Appendix I. Microwave transitions of benzonitrile (BN) and its minor isotopologues

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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Table I(A). Microwave transitions of the parent BN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
2	0	2	2	→	1	0	1	2	5501.92089	-0.00029
2	0	2	1	→	1	0	1	0	5502.12093	-0.00084
2	0	2	2	→	1	0	1	1	5503.19329	0.00108
2	0	2	3	→	1	0	1	2	5503.27626	0.00052
2	0	2	1	→	1	0	1	1	5505.30045	0.00068
2	1	1	2	→	1	1	0	1	5853.96411	-0.00049
2	1	1	2	→	1	1	0	2	5854.54858	-0.00039
2	1	1	1	→	1	1	0	1	5855.10909	-0.00013
2	1	1	3	→	1	1	0	2	5855.28492	0.00050
2	1	1	1	→	1	1	0	0	5856.56992	-0.00050
3	1	3	3	→	2	1	2	3	7772.46301	-0.00074
3	1	3	3	→	2	1	2	2	7773.09034	0.00029
3	1	3	4	→	2	1	2	3	7773.46504	0.00090
3	1	3	2	→	2	1	2	1	7773.46504	-0.00093
3	1	3	2	→	2	1	2	2	7774.44037	-0.00063
3	0	3	3	→	2	0	2	3	8205.43472	-0.00095
3	0	3	2	→	2	0	2	1	8206.56416	-0.00016
3	0	3	3	→	2	0	2	2	8206.78927	-0.00095
3	0	3	4	→	2	0	2	3	8206.83006	0.00080
3	0	3	2	→	2	0	2	2	8208.67197	0.00008
3	2	2	3	→	2	2	1	2	8282.75318	0.00011
3	2	2	4	→	2	2	1	3	8284.11790	0.00304
3	2	2	2	→	2	2	1	1	8284.87078	-0.00099
3	2	1	3	→	2	2	0	2	8359.79777	0.00027
3	2	1	4	→	2	2	0	3	8361.17292	0.00219
3	2	1	2	→	2	2	0	1	8361.92968	-0.00046
3	1	2	3	→	2	1	1	3	8769.05249	-0.00099
3	1	2	3	→	2	1	1	2	8769.78901	0.00008
3	1	2	2	→	2	1	1	1	8770.14650	-0.00111
3	1	2	4	→	2	1	1	3	8770.16731	0.00052
3	1	2	2	→	2	1	1	2	8771.29076	-0.00147
4	1	4	4	→	3	1	3	4	10342.35235	-0.00070
4	1	4	4	→	3	1	3	3	10343.35384	0.00041
4	1	4	3	→	3	1	3	2	10343.46617	-0.00029
4	1	4	5	→	3	1	3	4	10343.51825	0.00091
4	1	4	3	→	3	1	3	3	10344.81675	-0.00066
4	0	4	4	→	3	0	3	4	10853.84908	-0.00077
4	0	4	3	→	3	0	3	2	10855.13575	0.00017
4	0	4	4	→	3	0	3	3	10855.24300	-0.00045
4	0	4	5	→	3	0	3	4	10855.26157	0.00093
4	0	4	3	→	3	0	3	3	10857.01710	-0.00014
4	2	3	4	→	3	2	2	3	11029.57800	0.00030
4	2	3	5	→	3	2	2	4	11030.15428	0.00058

