5	11584.0030	11511.1449	11033.1811	10960.3254	10990.3605	10917.7221	120.5
121.5	11582.2373	11508.7916	11031.5907	10958.1236	10988.7422		121.5
122.5	11580.4589	11506.4207	11029.9369	10955.9006	10987.1179	10913.3152	122.5
123.5	11578.6565	11504.0333	11028.2941	10953.6612	10985.4772	10911.0891	123.5
124.5	11576.8382	11501.6295	11026.6109	10951.4148	10983.7750	10908.8495	124.5
125.5	11575.0077	11499.2024	11024.9551	10949.1375	10982.1432	10906.5942	125.5
126.5	11573.1588	11496.7670	11023.2414	10946.8599	10980.3973	10904.3265	126.5
127.5	11571.2917	11494.3147	11021.5338	10944.5490	10978.6881	10902.0310	127.5
128.5	11569.4058	11491.8405	11019.8114	10942.2434	10976.9803	10899.7276	128.5
129.5	11567.5006	11489.3495	11018.0524	10939.9070	10975.2448	10897.3937	129.5
130.5	11565.5818	11486.8442	11016.2968	10937.5683		10895.0692	130.5
131.5	11563.6467	11484.3234	11014.5127	10935.1985	10971.7384	10892.7190	131.5
132.5	11561.6855	11481.7788	11012.7282	10932.8168	10969.9435	10890.3330	132.5
133.5	11559.7061	11479.2221	11010.9126	10930.4209	10968.1351	10887.9566	133.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(0,0)			(0,1)		(1,2)a		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
134.5	11557.7520	11476.6469	11009.1200	10928.0091	10966.3188	10885.5536	134.5
135.5	11555.7337	11474.0473	11007.2613	10925.5782	10964.4889	10883.1451	135.5
136.5	11553.7069	11471.4779	11005.4033	10923.1255	10962.6202	10880.7097	136.5
137.5	11551.6684	11468.8383	11003.5342	10920.7084	10960.7723	10878.2600	137.5
138.5	11549.6069	11466.1985	11001.6423	10918.2257	10958.8617	10875.7995	138.5
139.5	11547.5336	11463.5364	10999.7462	10915.7432	10956.9465	10873.3117	139.5
140.5	11545.4421	11460.8603	10997.8305	10913.2362	10955.0385	10870.8040	140.5
141.5	11543.3371	11458.1661	10995.8782	10910.7197	10953.0717	10868.2978	141.5
142.5	11541.2090	11455.4596	10993.9403	10908.1886		10865.7092	142.5
143.5	11539.0656	11452.7317	10991.9574	10905.6313		10863.1891	143.5
144.5	11536.9053	11449.9938	10989.9851	10903.0649		10860.6081	144.5
145.5	11534.7257	11447.2311	10987.9879	10900.4891		10858.0684	145.5
146.5	11532.5296	11444.4575	10985.9688	10897.8964			146.5
147.5	11530.3205	11441.6626	10983.9354	10895.2887			147.5
148.5	11528.0827	11438.8531	10981.8792	10892.6524			148.5
149.5	11525.8373	11436.0257	10979.8278	10890.0088			149.5
150.5	11523.5756	11433.1819	10977.7476	10887.3609			150.5
151.5	11521.2982	11430.3232	10975.6491	10884.6818			151.5
152.5	11518.9978	11427.4494	10973.5532	10881.9882			152.5
153.5	11516.6813	11424.5515	10971.4108	10879.2809			153.5
154.5	11514.3453	11421.6407	10969.2671	10876.5583			154.5
155.5	11511.9974	11418.7105	10967.1073	10873.8303			155.5
156.5	11509.6261	11415.7700	10964.9348	10871.0722			156.5
157.5	11507.2463	11412.8062	10962.7366	10868.2978			157.5
158.5	11504.8428	11409.8278	10960.5276	10865.5188			158.5
159.5	11502.4199	11406.8305	10958.3370	10862.7151			159.5
160.5	11499.9870	11403.8209	10956.0735	10859.9078			160.5
161.5	11497.5300	11400.7906	10953.8179	10857.0776			161.5
162.5	11495.0618	11397.7449	10951.5520	10854.2331			162.5
163.5	11492.5634	11394.6846	10949.2583				163.5
164.5	11490.0606	11391.6019	10946.9636	10848.4971			164.5
165.5	11487.5419	11388.5053	10944.6425	10845.5986			165.5
166.5	11484.9949	11385.3922	10942.3069	10842.7007			166.5
167.5	11482.4350	11382.2566	10939.9070	10839.7856			167.5
168.5	11479.8686	11379.1092	10937.5683	10836.8303			168.5
169.5	11477.2723	11375.9469	10935.1985	10833.8695			169.5
170.5	11474.6625	11372.7664	10932.8168	10830.9176			170.5
171.5	11472.0339	11369.5680	10930.4209	10827.9158			171.5
172.5	11469.3854	11366.3516	10927.9578	10824.9198			172.5
173.5	11466.7268	11363.1212	10925.5133	10821.8967			173.5
174.5	11464.0465	11359.8775	10923.0583	10818.8307			174.5
175.5	11461.3506	11356.6034	10920.5682	10815.8159			175.5
176.5	11458.6397	11353.3223	10918.0739	10812.7424			176.5
177.5	11455.9121	11350.0099	10915.5788	10809.6912			177.5
178.5	11453.1572	11346.7092	10913.0296	10806.5816			178.5
179.5	11450.3910	11343.3765	10910.4900	10803.4667			179.5
180.5	11447.6076	11340.0470	10907.9294	10800.3542			180.5
181.5	11444.8122	11336.6546	10905.3662	10797.2088			181.5
182.5	11441.9864	11333.2737	10902.7650	10794.0562			182.5
183.5	11439.1540	11329.8711	10900.1639	10790.9142			183.5
184.5	11436.2980	11326.4563	10897.5356	10787.6589			184.5
185.5	11433.4294	11323.0233	10894.8976	10784.4824			185.5
186.5	11430.5417	11319.5711	10892.2401	10781.2605			186.5
187.5	11427.6379	11316.0968	10889.5597	10778.0424			187.5
188.5	11424.7145	11312.5998	10886.8934				188.5
189.5	11421.7672	11309.1140	10884.1808	10771.5237			189.5
190.5	11418.8115	11305.5925	10881.4608	10768.2627			190.5
191.5	11415.8369	11302.0482	10878.7204	10764.9535			191.5
192.5	11412.8062	11298.5063	10876.0009	10761.6146			192.5
193.5	11409.8278	11294.9387	10873.2002	10758.3068			193.5
194.5	11406.8305	11291.3503	10870.4312	10754.9549			194.5
195.5		11287.7404	10867.6185	10751.5500			195.5
196.5	11400.7005	11284.1226	10864.7894	10748.2285			196.5
197.5	11397.6178	11280.4384	10861.9785	10744.8397			197.5

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**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

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**(0,0)**

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**(0,1)**

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**(1,2)a**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
198.5	11394.5231	11276.8360	10859.1227	10741.4237			198.5
199.5	11391.4163	11273.1487	10856.2702				199.5
200.5	11388.2789	11269.4654	10853.3947	10734.5574			200.5
201.5	11385.1306	11265.7564	10850.4505	10731.1249			201.5
202.5	11381.9710	11262.0571	10847.5707	10727.6400			202.5
203.5	11378.7743	11258.2921	10844.6621				203.5
204.5	11375.5774	11254.5528	10841.6880				204.5
205.5	11372.3602	11250.7634	10838.7475				205.5
206.5	11369.1226		10835.7790				206.5
207.5	11365.8332		10832.7588				207.5
208.5	11362.5891		10829.7828				208.5
209.5	11359.3059		10826.7535				209.5
210.5	11356.0048		10823.7095				210.5
211.5	11352.6821		10820.6495				211.5
212.5	11349.3253		10817.6295				212.5
213.5							213.5
214.5			10811.4001				214.5
215.5			10808.2733				215.5
216.5			10805.1373				216.5
217.5			10801.9962				217.5
218.5			10798.8538				218.5
219.5			10795.6114				219.5
220.5			10792.4464				220.5
221.5			10789.1977				221.5
222.5							222.5
223.5			10782.7113				223.5
224.5			10779.4697				224.5
225.5			10776.2367				225.5
226.5			10772.9004				226.5
227.5			10769.5337				227.5
228.5			10766.2588				228.5
229.5			10762.9148				229.5
230.5			10759.5604				230.5
231.5							231.5
232.5							232.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(1,2)b			(0,2)		(1,3)a		
J	R(J)	P(J)	R(J)	P(J)	R(J)	P(J)	J
5.5							5.5
6.5						10514.5234	6.5
7.5						10514.1441	7.5
8.5		11065.1248				10513.7147	8.5
9.5						10513.2163	9.5
10.5		11064.1769				10512.7744	10.5
11.5		11063.7153				10512.2981	11.5
12.5		11063.2085		10550.8679		10511.8409	12.5
13.5		11062.7002		10550.3537		10511.3450	13.5
14.5		11062.1839		10549.8662		10510.8460	14.5
15.5		11061.6288		10549.3597		10510.3120	15.5
16.5				10548.7480		10509.7965	16.5
17.5		11060.4992		10548.1781		10509.2074	17.5
18.5		11059.8976		10547.6347		10508.6721	18.5
19.5				10547.0371		10508.0647	19.5
20.5		11058.6899		10546.4542			20.5
21.5		11058.0329					21.5
22.5		11057.3700		10545.1895		10506.2493	22.5
23.5		11056.7083		10544.5535		10505.6059	23.5
24.5		11055.9753		10543.8832		10504.9706	24.5
25.5		11055.3231		10543.2081		10504.2848	25.5
26.5		11054.6066	10558.9663	10542.5273		10503.5813	26.5
27.5	11070.8338	11053.8721	10558.8460	10541.8206		10502.9053	27.5
28.5	11070.6686	11053.1130	10558.7642	10541.1376	10519.7336	10502.1948	28.5
29.5	11070.5177		10558.6298	10540.3753		10501.4688	29.5
30.5	11070.3252	11051.5706	10558.4761	10539.6096	10519.4887		30.5
31.5	11070.1773	11050.7417	10558.3216	10538.8796	10519.3394	10499.9412	31.5
32.5	11069.9549	11049.9229	10558.1634		10519.1803	10499.1674	32.5
33.5		11049.1298	10557.9792	10537.3119	10518.9871	10498.4318	33.5
34.5	11069.4882	11048.2895	10557.7652	10536.4894	10518.8282		34.5
35.5	11069.2555		10557.5523	10535.6837	10518.6057	10496.7808	35.5
36.5	11068.9386	11046.5530	10557.3467	10534.8660	10518.4162	10495.9780	36.5
37.5	11068.6902	11045.6225	10557.0715	10534.0102	10518.1503	10495.1850	37.5
38.5	11068.3780	11044.7864	10556.8593	10533.1421	10517.9143	10494.3026	38.5
39.5	11068.1131	11043.8502		10532.2659	10517.6210		39.5
40.5	11067.6969	11042.8857	10556.2931			10492.5438	40.5
41.5	11067.3924	11041.9561	10555.9908	10530.4764	10517.0862	10491.6234	41.5
42.5	11067.0495	11041.0404	10555.6797	10529.5490	10516.7657	10490.7602	42.5
43.5	11066.6740	11040.0385	10555.3465	10528.6351	10516.4471	10489.8204	43.5
44.5	11066.2999	11039.0307	10555.0130	10527.6677	10516.0940	10488.8624	44.5
45.5	11065.8563	11038.0210	10554.6460	10526.7057	10515.7637	10487.9233	45.5
46.5	11065.4288	11036.9403	10554.2912	10525.7360	10515.4150	10486.9914	46.5
47.5	11064.9808	11035.9659	10553.9099	10524.7471	10515.0106	10485.9740	47.5
48.5	11064.5265	11034.8855		10523.7305	10514.6174	10484.9852	48.5
49.5	11064.0674	11033.8078	10553.0818	10522.7147	10514.2133	10483.9571	49.5
50.5	11063.5701	11032.7287	10552.6796	10521.6998	10513.7857	10482.9372	50.5
51.5	11063.0784	11031.5907	10552.2062	10520.6346	10513.3634		51.5
52.5	11062.5529	11030.5033	10551.7869	10519.5847	10512.8970	10480.8463	52.5
53.5	11062.0443	11029.3565	10551.2850	10518.5290	10512.4354		53.5
54.5	11061.4230	11028.1970	10550.7904	10517.4037	10511.9515	10478.7139	54.5
55.5	11060.8896	11027.0300	10550.2983	10516.2966	10511.4673		55.5
56.5	11060.3193	11025.8598	10549.7782	10515.2005	10510.9498	10476.4858	56.5
57.5	11059.7179	11024.6480	10549.2429	10514.0426	10510.4425	10475.3642	57.5
58.5	11059.1059	11023.4280	10548.7039	10512.8970	10509.9112	10474.2169	58.5
59.5	11058.4652	11022.1614	10548.1781	10511.7367	10509.3751	10473.0703	59.5
60.5	11057.8292	11020.9799	10547.5640	10510.5680	10508.7624	10471.9002	60.5
61.5	11057.1692	11019.6865	10546.9782	10509.3751	10508.2034	10470.7738	61.5
62.5	11056.4795		10546.4081	10508.1572	10507.6014		62.5
63.5	11055.7450	11017.1131	10545.7467	10506.9239	10507.0203	10468.3218	63.5
64.5	11055.0881	11015.7782	10545.1080	10505.7221	10506.3494	10467.0924	64.5
65.5	11054.3633	11014.5127	10544.4730	10504.4406	10505.7221	10465.8415	65.5
66.5	11053.6195	11013.1241	10543.8031	10503.1707	10505.1113	10464.6326	66.5
67.5	11052.8635	11011.7907	10543.1153	10501.8988	10504.4042	10463.3360	67.5
68.5	11052.0912	11010.4165	10542.4262	10500.6024	10503.7325	10462.0628	68.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(1,2)b			(0,2)		(1,3)a		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
69.5	11051.3376	11009.0034	10541.7344	10499.2920	10503.0439	10460.7937	69.5
70.5	11050.4929	11007.5822	10541.0111	10497.9686	10502.3266	10459.4592	70.5
71.5	11049.6990	11006.2101	10540.2918	10496.6275	10501.6364	10458.1213	71.5
72.5	11048.8618	11004.7423	10539.5257	10495.3062	10500.8784	10456.7945	72.5
73.5	11047.9726	11003.3330	10538.7676	10493.9101	10500.1267	10455.4548	73.5
74.5	11047.1478	11001.8504	10537.9931	10492.5438	10499.3786	10454.0436	74.5
75.5	11046.2583	11000.3430	10537.1896	10491.1395	10498.5837	10452.7152	75.5
76.5	11045.3758	10998.9033	10536.3862	10489.7211	10497.7919	10451.3055	76.5
77.5	11044.4717	10997.3814	10535.5622	10488.3039	10496.9744	10449.9182	77.5
78.5	11043.5326	10995.8782	10534.7093	10486.9043	10496.1821	10448.4816	78.5
79.5	11042.5573	10994.2958	10533.8942	10485.4174	10495.3062	10447.0497	79.5
80.5	11041.6245	10992.7649	10533.0125	10483.9571	10494.4402	10445.6055	80.5
81.5	11040.6630	10991.1842	10532.1303	10482.4598		10444.1264	81.5
82.5	11039.6461	10989.5774	10531.2351	10480.9626	10492.7137	10442.6279	82.5
83.5		10987.9879	10530.3548	10479.4658	10491.7896	10441.1604	83.5
84.5	11037.6278	10986.3826	10529.4005	10477.9430	10490.9096	10439.6802	84.5
85.5	11036.6001		10528.4499	10476.4031	10490.0248		85.5
86.5	11035.5416	10983.0996	10527.5032	10474.8627	10489.0444	10436.6268	86.5
87.5	11034.4747	10981.4230	10526.5406	10473.2896		10435.0602	87.5
88.5	11033.3862	10979.7422	10525.5574	10471.6830		10433.5081	88.5
89.5	11032.2887	10978.0518	10524.5603	10470.1057	10486.1355	10431.9276	89.5
90.5	11031.1623	10976.3337	10523.5768	10468.5032	10485.1529	10430.3261	90.5
91.5	11030.0260	10974.6074	10522.5405	10466.8818	10484.1216	10428.7003	91.5
92.5	11028.8733	10972.8615	10521.4958	10465.2325	10483.0995		92.5
93.5	11027.7135	10971.1243	10520.4219	10463.5746		10425.4544	93.5
94.5	11026.5183		10519.3394	10461.9166		10423.8096	94.5
95.5		10967.5269	10518.2558	10460.2308	10479.9343		95.5
96.5	11024.1638	10965.7157	10517.1531	10458.5293	10478.8272	10420.4561	96.5
97.5	11022.9218		10516.0940	10456.8354	10477.7831		97.5
98.5			10514.9188	10455.1014	10476.6746		98.5
99.5	11020.4239	10960.2321	10513.7857	10453.3575	10475.5470		99.5
100.5	11019.1367		10512.6217	10451.6029	10474.4112		100.5
101.5		10956.4933	10511.4673	10449.8477		10411.8848	101.5
102.5		10954.5767	10510.2518	10448.0478			102.5
103.5			10509.0609	10446.2803		10408.3573	103.5
104.5			10507.8547	10444.4553			104.5
105.5	11012.5746		10506.6016	10442.6279			105.5
106.5		10946.8599	10505.3652	10440.7833			106.5
107.5			10504.1305	10438.9339			107.5
108.5	11008.4117			10437.0629			108.5
109.5	11006.9455		10501.5370	10435.1878			109.5
110.5	11005.5606	10938.8333	10500.2309	10433.2931			110.5
111.5	11004.1143	10936.7848	10498.9107	10431.3659			111.5
112.5	11002.6506		10497.5829	10429.4492			112.5
113.5	11001.1721	10932.6714	10496.2875	10427.5097			113.5
114.5	10999.6323		10494.8823	10425.5567			114.5
115.5	10998.1658		10493.4769	10423.5837			115.5
116.5	10996.6261		10492.1106	10421.6100			116.5
117.5	10995.0750	10924.2665	10490.6828	10419.5962			117.5
118.5	10993.5097	10922.1004	10489.3179	10417.5805			118.5
119.5	10991.9574	10919.9619	10487.8743	10415.5637			119.5
120.5	10990.3605	10917.7784	10486.4030	10413.5337			120.5
121.5	10988.7422	10915.5788	10484.9206	10411.4837			121.5
122.5	10987.1179	10913.3901	10483.4277	10409.4117			122.5
123.5	10985.4772	10911.1513	10481.9588	10407.3245			123.5
124.5	10983.8432	10908.8495	10480.4602	10405.2279			124.5
125.5	10982.1432	10906.5942	10478.9598	10403.1241			125.5
126.5	10980.4853	10904.3716	10477.3711	10400.9859			126.5
127.5	10978.7684	10902.1002	10475.8228	10398.8495			127.5
128.5	10977.0412	10899.7969	10474.2548	10396.6911			128.5
129.5	10975.3430	10897.4538	10472.7262	10394.5344			129.5
130.5	10973.5532	10895.1375	10471.0806	10392.3286			130.5
131.5	10971.8005	10892.7821	10469.4776	10390.1534			131.5
132.5	10970.0164	10890.4331	10467.8453	10387.9525			132.5