4	2	3	3	→	3	2	2	2	11030.30206	0.00036
4	3	2	4	→	3	3	1	3	11080.79274	0.00046
4	3	2	5	→	3	3	1	4	11082.05603	0.00055
4	3	2	3	→	3	3	1	2	11082.54402	-0.00021
4	3	1	4	→	3	3	0	3	11085.02300	-0.00058
4	3	1	5	→	3	3	0	4	11086.28719	-0.00038
4	3	1	3	→	3	3	0	2	11086.77534	-0.00116
4	2	2	4	→	3	2	1	3	11219.42083	0.00013
4	2	2	5	→	3	2	1	4	11220.01225	0.00063
4	2	2	3	→	3	2	1	2	11220.16172	0.00001
4	1	3	4	→	3	1	2	4	11667.87919	-0.00120
4	1	3	4	→	3	1	2	3	11668.99401	0.00031
4	1	3	3	→	3	1	2	2	11669.09908	0.00057
4	1	3	5	→	3	1	2	4	11669.15974	0.00036
4	1	3	3	→	3	1	2	3	11670.60106	-0.00074
5	1	5	5	→	4	1	4	5	12896.33354	-0.00148
5	1	5	5	→	4	1	4	4	12897.50003	0.00072
5	1	5	4	→	4	1	4	3	12897.54245	0.00040
5	1	5	6	→	4	1	4	5	12897.58714	0.00058
5	1	5	4	→	4	1	4	4	12899.00424	-0.00178
5	0	5	5	→	4	0	4	5	13435.95919	-0.00034
5	0	5	4	→	4	0	4	3	13437.30105	0.00005
5	0	5	5	→	4	0	4	4	13437.36981	-0.00051
5	0	5	6	→	4	0	4	5	13437.37703	0.00162
5	0	5	4	→	4	0	4	4	13439.07385	-0.00095
5	2	4	5	→	4	2	3	5	13762.52239	-0.00057
5	2	4	5	→	4	2	3	4	13763.09922	0.00036
5	2	4	6	→	4	2	3	5	13763.39909	0.00089
5	2	4	4	→	4	2	3	3	13763.42760	-0.00071
5	2	4	4	→	4	2	3	4	13764.15155	-0.00105
5	3	3	5	→	4	3	2	4	13865.27990	0.00033
5	3	3	6	→	4	3	2	5	13865.93472	0.00027
5	3	3	4	→	4	3	2	3	13866.09469	0.00016
5	3	2	5	→	4	3	1	4	13880.02136	0.00037
5	3	2	6	→	4	3	1	5	13880.67813	0.00056
5	3	2	4	→	4	3	1	3	13880.83769	-0.00026
5	2	3	5	→	4	2	2	4	14131.93459	0.00024
5	2	3	6	→	4	2	2	5	14132.25193	0.00112
5	2	3	4	→	4	2	2	3	14132.28143	-0.00119
5	1	4	5	→	4	1	3	4	14545.09292	0.00019
5	1	4	4	→	4	1	3	3	14545.12907	-0.00036
5	1	4	6	→	4	1	3	5	14545.18084	0.00080
6	1	6	6	→	5	1	5	5	15433.91615	0.00019
6	1	6	5	→	5	1	5	4	15433.93287	0.00001
6	1	6	7	→	5	1	5	6	15433.96861	0.00081
6	0	6	6	→	5	0	5	6	15950.52109	-0.00138

6	0	6	5	→	5	0	5	4	15951.88773	0.00028
6	0	6	7	→	5	0	5	6	15951.93817	0.00108
6	0	6	6	→	5	0	5	5	15951.93817	-0.00018
6	0	6	5	→	5	0	5	5	15953.59144	-0.00049
6	2	5	6	→	5	2	4	5	16480.52213	0.00020
6	2	5	5	→	5	2	4	4	16480.69764	0.00074
6	2	5	7	→	5	2	4	6	16480.69764	0.00006
6	4	3	6	→	5	4	2	5	16632.59567	0.00093
6	4	3	7	→	5	4	2	6	16633.26618	0.00074
6	4	2	6	→	5	4	1	5	16633.36210	0.00045
6	4	3	5	→	5	4	2	4	16633.40944	0.00024
6	4	2	7	→	5	4	1	6	16634.03228	-0.00017
6	4	2	5	→	5	4	1	4	16634.17441	-0.00181
6	3	4	6	→	5	3	3	5	16655.05920	-0.00045
6	3	4	7	→	5	3	3	6	16655.44579	0.00103
6	3	4	5	→	5	3	3	4	16655.50318	-0.00117
6	3	3	6	→	5	3	2	5	16694.03638	0.00031
6	3	3	7	→	5	3	2	6	16694.42515	0.00084
6	3	3	5	→	5	3	2	4	16694.48277	-0.00154
6	2	4	6	→	5	2	3	5	17095.45670	-0.00048
6	2	4	7	→	5	2	3	6	17095.65044	0.00027
6	2	4	5	→	5	2	3	4	17095.65044	0.00004
6	1	5	6	→	5	1	4	5	17389.72912	-0.00118
6	1	5	5	→	5	1	4	4	17389.74344	0.00236
6	1	5	7	→	5	1	4	6	17389.78014	-0.00018
7	1	7	7	→	6	1	6	6	17952.15764	-0.00064
7	1	7	6	→	6	1	6	5	17952.16499	0.00105
7	1	7	8	→	6	1	6	7	17952.19187	0.00060
7	0	7	6	→	6	0	6	5	18409.34944	-0.00013
7	0	7	8	→	6	0	6	7	18409.38466	0.00013
7	0	7	7	→	6	0	6	6	18409.38888	0.00044
7	2	6	7	→	6	2	5	6	19179.00150	-0.00032
7	2	6	6	→	6	2	5	5	19179.10125	-0.00162
7	2	6	8	→	6	2	5	7	19179.11520	0.00228
7	4	4	7	→	6	4	3	6	19423.84769	0.00049
7	4	4	8	→	6	4	3	7	19424.27501	-0.00012
7	4	4	6	→	6	4	3	5	19424.34352	0.00166
7	4	3	7	→	6	4	2	6	19426.39269	-0.00011
7	4	3	8	→	6	4	2	7	19426.81990	-0.00107
7	4	3	6	→	6	4	2	5	19426.88779	0.00007
7	3	5	7	→	6	3	4	6	19448.33987	0.00079
7	3	5	8	→	6	3	4	7	19448.58664	0.00113
7	3	5	6	→	6	3	4	5	19448.60569	-0.00202
7	3	4	7	→	6	3	3	6	19534.78566	0.00033
7	3	4	8	→	6	3	3	7	19535.03756	0.00083
7	3	4	6	→	6	3	3	5	19535.05774	-0.00178

7	2	5	7	→	6	2	4	6	20095.96507	0.00042
7	2	5	6	→	6	2	4	5	20096.08049	-0.00202
7	2	5	8	→	6	2	4	7	20096.09270	0.00096
7	1	6	6	→	6	1	5	5	20192.93425	0.00144
7	1	6	7	→	6	1	5	6	20192.93425	-0.00025
7	1	6	8	→	6	1	5	7	20192.96341	-0.00008
8	1	8	8	→	7	1	7	7	20452.90380	0.00009
8	1	8	7	→	7	1	7	6	20452.90380	-0.00025
8	1	8	9	→	7	1	7	8	20452.92552	-0.00022
8	0	8	7	→	7	0	7	6	20828.17622	0.00075
8	0	8	9	→	7	0	7	8	20828.20297	0.00089
8	0	8	8	→	7	0	7	7	20828.20297	-0.00242
8	2	7	8	→	7	2	6	7	21855.93236	-0.00013
8	2	7	7	→	7	2	6	6	21855.99398	-0.00079
8	2	7	9	→	7	2	6	8	21856.00780	0.00107
8	4	5	8	→	7	4	4	7	22222.94934	0.00059
8	4	5	9	→	7	4	4	8	22223.24063	0.00133
8	4	5	7	→	7	4	4	6	22223.27036	-0.00141
8	4	4	8	→	7	4	3	7	22229.90336	-0.00021
8	4	4	9	→	7	4	3	8	22230.19557	0.00096
8	4	4	7	→	7	4	3	6	22230.22476	-0.00239
8	3	6	8	→	7	3	5	7	22242.07854	-0.00094
8	3	6	9	→	7	3	5	8	22242.24589	-0.00094
8	3	6	7	→	7	3	5	6	22242.25520	0.00172
8	3	5	8	→	7	3	4	7	22411.09040	-0.00008
8	3	5	9	→	7	3	4	8	22411.26446	-0.00063
8	3	5	7	→	7	3	4	6	22411.27378	0.00132
9	1	9	8	→	8	1	8	7	22937.73301	0.00143
9	1	9	9	→	8	1	8	8	22937.73301	-0.00085
9	1	9	10	→	8	1	8	9	22937.74935	0.00022
8	1	7	7	→	7	1	6	6	22943.46284	-0.00165
8	1	7	8	→	7	1	6	7	22943.47459	0.00113
8	1	7	9	→	7	1	6	8	22943.48982	0.00081
8	2	6	8	→	7	2	5	7	23110.91624	-0.00116
8	2	6	7	→	7	2	5	6	23110.99118	-0.00145
8	2	6	9	→	7	2	5	8	23111.00725	0.00275
9	0	9	8	→	8	0	8	7	23227.69141	-0.00023
9	0	9	10	→	8	0	8	9	23227.71275	0.00091
9	0	9	9	→	8	0	8	8	23227.71275	-0.00129
9	2	8	9	→	8	2	7	8	24509.13783	0.00079
9	2	8	8	→	8	2	7	7	24509.17383	-0.00275
9	2	8	10	→	8	2	7	9	24509.18966	0.00129