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**NbS [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.**

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**(1,2)b**

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**(0,2)**

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**(1,3)a**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
133.5	10968.2248	10888.0628	10466.2031	10385.7111			133.5
134.5	10966.4350	10885.6581	10464.5861	10383.4341			134.5
135.5	10964.5805	10883.2224	10462.8921	10381.2133			135.5
136.5	10962.7366	10880.8093	10461.1892	10378.9706			136.5
137.5	10960.8763	10878.3618		10376.6876			137.5
138.5		10875.8986	10457.7869	10374.3698			138.5
139.5	10957.1116	10873.4373	10456.0584	10372.0665			139.5
140.5	10955.1927	10870.9438		10369.7266			140.5
141.5	10953.2608	10868.4032	10452.5533	10367.3861			141.5
142.5	10951.3334	10865.9182	10450.8017	10365.0549			142.5
143.5	10949.3710	10863.3728	10448.9888	10362.6783			143.5
144.5	10947.3960	10860.8311	10447.2115	10360.3153			144.5
145.5	10945.4310	10858.2597	10445.3958	10357.8975			145.5
146.5	10943.3593	10855.6707	10443.5660	10355.4783			146.5
147.5	10941.3696		10441.6852	10353.0742			147.5
148.5	10939.3191	10850.4505	10439.8270	10350.6140			148.5
149.5	10937.2524	10847.8145	10437.9859	10348.1842			149.5
150.5	10935.1985	10845.1685	10436.0838	10345.6987			150.5
151.5	10933.0842	10842.4585		10343.2191			151.5
152.5		10839.7856		10340.7212			152.5
153.5		10837.0605		10338.2159			153.5
154.5		10834.3724		10335.7164			154.5
155.5		10831.6385		10333.1560			155.5
156.5				10330.6502			156.5
157.5		10826.1134		10328.0579			157.5
158.5				10325.4583			158.5
159.5				10322.8430			159.5
160.5							160.5
161.5							161.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(1,3)b			(2,4)a		(2,4)b		
J	R(J)	P(J)	R(J)	P(J)	R(J)	P(J)	J
5.5							5.5
6.5		10514.5234					6.5
7.5		10514.1441					7.5
8.5		10513.7147					8.5
9.5							9.5
10.5		10512.7744					10.5
11.5		10512.2981					11.5
12.5		10511.8409					12.5
13.5		10511.3450					13.5
14.5		10510.8460					14.5
15.5		10510.3120					15.5
16.5		10509.7965					16.5
17.5		10509.2074					17.5
18.5		10508.6721					18.5
19.5		10508.0647					19.5
20.5							20.5
21.5						10469.4776	21.5
22.5		10506.2493				10468.8331	22.5
23.5		10505.6059				10468.2191	23.5
24.5		10504.9706				10467.5282	24.5
25.5		10504.2848				10466.8818	25.5
26.5		10503.5813				10466.2031	26.5
27.5		10502.9053				10465.5187	27.5
28.5	10519.7336	10502.1948				10464.7928	28.5
29.5		10501.4688				10464.0567	29.5
30.5	10519.4887					10463.3360	30.5
31.5	10519.3394	10499.9412				10462.5961	31.5
32.5	10519.1803	10499.1674				10461.8473	32.5
33.5	10518.9871	10498.4318					33.5
34.5	10518.8282					10460.2308	34.5
35.5	10518.6057	10496.7808	10481.0691		10481.1544	10459.4592	35.5
36.5	10518.4162	10495.9780	10480.8463		10480.9626	10458.6363	36.5
37.5	10518.1503	10495.1850	10480.6117		10480.7335	10457.7869	37.5
38.5	10517.9143	10494.3026	10480.3780		10480.4602	10456.9610	38.5
39.5			10480.1161		10480.2197	10456.1175	39.5
40.5		10492.5438	10479.8398		10479.9343	10455.2188	40.5
41.5	10517.0862		10479.5677		10479.6715		41.5
42.5	10516.7657	10490.7602	10479.2788		10479.3691	10453.4474	42.5
43.5	10516.4471	10489.8204	10478.9598		10479.0245	10452.5533	43.5
44.5	10516.0940	10488.8624	10478.6203		10478.7139	10451.6029	44.5
45.5	10515.7637	10487.9233	10478.3051		10478.3754	10450.6658	45.5
46.5	10515.4150	10486.9914	10477.9430		10478.0215	10449.6919	46.5
47.5	10515.0106	10485.9740	10477.5527				47.5
48.5	10514.6174	10484.9852	10477.1757		10477.2706		48.5
49.5	10514.2133	10483.9571	10476.7672		10476.9173	10446.7420	49.5
50.5	10513.7857	10482.9372	10476.4031		10476.4858	10445.7443	50.5
51.5	10513.3634		10476.0117		10476.0117	10444.7190	51.5
52.5	10512.8970	10480.8463	10475.5470		10475.6096	10443.6437	52.5
53.5	10512.4354				10475.1450	10442.6279	53.5
54.5	10511.9515	10478.7139				10441.5878	54.5
55.5	10511.4673		10474.1353		10474.2169	10440.4674	55.5
56.5	10510.9498	10476.4858	10473.6573		10473.7196	10439.3737	56.5
57.5	10510.4425	10475.3642			10473.1945	10438.2700	57.5
58.5	10509.9112	10474.2169	10472.6280		10472.7262	10437.1735	58.5
59.5	10509.3751	10473.0703	10472.1000		10472.1559	10436.0142	59.5
60.5	10508.7624	10471.9002	10471.5426		10471.6163	10434.8730	60.5
61.5	10508.2034	10470.7738	10470.9663		10471.0219	10433.7115	61.5
62.5	10507.6014		10470.3807		10470.4609	10432.5530	62.5
63.5	10507.0203	10468.3218	10469.8495		10469.8495	10431.3659	63.5
64.5	10506.3494	10467.0924			10469.2723	10430.1442	64.5
65.5	10505.7221	10465.8415			10468.6830	10428.9219	65.5
66.5	10505.1113	10464.6326	10467.9428		10468.0391	10427.6822	66.5
67.5	10504.4042	10463.3360	10467.3059		10467.3671	10426.4448	67.5
68.5	10503.7325	10462.0628	10466.6499		10466.7080		68.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(1,3)b			(2,4)a		(2,4)b		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
69.5	10503.0439	10460.7937	10465.9774		10466.0346	10423.9220	69.5
70.5	10502.3266	10459.4592			10465.3685	10422.6203	70.5
71.5	10501.6364	10458.1213	10464.5861		10464.6326	10421.3306	71.5
72.5	10500.8784	10456.7945	10463.8636		10463.9293	10420.0302	72.5
73.5	10500.1267	10455.4548	10463.1416		10463.1910	10418.6989	73.5
74.5	10499.3786	10454.0436	10462.3714		10462.4476	10417.3526	74.5
75.5	10498.5837	10452.7152	10461.6317		10461.6956	10415.9877	75.5
76.5	10497.7919	10451.3055	10460.8506		10460.9332		76.5
77.5	10496.9744	10449.9182	10460.0767		10460.1340		77.5
78.5	10496.1821	10448.4816	10459.2565		10459.3504	10411.8298	78.5
79.5	10495.3062	10447.0497			10458.5293	10410.4320	79.5
80.5	10494.4402	10445.6055	10457.6895		10457.6895	10409.0232	80.5
81.5		10444.1264	10456.7945		10456.8354	10407.5583	81.5
82.5	10492.7137	10442.6279	10455.9325		10456.0049	10406.1398	82.5
83.5		10441.1604	10455.1014		10455.1014	10404.6542	83.5
84.5	10490.9096				10454.2523		84.5
85.5	10490.0248				10453.3575		85.5
86.5	10489.0444	10436.6268	10452.3848		10452.4386	10400.2219	86.5
87.5		10435.0602	10451.4596		10451.5176	10398.6851	87.5
88.5		10433.5081	10450.5079		10450.5716	10397.0997	88.5
89.5	10486.1355	10431.9276	10449.5659		10449.5659	10395.5917	89.5
90.5		10430.3261	10448.6476		10448.6476	10394.0485	90.5
91.5	10484.1216	10428.7003	10447.6621		10447.6621	10392.4753	91.5
92.5	10483.0995		10446.6457		10446.6457	10390.8874	92.5
93.5		10425.4544	10445.6055		10445.6715	10389.2981	93.5
94.5		10423.8096	10444.5755			10387.6858	94.5
95.5		10443.5660			10443.5660	10386.0485	95.5
96.5		10420.4561	10442.5463		10442.5463	10384.4057	96.5
97.5		10418.8188	10441.4946		10441.4946	10382.8108	97.5
98.5		10417.1004	10440.3734		10440.3734	10381.0941	98.5
99.5	10475.5470	10415.3808				10379.4158	99.5
100.5	10474.4112	10413.6366	10438.2141		10438.2141	10377.7256	100.5
101.5	10473.2896	10411.8848	10437.0629		10437.0629	10376.0532	101.5
102.5	10472.1000	10410.1393	10435.9336		10435.9336	10374.3109	102.5
103.5	10470.9095	10408.3573	10434.7971		10434.7971	10372.5852	103.5
104.5	10469.7212		10433.6131		10433.6131		104.5
105.5	10468.5032		10432.4417		10432.4417		105.5
106.5		10402.9525	10431.2855		10431.2855		106.5
107.5			10430.0946		10430.0946		107.5
108.5		10399.2773	10428.8371		10428.8371		108.5
109.5			10427.6088		10427.6332		109.5
110.5			10426.3348		10426.3348		110.5
111.5			10425.0887		10425.0887		111.5
112.5		10391.7487	10423.8096		10423.8096		112.5
113.5			10422.5634				113.5
114.5			10421.2782				114.5
115.5			10419.9521				115.5
116.5			10418.6406				116.5
117.5			10417.2772				117.5
118.5			10415.9301				118.5
119.5			10414.5711				119.5
120.5			10413.1844				120.5
121.5			10411.8298				121.5
122.5			10410.3826				122.5
123.5			10408.9337				123.5
124.5			10407.5583				124.5
125.5							125.5
126.5			10404.6208				126.5
127.5			10403.1241				127.5
128.5			10401.6476				128.5
129.5			10400.1280				129.5
130.5			10398.6195				130.5
131.5			10397.0997				131.5
132.5							132.5

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**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

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**(1,3)b**

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**(2,4)a**

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**(2,4)b**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
133.5			10393.9799				133.5
134.5			10392.4117				134.5
135.5			10390.8168				135.5
136.5			10389.2162				136.5
137.5			10387.6087				137.5
138.5			10385.9763				138.5
139.5							139.5
140.5			10382.6955				140.5
141.5			10381.0177				141.5
142.5			10379.3324				142.5
143.5			10377.6439				143.5
144.5			10375.9321				144.5
145.5			10374.2032				145.5
146.5			10372.5160				146.5
147.5			10370.7305				147.5
148.5			10368.9653				148.5
149.5			10367.1916				149.5
150.5			10365.4334				150.5
151.5			10363.5884				151.5
152.5			10361.7746				152.5
153.5			10359.9391				153.5
154.5							154.5
155.5							155.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(1,0)a			(1,0)b		(2,1)a		
J	R(J)	P(J)	R(J)	P(J)	R(J)	P(J)	J
15.5							15.5
16.5		12176.2067		12176.2067			16.5
17.5		12175.5917		12175.5917			17.5
18.5		12174.9495		12174.9495		12124.5909	18.5
19.5		12174.2973		12174.2973		12123.9507	19.5
20.5	12186.3506		12173.6288	12186.3506			20.5
21.5	12186.2689	12172.9433	12186.2689	12172.9433		12122.5773	21.5
22.5	12186.1617	12172.2318	12186.1617	12172.2318		12121.9122	22.5
23.5	12186.0311	12171.5028	12186.0311	12171.5028			23.5
24.5	12185.8932	12170.7549	12185.8932	12170.7549		12120.4181	24.5
25.5	12185.7456	12169.9953	12185.7456	12169.9953		12119.6407	25.5
26.5	12185.5699	12169.2166	12185.5699	12169.2166		12118.8747	26.5
27.5	12185.3624	12168.4115	12185.3624	12168.4115		12118.0691	27.5
28.5	12185.1636	12167.5945	12185.1636	12167.5945		12117.2510	28.5
29.5	12184.9259	12166.7673	12184.9259	12166.7673		12116.4393	29.5
30.5	12184.6768	12165.8976	12184.6768	12165.8976			30.5
31.5	12184.4073	12165.0371	12184.4073	12165.0371		12114.7165	31.5
32.5	12184.1210	12164.1469	12184.1210	12164.1469		12113.8085	32.5
33.5	12183.8194	12163.2325	12183.8194	12163.2325		12112.9257	33.5
34.5		12162.3070		12162.3070		12111.9952	34.5
35.5	12183.1710		12183.1710			12111.0451	35.5
36.5	12182.8035	12160.3756	12182.8035	12160.3756		12110.1017	36.5
37.5	12182.4196		12182.4196			12109.1125	37.5
38.5	12182.0767	12158.4374	12182.0767	12158.4374		12108.1361	38.5
39.5	12181.6671	12157.4267	12181.6671	12157.4267	12131.2320	12107.1547	39.5
40.5	12181.2196	12156.3909	12181.2196	12156.3909	12130.7869		40.5
41.5	12180.7666	12155.3533	12180.7666	12155.3533	12130.3662	12105.0347	41.5
42.5	12180.3077	12154.2854	12180.3077	12154.2854	12129.8997	12103.9806	42.5
43.5	12179.8220	12153.1930	12179.8220	12153.1930		12102.8826	43.5
44.5	12179.3081	12152.0774	12179.3081	12152.0774	12128.9171	12101.7882	44.5
45.5	12178.7929	12150.9585	12178.7929	12150.9585	12128.3899	12100.6557	45.5
46.5	12178.2551	12149.8109	12178.2551	12149.8109	12127.8563	12099.5279	46.5
47.5	12177.7065	12148.6574	12177.7065	12148.6574	12127.3172	12098.3763	47.5
48.5	12177.1163	12147.4751	12177.1163	12147.4751	12126.7243	12097.1869	48.5
49.5	12176.5203	12146.2818	12176.5203	12146.2818	12126.1713	12095.9997	49.5
50.5	12175.9213	12145.0686	12175.9213	12145.0686		12094.7874	50.5
51.5	12175.2876	12143.8345	12175.2876	12143.8345	12124.9124	12093.5556	51.5
52.5	12174.6443	12142.5779	12174.6443	12142.5779	12124.2575	12092.3222	52.5
53.5		12141.3152		12141.3152	12123.5851	12091.0511	53.5
54.5	12173.2892	12140.0226	12173.2892	12140.0226	12122.9003	12089.7892	54.5
55.5	12172.5930	12138.7258	12172.5930	12138.7258	12122.2138	12088.4590	55.5
56.5	12171.8693	12137.4047	12171.8693	12137.4047	12121.5155	12087.1440	56.5
57.5	12171.1345	12136.0762	12171.1345	12136.0762	12120.7426	12085.8274	57.5
58.5	12170.3672	12134.7071	12170.3672	12134.7071	12120.0281	12084.4565	58.5
59.5	12169.6068	12133.3342	12169.6068	12133.3342	12119.2283	12083.0974	59.5
60.5	12168.8099	12131.9429	12168.8099	12131.9429	12118.4346	12081.7057	60.5
61.5	12168.0020	12130.5262	12168.0020	12130.5262	12117.5980	12080.2988	61.5
62.5	12167.1740	12129.0904	12167.1740	12129.0904	12116.8157		62.5
63.5	12166.3183	12127.6488	12166.3183	12127.6488	12115.9462	12077.4234	63.5
64.5	12165.4538	12126.1713	12165.4538	12126.1713	12115.1219	12075.9815	64.5
65.5	12164.5748	12124.7012	12164.5748	12124.7012	12114.2133	12074.4954	65.5
66.5	12163.6733	12123.1912	12163.6733	12123.1912	12113.3056	12072.9800	66.5
67.5	12162.7516	12121.6738	12162.7516	12121.6738	12112.3777	12071.4704	67.5
68.5	12161.8078	12120.1432	12161.8078	12120.1432	12111.4662	12069.9802	68.5
69.5	12160.8569	12118.5720	12160.8569	12118.5720	12110.5125	12068.3966	69.5
70.5	12159.8948	12117.0144	12159.8948	12117.0144	12109.5402	12066.8250	70.5
71.5	12158.8716	12115.4139	12158.8716	12115.4139	12108.5477		71.5
72.5	12157.8815	12113.8085	12157.8815	12113.8085	12107.5514	12063.6328	72.5
73.5	12156.8650	12112.1624	12156.8321	12112.1624	12106.4992		73.5
74.5	12155.8151	12110.5521	12155.7750	12110.5125	12105.4498	12060.3713	74.5
75.5	12154.6991	12108.8719	12154.6991	12108.8436	12104.4064	12058.6991	75.5
76.5	12153.6662	12107.2094	12153.6116	12107.1547	12103.3180	12057.0225	76.5
77.5	12152.5697	12105.4979	12152.5074	12105.4498	12102.2243	12055.3108	77.5
78.5	12151.4525	12103.7854		12103.7093	12101.1140	12053.6184	78.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