Table I(B). Microwave transitions of the $^{13}C_1$ isotopologue of BN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	3	→	2	1	2	2	7767.53194	-0.00088
3	1	3	4	→	2	1	2	3	7767.90660	-0.00008
3	1	3	2	→	2	1	2	1	7767.90660	-0.00046
3	0	3	2	→	2	0	2	1	8200.44665	-0.00178
3	0	3	3	→	2	0	2	2	8200.67258	-0.00011
3	0	3	4	→	2	0	2	3	8200.71308	0.00044
4	1	4	4	→	3	1	3	3	10336.01313	0.00065
4	1	4	3	→	3	1	3	2	10336.12513	0.00002
4	1	4	5	→	3	1	3	4	10336.17616	-0.00039
4	0	4	3	→	3	0	3	2	10847.26719	-0.00086
4	0	4	4	→	3	0	3	3	10847.37283	-0.00139
4	0	4	5	→	3	0	3	4	10847.39367	0.00099
4	2	3	4	→	3	2	2	3	11021.12569	0.00012
4	2	3	5	→	3	2	2	4	11021.70104	0.00042
4	2	3	3	→	3	2	2	2	11021.84781	-0.00057
4	2	2	4	→	3	2	1	3	11210.33038	-0.00104
4	2	2	5	→	3	2	1	4	11210.92039	0.00033
4	2	2	3	→	3	2	1	2	11211.06796	-0.00177
4	1	3	4	→	3	1	2	3	11659.59000	0.00028
4	1	3	3	→	3	1	2	2	11659.69562	0.00033
4	1	3	5	→	3	1	2	4	11659.75544	0.00018
5	1	5	5	→	4	1	4	4	12888.42646	0.00266
5	1	5	4	→	4	1	4	3	12888.46641	-0.00017
5	1	5	6	→	4	1	4	5	12888.51087	-0.00051
5	0	5	4	→	4	0	4	3	13427.87122	-0.00114
5	0	5	5	→	4	0	4	4	13427.94005	0.00017
5	0	5	6	→	4	0	4	5	13427.94727	0.00080
6	0	6	5	→	5	0	5	4	15941.04414	0.00057
6	0	6	7	→	5	0	5	6	15941.09272	-0.00028
6	0	6	6	→	5	0	5	5	15941.09272	0.00006
6	2	5	6	→	5	2	4	5	16468.06374	0.00146
6	2	5	5	→	5	2	4	4	16468.23681	-0.00048
6	2	5	7	→	5	2	4	6	16468.23681	-0.00111
6	2	4	6	→	5	2	3	5	17081.08834	-0.00004
6	2	4	7	→	5	2	3	6	17081.28078	0.00104
6	2	4	5	→	5	2	3	4	17081.28078	0.00088
6	1	5	6	→	5	1	4	5	17376.04657	0.00019
6	1	5	5	→	5	1	4	4	17376.06012	0.00207
6	1	5	7	→	5	1	4	6	17376.09739	0.00053
7	0	7	6	→	6	0	6	5	18397.14668	0.00050
7	0	7	8	→	6	0	6	7	18397.18208	0.00109
7	0	7	7	→	6	0	6	6	18397.18208	-0.00128
7	1	6	6	→	6	1	5	5	20177.33386	0.00045
7	1	6	7	→	6	1	5	6	20177.33386	-0.00020

7	1	6	8	→	6	1	5	7	20177.36111	-0.00264
8	1	8	8	→	7	1	7	7	20438.90184	0.00122
8	1	8	7	→	7	1	7	6	20438.90184	0.00050
8	1	8	9	→	7	1	7	8	20438.92148	-0.00163
8	0	8	7	→	7	0	7	6	20814.57981	0.00134
8	0	8	9	→	7	0	7	8	20814.60481	-0.00020
8	0	8	8	→	7	0	7	7	20814.60481	-0.00214

Table I(C). Microwave transitions of the $^{13}C_2$ isotopologue of BN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	3	→	2	1	2	2	7753.01982	0.00066
3	1	3	4	→	2	1	2	3	7753.39425	-0.00013
3	1	3	2	→	2	1	2	1	7753.39425	-0.00011
3	0	3	2	→	2	0	2	1	8189.77812	-0.00143
3	0	3	3	→	2	0	2	2	8190.00433	-0.00064
3	0	3	4	→	2	0	2	3	8190.04464	-0.00013
4	1	4	4	→	3	1	3	3	10315.65142	0.00080
4	1	4	3	→	3	1	3	2	10315.76344	0.00000
4	1	4	5	→	3	1	3	4	10315.81517	-0.00008
4	0	4	3	→	3	0	3	2	10828.84974	-0.00080
4	0	4	4	→	3	0	3	3	10828.95658	-0.00088
4	0	4	5	→	3	0	3	4	10828.97677	0.00111
4	2	3	4	→	3	2	2	3	11011.31532	0.00128
4	2	3	5	→	3	2	2	4	11011.89114	0.00002
4	2	3	3	→	3	2	2	2	11012.03942	0.00003
4	2	2	4	→	3	2	1	3	11209.89231	-0.00104
4	2	2	5	→	3	2	1	4	11210.48439	0.00000
4	2	2	3	→	3	2	1	2	11210.63412	-0.00050
4	1	3	4	→	3	1	2	3	11657.90626	0.00029
4	1	3	3	→	3	1	2	2	11658.01226	0.00037
4	1	3	5	→	3	1	2	4	11658.07207	0.00014
5	1	5	5	→	4	1	4	4	12861.51827	-0.00029
5	1	5	4	→	4	1	4	3	12861.56127	-0.00005
5	1	5	6	→	4	1	4	5	12861.60570	-0.00070
5	0	5	4	→	4	0	4	3	13399.09330	-0.00117
5	0	5	5	→	4	0	4	4	13399.16231	-0.00019
5	0	5	6	→	4	0	4	5	13399.16909	0.00023
5	2	4	5	→	4	2	3	4	13739.12438	0.00007
5	2	4	6	→	4	2	3	5	13739.42393	-0.00039
5	2	4	4	→	4	2	3	3	13739.45405	-0.00046
6	1	6	6	→	5	1	5	5	15389.02799	0.00012
6	1	6	5	→	5	1	5	4	15389.04786	0.00293
6	1	6	7	→	5	1	5	6	15389.07993	-0.00031
6	0	6	5	→	5	0	5	4	15900.21397	-0.00154
6	0	6	7	→	5	0	5	6	15900.26533	0.00024
6	0	6	6	→	5	0	5	5	15900.26533	0.00052
6	2	5	6	→	5	2	4	5	16450.09135	0.00037
6	2	5	5	→	5	2	4	4	16450.26705	0.00076
6	2	5	7	→	5	2	4	6	16450.26705	-0.00002
6	2	4	6	→	5	2	3	5	17090.28536	-0.00090
6	2	4	7	→	5	2	3	6	17090.47936	0.00111
6	2	4	5	→	5	2	3	4	17090.47936	0.00099
6	1	5	6	→	5	1	4	5	17367.08444	-0.00062

6	1	5	5	→	5	1	4	4	17367.09883	0.00254
6	1	5	7	→	5	1	4	6	17367.13523	-0.00019
7	1	7	7	→	6	1	6	6	17897.82807	-0.00023
7	1	7	6	→	6	1	6	5	17897.83521	0.00099
7	1	7	8	→	6	1	6	7	17897.86127	-0.00055
7	0	7	6	→	6	0	6	5	18344.17796	0.00094
7	0	7	8	→	6	0	6	7	18344.21269	0.00059
7	0	7	7	→	6	0	6	6	18344.21269	-0.00147
7	1	6	6	→	6	1	5	5	20161.27502	-0.00103
7	1	6	7	→	6	1	5	6	20161.27502	-0.00183
7	1	6	8	→	6	1	5	7	20161.30703	0.00076
8	1	8	8	→	7	1	7	7	20388.74895	0.00110
8	1	8	7	→	7	1	7	6	20388.74895	0.00044
8	1	8	9	→	7	1	7	8	20388.76834	-0.00207
8	0	8	7	→	7	0	7	6	20750.79632	0.00182
8	0	8	9	→	7	0	7	8	20750.82075	-0.00010
8	0	8	8	→	7	0	7	7	20750.82075	-0.00178
8	2	7	8	→	7	2	6	7	21809.91686	-0.00142
8	2	7	7	→	7	2	6	6	21809.97886	-0.00216
8	2	7	9	→	7	2	6	8	21809.99588	0.00291