(1,0)a			(1,0)b		(2,1)a		
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
79.5	12150.3101	12102.0464	12150.2205	12101.9803	12099.9778	12051.9339	79.5
80.5	12149.1563	12100.2973			12098.8135	12050.1220	80.5
81.5	12147.9812	12098.5211		12098.4331	12097.6385	12048.3645	81.5
82.5	12146.7960	12096.7376			12096.4467	12046.5782	82.5
83.5	12145.5481	12094.9225			12095.2368		83.5
84.5	12144.3522	12093.1054			12094.0049	12042.9657	84.5
85.5	12143.1071	12091.2586			12092.7557	12041.1432	85.5
86.5	12141.8337	12089.3846			12091.4969	12039.2651	86.5
87.5	12140.5497	12087.5080			12090.2142	12037.3721	87.5
88.5	12139.2499	12085.6132			12088.9210	12035.4867	88.5
89.5	12137.9277	12083.6959			12087.6048	12033.5762	89.5
90.5	12136.5873	12081.7589			12086.2552	12031.6608	90.5
91.5	12135.2287	12079.8098			12084.9049	12029.7000	91.5
92.5	12133.8542	12077.8418			12083.5352	12027.7197	92.5
93.5	12132.4240	12075.8450			12082.1324	12025.7422	93.5
94.5	12131.0300	12073.8387	12131.1247		12080.7374	12023.7431	94.5
95.5	12129.6521	12071.8108	12129.7271		12079.2965		95.5
96.5	12128.1921	12069.7565	12128.2844	12069.8606	12077.8418	12019.6910	96.5
97.5	12126.7243	12067.7552	12126.8079	12067.8268	12076.3815	12017.6442	97.5
98.5	12125.2320		12125.3135	12065.7531	12074.8900	12015.5402	98.5
99.5	12123.7274	12063.5581	12123.7986	12063.6328	12073.4017	12013.4463	99.5
100.5	12122.2138	12061.4421	12122.2698	12061.5134	12071.8728	12011.3385	100.5
101.5	12120.6663	12059.3038	12120.7426	12059.3744	12070.3244	12009.2151	101.5
102.5	12119.1138	12057.1558		12057.2231	12068.7566	12007.0627	102.5
103.5	12117.5330	12054.9955	12117.5980	12055.0477	12067.1723	12004.9003	103.5
104.5	12115.9462	12052.8028	12115.9935	12052.8668	12065.5952	12002.6857	104.5
105.5	12114.3189	12050.5805	12114.3816	12050.6551	12063.9906	12000.4972	105.5
106.5	12112.6703	12048.3645	12112.7533	12048.4245	12062.3425	11998.2763	106.5
107.5	12111.0451	12046.1601		12046.1601	12060.6892	11996.0457	107.5
108.5	12109.3713	12043.8602	12109.4221	12043.9189	12058.9890	11993.7636	108.5
109.5	12107.6945	12041.5843	12107.7420		12057.3198	11991.4976	109.5
110.5	12105.9898	12039.2943	12106.0353	12039.3368	12055.6118	11989.1953	110.5
111.5	12104.2588	12036.9821	12104.3134	12036.9821	12053.8698	11986.8831	111.5
112.5	12102.5133	12034.6547	12102.5733	12034.7020	12052.1397	11984.5355	112.5
113.5	12100.7552		12100.7980	12032.3520	12050.3680	11982.1865	113.5
114.5	12098.9692	12029.9229	12099.0141		12048.5561	11979.8130	114.5
115.5	12097.1869	12027.5524	12097.1869	12027.5936	12046.7432	11977.4167	115.5
116.5	12095.3648	12025.1236	12095.4173			11975.0097	116.5
117.5	12093.5556	12022.7224	12093.5556	12022.7726			117.5
118.5	12091.6683	12020.2837	12091.6927	12020.3287			118.5
119.5	12089.7892	12017.8191	12089.8567	12017.8622			119.5
120.5	12087.9566		12087.9730				120.5
121.5	12086.0040		12086.0644				121.5
122.5	12084.0754	12010.3334	12084.1383	12010.3902			122.5
123.5	12082.1324	12007.7793	12082.2009	12007.8629			123.5
124.5	12080.1716	12005.2516	12080.2397	12005.3139			124.5
125.5	12078.1517	12002.6857	12078.2515	12002.7389			125.5
126.5	12076.1849		12076.2572	12000.1697			126.5
127.5	12074.1562	11997.4850	12074.2303	11997.5595			127.5
128.5	12072.1258	11994.8961	12072.2056	11994.9369			128.5
129.5	12070.0652	11992.2428	12070.1424	11992.2428			129.5
130.5	12067.9813	11989.5655	12068.0681	11989.6412			130.5
131.5	12065.8892	11986.8831	12065.9761	11986.9579			131.5
132.5		11984.1981	12063.8751	11984.2617			132.5
133.5	12061.6486	11981.4728	12061.7346	11981.5634			133.5
134.5			12059.5932	11978.8095			134.5
135.5			12057.4257	11976.0661			135.5
136.5			12055.2527	11973.2970			136.5
137.5			12053.0372	11970.5302			137.5
138.5			12050.8137	11967.7331			138.5
139.5			12048.5561	11964.9086			139.5
140.5			12046.3169	11962.0581			140.5
141.5			12044.0328	11959.2102			141.5
142.5			12041.7371	11956.3332			142.5

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**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

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**(1,0)a**

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**(1,0)b**

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**(2,1)a**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
143.5			12039.4131	11953.4320			143.5
144.5			12037.1119	11950.5272			144.5
145.5			12034.7020	11947.5855			145.5
146.5			12032.3520	11944.6364			146.5
147.5			12029.9229	11941.6810			147.5
148.5			12027.5524				148.5
149.5							149.5
150.5							150.5

**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

**(2,1)b**

<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
27.5							27.5
28.5		12117.4082					28.5
29.5		12116.5806					29.5
30.5		12115.7247					30.5
31.5		12114.8533					31.5
32.5		12113.9625					32.5
33.5		12113.0567					33.5
34.5		12112.1624					34.5
35.5		12111.1879					35.5
36.5		12110.2253					36.5
37.5		12109.2305					37.5
38.5		12108.2486					38.5
39.5		12107.2094					39.5
40.5	12130.9047	12106.1816					40.5
41.5	12130.4624	12105.1295					41.5
42.5	12129.9858	12104.0687					42.5
43.5	12129.4817	12102.9852					43.5
44.5	12128.9966	12101.8663					44.5
45.5	12128.4886	12100.7552					45.5
46.5	12127.9315	12099.6041					46.5
47.5	12127.3678	12098.4331					47.5
48.5	12126.8079						48.5
49.5	12126.2588	12096.0767					49.5
50.5	12125.6012						50.5
51.5	12124.9773	12093.6788					51.5
52.5	12124.3185	12092.3961					52.5
53.5	12123.6639						53.5
54.5	12122.9539	12089.8567					54.5
55.5	12122.2698	12088.5420					55.5
56.5	12121.5509	12087.2262					56.5
57.5		12085.8884					57.5
58.5	12120.0281	12084.5376					58.5
59.5	12119.2866	12083.1526					59.5
60.5	12118.5070	12081.7589					60.5
61.5	12117.6893	12080.3683					61.5
62.5	12116.8764	12078.9527					62.5
63.5	12115.9935	12077.4818					63.5
64.5	12115.1458	12075.9815					64.5
65.5		12074.5370					65.5
66.5	12113.3578	12073.0384					66.5
67.5	12112.4545	12071.5315					67.5
68.5	12111.5096	12069.9802					68.5
69.5	12110.5521	12068.4368					69.5
70.5	12109.5402	12066.8689					70.5
71.5	12108.5998	12065.2834					71.5
72.5	12107.5859	12063.6328					72.5
73.5	12106.5644	12062.0641					73.5
74.5	12105.4979	12060.3713					74.5
75.5	12104.4474	12058.7458					75.5
76.5	12103.3784	12057.0707					76.5
77.5	12102.2754	12055.3914					77.5
78.5	12101.1554	12053.6772					78.5
79.5	12100.0118	12051.9339					79.5
80.5	12098.8373						80.5
81.5	12097.6904	12048.4245					81.5
82.5		12046.6354					82.5
83.5	12095.2946	12044.8319					83.5
84.5	12094.0651	12043.0169					84.5
85.5	12092.8206	12041.1432					85.5
86.5	12091.5657	12039.3210					86.5
87.5	12090.2875	12037.4428					87.5
88.5	12088.9924	12035.5543					88.5
89.5	12087.6518	12033.6509					89.5
90.5	12086.3150	12031.7303					90.5

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**NbS** [17.2]<sub>5/2</sub> → a<sup>2</sup>Δ<sub>5/2</sub> rotational lines.

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**(2,1)b**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>J</i>
91.5	12084.9882	12029.7563					91.5
92.5	12083.6112	12027.7926					92.5
93.5	12082.2009	12025.8176					93.5
94.5	12080.7919	12023.8297					94.5
95.5	12079.3692	12021.7790					95.5
96.5	12077.9185	12019.7486					96.5
97.5	12076.4607						97.5
98.5	12074.9698	12015.6327					98.5
99.5	12073.4769	12013.5482					99.5
100.5	12071.9368	12011.4243					100.5
101.5	12070.4153	12009.2925					101.5
102.5	12068.8692	12007.1762					102.5
103.5	12067.3108	12004.9812					103.5
104.5	12065.6960	12002.8127					104.5
105.5	12064.0704	12000.6018					105.5
106.5	12062.4603	11998.3602					106.5
107.5	12060.8024	11996.1693					107.5
108.5	12059.1412	11993.8952					108.5
109.5	12057.4257	11991.6109					109.5
110.5	12055.7607	11989.3288					110.5
111.5	12054.0442	11987.0196					111.5
112.5	12052.2856	11984.6907					112.5
113.5	12050.5287	11982.3481					113.5
114.5	12048.7275	11979.9866					114.5
115.5	12046.9596						115.5
116.5	12045.1349						116.5
117.5	12043.2996						117.5
118.5	12041.4526						118.5
119.5	12039.5678						119.5
120.5	12037.6878						120.5
121.5	12035.7654						121.5
122.5	12033.8246						122.5
123.5	12031.9151						123.5
124.5	12029.9229						124.5
125.5	12027.9006						125.5
126.5	12025.8957						126.5
127.5							127.5
128.5							128.5

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NbS  $C^4\Sigma^- \rightarrow X^4\Sigma^-$  rotational lines.

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(0,0)

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$J$	$R_2(J)$	$P_2(J)$	$R_3(J)$	$P_3(J)$	$J$
30.5					30.5
31.5				15659.9214	31.5
32.5				15659.0318	32.5
33.5			15677.3433	15658.1425	33.5
34.5			15676.9889	15657.2240	34.5
35.5			15676.6392	15656.2929	35.5
36.5			15676.2522	15655.3488	36.5
37.5			15675.8665	15654.3754	37.5
38.5			15675.4240	15653.3982	38.5
39.5			15675.0032	15652.3915	39.5
40.5			15674.5387	15651.3717	40.5
41.5			15674.0589	15650.3032	41.5
42.5			15673.5728	15649.2602	42.5
43.5			15673.0505	15648.1658	43.5
44.5			15672.5179	15647.0778	44.5
45.5			15671.9693	15645.9806	45.5
46.5			15671.4086	15644.8471	46.5
47.5			15670.8216	15643.6542	47.5
48.5			15670.2169	15642.5021	48.5
49.5			15669.5969	15641.3060	49.5
50.5			15668.9581	15640.0894	50.5
51.5			15668.3023	15638.8306	51.5
52.5			15667.6311	15637.6027	52.5
53.5			15666.9507	15636.3302	53.5
54.5			15666.1849	15635.0487	54.5
55.5			15665.4386	15633.7513	55.5
56.5			15664.6883	15632.4119	56.5
57.5			15663.9130	15631.0692	57.5
58.5			15663.1125	15629.7214	58.5
59.5			15662.3196	15628.3145	59.5
60.5			15661.4709	15626.9196	60.5
61.5			15660.6097	15625.4951	61.5
62.5			15659.7270	15624.0620	62.5
63.5			15658.8412	15622.5543	63.5
64.5			15657.9207	15621.1408	64.5
65.5			15656.9775	15619.6709	65.5
66.5			15656.0407	15618.1459	66.5
67.5			15655.0191	15616.5527	67.5
68.5			15654.0055	15614.9813	68.5
69.5			15653.0698	15613.4698	69.5
70.5			15652.0241	15611.8224	70.5
71.5			15650.9777	15610.1995	71.5
72.5			15649.8325	15608.6423	72.5
73.5			15648.8247	15606.9611	73.5
74.5	15630.8204		15647.7056	15605.2241	74.5
75.5	15629.7214		15646.5464	15603.5585	75.5
76.5	15628.6315	15584.9742	15645.3487	15601.8716	76.5
77.5	15627.4928	15583.2978	15644.2555	15600.1773	77.5
78.5	15626.3893	15581.6507	15643.0549	15598.4282	78.5
79.5	15625.1914	15579.9771	15641.8640	15596.6439	79.5
80.5	15624.0620	15578.2374		15594.7932	80.5
81.5	15622.8460		15639.3391	15592.9225	81.5
82.5		15574.7104	15638.0100	15591.0877	82.5
83.5		15572.8967	15636.7686	15589.2765	83.5
84.5		15571.0596	15635.4219	15587.4128	84.5
85.5		15569.2792	15634.0638	15585.5189	85.5
86.5			15632.7961	15583.7191	86.5
87.5			15631.4216		87.5
88.5			15629.9649	15579.7433	88.5
89.5	15612.1927		15628.6315	15577.8709	89.5
90.5	15610.8514		15627.1601		90.5
91.5	15609.4817	15557.4378	15625.8107	15573.8963	91.5
92.5	15608.0834	15555.5294	15624.2449	15571.8375	92.5
93.5	15606.6658	15553.5828	15622.8460	15569.7889	93.5

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**NbS  $C^4\Sigma^- \rightarrow X^4\Sigma^-$  rotational lines.**

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**(0,0)**

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<i>J</i>	<i>R</i> <sub>2</sub> ( <i>J</i> )	<i>P</i> <sub>2</sub> ( <i>J</i> )	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>J</i>
94.5	15605.2241	15551.6005	15621.2717	15567.6913	94.5
95.5	15603.7536	15549.5949	15619.6709	15565.5996	95.5
96.5	15602.2692	15547.5578	15618.1459	15563.4592	96.5
97.5	15600.7686	15545.5076	15616.5527	15561.3703	97.5
98.5	15599.2205	15543.4315	15614.9813	15559.2754	98.5
99.5	15597.6723	15541.3312	15613.4698	15557.0349	99.5
100.5	15596.1119	15539.2167	15611.8224	15554.8921	100.5
101.5	15594.5242	15537.0779	15610.1995	15552.7629	101.5
102.5	15592.9225	15534.9254	15608.4390	15550.4067	102.5
103.5	15591.2830	15532.7441		15548.2979	103.5
104.5	15589.6361	15530.5493	15605.0439	15546.0057	104.5
105.5	15587.9662	15528.3321	15603.3746	15543.6808	105.5
106.5	15586.2770	15526.0931	15601.6364	15541.3312	106.5
107.5	15584.5675	15523.8387	15599.8890	15539.0722	107.5
108.5	15582.8394	15521.5647	15598.0544	15536.6682	108.5
109.5	15581.0883	15519.2736	15596.2768	15534.3505	109.5
110.5	15579.3224	15516.9465	15594.3270	15531.9120	110.5
111.5	15577.5362	15514.6175	15592.6107	15529.5991	111.5
112.5	15575.7316	15512.2555	15590.6931	15527.1594	112.5
113.5	15573.8963	15509.8891		15524.6896	113.5
114.5	15572.0538	15507.4914	15586.8282	15522.2253	114.5
115.5	15570.1849	15505.0784	15584.9742	15519.8178	115.5
116.5	15568.2975	15502.6481	15582.9872	15517.2514	116.5
117.5	15566.3913	15500.1846	15581.0883	15514.7158	117.5
118.5	15564.4608	15497.7180	15579.0178	15512.2555	118.5
119.5	15562.5117	15495.2242	15576.9922	15509.6680	119.5
120.5	15560.5460	15492.7110	15574.9144	15507.1144	120.5
121.5	15558.5540	15490.1790	15572.8967	15504.4185	121.5
122.5	15556.5481	15487.6302	15570.8029	15501.8260	122.5
123.5	15554.5171	15485.0526	15568.7166	15499.1928	123.5
124.5	15552.4638	15482.4598	15566.7107	15496.4692	124.5
125.5	15550.4067	15479.8491	15564.4608	15493.8336	125.5
126.5	15548.2979	15477.2139	15562.3635	15491.1523	126.5
127.5		15474.5603	15560.2137	15488.3809	127.5
128.5	15544.0685	15471.8976	15557.9925	15485.7018	128.5
129.5	15541.9239	15469.1965		15483.0021	129.5
130.5	15539.7705	15466.4775		15480.1897	130.5
131.5	15537.5634	15463.7504		15477.4400	131.5
132.5	15535.3333	15461.0126		15474.5603	132.5
133.5	15533.1050	15458.2298		15471.7677	133.5
134.5	15530.8555	15455.4389		15468.9225	134.5
135.5	15528.5898	15452.6330		15465.9285	135.5
136.5	15526.2970	15449.7943		15463.0200	136.5
137.5	15523.9823	15446.9423		15460.1396	137.5
138.5	15521.6443	15444.0704		15457.2774	138.5
139.5	15519.2736	15441.1677		15454.3178	139.5
140.5	15516.9465	15438.2653		15451.3040	140.5
141.5	15514.5348	15435.3355		15448.3199	141.5
142.5	15512.1242	15432.3804			142.5
143.5	15509.6680	15429.4250		15442.2591	143.5
144.5	15507.2101	15426.4105		15439.2238	144.5
145.5	15504.7336	15423.3905			145.5
146.5	15502.2355	15420.3443			146.5
147.5	15499.7300	15417.3009			147.5
148.5	15497.1860	15414.2509			148.5
149.5	15494.6285	15411.1339			149.5
150.5	15492.0634	15408.0429			150.5
151.5	15489.4298	15404.8885			151.5
152.5	15486.8169	15401.7441			152.5
153.5	15484.1614				153.5
154.5	15481.4926				154.5
155.5	15478.8144				155.5
156.5	15476.1516				156.5
157.5	15473.3833				157.5

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NbS  $C^4\Sigma^- \rightarrow X^4\Sigma^-$  rotational lines.