Table I(D). Microwave transitions of the $^{13}C_3$ isotopologue of BN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
3	1	3	3	→	2	1	2	2	7706.50277	0.00147
3	1	3	4	→	2	1	2	3	7706.87541	-0.00118
3	1	3	2	→	2	1	2	1	7706.87541	-0.00101
3	0	3	2	→	2	0	2	1	8138.62225	-0.00096
3	0	3	3	→	2	0	2	2	8138.84784	-0.00035
3	0	3	4	→	2	0	2	3	8138.88794	-0.00040
4	1	4	4	→	3	1	3	3	10254.22180	-0.00022
4	1	4	3	→	3	1	3	2	10254.33562	0.00074
4	1	4	5	→	3	1	3	4	10254.38641	-0.00035
4	0	4	3	→	3	0	3	2	10763.10878	-0.00043
4	0	4	4	→	3	0	3	3	10763.21347	-0.00216
4	0	4	5	→	3	0	3	4	10763.23404	-0.00023
4	2	3	4	→	3	2	2	3	10940.53196	-0.00010
4	2	3	5	→	3	2	2	4	10941.10918	0.00004
4	2	3	3	→	3	2	2	2	10941.25642	-0.00100
4	2	2	4	→	3	2	1	3	11133.62615	-0.00042
4	2	2	5	→	3	2	1	4	11134.21751	0.00033
4	2	2	3	→	3	2	1	2	11134.36836	0.00101
4	1	3	4	→	3	1	2	3	11579.18200	0.00072
4	1	3	3	→	3	1	2	2	11579.28782	0.00041
4	1	3	5	→	3	1	2	4	11579.34751	0.00018
5	1	5	5	→	4	1	4	4	12785.59894	0.00079
5	1	5	4	→	4	1	4	3	12785.64220	0.00120
5	1	5	6	→	4	1	4	5	12785.68518	-0.00093
5	0	5	4	→	4	0	4	3	13320.37840	-0.00067
5	0	5	5	→	4	0	4	4	13320.44712	0.00052
5	0	5	6	→	4	0	4	5	13320.45388	0.00047
5	2	4	5	→	4	2	3	4	13651.36130	-0.00014
5	2	4	6	→	4	2	3	5	13651.66179	0.00027
5	2	4	4	→	4	2	3	3	13651.69132	-0.00040
6	1	6	6	→	5	1	5	5	15299.03755	-0.00056
6	1	6	5	→	5	1	5	4	15299.05853	0.00324
6	1	6	7	→	5	1	5	6	15299.08941	-0.00121
6	0	6	5	→	5	0	5	4	15809.72397	0.00051
6	0	6	7	→	5	0	5	6	15809.77272	-0.00031
6	0	6	6	→	5	0	5	5	15809.77272	0.00036
6	2	5	6	→	5	2	4	5	16345.81124	-0.00257
6	2	5	5	→	5	2	4	4	16345.99064	0.00135
6	2	5	7	→	5	2	4	6	16345.99064	0.00061
6	2	4	6	→	5	2	3	5	16969.71003	0.00029
6	2	4	7	→	5	2	3	6	16969.90264	0.00119
6	2	4	5	→	5	2	3	4	16969.90264	0.00106
6	1	5	6	→	5	1	4	5	17252.66063	-0.00100

6	1	5	5	→	5	1	4	4	17252.67480	0.00141
6	1	5	7	→	5	1	4	6	17252.71216	-0.00008
7	1	7	7	→	6	1	6	6	17794.14895	-0.00045
7	1	7	6	→	6	1	6	5	17794.15614	0.00070
7	1	7	8	→	6	1	6	7	17794.18220	-0.00085
7	0	7	6	→	6	0	6	5	18242.31615	0.00051
7	0	7	8	→	6	0	6	7	18242.35212	0.00144
7	0	7	7	→	6	0	6	6	18242.35212	-0.00039
7	1	6	6	→	6	1	5	5	20030.94690	0.00200
7	1	6	7	→	6	1	5	6	20030.94690	0.00138
7	1	6	8	→	6	1	5	7	20030.97242	-0.00285
8	1	8	8	→	7	1	7	7	20271.68465	0.00109
8	1	8	7	→	7	1	7	6	20271.68465	0.00033
8	1	8	9	→	7	1	7	8	20271.70336	-0.00287
8	0	8	7	→	7	0	7	6	20637.22212	0.00185
8	0	8	9	→	7	0	7	8	20637.24700	0.00031
8	0	8	8	→	7	0	7	7	20637.24700	-0.00121
8	2	7	8	→	7	2	6	7	21674.29855	0.00107
8	2	7	7	→	7	2	6	6	21674.35864	-0.00174
8	2	7	9	→	7	2	6	8	21674.37330	0.00099