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$J$	$R_2(J)$	$P_2(J)$	$R_3(J)$	$P_3(J)$	$J$
158.5	15470.6556				158.5
159.5	15467.8748				159.5
160.5	15465.0620				160.5
161.5	15462.2748				161.5
162.5	15459.4984				162.5
163.5	15456.6033				163.5
164.5	15453.7458				164.5
165.5	15450.8435				165.5
166.5	15447.9371				166.5
167.5	15445.0271				167.5
168.5	15442.0735				168.5
169.5	15439.0564				169.5
170.5	15436.0893				170.5
171.5	15433.1137				171.5
172.5	15430.0411				172.5
173.5	15426.9755				173.5
174.5	15423.8980				174.5
175.5	15420.7522				175.5
176.5					176.5
177.5	15414.4520				177.5
178.5	15411.3206				178.5
179.5					179.5
180.5					180.5

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**NbS  $C^4\Sigma^- \rightarrow X^4\Sigma^-$  rotational lines.**

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<i>J</i>	$R_2(J)$	$P_2(J)$	$R_3(J)$	$P_3(J)$	<i>J</i>
30.5					30.5
31.5				15119.7985	31.5
32.5				15118.9320	32.5
33.5				15118.0954	33.5
34.5				15117.2404	34.5
35.5				15116.3428	35.5
36.5				15115.4396	36.5
37.5				15114.4695	37.5
38.5				15113.5697	38.5
39.5				15112.6007	39.5
40.5				15111.5966	40.5
41.5				15110.6301	41.5
42.5				15109.5960	42.5
43.5				15108.5999	43.5
44.5				15107.5351	44.5
45.5				15106.4716	45.5
46.5				15105.3948	46.5
47.5				15104.2686	47.5
48.5				15103.1149	48.5
49.5				15102.0408	49.5
50.5				15100.8546	50.5
51.5				15099.6712	51.5
52.5				15098.4990	52.5
53.5				15097.2799	53.5
54.5			15127.2082		54.5
55.5			15126.5541	15094.8426	55.5
56.5			15125.8897	15093.5217	56.5
57.5			15125.1731	15092.2620	57.5
58.5			15124.4063	15090.9810	58.5
59.5			15123.6691	15089.6418	59.5
60.5			15122.8920	15088.3055	60.5
61.5			15122.1379	15086.9749	61.5
62.5			15121.3147	15085.5704	62.5
63.5			15120.4734		63.5
64.5			15119.6392	15082.8417	64.5
65.5			15118.7780	15081.3980	65.5
66.5			15117.9247	15079.9170	66.5
67.5			15116.9997	15078.5042	67.5
68.5			15116.0875	15076.9868	68.5
69.5			15115.1764	15075.4603	69.5
70.5			15114.2138		70.5
71.5			15113.2560	15072.3817	71.5
72.5			15112.2682	15070.8547	72.5
73.5				15069.2810	73.5
74.5			15110.2339	15067.6723	74.5
75.5			15109.1440	15066.0706	75.5
76.5			15108.1230	15064.4605	76.5
77.5			15106.9754	15062.8098	77.5
78.5			15105.8654	15061.1308	78.5
79.5			15104.7818	15059.4496	79.5
80.5			15103.6331	15057.8007	80.5
81.5			15102.5313	15056.0586	81.5
82.5			15101.3242	15054.3192	82.5
83.5			15100.0830	15052.5160	83.5
84.5			15098.9434	15050.7792	84.5
85.5			15097.6440	15048.9617	85.5
86.5			15096.4208	15047.1431	86.5
87.5			15095.1411	15045.3488	87.5
88.5			15093.8909	15043.5167	88.5
89.5	15076.1792		15092.5187		89.5
90.5	15074.8704		15091.2366	15039.7535	90.5
91.5	15073.6676	15021.5451		15037.8719	91.5
92.5	15072.3817	15019.7259	15088.5156	15035.9141	92.5
93.5	15071.0663	15017.8890	15087.1666		93.5

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**NbS  $C^4\Sigma^- \rightarrow X^4\Sigma^-$  rotational lines.**

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<i>J</i>	<i>R</i> <sub>2</sub> ( <i>J</i> )	<i>P</i> <sub>2</sub> ( <i>J</i> )	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>J</i>
94.5	15069.7333	15016.0132	15085.6917	15032.0299	94.5
95.5	15068.3635	15014.1189	15084.2960	15030.0508	95.5
96.5	15066.9963	15012.1868	15082.8417	15028.0791	96.5
97.5	15065.5940	15010.2257	15081.3980	15026.0089	97.5
98.5	15064.1700	15008.2576	15079.9170	15024.0264	98.5
99.5	15062.7441	15006.2880			99.5
100.5	15061.2850	15004.2856		15019.8712	100.5
101.5	15059.8189	15002.2538			101.5
102.5	15058.3202	15000.2179	15073.8360	15015.7206	102.5
103.5	15056.8004	14998.1515	15072.2590	15013.5650	103.5
104.5	15055.2656	14996.0655	15070.6121	15011.4007	104.5
105.5	15053.7245	14993.9729	15069.0653	15009.3031	105.5
106.5	15052.1532	14991.8552		15007.0813	106.5
107.5	15050.5616	14989.7176	15065.7604	15004.8536	107.5
108.5	15048.9617	14987.5559		15002.6611	108.5
109.5	15047.3278	14985.3779	15062.3886	15000.4240	109.5
110.5	15045.6916	14983.1971	15060.6990	14998.1515	110.5
111.5	15044.0245	14980.9744		14995.9332	111.5
112.5	15042.3425	14978.7507	15057.2418	14993.5904	112.5
113.5	15040.6488	14976.5034	15055.4558	14991.3283	113.5
114.5	15038.9222	14974.2393	15053.7245	14988.9925	114.5
115.5	15037.1877	14971.9076	15051.9128	14986.6085	115.5
116.5	15035.4278	14969.6481	15050.0567	14984.2384	116.5
117.5	15033.6517	14967.3235	15048.2116	14981.9147	117.5
118.5	15031.8540	14964.9819	15046.3552		118.5
119.5	15030.0508	14962.6247		14977.0360	119.5
120.5	15028.2056	14960.2430	15042.5602	14974.6618	120.5
121.5	15026.3632	14957.8437	15040.6488	14972.1267	121.5
122.5	15024.4850	14955.4323		14969.6481	122.5
123.5	15022.6024	14952.9983	15036.8390		123.5
124.5	15020.6959	14950.5447	15034.8451		124.5
125.5	15018.7607	14948.0713	15032.8157		125.5
126.5	15016.8086	14945.5790	15030.8052		126.5
127.5	15014.8566	14943.0690	15028.8124		127.5
128.5	15012.8629	14940.5409	15026.7799		128.5
129.5	15010.8556	14937.9921	15024.7135		129.5
130.5	15008.8010	14935.4300	15022.6671		130.5
131.5	15006.7936	14932.8448	15020.5292		131.5
132.5	15004.7403	14930.2395	15018.4236		132.5
133.5	15002.6611	14927.6143	15016.2842		133.5
134.5	15000.5372	14924.9755	15014.1189		134.5
135.5	14998.4478	14922.3165			135.5
136.5	14996.2854	14919.6336			136.5
137.5	14994.1424	14916.9054			137.5
138.5	14991.9539	14914.2185			138.5
139.5		14911.4729			139.5
140.5	14987.5559	14908.7270			140.5
141.5	14985.3003	14905.9431			141.5
142.5		14903.1603			142.5
143.5	14980.7822	14900.3520			143.5
144.5	14978.4711	14897.5359			144.5
145.5	14976.1680	14894.6836			145.5
146.5	14973.8485	14891.8005			146.5
147.5	14971.4811	14888.8911			147.5
148.5	14969.1167	14885.9819			148.5
149.5	14966.7508	14883.0936			149.5
150.5	14964.3084	14880.1207			150.5
151.5	14961.8689	14877.1639			151.5
152.5	14959.4654	14874.1884			152.5
153.5	14956.9474	14871.1814			153.5
154.5	14954.4501	14868.1646			154.5
155.5	14951.9837	14865.1234			155.5
156.5	14949.4806	14862.0681			156.5
157.5	14946.9075	14858.9876			157.5

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**NbS  $C^4\Sigma^- \rightarrow X^4\Sigma^-$  rotational lines.**

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**(0,1)**

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<i>J</i>	<i>R</i> <sub>2</sub> ( <i>J</i> )	<i>P</i> <sub>2</sub> ( <i>J</i> )	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>J</i>
158.5	14944.3473	14855.8664			158.5
159.5	14941.7626	14852.7586			159.5
160.5	14939.1645				160.5
161.5	14936.5175	14846.4890			161.5
162.5	14933.8651	14843.3411			162.5
163.5	14931.1821				163.5
164.5	14928.4815				164.5
165.5	14925.8315				165.5
166.5	14923.0616				166.5
167.5	14920.3624				167.5
168.5	14917.6185				168.5
169.5	14914.8566				169.5
170.5	14912.0298				170.5
171.5	14909.2414				171.5
172.5	14906.3530				172.5
173.5	14903.5238				173.5
174.5	14900.7193				174.5
175.5					175.5
176.5					176.5

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**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

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**(0,0)**

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$J$	$R_1(J)$	$P_1(J)$	$Q_1(J)$	$R_2(J)$	$P_2(J)$	$Q_2(J)$	$J$
47.5							47.5
48.5						7711.1099	48.5
49.5						7710.5414	49.5
50.5						7710.0490	50.5
51.5						7709.4719	51.5
52.5						7708.9560	52.5
53.5						7708.3780	53.5
54.5						7707.7716	54.5
55.5						7707.2330	55.5
56.5						7706.6370	56.5
57.5						7706.0512	57.5
58.5				7723.3379		7705.3736	58.5
59.5				7722.9776		7704.8114	59.5
60.5				7722.6523		7704.1679	60.5
61.5				7722.2708		7703.5207	61.5
62.5				7721.9384		7702.8699	62.5
63.5				7721.6090		7702.1982	63.5
64.5				7721.2087		7701.5067	64.5
65.5				7720.8247		7700.8242	65.5
66.5				7720.3745		7700.1493	66.5
67.5				7720.0143		7699.4409	67.5
68.5				7719.6016		7698.7449	68.5
69.5				7719.1764		7697.9979	69.5
70.5				7718.7387		7697.2758	70.5
71.5				7718.2650		7696.5174	71.5
72.5				7717.7987		7695.7775	72.5
73.5				7717.3629		7695.0138	73.5
74.5				7716.8917		7694.2004	74.5
75.5				7716.4021		7693.4231	75.5
76.5				7715.9242		7692.5945	76.5
77.5				7715.4081		7691.8637	77.5
78.5				7714.8474		7691.0228	78.5
79.5				7714.3467		7690.2051	79.5
80.5				7713.8421		7689.3919	80.5
81.5						7688.5180	81.5
82.5				7712.7304		7687.6617	82.5
83.5				7712.1336		7686.8175	83.5
84.5				7711.5677		7685.9616	84.5
85.5				7710.9934		7685.0541	85.5
86.5				7710.3846		7684.1619	86.5
87.5				7709.7768		7683.2715	87.5
88.5				7709.1846		7682.3708	88.5
89.5				7708.5442		7681.4453	89.5
90.5				7707.8938		7680.5141	90.5
91.5				7707.2672		7679.5621	91.5
92.5				7706.6370		7678.6483	92.5
93.5				7705.9128		7677.6508	93.5
94.5				7705.2838		7676.6770	94.5
95.5				7704.5823		7675.6904	95.5
96.5				7703.8931		7674.7142	96.5
97.5				7703.1708		7673.7101	97.5
98.5				7702.4795		7672.7207	98.5
99.5				7701.7659		7671.6763	99.5
100.5				7701.0257		7670.6399	100.5
101.5				7700.2982		7669.6036	101.5
102.5				7699.5286		7668.5872	102.5
103.5				7698.7449		7667.5081	103.5
104.5				7697.9979		7666.4406	104.5
105.5				7697.1988		7665.3416	105.5
106.5				7696.4040		7664.2480	106.5
107.5				7695.6034		7663.1910	107.5
108.5				7694.7877		7662.0787	108.5
109.5				7693.9534		7660.9513	109.5
110.5				7693.0955		7659.8430	110.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,0)**

$J$	$R_1(J)$	$P_1(J)$	$Q_1(J)$	$R_2(J)$	$P_2(J)$	$Q_2(J)$	$J$
111.5				7692.2931		7658.7121	111.5
112.5				7691.4235		7657.5192	112.5
113.5				7690.5618			113.5
114.5				7689.6923		7655.2027	114.5
115.5				7688.8051		7654.0629	115.5
116.5				7687.9460		7652.8539	116.5
117.5				7687.0170		7651.6626	117.5
118.5				7686.1044		7650.4834	118.5
119.5				7685.2106		7649.2551	119.5
120.5				7684.2467		7648.0353	120.5
121.5				7683.2715		7646.8147	121.5
122.5				7682.3708		7645.5543	122.5
123.5				7681.4007		7644.2891	123.5
124.5				7680.4392		7643.0585	124.5
125.5				7679.4313		7641.7798	125.5
126.5				7678.4179		7640.4905	126.5
127.5				7677.4551		7639.1914	127.5
128.5				7676.4140		7637.9026	128.5
129.5						7636.5793	129.5
130.5				7674.3944		7635.2788	130.5
131.5				7673.3533		7633.9272	131.5
132.5				7672.3036		7632.5825	132.5
133.5				7671.2262		7631.2445	133.5
134.5				7670.1482		7629.8838	134.5
135.5				7669.0898		7628.5044	135.5
136.5				7667.9958		7627.1338	136.5
137.5				7666.8890		7625.7526	137.5
138.5				7665.8090		7624.3799	138.5
139.5				7664.6569		7622.9669	139.5
140.5				7663.5433		7621.5245	140.5
141.5				7662.4345		7620.1018	141.5
142.5				7661.3036		7618.6797	142.5
143.5				7660.1127		7617.2308	143.5
144.5				7658.9498		7615.7561	144.5
145.5				7657.7677		7614.2707	145.5
146.5				7656.5653		7612.8298	146.5
147.5				7655.3793		7611.3612	147.5
148.5				7654.1808			148.5
149.5				7652.9803		7608.3577	149.5
150.5				7651.7409		7606.8164	150.5
151.5				7650.4834		7605.3068	151.5
152.5				7649.2551		7603.7696	152.5
153.5				7647.9963		7602.2524	153.5
154.5				7646.7378		7600.6928	154.5
155.5				7645.4631		7599.1370	155.5
156.5				7644.1584		7597.5732	156.5
157.5						7595.9934	157.5
158.5						7594.4215	158.5
159.5						7592.8018	159.5
160.5						7591.2090	160.5
161.5						7589.5980	161.5
162.5						7587.9686	162.5
163.5						7586.3534	163.5
164.5						7584.7030	164.5
165.5						7583.0698	165.5
166.5						7581.3995	166.5
167.5						7579.7406	167.5
168.5						7578.0668	168.5
169.5						7576.3322	169.5
170.5						7574.6898	170.5
171.5						7572.9721	171.5
172.5						7571.2274	172.5
173.5						7569.5579	173.5
174.5							174.5

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**NbS**  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.

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**(0,0)**

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$J$	$R_1(J)$	$P_1(J)$	$Q_1(J)$	$R_2(J)$	$P_2(J)$	$Q_2(J)$	$J$
175.5						7566.0948	175.5
176.5						7564.3945	176.5
177.5						7562.6182	177.5
178.5						7560.8860	178.5
179.5							179.5
180.5							180.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,0)**

<i>J</i>	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>Q</i> <sub>3</sub> ( <i>J</i> )	<i>R</i> <sub>4</sub> ( <i>J</i> )	<i>P</i> <sub>4</sub> ( <i>J</i> )	<i>Q</i> <sub>4</sub> ( <i>J</i> )	<i>J</i>
14.5							14.5
15.5						7794.3197	15.5
16.5						7794.1492	16.5
17.5						7793.9400	17.5
18.5						7793.7477	18.5
19.5						7793.5427	19.5
20.5						7793.3348	20.5
21.5						7793.0816	21.5
22.5						7792.8228	22.5
23.5						7792.5842	23.5
24.5						7792.3181	24.5
25.5						7792.0455	25.5
26.5						7791.7326	26.5
27.5						7791.4753	27.5
28.5						7791.1689	28.5
29.5						7790.8271	29.5
30.5					7781.2329	7790.5205	30.5
31.5					7780.5805	7790.1823	31.5
32.5					7779.9372	7789.8386	32.5
33.5					7779.3056	7789.4672	33.5
34.5			7753.0917		7778.5967	7789.0919	34.5
35.5		7741.9612	7752.7046	7799.7792	7777.9389	7788.6805	35.5
36.5		7741.2596	7752.2750	7799.6788	7777.2687	7788.3054	36.5
37.5		7740.5583	7751.9002	7799.6024	7776.5099	7787.8926	37.5
38.5		7739.8492	7751.4525	7799.4865		7787.4885	38.5
39.5		7739.0932	7751.0722	7799.3653	7775.0818	7787.0736	39.5
40.5		7738.3787	7750.6430	7799.2287	7774.3677	7786.6392	40.5
41.5		7737.6208	7750.1856	7799.0829	7773.6287	7786.2066	41.5
42.5		7736.9127	7749.7205	7798.9200	7772.8582	7785.7562	42.5
43.5		7736.1451	7749.2645	7798.7664	7772.1010	7785.2853	43.5
44.5		7735.3329	7748.7886	7798.5928	7771.3238	7784.8005	44.5
45.5			7748.3128	7798.4157	7770.5194	7784.3185	45.5
46.5		7733.7660	7747.8207	7798.2240	7769.7323	7783.8526	46.5
47.5		7732.9630	7747.3256	7798.0356	7768.9901	7783.3505	47.5
48.5		7732.1793	7746.7803	7797.8347	7768.1198	7782.8251	48.5
49.5		7731.3122	7746.2823	7797.6021	7767.2689	7782.3061	49.5
50.5		7730.4901	7745.7419	7797.3647	7766.4673	7781.7566	50.5
51.5	7761.0505	7729.6460	7745.2051	7797.1447	7765.5949	7781.2149	51.5
52.5	7760.8042	7728.7816	7744.6348	7796.8868	7764.7579	7780.6767	52.5
53.5	7760.5422	7727.9136	7744.0771	7796.6400	7763.8778	7780.1060	53.5
54.5	7760.2861	7727.0262		7796.3573	7763.0192	7779.5391	54.5
55.5	7759.9872	7726.1695	7742.8912	7796.0664	7762.1459	7778.9561	55.5
56.5	7759.6844	7725.2789	7742.3410	7795.7806	7761.2510	7778.3524	56.5
57.5		7724.3680	7741.7266	7795.4661		7777.7536	57.5
58.5	7759.0864	7723.4733	7741.0997	7795.1555	7759.4338	7777.1226	58.5
59.5	7758.7130	7722.5206	7740.4698	7794.8283	7758.4963	7776.5099	59.5
60.5	7758.3975	7721.6090	7739.8492	7794.4981	7757.5452	7775.8891	60.5
61.5	7758.0602	7720.6289	7739.1986	7794.1492	7756.5775	7775.2250	61.5
62.5	7757.7044	7719.6894	7738.5457	7793.7863	7755.6631	7774.5825	62.5
63.5	7757.3280	7718.7387	7737.8881	7793.4482	7754.6847	7773.9117	63.5
64.5	7756.9338	7717.7496	7737.2145	7793.0816	7753.7025	7773.2426	64.5
65.5	7756.5775	7716.7669	7736.5100	7792.7069	7752.7858	7772.5607	65.5
66.5	7756.1671	7715.7618	7735.8250	7792.3181	7751.7485	7771.8620	66.5
67.5	7755.7384	7714.7747	7735.1254	7791.8972	7750.7203	7771.1638	67.5
68.5	7755.3364	7713.7449	7734.4214	7791.4753	7749.7205	7770.4545	68.5
69.5	7754.9275	7712.7304	7733.6611	7791.0579	7748.6908	7769.7323	69.5
70.5	7754.4519	7711.7290	7732.9630	7790.6144	7747.6835	7768.9901	70.5
71.5	7754.0364	7710.6398		7790.1823	7746.6226	7768.2572	71.5
72.5	7753.5818	7709.6001	7731.4361	7789.7171	7745.5701	7767.5125	72.5
73.5	7753.1065	7708.5442	7730.7348	7789.2582	7744.4877	7766.7362	73.5
74.5	7752.6806	7707.4716	7729.9159	7788.8047	7743.4627	7765.9757	74.5
75.5	7752.1711	7706.3704	7729.1240	7788.3187	7742.3577	7765.1827	75.5
76.5	7751.6605	7705.2838	7728.3362	7787.8381	7741.2596	7764.3956	76.5
77.5	7751.1402	7704.1679		7787.3281	7740.1609	7763.5878	77.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,0)**

$J$	$R_3(J)$	$P_3(J)$	$Q_3(J)$	$R_4(J)$	$P_4(J)$	$Q_4(J)$	$J$
78.5	7750.6430	7703.0341		7786.8061	7739.0543	7762.7811	78.5
79.5	7750.1081	7701.9403		7786.2832	7737.9832	7761.9547	79.5
80.5	7749.5390	7700.8242		7785.7562	7736.7779	7761.1287	80.5
81.5	7749.0626	7699.6721	7724.1969	7785.2156	7735.6374	7760.2861	81.5
82.5	7748.5356	7698.5134	7723.3379	7784.6621	7734.5001	7759.4338	82.5
83.5	7747.9523	7697.3731	7722.5206	7784.1001	7733.3400	7758.5727	83.5
84.5	7747.3632	7696.1814	7721.6090	7783.5270	7732.1793	7757.7044	84.5
85.5	7746.7803	7695.0138	7720.7455	7782.9115	7731.0067	7756.8252	85.5
86.5	7746.1786	7693.8265	7719.8350		7729.8210	7755.9266	86.5
87.5	7745.5701	7692.5945	7718.9355	7781.7566	7728.6257	7755.0331	87.5
88.5	7744.9463	7691.4235	7718.0245	7781.1453	7727.3859	7754.1230	88.5
89.5	7744.3167	7690.2051	7717.1542	7780.5193	7726.1695	7753.1976	89.5
90.5	7743.6915	7688.9727	7716.1707	7779.8911	7724.9478	7752.2750	90.5
91.5	7743.0451	7687.7084	7715.2183	7779.2531	7723.6949	7751.3447	91.5
92.5	7742.4372	7686.4675	7714.2858	7778.5967	7722.4858	7750.3789	92.5
93.5	7741.7266	7685.2106	7713.3166	7777.9389	7721.2087	7749.4278	93.5
94.5	7741.0739	7683.9477	7712.3540	7777.2687	7719.9432	7748.4585	94.5
95.5	7740.3556	7682.6670	7711.3713	7776.5878	7718.6711	7747.4880	95.5
96.5	7739.6725	7681.4007	7710.3846	7775.8891	7717.3629	7746.4871	96.5
97.5	7738.9952	7680.0624	7709.3798	7775.2250	7716.0986	7745.4864	97.5
98.5	7738.2365	7678.7747	7708.3780	7774.4799	7714.7747	7744.4877	98.5
99.5	7737.5174	7677.4551	7707.3560	7773.7614	7713.4643	7743.4627	99.5
100.5	7736.7779	7676.0978	7706.3241	7773.0287	7712.1336	7742.4372	100.5
101.5	7736.0677	7674.7995	7705.2838	7772.2901	7710.8075	7741.4008	101.5
102.5	7735.3008	7673.4523	7704.2225	7771.5380	7709.4719	7740.3556	102.5
103.5	7734.5001	7672.1101	7703.1708	7770.7824	7708.1130	7739.2954	103.5
104.5	7733.7660	7670.7858	7702.1064	7770.0118	7706.7408	7738.2365	104.5
105.5	7732.9630	7669.3662	7701.0257	7769.2334	7705.3736	7737.1617	105.5
106.5	7732.1793	7667.9958	7699.9411	7768.4376	7703.9932	7736.0677	106.5
107.5	7731.3671	7666.6015	7698.8294	7767.6381	7702.6046	7734.9714	107.5
108.5	7730.5736	7665.1934	7697.7251	7766.8262	7701.1962	7733.8676	108.5
109.5	7729.7337	7663.7645	7696.6098	7765.9757	7699.7778	7732.7508	109.5
110.5	7728.8998	7662.3365	7695.4880	7765.1827	7698.3687	7731.6261	110.5
111.5	7728.0550	7660.9194	7694.3399	7764.3472	7696.9425	7730.4901	111.5
112.5	7727.1861	7659.4712	7693.1877	7763.4944	7695.4880	7729.3450	112.5
113.5	7726.3482	7658.0163	7692.0365	7762.6304	7694.0438	7728.1901	113.5
114.5	7725.4685	7656.5653	7690.8677	7761.7605	7692.5945	7727.0262	114.5
115.5	7724.5856	7655.1018	7689.6923	7760.8790	7691.1177	7725.8585	115.5
116.5	7723.6949	7653.6061	7688.5180	7759.9872	7689.6305	7724.6678	116.5
117.5	7722.7895	7652.1352	7687.3072	7759.0864	7688.1367	7723.4733	117.5
118.5	7721.8683	7650.6082	7686.1044	7758.1831	7686.6455	7722.2708	118.5
119.5	7720.9531	7649.1047	7684.8873	7757.2587	7685.1434	7721.0549	119.5
120.5	7720.0143	7647.5742	7683.6467	7756.3323	7683.6467	7719.8350	120.5
121.5	7719.0751	7646.0291	7682.4260	7755.3957	7682.0970	7718.5986	121.5
122.5	7718.1280	7644.5199	7681.1822	7754.4519	7680.5519	7717.3629	122.5
123.5	7717.1542	7642.9779	7679.9205	7753.4766	7679.0062	7716.0986	123.5
124.5	7716.1707	7641.4425	7678.6577	7752.5173	7677.4551	7714.8474	124.5
125.5	7715.2183	7639.8534	7677.3822	7751.5285	7675.8862	7713.5671	125.5
126.5	7714.2128	7638.2794	7676.0978	7750.5529	7674.3123	7712.2846	126.5
127.5	7713.1999	7636.6715	7674.7995	7749.5390	7672.7207	7710.9934	127.5
128.5	7712.2174	7635.0844	7673.4930	7748.5356	7671.1134	7709.6905	128.5
129.5	7711.1608	7633.4981	7672.1779	7747.4880	7669.5280	7708.3780	129.5
130.5	7710.1342	7631.8752	7670.8579	7746.4871	7667.9105	7707.0574	130.5
131.5	7709.0899	7630.2374	7669.5280	7745.4864	7666.2913	7705.7265	131.5
132.5	7708.0417	7628.6008	7668.1806	7744.3965	7664.6569	7704.3837	132.5
133.5	7706.9775	7626.9595	7666.8299	7743.3331	7663.0102	7703.0341	133.5
134.5	7705.8999	7625.3014	7665.4583	7742.2702	7661.3536	7701.6708	134.5
135.5	7704.8114	7623.6215	7664.0862	7741.1867	7659.6911	7700.2982	135.5
136.5	7703.7181	7621.9716	7662.6950	7740.0986	7658.0163	7698.9172	136.5
137.5	7702.6046	7620.2734	7661.3036	7738.9952	7656.3348	7697.5285	137.5
138.5	7701.5067	7618.5934	7659.8983	7737.8881	7654.6352	7696.1264	138.5
139.5	7700.3570	7616.8543	7658.4944	7736.7779	7652.9409	7694.7131	139.5
140.5	7699.2410	7615.1836	7657.0672	7735.6374	7651.2360	7693.2950	140.5
141.5	7698.1012	7613.4265	7655.6295	7734.5001	7649.4989	7691.8637	141.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,0)**

<i>J</i>	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>Q</i> <sub>3</sub> ( <i>J</i> )	<i>R</i> <sub>4</sub> ( <i>J</i> )	<i>P</i> <sub>4</sub> ( <i>J</i> )	<i>Q</i> <sub>4</sub> ( <i>J</i> )	<i>J</i>
142.5	7696.9424	7611.7172	7654.1808	7733.3400	7647.7490	7690.4241	142.5
143.5	7695.7775	7609.9660	7652.7351	7732.1793	7646.0291	7688.9727	143.5
144.5	7694.6012	7608.2221	7651.2360	7731.0067	7644.2891	7687.5123	144.5
145.5	7693.4231	7606.4544	7649.7943	7729.8210	7642.5166	7686.0415	145.5
146.5	7692.2235	7604.6900	7648.3199	7728.6257	7640.7566	7684.5613	146.5
147.5	7691.0228	7602.8984	7646.8147	7727.4365	7638.9742	7683.0730	147.5
148.5	7689.8062	7601.1043	7645.3178	7726.2254	7637.1808	7681.5693	148.5
149.5	7688.5731	7599.3196	7643.8087	7725.0119	7635.3923	7680.0624	149.5
150.5	7687.3391	7597.4994	7642.2834	7723.7704	7633.5774	7678.5390	150.5
151.5	7686.1044	7595.6652	7640.7566	7722.5206	7631.7518	7677.0082	151.5
152.5	7684.8873	7593.8518	7639.1914	7721.2735	7629.9260	7675.4697	152.5
153.5	7683.5687		7637.6495	7720.0143	7628.0923	7673.9170	153.5
154.5	7682.3113	7590.1491	7636.1042	7718.7387	7626.2392	7672.3589	154.5
155.5	7681.0178	7588.3034	7634.5217	7717.4552	7624.3799	7670.7858	155.5
156.5	7679.7093	7586.4221	7632.9383	7716.1707	7622.5138	7669.2060	156.5
157.5	7678.4179	7584.5507	7631.3529	7714.8474	7620.6302	7667.6147	157.5
158.5	7677.0966	7582.6676	7629.7911	7713.5671	7618.7479	7666.0155	158.5
159.5	7675.7468	7580.7668	7628.1376	7712.2174	7616.8543	7664.4067	159.5
160.5	7674.4330	7578.8581	7626.5049	7710.8861	7614.9373	7662.7844	160.5
161.5	7673.0804	7576.9006	7624.8830	7709.5424	7613.0124	7661.1529	161.5
162.5	7671.7128	7575.0016	7623.2309	7708.1842	7611.0954	7659.5117	162.5
163.5	7670.3464	7573.0660	7621.5806	7706.8230	7609.1538	7657.8631	163.5
164.5	7668.9718	7571.1205	7619.9191	7705.4483	7607.2138	7656.2016	164.5
165.5	7667.6147	7569.1594	7618.2455	7704.0601	7605.2505	7654.5305	165.5
166.5	7666.1917	7567.1971	7616.5558	7702.6632	7603.2842	7652.8539	166.5
167.5	7664.7755	7565.2271	7614.8759	7701.2571	7601.3088	7651.1552	167.5
168.5	7663.3422	7563.2562	7613.1662	7699.8383	7599.3196	7649.4613	168.5
169.5	7661.9253	7561.2656	7611.4586	7698.3979	7597.3214	7647.7490	169.5
170.5	7660.4896	7559.2200	7609.7661	7696.9425	7595.3182	7646.0291	170.5
171.5	7659.0363		7607.9959	7695.4880	7593.3005	7644.2891	171.5
172.5	7657.5794		7606.2549	7694.0438	7591.2748	7642.5166	172.5
173.5	7656.1071		7604.5034	7692.5945	7589.2353	7640.7965	173.5
174.5	7654.6352		7602.7398	7691.1177	7587.1916	7639.0327	174.5
175.5			7600.9706	7689.6305	7585.1344	7637.2616	175.5
176.5			7599.2291	7688.1367	7583.0698	7635.4756	176.5
177.5			7597.3908	7686.6455	7580.9920	7633.6886	177.5
178.5			7595.5861	7685.0895	7578.8928	7631.8752	178.5
179.5			7593.7706	7683.5687	7576.8085	7630.0652	179.5
180.5			7591.9480	7682.0167	7574.6898	7628.2410	180.5
181.5			7590.1183	7680.4626	7572.5831	7626.4085	181.5
182.5			7588.3034	7678.9026	7570.4568	7624.5301	182.5
183.5			7586.4221	7677.3242	7568.3247	7622.7095	183.5
184.5			7584.5507	7675.7468	7566.1712	7620.8483	184.5
185.5			7582.6676	7674.1484	7564.0221	7618.9501	185.5
186.5			7580.7668	7672.5442	7561.8623	7617.0831	186.5
187.5			7578.8927	7670.9158	7559.6836	7615.1836	187.5
188.5			7576.9909	7669.2981	7557.4782	7613.2827	188.5
189.5			7575.0776	7667.6591	7555.2998	7611.3612	189.5
190.5			7573.1476	7666.0155	7553.0882	7609.4632	190.5
191.5			7571.2274	7664.4067		7607.4975	191.5
192.5			7569.2648	7662.6950		7605.5514	192.5
193.5			7567.3011	7661.0016		7603.5966	193.5
194.5			7565.3398	7659.3145		7601.6289	194.5
195.5			7563.3706	7657.6090		7599.6470	195.5
196.5			7561.3711	7655.8974		7597.6566	196.5
197.5			7559.3670	7654.1808		7595.6652	197.5
198.5			7557.3640			7593.6462	198.5
199.5			7555.3213	7650.7030		7591.6270	199.5
200.5			7553.3046	7648.9472		7589.5980	200.5
201.5			7551.2714	7647.1669		7587.5431	201.5
202.5			7549.2126	7645.3763		7585.5018	202.5
203.5			7547.1532			7583.4375	203.5
204.5			7545.0941	7641.8105		7581.3620	204.5
205.5			7542.9976	7639.9957		7579.2787	205.5

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**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

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**(0,0)**

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<i>J</i>	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>Q</i> <sub>3</sub> ( <i>J</i> )	<i>R</i> <sub>4</sub> ( <i>J</i> )	<i>P</i> <sub>4</sub> ( <i>J</i> )	<i>Q</i> <sub>4</sub> ( <i>J</i> )	<i>J</i>
206.5			7540.8789	7638.1773		7577.2016	206.5
207.5			7538.7860	7636.3481		7575.0776	207.5
208.5			7536.6698	7634.5217		7572.9721	208.5
209.5				7632.6570		7570.8483	209.5
210.5				7630.7924		7568.6982	210.5
211.5				7628.9034		7566.5524	211.5
212.5				7627.0258		7564.3945	212.5
213.5				7625.1345		7562.2126	213.5
214.5				7623.2309		7560.0186	214.5
215.5				7621.3181		7557.8554	215.5
216.5				7619.3840		7555.6512	216.5
217.5				7617.4207		7553.4413	217.5
218.5				7615.4955		7551.2096	218.5
219.5				7613.5113		7548.9671	219.5
220.5				7611.5343		7546.7423	220.5
221.5				7609.5571		7544.4977	221.5
222.5				7607.5401			222.5
223.5				7605.5514			223.5
224.5				7603.5176			224.5
225.5				7601.4801			225.5
226.5							226.5
227.5				7597.3908			227.5
228.5				7595.3182			228.5
229.5				7593.2405			229.5
230.5				7591.1660			230.5
231.5				7589.0737			231.5
232.5				7586.9535			232.5
233.5							233.5
234.5							234.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,1)**