Table I(E). Microwave transitions of the $^{13}C_4$ isotopologue of BN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	3	→	2	1	2	2	7674.36272	0.00162
3	1	3	4	→	2	1	2	3	7674.73543	0.00044
3	1	3	2	→	2	1	2	1	7674.73543	-0.00026
3	0	3	2	→	2	0	2	1	8098.21626	-0.00007
3	0	3	3	→	2	0	2	2	8098.44066	0.00033
3	0	3	4	→	2	0	2	3	8098.48067	0.00015
4	1	4	4	→	3	1	3	3	10212.86333	0.00029
4	1	4	3	→	3	1	3	2	10212.97526	-0.00061
4	1	4	5	→	3	1	3	4	10213.02709	-0.00007
4	0	4	3	→	3	0	3	2	10715.43869	-0.00049
4	0	4	4	→	3	0	3	3	10715.54336	-0.00170
4	0	4	5	→	3	0	3	4	10715.56483	0.00103
4	1	3	4	→	3	1	2	3	11503.36993	0.00051
4	1	3	3	→	3	1	2	2	11503.47478	-0.00022
4	1	3	5	→	3	1	2	4	11503.53459	-0.00052
5	1	5	5	→	4	1	4	4	12736.06523	0.00107
5	1	5	4	→	4	1	4	3	12736.10667	-0.00041
5	1	5	6	→	4	1	4	5	12736.15072	-0.00107
5	0	5	4	→	4	0	4	3	13269.44320	-0.00097
5	0	5	5	→	4	0	4	4	13269.51133	-0.00015
5	0	5	6	→	4	0	4	5	13269.51940	0.00111
6	0	6	5	→	5	0	5	4	15758.36232	0.00033
6	0	6	7	→	5	0	5	6	15758.41136	-0.00009
6	0	6	6	→	5	0	5	5	15758.41136	0.00032
6	2	5	6	→	5	2	4	5	16260.04991	-0.00147
6	2	5	5	→	5	2	4	4	16260.22710	0.00228
6	2	5	7	→	5	2	4	6	16260.22710	0.00061
6	2	4	6	→	5	2	3	5	16843.19829	-0.00109
6	2	4	7	→	5	2	3	6	16843.39180	0.00102
6	2	4	5	→	5	2	3	4	16843.39180	0.00082
6	1	5	6	→	5	1	4	5	17148.25698	-0.00107
6	1	5	5	→	5	1	4	4	17148.27058	0.00066
6	1	5	7	→	5	1	4	6	17148.31003	0.00126
7	0	7	6	→	6	0	6	5	18191.18241	-0.00110
7	0	7	8	→	6	0	6	7	18191.22111	0.00108
7	0	7	7	→	6	0	6	6	18191.22111	-0.00039
7	1	6	6	→	6	1	5	5	19917.21490	0.00153
7	1	6	7	→	6	1	5	6	19917.21490	0.00116
7	1	6	8	→	6	1	5	7	19917.24208	-0.00165
8	0	8	7	→	7	0	7	6	20584.90421	0.00043
8	0	8	9	→	7	0	7	8	20584.93038	0.00168
8	0	8	8	→	7	0	7	7	20584.93038	-0.00162