<i>J</i>	<i>R</i> <sub>1</sub> ( <i>J</i> )	<i>P</i> <sub>1</sub> ( <i>J</i> )	<i>Q</i> <sub>1</sub> ( <i>J</i> )	<i>R</i> <sub>2</sub> ( <i>J</i> )	<i>P</i> <sub>2</sub> ( <i>J</i> )	<i>Q</i> <sub>2</sub> ( <i>J</i> )	<i>J</i>
39.5							39.5
40.5			7149.9507			7181.4571	40.5
41.5			7149.5352			7181.0669	41.5
42.5			7149.1410			7180.6667	42.5
43.5			7148.7664			7180.2620	43.5
44.5			7148.3364			7179.8360	44.5
45.5			7147.9263			7179.4346	45.5
46.5			7147.5001			7178.9553	46.5
47.5			7147.0381			7178.5139	47.5
48.5			7146.6146			7178.0703	48.5
49.5			7146.1278			7177.5951	49.5
50.5			7145.6887			7177.1098	50.5
51.5			7145.2070			7176.6377	51.5
52.5			7144.7576			7176.1548	52.5
53.5			7144.1962			7175.6477	53.5
54.5			7143.7215			7175.1001	54.5
55.5			7143.2254			7174.5840	55.5
56.5			7142.7249			7174.0868	56.5
57.5			7142.1753			7173.5198	57.5
58.5			7141.6206			7172.9959	58.5
59.5			7141.0662			7172.4070	59.5
60.5			7140.5165			7171.8646	60.5
61.5			7139.9974			7171.3026	61.5
62.5			7139.4262			7170.7010	62.5
63.5			7138.8676			7170.0952	63.5
64.5			7138.2423			7169.5143	64.5
65.5			7137.6616			7168.9154	65.5
66.5			7137.0830			7168.2750	66.5
67.5			7136.4213			7167.6608	67.5
68.5			7135.8391	7187.8834		7167.0180	68.5
69.5			7135.1947	7187.5285		7166.3721	69.5
70.5			7134.5598	7187.1609		7165.7287	70.5
71.5			7133.9186	7186.8090		7165.0468	71.5
72.5			7133.2476	7186.4199		7164.3730	72.5
73.5			7132.5730	7186.0638		7163.7010	73.5
74.5			7131.9203	7185.6506		7163.0208	74.5
75.5			7131.2265	7185.2671		7162.3225	75.5
76.5			7130.5202	7184.8374		7161.5963	76.5
77.5			7129.8318	7184.4335		7160.8771	77.5
78.5			7129.1423	7184.0042		7160.1812	78.5
79.5			7128.3493	7183.5800	7135.5784	7159.4544	79.5
80.5			7127.6640	7183.1509	7134.5598	7158.7004	80.5
81.5			7126.9492	7182.6661	7133.4960	7157.9567	81.5
82.5			7126.1568	7182.2444	7132.4537	7157.1682	82.5
83.5			7125.4324	7181.7500	7131.3265	7156.4167	83.5
84.5			7124.6620	7181.2631	7130.2928	7155.6454	84.5
85.5			7123.9005	7180.8098	7129.2033	7154.8456	85.5
86.5			7123.1323	7180.2620	7128.1224	7154.0593	86.5
87.5			7122.3407	7179.7506	7127.0439	7153.2639	87.5
88.5			7121.5524	7179.2585	7125.9168	7152.4480	88.5
89.5			7120.7653	7178.7569	7124.8055	7151.6466	89.5
90.5			7119.9498	7178.2070	7123.6722	7150.8017	90.5
91.5			7119.1363	7177.6402	7122.5436	7149.9732	91.5
92.5			7118.2936	7177.1098	7121.4074	7149.1410	92.5
93.5			7117.4671	7176.5499	7120.2713	7148.2592	93.5
94.5			7116.6174	7175.9681	7119.1363	7147.4050	94.5
95.5			7115.7641	7175.4218	7117.9495	7146.5436	95.5
96.5			7114.9242	7174.8385	7116.7624	7145.6513	96.5
97.5			7114.0462	7174.2658	7115.5619	7144.7576	97.5
98.5			7113.1373	7173.6569	7114.3806	7143.8731	98.5
99.5			7112.2943	7173.0480	7113.1794	7142.9750	99.5
100.5			7111.3833	7172.4070	7112.0029	7142.0599	100.5
101.5			7110.4717	7171.7867	7110.7519	7141.1377	101.5
102.5			7109.5557	7171.1226	7109.5557	7140.2011	102.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,1)**

$J$	$R_1(J)$	$P_1(J)$	$Q_1(J)$	$R_2(J)$	$P_2(J)$	$Q_2(J)$	$J$
103.5			7108.6517	7170.5079	7108.2919	7139.2723	103.5
104.5			7107.7320	7169.8636	7107.0884	7138.3218	104.5
105.5			7106.8106	7169.1814	7105.7793	7137.3592	105.5
106.5			7105.8877	7168.5087	7104.5385	7136.3983	106.5
107.5			7104.9131	7167.8542	7103.2914	7135.4191	107.5
108.5			7103.9430	7167.1481	7102.0056	7134.4347	108.5
109.5			7102.9885	7166.4683	7100.7322	7133.4351	109.5
110.5			7102.0056	7165.7287	7099.4379	7132.4537	110.5
111.5			7101.0084	7165.0468	7098.1467	7131.4431	111.5
112.5			7100.0471	7164.3073	7096.8333	7130.4244	112.5
113.5			7099.0537	7163.5692	7095.5234	7129.3901	113.5
114.5			7098.0406	7162.8323	7094.1747	7128.3493	114.5
115.5			7097.0359	7162.0989	7092.8455	7127.3247	115.5
116.5			7095.9529	7161.3186	7091.5005	7126.2687	116.5
117.5			7094.9902	7160.5638	7090.1599	7125.2238	117.5
118.5			7093.9125	7159.7735	7088.7943	7124.1421	118.5
119.5			7092.8624	7158.9878	7087.4070	7123.0576	119.5
120.5			7091.8090	7158.1867	7086.0396	7121.9703	120.5
121.5			7090.7377	7157.3962	7084.6475	7120.8847	121.5
122.5			7089.6735	7156.5887	7083.2484	7119.7775	122.5
123.5			7088.6114	7155.7659	7081.8556	7118.6634	123.5
124.5			7087.5107	7154.9375		7117.5511	124.5
125.5			7086.4436	7154.0913		7116.4226	125.5
126.5			7085.3211	7153.2639		7115.2955	126.5
127.5			7084.2417	7152.4010		7114.1392	127.5
128.5			7083.1271	7151.5298		7112.9852	128.5
129.5			7081.9753	7150.6938		7111.8269	129.5
130.5			7080.8978	7149.7886		7110.6533	130.5
131.5			7079.7452	7148.9014		7109.4955	131.5
132.5				7148.0102		7108.2919	132.5
133.5				7147.0986		7107.0884	133.5
134.5				7146.1837		7105.8877	134.5
135.5				7145.2526		7104.6802	135.5
136.5				7144.2818		7103.4586	136.5
137.5				7143.3907		7102.2266	137.5
138.5				7142.4336		7100.9776	138.5
139.5				7141.4715		7099.7514	139.5
140.5				7140.5165		7098.4769	140.5
141.5				7139.5350		7097.2262	141.5
142.5				7138.5503		7095.9529	142.5
143.5				7137.5705		7094.6751	143.5
144.5				7136.5544		7093.3904	144.5
145.5				7135.5784		7092.0866	145.5
146.5				7134.5598		7090.7869	146.5
147.5				7133.4960		7089.4655	147.5
148.5				7132.4537		7088.1486	148.5
149.5				7131.4431		7086.8178	149.5
150.5				7130.3769		7085.4784	150.5
151.5				7129.3170		7084.1297	151.5
152.5				7128.2536		7082.7709	152.5
153.5				7127.1709		7081.4219	153.5
154.5				7126.0862		7080.0453	154.5
155.5				7125.0035		7078.6697	155.5
156.5				7123.9005		7077.2840	156.5
157.5						7075.8859	157.5
158.5						7074.4890	158.5
159.5						7073.0751	159.5
160.5						7071.6537	160.5
161.5						7070.2238	161.5
162.5						7068.7949	162.5
163.5						7067.3628	163.5
164.5						7065.8807	164.5
165.5						7064.4450	165.5
166.5						7062.9763	166.5

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**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

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**(0,1)**

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<i>J</i>	<i>R</i> <sub>1</sub> ( <i>J</i> )	<i>P</i> <sub>1</sub> ( <i>J</i> )	<i>Q</i> <sub>1</sub> ( <i>J</i> )	<i>R</i> <sub>2</sub> ( <i>J</i> )	<i>P</i> <sub>2</sub> ( <i>J</i> )	<i>Q</i> <sub>2</sub> ( <i>J</i> )	<i>J</i>
167.5						7061.5114	167.5
168.5						7060.0104	168.5
169.5						7058.5428	169.5
170.5						7057.0477	170.5
171.5						7055.5425	171.5
172.5						7054.0358	172.5
173.5						7052.5116	173.5
174.5						7050.9979	174.5
175.5						7049.4622	175.5
176.5						7047.9216	176.5
177.5						7046.3798	177.5
178.5						7044.8209	178.5
179.5						7043.2728	179.5
180.5						7041.7063	180.5
181.5						7040.1329	181.5
182.5						7038.5492	182.5
183.5							183.5

NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.

(0,1)

$J$	$R_3(J)$	$P_3(J)$	$Q_3(J)$	$R_4(J)$	$P_4(J)$	$Q_4(J)$	$J$
26.5							26.5
27.5						7251.2630	27.5
28.5						7250.9855	28.5
29.5			7217.7882			7250.6987	29.5
30.5			7217.4965			7250.3819	30.5
31.5			7217.1569			7250.1055	31.5
32.5			7216.8604			7249.7274	32.5
33.5			7216.5551			7249.4606	33.5
34.5			7216.2087			7249.0917	34.5
35.5			7215.8477			7248.7575	35.5
36.5			7215.5137			7248.4129	36.5
37.5			7215.1619			7248.0314	37.5
38.5			7214.7828			7247.6901	38.5
39.5			7214.4061			7247.3230	39.5
40.5		7201.8130	7214.0184			7246.9127	40.5
41.5		7201.0843	7213.6293			7246.5715	41.5
42.5		7200.3966	7213.2058			7246.1475	42.5
43.5		7199.6884	7212.8066			7245.7552	43.5
44.5		7198.9836	7212.3694			7245.3230	44.5
45.5		7198.2273	7211.9379			7244.8462	45.5
46.5		7197.4838	7211.5012			7244.4125	46.5
47.5		7196.7444	7211.0746			7243.9681	47.5
48.5		7195.9619	7210.6086			7243.5050	48.5
49.5		7195.2276	7210.1412			7243.0422	49.5
50.5		7194.3953	7209.6490			7242.5945	50.5
51.5		7193.6602	7209.2017			7242.0898	51.5
52.5	7224.8174	7192.8728	7208.6709			7241.5963	52.5
53.5	7224.6404	7192.0380	7208.1846	7257.6254		7241.0801	53.5
54.5	7224.4112	7191.2374	7207.6492	7257.3919		7240.5928	54.5
55.5	7224.2000	7190.3907	7207.1627	7257.1884		7240.0839	55.5
56.5	7223.9747	7189.5687	7206.6521	7256.9537		7239.5899	56.5
57.5	7223.7419	7188.7398	7206.0678	7256.7199		7239.0076	57.5
58.5	7223.4619	7187.8834	7205.5055	7256.4907		7238.4774	58.5
59.5	7223.2263	7187.0317	7204.9721			7237.9225	59.5
60.5	7222.9815	7186.1735	7204.4355	7255.9684		7237.3405	60.5
61.5	7222.7065	7185.2671	7203.8484	7255.7254		7236.7578	61.5
62.5	7222.4048	7184.3986	7203.2488	7255.4231		7236.1840	62.5
63.5	7222.1033	7183.4927	7202.6311	7255.1237		7235.5994	63.5
64.5	7221.7940	7182.6022	7202.0514	7254.8269		7234.9939	64.5
65.5	7221.5000	7181.6871	7201.4422	7254.5339		7234.3992	65.5
66.5	7221.1761	7180.8098	7200.8219	7254.2215		7233.7587	66.5
67.5	7220.8602	7179.8360	7200.2136	7253.8583		7233.1498	67.5
68.5	7220.5242	7178.9082	7199.5705	7253.5579		7232.5093	68.5
69.5	7220.1820	7177.9566	7198.9371	7253.2058		7231.8629	69.5
70.5	7219.8066	7177.0127	7198.2273	7252.8703		7231.1963	70.5
71.5	7219.4579	7176.0400	7197.6086	7252.4916		7230.5565	71.5
72.5	7219.0832	7175.1001	7196.9499	7252.0804		7229.8614	72.5
73.5	7218.7124	7174.0868	7196.2329	7251.7360		7229.2181	73.5
74.5	7218.3276	7173.1315	7195.5676	7251.3497		7228.5167	74.5
75.5	7217.9003	7172.1124	7194.8729	7250.9462			75.5
76.5	7217.4965	7171.0959	7194.1406	7250.5396		7227.1245	76.5
77.5	7217.0976	7170.0952	7193.4332	7250.1324		7226.4105	77.5
78.5	7216.6688	7169.0718	7192.7031	7249.6865		7225.6751	78.5
79.5	7216.2087	7168.0598	7192.0030	7249.2559		7224.9422	79.5
80.5	7215.7763	7166.9716	7191.2374	7248.8328		7224.2000	80.5
81.5	7215.3146	7165.9658	7190.4858	7248.3568		7223.4619	81.5
82.5	7214.8539	7164.8973	7189.7600	7247.9128		7222.7065	82.5
83.5	7214.4061	7163.8361	7188.9696	7247.4755		7221.9458	83.5
84.5	7213.9233	7162.7352	7188.2027	7246.9665		7221.1761	84.5
85.5	7213.4124	7161.6662	7187.3988	7246.4917	7194.5335	7220.3636	85.5
86.5	7212.9158	7160.5638	7186.6148	7246.0103	7193.4332	7219.5824	86.5
87.5	7212.4245	7159.4544	7185.8082	7245.4786	7192.3277	7218.8025	87.5
88.5	7211.9379	7158.3650	7185.0099	7244.9846	7191.2374	7217.9770	88.5
89.5	7211.3940	7157.2744	7184.1918	7244.4629	7190.1034	7217.1569	89.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(0,1)**

<i>J</i>	<i>R</i> <sub>3</sub> ( <i>J</i> )	<i>P</i> <sub>3</sub> ( <i>J</i> )	<i>Q</i> <sub>3</sub> ( <i>J</i> )	<i>R</i> <sub>4</sub> ( <i>J</i> )	<i>P</i> <sub>4</sub> ( <i>J</i> )	<i>Q</i> <sub>4</sub> ( <i>J</i> )	<i>J</i>
90.5	7210.8605	7156.1317	7183.3400	7243.8883	7188.9922	7216.3238	90.5
91.5	7210.3079	7154.9987	7182.5230	7243.4046	7187.8834	7215.5025	91.5
92.5	7209.7658	7153.8560	7181.6871	7242.8794	7186.7198	7214.6561	92.5
93.5	7209.2017	7152.6995	7180.8098	7242.2882	7185.5783	7213.8113	93.5
94.5	7208.6458	7151.5298	7179.9451	7241.7269	7184.3986	7212.9158	94.5
95.5	7208.0660	7150.3781	7179.0727	7241.1437	7183.2744	7212.0687	95.5
96.5	7207.4502	7149.2055	7178.2070	7240.5928	7182.0768	7211.1842	96.5
97.5	7206.8870	7148.0102	7177.3405	7240.0144	7180.8831	7210.3079	97.5
98.5	7206.3106	7146.7978	7176.4109	7239.3696	7179.6832	7209.3985	98.5
99.5	7205.6639	7145.6015	7175.5057	7238.7938	7178.5139	7208.5009	99.5
100.5	7205.0708	7144.4210	7174.5840	7238.1467	7177.3070	7207.5973	100.5
101.5	7204.4355	7143.1785	7173.6569	7237.5584	7176.0616	7206.6521	101.5
102.5		7141.9383	7172.7374	7236.9236	7174.8385	7205.7336	102.5
103.5	7203.1498	7140.7378	7171.7867	7236.2913	7173.5834	7204.7919	103.5
104.5	7202.4857	7139.4495	7170.8427	7235.5994	7172.3565	7203.8484	104.5
105.5	7201.8480	7138.2423	7169.9245	7234.9939	7171.0959	7202.8846	105.5
106.5	7201.1406	7136.9330	7168.9154	7234.2861	7169.8636	7201.9275	106.5
107.5	7200.4833	7135.6907	7167.9400	7233.6169	7168.5742	7200.9697	107.5
108.5	7199.7952	7134.4347	7166.9716	7232.8883	7167.3010	7199.9817	108.5
109.5	7199.0987	7133.1176	7165.9658	7232.2130	7165.9658	7198.9836	109.5
110.5	7198.3905	7131.8237	7164.9592	7231.5225	7164.7210	7197.9904	110.5
111.5	7197.6802	7130.5202	7163.9694	7230.8078	7163.4395	7196.9499	111.5
112.5	7196.9499	7129.2033	7162.9449		7162.0989	7195.9619	112.5
113.5	7196.2329	7127.8923	7161.9067	7229.3938	7160.7741	7194.9360	113.5
114.5	7195.4687	7126.5545	7160.8771	7228.6405	7159.4544	7193.8997	114.5
115.5	7194.7251	7125.2238	7159.8289	7227.8773	7158.1248	7192.8728	115.5
116.5	7193.9693	7123.8774	7158.7667	7227.1245	7156.7594	7191.8096	116.5
117.5	7193.1908	7122.5203	7157.7166	7226.3524	7155.3885	7190.7497	117.5
118.5	7192.4066	7121.1335	7156.6419	7225.5997	7154.0593	7189.6810	118.5
119.5	7191.6221	7119.7775	7155.5603	7224.8174	7152.6995	7188.6152	119.5
120.5	7190.8432	7118.3963	7154.4774	7224.0319	7151.3036	7187.5285	120.5
121.5	7190.0330	7117.0048	7153.3777	7223.2263	7149.9507	7186.4199	121.5
122.5	7189.1975	7115.6131	7152.2652	7222.4048	7148.5135	7185.2671	122.5
123.5	7188.3838	7114.2188	7151.1577	7221.6037	7147.0986	7184.1918	123.5
124.5	7187.5978	7112.7835	7150.0350	7220.7343	7145.6887	7183.0816	124.5
125.5	7186.7198	7111.3833	7148.9014	7219.9141	7144.2818	7181.9547	125.5
126.5	7185.8713	7109.9380	7147.7653	7219.0832	7142.8360	7180.8098	126.5
127.5	7185.0099	7108.5035	7146.6146	7218.2139	7141.4000	7179.6832	127.5
128.5	7184.1457	7107.0295	7145.4609	7217.3567	7139.9391	7178.5139	128.5
129.5	7183.2744	7105.5955	7144.2818	7216.4849	7138.4829	7177.3405	129.5
130.5	7182.3843	7104.1184	7143.1152	7215.6215	7137.0830	7176.1548	130.5
131.5	7181.5025	7102.6267	7141.9383	7214.7226	7135.5784	7175.0011	131.5
132.5	7180.5583	7101.1569	7140.7378	7213.8113	7134.0801	7173.8177	132.5
133.5	7179.6832	7099.6683	7139.5350	7212.9158	7132.5730	7172.6083	133.5
134.5	7178.7819	7098.1837	7138.3218	7211.9846	7131.0914	7171.4005	134.5
135.5	7177.8366	7096.6543	7137.1015	7211.0746	7129.6078	7170.1808	135.5
136.5	7176.8973	7095.1328	7135.8868	7210.1412	7128.0762	7168.9154	136.5
137.5	7175.9681	7093.6225	7134.6404	7209.2017	7126.5545	7167.7315	137.5
138.5	7175.0011	7092.0866	7133.4130	7208.2671	7125.0035	7166.4834	138.5
139.5	7174.0581	7090.5333	7132.1425	7207.2907	7123.4581	7165.2326	139.5
140.5	7173.0480	7088.9849	7130.8828	7206.3106	7121.9149	7163.9694	140.5
141.5	7172.0859	7087.4070	7129.6078	7205.3207	7120.3528	7162.7032	141.5
142.5	7171.0959	7085.8582	7128.3493	7204.3668	7118.8019	7161.4334	142.5
143.5	7170.0952	7084.3004	7127.0439	7203.3469	7117.2041	7160.1497	143.5
144.5	7169.0951	7082.6924	7125.7448	7202.3607	7115.6131	7158.8475	144.5
145.5	7168.0598	7081.0898	7124.4448	7201.3334	7113.9978	7157.5383	145.5
146.5	7167.0180	7079.5098	7123.1323	7200.3032	7112.4043	7156.2320	146.5
147.5	7165.9658	7077.8698	7121.8032	7199.2812		7154.9220	147.5
148.5	7164.9592		7120.4831	7198.2273		7153.5786	148.5
149.5	7163.9032		7119.1363	7197.1515		7152.2417	149.5
150.5	7162.8323		7117.7840	7196.1298		7150.8908	150.5
151.5	7161.7473		7116.4226	7195.0495		7149.5352	151.5
152.5	7160.6854		7115.0541	7193.9693		7148.1714	152.5
153.5	7159.5879		7113.6786	7192.8728		7146.7978	153.5

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**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

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**(0,1)**

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<i>J</i>	$R_3(J)$	$P_3(J)$	$Q_3(J)$	$R_4(J)$	$P_4(J)$	$Q_4(J)$	<i>J</i>
154.5	7158.4904		7112.2943	7191.8096		7145.4028	154.5
155.5	7157.3962		7110.9002	7190.6867		7144.0135	155.5
156.5	7156.3050		7109.4955	7189.5687		7142.6177	156.5
157.5	7155.1550		7108.0922	7188.4633		7141.2090	157.5
158.5	7154.0171		7106.6632	7187.3178		7139.7913	158.5
159.5	7152.8635		7105.2380	7186.1735		7138.3218	159.5
160.5	7151.7175		7103.7929	7185.0099		7136.9330	160.5
161.5	7150.5439		7102.3541	7183.8646		7135.4818	161.5
162.5	7149.3729		7100.8982	7182.6974		7134.0236	162.5
163.5	7148.2081		7099.4379	7181.5147		7132.5730	163.5
164.5	7147.0104		7097.9602	7180.3404		7131.0914	164.5
165.5	7145.7955		7096.4799	7179.1317		7129.6078	165.5
166.5	7144.6032		7094.9902	7177.9411		7128.1224	166.5
167.5	7143.3907		7093.4773	7176.7152		7126.6234	167.5
168.5	7142.1753		7091.9946	7175.5057		7125.1147	168.5
169.5	7140.9131		7090.4646	7174.2658		7123.6033	169.5
170.5	7139.6700		7088.9342			7122.0663	170.5
171.5	7138.4194		7087.4070			7120.5277	171.5
172.5	7137.1789		7085.8582			7118.9933	172.5
173.5	7135.8868		7084.3004			7117.4671	173.5
174.5	7134.6212		7082.7639			7115.8787	174.5
175.5	7133.3152		7081.1739			7114.3079	175.5
176.5	7132.0361		7079.5887			7112.7346	176.5
177.5	7130.7275		7078.0136			7111.1459	177.5
178.5	7129.3901		7076.3962			7109.5557	178.5
179.5	7128.0762		7074.7986			7107.9367	179.5
180.5	7126.7468		7073.1842			7106.3105	180.5
181.5	7125.4012		7071.5654			7104.6905	181.5
182.5	7124.0444		7069.9333			7103.0843	182.5
183.5	7122.6931		7068.2953			7101.4247	183.5
184.5	7121.3215		7066.6326			7099.7994	184.5
185.5	7119.9498		7064.9682			7098.1467	185.5
186.5	7118.5628		7063.3133			7096.4799	186.5
187.5	7117.1238		7061.6418				187.5
188.5			7059.9448				188.5
189.5			7058.2464				189.5
190.5			7056.5376				190.5
191.5			7054.8225				191.5
192.5			7053.1043				192.5
193.5			7051.3701				193.5
194.5			7049.6167				194.5
195.5			7047.8977				195.5
196.5			7046.1248				196.5
197.5			7044.3485				197.5
198.5			7042.5438				198.5
199.5			7040.8040				199.5
200.5			7038.9768				200.5
201.5			7037.1638				201.5
202.5			7035.3363				202.5
203.5			7033.5579				203.5
204.5			7031.6860				204.5
205.5			7029.8322				205.5
206.5							206.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(1,0)**

$J$	$R_1(J)$	$P_1(J)$	$Q_1(J)$	$R_2(J)$	$P_2(J)$	$Q_2(J)$	$J$
12.5							12.5
13.5						8222.2546	13.5
14.5						8222.0906	14.5
15.5						8221.8905	15.5
16.5						8221.6865	16.5
17.5						8221.5077	17.5
18.5						8221.2571	18.5
19.5						8221.0474	19.5
20.5						8220.8014	20.5
21.5						8220.5497	21.5
22.5						8220.2821	22.5
23.5						8219.9706	23.5
24.5						8219.6916	24.5
25.5						8219.3889	25.5
26.5						8219.0797	26.5
27.5						8218.7585	27.5
28.5			8180.4472			8218.4160	28.5
29.5			8180.0558			8218.0516	29.5
30.5			8179.6712			8217.6697	30.5
31.5			8179.2688			8217.3282	31.5
32.5			8178.8467			8216.9161	32.5
33.5			8178.4142			8216.5296	33.5
34.5			8177.9906			8216.1093	34.5
35.5			8177.5478			8215.7074	35.5
36.5			8177.0712			8215.2854	36.5
37.5			8176.5948			8214.8290	37.5
38.5			8176.1271			8214.3693	38.5
39.5			8175.6626			8213.8982	39.5
40.5			8175.1500			8213.4221	40.5
41.5			8174.6190			8212.9523	41.5
42.5			8174.0931			8212.4470	42.5
43.5			8173.5537			8211.9262	43.5
44.5			8172.9876			8211.4013	44.5
45.5			8172.4586			8210.8498	45.5
46.5			8171.8671			8210.3313	46.5
47.5			8171.3084			8209.7873	47.5
48.5			8170.7335			8209.1785	48.5
49.5			8170.1336			8208.6312	49.5
50.5			8169.5212			8208.0140	50.5
51.5			8168.8840			8207.4276	51.5
52.5			8168.2617			8206.8170	52.5
53.5			8167.6181			8206.2038	53.5
54.5			8166.9781	8222.2031		8205.5404	54.5
55.5			8166.2830	8221.8342		8204.9095	55.5
56.5			8165.6053	8221.4740		8204.2698	56.5
57.5			8164.9340	8221.0803		8203.5905	57.5
58.5			8164.2206	8220.7005		8202.9124	58.5
59.5			8163.5235	8220.3389		8202.2276	59.5
60.5			8162.8065	8219.9469		8201.5132	60.5
61.5			8162.1035	8219.5320		8200.8281	61.5
62.5			8161.3572	8219.0797		8200.0758	62.5
63.5			8160.5963	8218.6856		8199.3634	63.5
64.5			8159.8312	8218.2071		8198.6242	64.5
65.5			8159.0820	8217.7431		8197.8434	65.5
66.5			8158.2917	8217.3282		8197.0918	66.5
67.5			8157.4789	8216.8082		8196.3141	67.5
68.5			8156.7117	8216.3065		8195.5366	68.5
69.5			8155.8986	8215.8139		8194.7138	69.5
70.5			8155.0469	8215.2854		8193.9166	70.5
71.5			8154.2378	8214.7742		8193.0999	71.5
72.5			8153.3918	8214.2391		8192.2441	72.5
73.5			8152.5394	8213.6804		8191.4110	73.5
74.5			8151.7186	8213.1482		8190.5423	74.5
75.5			8150.8036	8212.5580		8189.7049	75.5

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**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

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**(1,0)**

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$J$	$R_1(J)$	$P_1(J)$	$Q_1(J)$	$R_2(J)$	$P_2(J)$	$Q_2(J)$	$J$
76.5			8149.9330	8211.9677		8188.8371	76.5
77.5			8149.0545	8211.4013		8187.9706	77.5
78.5			8148.1440	8210.7860		8187.0400	78.5
79.5			8147.2441	8210.1665		8186.1322	79.5
80.5			8146.3299	8209.5531		8185.2144	80.5
81.5			8145.3972	8208.9078		8184.2719	81.5
82.5			8144.4527	8208.2769		8183.3218	82.5
83.5			8143.5110	8207.6388		8182.3918	83.5
84.5			8142.5396	8206.9706		8181.4177	84.5
85.5			8141.5980	8206.2934		8180.4472	85.5
86.5			8140.5929	8205.5774		8179.4568	86.5
87.5			8139.6278	8204.9095		8178.4856	87.5
88.5			8138.6188	8204.1652		8177.4722	88.5
89.5			8137.6183	8203.4596		8176.4557	89.5
90.5			8136.5827	8202.7055		8175.4128	90.5
91.5			8135.5596	8201.9521		8174.3791	91.5
92.5				8201.2283		8173.3261	92.5
93.5				8200.4742		8172.2908	93.5
94.5				8199.6932		8171.1918	94.5
95.5				8198.9013		8170.1336	95.5
96.5				8198.1019		8169.0426	96.5
97.5				8197.3152		8167.9423	97.5
98.5				8196.4993		8166.8471	98.5
99.5				8195.6536		8165.6976	99.5
100.5				8194.8345		8164.5594	100.5
101.5				8193.9823		8163.4479	101.5
102.5				8193.1144		8162.2687	102.5
103.5				8192.2441		8161.1295	103.5
104.5				8191.3803		8159.9346	104.5
105.5				8190.4798		8158.7605	105.5
106.5				8189.5491		8157.5566	106.5
107.5				8188.6574		8156.3562	107.5
108.5				8187.7323		8155.1216	108.5
109.5				8186.7905		8153.8984	109.5
110.5				8185.8361			110.5
111.5				8184.8723			111.5
112.5							112.5

NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.

(1,0)

$J$	$R_3(J)$	$P_3(J)$	$Q_3(J)$	$R_4(J)$	$P_4(J)$	$Q_4(J)$	$J$
17.5							17.5
18.5			8259.6293				18.5
19.5			8259.4010				19.5
20.5			8259.1199				20.5
21.5			8258.8320				21.5
22.5			8258.5809				22.5
23.5			8258.2490				23.5
24.5			8257.9766				24.5
25.5			8257.6568		8288.6365		25.5
26.5			8257.3310		8288.0127		26.5
27.5			8257.0117		8287.3725		27.5
28.5			8256.6116		8286.7192		28.5
29.5			8256.2822		8286.0706		29.5
30.5			8255.9121		8285.3724		30.5
31.5			8255.4999		8284.7152	8294.2209	31.5
32.5			8255.1119		8284.0424	8293.8433	32.5
33.5			8254.6955		8283.3210	8293.4562	33.5
34.5			8254.2858		8282.6153	8293.0325	34.5
35.5			8253.8782		8281.8826	8292.6305	35.5
36.5			8253.4219		8281.1334	8292.1748	36.5
37.5			8253.0114		8280.3866	8291.7357	37.5
38.5			8252.5403		8279.6454	8291.2727	38.5
39.5			8252.0418		8278.8864	8290.8006	39.5
40.5			8251.5537	8302.8305	8278.1088	8290.3182	40.5
41.5			8251.0709	8302.6555	8277.3118	8289.8310	41.5
42.5			8250.5724	8302.4526	8276.4588	8289.3187	42.5
43.5			8250.0281	8302.2501	8275.6774	8288.8246	43.5
44.5			8249.5502	8302.0405	8274.8544	8288.2686	44.5
45.5			8249.0228	8301.8027	8274.0507	8287.7467	45.5
46.5			8248.4463	8301.5493	8273.1675	8287.2069	46.5
47.5			8247.8956	8301.3010	8272.3337	8286.6573	47.5
48.5			8247.3310	8301.0180	8271.4450	8286.0706	48.5
49.5			8246.7679	8300.7101	8270.5555	8285.4922	49.5
50.5	8261.6549		8246.1545	8300.4568	8269.6547	8284.8957	50.5
51.5	8261.3674		8245.5483	8300.1387	8268.7544	8284.2693	51.5
52.5	8261.0437		8244.9219	8299.8239	8267.8386	8283.6923	52.5
53.5	8260.7046		8244.3036	8299.4950	8266.8991	8283.0622	53.5
54.5	8260.3719		8243.6628	8299.1939	8265.9889	8282.4299	54.5
55.5	8260.0071		8243.0222	8298.8276	8265.0339	8281.7928	55.5
56.5	8259.6524		8242.3308	8298.4680	8264.0444	8281.1102	56.5
57.5	8259.2793		8241.6884	8298.1087	8263.0819	8280.4585	57.5
58.5	8258.9096		8240.9982	8297.6967	8262.1334	8279.7731	58.5
59.5	8258.4496		8240.2903	8297.3245	8261.1247	8279.0772	59.5
60.5	8258.0475		8239.5963	8296.9196	8260.0989	8278.3741	60.5
61.5	8257.6832		8238.8631	8296.5022	8259.1199	8277.6605	61.5
62.5	8257.2335		8238.1401	8296.0716	8258.0475	8276.9364	62.5
63.5	8256.8099		8237.4096	8295.6538	8257.0117	8276.2010	63.5
64.5	8256.3529		8236.6756	8295.1776	8256.0193	8275.4312	64.5
65.5	8255.9121		8235.9188	8294.7359	8254.9186	8274.6945	65.5
66.5	8255.4308		8235.1467	8294.2572	8253.8484	8273.9121	66.5
67.5	8254.9472		8234.3423	8293.7727	8252.7945	8273.1675	67.5
68.5	8254.4211		8233.5883	8293.2863	8251.6843	8272.3337	68.5
69.5	8253.9478		8232.7543	8292.7824	8250.5906	8271.5379	69.5
70.5	8253.4219		8231.9580	8292.2815	8249.4689	8270.7294	70.5
71.5	8252.8876		8231.1144	8291.7514	8248.3431	8269.8898	71.5
72.5	8252.3416	8208.4584	8230.2848	8291.2031	8247.1955	8269.0736	72.5
73.5	8251.8021	8207.3372	8229.4511	8290.6595	8246.0521	8268.2061	73.5
74.5	8251.2367	8206.2038	8228.5760	8290.1215	8244.9219	8267.3439	74.5
75.5	8250.6776	8205.0341	8227.7042	8289.5308	8243.7357	8266.4756	75.5
76.5		8203.8408	8226.8270	8288.9363	8242.5576	8265.5977	76.5
77.5	8249.4689	8202.6586	8225.9345		8241.3620	8264.6887	77.5
78.5	8248.8688	8201.4437	8225.0336	8287.7467	8240.1602	8263.8271	78.5
79.5	8248.2433	8200.2632	8224.1214	8287.1060	8238.9618	8262.8885	79.5
80.5	8247.6224	8199.0301	8223.2003	8286.5111	8237.7534	8261.9771	80.5

**NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.**

**(1,0)**

$J$	$R_3(J)$	$P_3(J)$	$Q_3(J)$	$R_4(J)$	$P_4(J)$	$Q_4(J)$	$J$
81.5	8247.0031	8197.8318	8222.2546	8285.8682	8236.4850	8261.0218	81.5
82.5	8246.3300	8196.5502	8221.2951	8285.2335	8235.2672	8260.0767	82.5
83.5	8245.6748	8195.3113	8220.3389	8284.5560	8234.0063	8259.1199	83.5
84.5	8245.0077	8193.9926	8219.3889	8283.8808	8232.7543	8258.1570	84.5
85.5	8244.3036	8192.7585	8218.4160	8283.1941	8231.4314		85.5
86.5	8243.6372	8191.4388	8217.4027	8282.5059	8230.1527	8256.1854	86.5
87.5	8242.9112	8190.1940	8216.4010	8281.7928	8228.8653	8255.1797	87.5
88.5	8242.1993	8188.8371	8215.3887	8281.1102	8227.5500	8254.1725	88.5
89.5	8241.4723	8187.5363	8214.3693	8280.3866	8226.2324	8253.1507	89.5
90.5	8240.7331	8186.2264	8213.3355	8279.6454	8224.9320	8252.1114	90.5
91.5	8240.0023	8184.8723	8212.2862	8278.8864	8223.5509	8251.0709	91.5
92.5	8239.2279	8183.5182	8211.2589	8278.1088	8222.2031	8250.0281	92.5
93.5	8238.4471	8182.1679	8210.1665	8277.3569	8220.8432	8248.9632	93.5
94.5	8237.6873	8180.7819	8209.0896	8276.5600	8219.4653	8247.8956	94.5
95.5	8236.8731	8179.3937	8208.0077	8275.7603	8218.0743	8246.7679	95.5
96.5	8236.0782	8177.9906	8206.9030	8274.9682	8216.6691	8245.6748	96.5
97.5	8235.2672	8176.5948	8205.7869	8274.1385	8215.2854	8244.5568	97.5
98.5	8234.4430	8175.1903	8204.6586	8273.3146	8213.8424	8243.4390	98.5
99.5	8233.5883	8173.7412	8203.5342	8272.4913	8212.4470	8242.3014	99.5
100.5	8232.7543	8172.2908	8202.3976	8271.6310	8210.9919	8241.1498	100.5
101.5	8231.8839	8170.8446	8201.2283	8270.7655	8209.5531	8240.0023	101.5
102.5	8231.0208	8169.4191	8200.0758	8269.8898	8208.0591	8238.8631	102.5
103.5	8230.1442	8167.9291	8198.9013	8268.9786	8206.5877	8237.6873	103.5
104.5	8229.2400	8166.4370	8197.6989	8268.1382	8205.1153	8236.4850	104.5
105.5	8228.3275	8164.9635	8196.4993	8267.2344	8203.6124	8235.2672	105.5
106.5	8227.4246	8163.4479	8195.3113	8266.3160	8202.1254	8234.0781	106.5
107.5	8226.4974	8161.9325	8194.0772	8265.3887	8200.5918	8232.8517	107.5
108.5	8225.5691	8160.4258	8192.8450	8264.4503	8199.0993	8231.6186	108.5
109.5	8224.6025	8158.8999	8191.6034	8263.4859	8197.5297	8230.3607	109.5
110.5	8223.6609	8157.3252	8190.3533	8262.5345	8195.9714	8229.1259	110.5
111.5	8222.6838	8155.7847	8189.0818	8261.5381	8194.4281	8227.8552	111.5
112.5	8221.6865	8154.1817	8187.8160	8260.5884	8192.8450	8226.5810	112.5
113.5	8220.7005	8152.5867	8186.5095	8259.5907	8191.2755	8225.2859	113.5
114.5	8219.6916	8151.0434	8185.2144	8258.5809	8189.7049	8224.0115	114.5
115.5	8218.6856	8149.3972	8183.9233	8257.5568	8188.0891	8222.6838	115.5
116.5	8217.6697	8147.8165	8182.5985	8256.5192	8186.4570	8221.3786	116.5
117.5	8216.6078	8146.2280	8181.2764	8255.4999	8184.8507	8220.0401	117.5
118.5	8215.5733	8144.5630	8179.9388		8183.1994	8218.6856	118.5
119.5	8214.5001	8142.9168	8178.5769	8253.4219	8181.5664	8217.3492	119.5
120.5	8213.4221	8141.2881	8177.2152	8252.3416		8215.9813	120.5
121.5	8212.3561	8139.6278	8175.8455	8251.2367	8178.2322	8214.6076	121.5
122.5	8211.2589	8137.9381	8174.4591	8250.1504	8176.5948	8213.2116	122.5
123.5	8210.1664	8136.2489	8173.0752	8249.0426	8174.8646	8211.8155	123.5
124.5	8209.0536	8134.5764	8171.6656	8247.9524	8173.1648	8210.4170	124.5
125.5	8207.9256	8132.8523	8170.2426	8246.7906	8171.4659	8208.9894	125.5
126.5	8206.8170	8131.1485	8168.8283	8245.6748	8169.7410	8207.5551	126.5
127.5	8205.6645	8129.3750	8167.3810	8244.5568	8167.9906	8206.1208	127.5
128.5	8204.4927	8127.5634	8165.9390	8243.3669	8166.2675	8204.6586	128.5
129.5	8203.3172	8125.8937	8164.4733	8242.1993	8164.5083	8203.2067	129.5
130.5	8202.1254	8124.1600	8163.0040	8240.9982	8162.7433	8201.7447	130.5
131.5	8200.9429	8122.3742	8161.5267	8239.8116	8160.9540	8200.2632	131.5
132.5	8199.7324	8120.6183	8160.0311	8238.6024	8159.1803	8198.7544	132.5
133.5	8198.5160	8118.8081	8158.5370	8237.4095	8157.3892	8197.2357	133.5
134.5	8197.3152	8117.0218	8157.0181	8236.1594	8155.5429	8195.7248	134.5
135.5	8196.0256	8115.2098	8155.4871	8234.9114	8153.7645	8194.1992	135.5
136.5	8194.8345	8113.3664	8153.9438	8233.6758	8151.9281	8192.6618	136.5
137.5	8193.5538	8111.5313	8152.4198	8232.3812	8150.0876	8191.1069	137.5
138.5	8192.2834	8109.7136	8150.8564	8231.1406	8148.2259	8189.5491	138.5
139.5	8191.0282	8107.8241	8149.2840	8229.8470	8146.3570	8187.9706	139.5
140.5	8189.7049	8105.9782	8147.6952	8228.5760	8144.5056	8186.3956	140.5
141.5	8188.4060	8104.0943	8146.1290	8227.2684	8142.5826	8184.7873	141.5
142.5	8187.1238	8102.2479	8144.5056	8225.9345	8140.7139	8183.1994	142.5
143.5	8185.7581	8100.2895	8142.9168	8224.6025	8138.8280	8181.5664	143.5
144.5	8184.4395	8098.3985	8141.2881	8223.2524	8136.8827	8179.9388	144.5

NbS  $D^4\Delta \rightarrow A'^4\Phi$  rotational lines.

(1,0)

$J$	$R_3(J)$	$P_3(J)$	$Q_3(J)$	$R_4(J)$	$P_4(J)$	$Q_4(J)$	$J$
145.5	8183.1116	8096.4791	8139.6502	8221.9180	8134.9501	8178.2967	145.5
146.5	8181.7584	8094.5445	8138.0170	8220.5497	8133.0316	8176.6556	146.5
147.5	8180.4067	8092.6067	8136.3668	8219.1720	8131.0753	8174.9877	147.5
148.5	8179.0161		8134.7020	8217.7954	8129.1120	8173.3262	148.5
149.5	8177.6387		8133.0316	8216.4010	8127.1290	8171.6656	149.5
150.5	8176.2230		8131.3387	8214.9904	8125.1497	8169.9342	150.5
151.5	8174.8317		8129.6353	8213.5766	8123.2053	8168.2315	151.5
152.5	8173.4175		8127.9335	8212.1386	8121.1555	8166.5066	152.5
153.5	8171.9819		8126.2296	8210.7123	8119.1403	8164.7791	153.5
154.5	8170.5509		8124.4978	8209.2458	8117.0984	8163.0303	154.5
155.5	8169.0999		8122.7614	8207.7776	8115.0423	8161.2999	155.5
156.5	8167.6181		8121.0136	8206.2934	8113.0066	8159.5267	156.5
157.5	8166.1608		8119.2602	8204.8284	8110.9561	8157.7665	157.5
158.5	8164.6667		8117.4879	8203.3172	8108.8864	8155.9684	158.5
159.5	8163.1903		8115.7131	8201.8090	8106.7947	8154.1817	159.5
160.5	8161.6745		8113.9568	8200.2632	8104.6984	8152.3642	160.5
161.5	8160.1521		8112.1276	8198.7544	8102.6102	8150.5531	161.5
162.5	8158.5921		8110.3153	8197.2357	8100.5070	8148.7364	162.5
163.5	8157.1077		8108.4912	8195.6536	8098.3671	8146.8903	163.5
164.5	8155.5429		8106.6584	8194.0772	8096.2188	8145.0276	164.5
165.5			8104.8207	8192.4992	8094.0765	8143.1669	165.5
166.5	8152.4198		8102.9721	8190.9290	8091.9322	8141.2881	166.5
167.5	8150.8564		8101.1056	8189.3261	8089.7511	8139.4094	167.5
168.5			8099.2555	8187.7025	8087.5914	8137.5171	168.5
169.5			8097.3681		8085.3781	8135.5897	169.5
170.5			8095.4688	8184.4395	8083.1794	8133.6834	170.5
171.5				8182.7920	8080.9612	8131.7506	171.5
172.5				8181.1468	8078.7277	8129.7825	172.5
173.5				8179.4568	8076.4994	8127.8596	173.5
174.5				8177.7875	8074.2567	8125.8937	174.5
175.5				8176.0944	8071.9942	8123.9220	175.5
176.5				8174.3936	8069.7332	8121.9359	176.5
177.5				8172.6742	8067.4509	8119.9484	177.5
178.5				8170.9608	8065.1507	8117.9281	178.5
179.5				8169.1743		8115.9019	179.5
180.5				8167.4524		8113.8773	180.5
181.5				8165.6976		8111.8258	181.5
182.5				8163.9138		8109.7643	182.5
183.5				8162.1286		8107.7137	183.5
184.5				8160.3324		8105.6290	184.5
185.5				8158.5370		8103.5394	185.5
186.5				8156.7117		8101.4361	186.5
187.5						8099.3333	187.5
188.5						8097.1970	188.5
189.5						8095.0694	189.5
190.5						8092.9492	190.5
191.5						8090.7633	191.5
192.5						8088.5951	192.5
193.5						8086.3845	193.5
194.5						8084.2220	194.5
195.5						8082.0101	195.5
196.5						8079.8108	196.5
197.5						8077.5620	197.5
198.5						8075.3480	198.5
199.5						8073.0747	199.5
200.5						8070.8146	200.5
201.5						8068.5392	201.5
202.5						8066.2686	202.5
203.5						8063.9605	203.5
204.5						8061.6496	204.5
205.5							205.5

**NbS  $E^4\Delta_{7/2} \rightarrow A'^4\Phi_{9/2}$  rotational lines.**

(0,0)				(1,0)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
27.5							27.5
28.5				11760.4408			28.5
29.5				11760.1844		11751.2306	29.5
30.5				11759.8666		11750.6244	30.5
31.5				11759.5066		11750.0024	31.5
32.5				11759.1797		11749.3519	32.5
33.5	11311.2843	11291.3503		11758.7764		11748.6522	33.5
34.5	11310.8136	11290.3549		11758.4094		11748.0098	34.5
35.5	11310.3505	11289.2827		11757.9996		11747.2918	35.5
36.5		11288.2308		11757.5607		11746.5782	36.5
37.5	11309.3199	11287.1059		11757.1095		11745.8243	37.5
38.5	11308.8120	11285.9685		11756.6455		11745.0546	38.5
39.5	11308.2902	11284.9073		11756.1442		11744.2725	39.5
40.5	11307.7261	11283.7064		11755.6268		11743.4758	40.5
41.5	11307.1837	11282.5880		11755.1010		11742.6464	41.5
42.5	11306.6163	11281.3898		11754.5394		11741.8013	42.5
43.5	11306.0070	11280.1913		11754.0005		11740.9528	43.5
44.5		11279.0097		11753.4099		11740.0694	44.5
45.5	11304.7566	11277.7560		11752.7812		11739.1584	45.5
46.5	11304.0469	11276.5548		11752.1928		11738.2417	46.5
47.5	11303.4347			11751.5388		11737.3119	47.5
48.5	11302.7520	11274.0132		11750.8726		11736.3706	48.5
49.5	11302.0343	11272.7066		11750.1962		11735.3850	49.5
50.5	11301.3400	11271.3882		11749.4944		11734.4019	50.5
51.5	11300.6351	11270.0996		11748.7606		11733.4040	51.5
52.5	11299.8729	11268.7560		11748.0098		11732.3794	52.5
53.5	11299.0834	11267.3807		11747.2918		11731.3236	53.5
54.5	11298.3328	11266.0100	11282.0086			11730.2412	54.5
55.5	11297.5186	11264.6188	11280.9240	11745.7052			55.5
56.5	11296.7194	11263.1861	11279.8335	11744.8812		11728.0568	56.5
57.5	11295.8604	11261.7886	11278.6810	11744.0330		11726.9418	57.5
58.5	11295.0158	11260.3384	11277.5489	11743.2186		11725.7898	58.5
59.5	11294.1622	11258.8775	11276.3844	11742.3473		11724.6384	59.5
60.5		11257.4316	11275.2018	11741.4713		11723.4645	60.5
61.5	11292.4050	11255.9335	11274.0132	11740.5628		11722.2585	61.5
62.5	11291.5152		11272.8155	11739.6173		11721.0498	62.5
63.5	11290.6091	11252.8854	11271.5901	11738.6728		11719.8073	63.5
64.5	11289.5943	11251.3712	11270.3580	11737.7516		11718.5661	64.5
65.5	11288.6762	11249.8403	11269.0952	11736.7751		11717.3137	65.5
66.5		11248.2859	11267.8398	11735.7999		11716.0186	66.5
67.5	11286.7049	11246.7117	11266.5494	11734.7545		11714.7036	67.5
68.5	11285.6909	11245.1069		11733.7153		11713.3647	68.5
69.5	11284.6857	11243.4880	11263.9172	11732.6803		11712.0331	69.5
70.5	11283.6385	11241.8777	11262.5907	11731.6012		11710.6728	70.5
71.5	11282.5880	11240.2225	11261.2437	11730.4986		11709.2590	71.5
72.5	11281.5370	11238.5774	11259.8914	11729.3982		11707.9175	72.5
73.5	11280.4384	11236.8979	11258.4999			11706.4771	73.5
74.5	11279.3204	11235.1993	11257.1025	11727.1314		11705.0521	74.5
75.5	11278.1804	11233.5058	11255.6980			11703.5999	75.5
76.5	11277.0709	11231.7751	11254.2722			11702.1292	76.5
77.5	11275.9252	11230.0501	11252.8260			11700.6431	77.5
78.5	11274.7523	11228.2889	11251.3712			11699.1317	78.5
79.5	11273.5689	11226.5265	11249.8753			11697.6210	79.5
80.5	11272.3897	11224.7316	11248.4019			11696.0795	80.5
81.5		11222.9709	11246.8997			11694.4949	81.5
82.5	11269.9465	11221.1308	11245.3754			11692.9423	82.5
83.5		11219.2980	11243.8376			11691.3260	83.5
84.5	11267.4144	11217.4540	11242.2765			11689.7354	84.5
85.5	11266.1633	11215.5798	11240.7095			11688.0850	85.5
86.5		11213.7191	11239.1224			11686.4678	86.5
87.5	11263.5557	11211.8210	11237.5225			11684.8051	87.5
88.5	11262.2459	11209.9156	11235.9118			11683.1274	88.5
89.5	11260.9079	11207.9862	11234.2774			11681.4075	89.5
90.5	11259.5452	11206.0343	11232.6276			11679.6989	90.5

**NbS  $E^4\Delta_{7/2} \rightarrow A'^4\Phi_{9/2}$  rotational lines.**

(0,0)				(1,0)			
<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
91.5	11258.1729	11204.0882	11230.9688			11677.9606	91.5
92.5	11256.7787	11202.1152	11229.2867			11676.1766	92.5
93.5	11255.3431	11200.1357	11227.5842			11674.4021	93.5
94.5	11253.9985	11198.1262	11225.9186			11672.5838	94.5
95.5	11252.5308	11196.1139	11224.1566				95.5
96.5	11251.0823	11194.0819	11222.4092			11668.9442	96.5
97.5	11249.6162	11192.0363	11220.6570				97.5
98.5	11248.1311	11189.9708	11218.8871				98.5
99.5	11246.6317	11187.8934	11217.0915				99.5
100.5	11245.1069	11185.7971	11215.3006				100.5
101.5	11243.5974	11183.6857	11213.4670				101.5
102.5	11242.0408	11181.5483	11211.6341				102.5
103.5	11240.4941	11179.4140	11209.7806				103.5
104.5	11238.9197	11177.2630	11207.9155				104.5
105.5	11237.3238	11175.0811	11206.0343				105.5
106.5	11235.6868	11172.8913	11204.1366				106.5
107.5	11234.0821	11170.6890	11202.2153				107.5
108.5	11232.4548	11168.4760	11200.2809				108.5
109.5	11230.7901	11166.2364	11198.3431				109.5
110.5	11229.1318	11163.9801	11196.3782				110.5
111.5	11227.4212	11161.7164	11194.4019				111.5
112.5	11225.7323	11159.4535	11192.4062				112.5
113.5	11224.0203	11157.1349	11190.3949				113.5
114.5	11222.2735	11154.8274	11188.3743				114.5
115.5	11220.5132	11152.5163	11186.3333				115.5
116.5	11218.7593	11150.1498	11184.2782				116.5
117.5	11216.9787	11147.7960	11182.2079				117.5
118.5	11215.1885	11145.4176	11180.1213				118.5
119.5	11213.3214	11143.0273	11178.0214				119.5
120.5	11211.5545	11140.5818	11175.8998				120.5
121.5	11209.7087	11138.2068	11173.7722				121.5
122.5	11207.8265	11135.7600	11171.6205				122.5
123.5	11205.9654	11133.3120	11169.4572				123.5
124.5	11204.0883	11130.8485	11167.2742				124.5
125.5		11128.3612	11165.0812				125.5
126.5		11125.8592	11162.8741				126.5
127.5		11123.3588	11160.6450				127.5
128.5		11120.8184	11158.3974				128.5
129.5		11118.2789	11156.1446				129.5
130.5		11115.7170	11153.8598				130.5
131.5		11113.1277	11151.5796				131.5
132.5		11110.5414	11149.2657				132.5
133.5		11107.9262	11146.9468				133.5
134.5		11105.3374	11144.6050				134.5
135.5			11142.2498				135.5
136.5			11139.8796				136.5
137.5			11137.4942				137.5
138.5			11135.0942				138.5
139.5			11132.6741				139.5
140.5			11130.2405				140.5
141.5			11127.7949				141.5
142.5			11125.3335				142.5
143.5			11122.8536				143.5
144.5			11120.3570				144.5
145.5			11117.8538				145.5
146.5			11115.3183				146.5
147.5			11112.7371				147.5
148.5			11110.2171				148.5
149.5			11107.6435				149.5
150.5			11105.0544				150.5
151.5			11102.4185				151.5
152.5			11099.7928				152.5
153.5			11097.1897				153.5
154.5							154.5

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**NbS  $E^4\Delta_{7/2} \rightarrow A'^4\Phi_{9/2}$  rotational lines.**

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**(0,0)**

**(1,0)**

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<i>J</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>R(J)</i>	<i>P(J)</i>	<i>Q(J)</i>	<i>J</i>
155.5			11091.8714				155.5
156.5			11089.1881				156.5
157.5			11086.4893				157.5
158.5			11083.7743				158.5
159.5			11081.0644				159.5
160.5			11078.2710				160.5
161.5			11075.5417				161.5
162.5			11072.7632				162.5
163.5			11069.9549				163.5
164.5			11067.1638				164.5
165.5			11064.2669				165.5
166.5			11061.4230				166.5
167.5			11058.5719				167.5
168.5			11055.7176				168.5
169.5			11052.8635				169.5
170.5			11049.9229				170.5
171.5			11047.0257				171.5
172.5			11044.0588				172.5
173.5			11041.0837				173.5
174.5			11038.1340				174.5
175.5			11035.1464				175.5
176.5			11032.1383				176.5
177.5							177.5

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