Table I(F). Microwave transitions of the $^{13}C_5$ isotopologue of BN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	3	→	2	1	2	2	7695.55421	0.00036
3	1	3	4	→	2	1	2	3	7695.92851	-0.00007
3	1	3	2	→	2	1	2	1	7695.92851	-0.00085
3	0	3	2	→	2	0	2	1	8121.48378	0.00026
3	0	3	3	→	2	0	2	2	8121.70796	-0.00028
3	0	3	4	→	2	0	2	3	8121.74858	0.00021
4	1	4	4	→	3	1	3	3	10240.87531	-0.00055
4	1	4	3	→	3	1	3	2	10240.98975	0.00082
4	1	4	5	→	3	1	3	4	10241.04028	-0.00002
4	0	4	3	→	3	0	3	2	10745.44539	-0.00138
4	0	4	4	→	3	0	3	3	10745.55141	-0.00172
4	0	4	5	→	3	0	3	4	10745.57161	-0.00010
4	1	3	4	→	3	1	2	3	11538.93345	0.00129
4	1	3	3	→	3	1	2	2	11539.03884	0.00095
4	1	3	5	→	3	1	2	4	11539.09743	-0.00077
5	1	5	5	→	4	1	4	4	12770.72554	0.00321
5	1	5	4	→	4	1	4	3	12770.76441	-0.00089
5	1	5	6	→	4	1	4	5	12770.81077	0.00067
5	0	5	4	→	4	0	4	3	13305.50761	-0.00110
5	0	5	5	→	4	0	4	4	13305.57626	-0.00014
5	0	5	6	→	4	0	4	5	13305.58355	0.00053
6	0	6	5	→	5	0	5	4	15799.94217	-0.00065
6	0	6	7	→	5	0	5	6	15799.99222	-0.00018
6	0	6	6	→	5	0	5	5	15799.99222	0.00005
6	2	5	6	→	5	2	4	5	16307.36884	0.00012
6	2	5	7	→	5	2	4	6	16307.48891	-0.00008
6	2	5	5	→	5	2	4	4	16307.56373	-0.00008
6	2	4	6	→	5	2	3	5	16897.32358	-0.00154
6	2	4	7	→	5	2	3	6	16897.51757	0.00047
6	2	4	5	→	5	2	3	4	16897.51757	0.00027
6	1	5	6	→	5	1	4	5	17200.12382	-0.00140
6	1	5	5	→	5	1	4	4	17200.13849	0.00150
6	1	5	7	→	5	1	4	6	17200.17651	0.00056
7	1	6	6	→	6	1	5	5	19976.45517	0.00155
7	1	6	7	→	6	1	5	6	19976.45517	0.00101
7	1	6	8	→	6	1	5	7	19976.48320	-0.00088
8	1	8	8	→	7	1	7	7	20256.87590	-0.00040
8	1	8	7	→	7	1	7	6	20256.87590	-0.00107
8	1	8	9	→	7	1	7	8	20256.89944	0.00063

Table I(G). Microwave transitions of the ^{15}N isotopologue of BN in MHz

J'	$K_{a'}$	$K_{c'}$	→	J"	$K_{a"}$	$K_{c"}$	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	→	2	1	2	7582.65378	0.00072
3	0	3	→	2	0	2	7997.56680	0.00000
3	1	2	→	2	1	1	8528.52026	0.00029
4	1	4	→	3	1	3	10091.35830	-0.00053
4	0	4	→	3	0	3	10585.28146	-0.00028
4	2	3	→	3	2	2	10741.72851	-0.00013
4	2	2	→	3	2	1	10911.65024	-0.00058
4	1	3	→	3	1	2	11349.74648	0.00017
5	1	5	→	4	1	4	12585.60000	0.00031
5	0	5	→	4	0	4	13112.73331	-0.00025
5	2	4	→	4	2	3	13405.55576	0.00042

Appendix II. Microwave transitions of perfluorobenzonitrile (PFBN) and its minor isotopologues

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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Table II(A). Microwave transitions of the parent PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	2	3	4	→	3	2	2	3	4671.92765	0.00007
4	2	3	5	→	3	2	2	4	4672.44356	0.00025
4	2	3	3	→	3	2	2	2	4672.57536	-0.00030
5	1	5	5	→	4	1	4	4	4823.99137	0.00007
5	1	5	4	→	4	1	4	3	4824.01090	-0.00083
5	1	5	6	→	4	1	4	5	4824.05585	-0.00030
5	0	5	4	→	4	0	4	3	4829.62069	0.00052
5	0	5	5	→	4	0	4	4	4829.62069	-0.00031
5	0	5	6	→	4	0	4	5	4829.66858	-0.00056
4	1	3	3	→	3	1	2	2	4940.95145	0.00020
4	1	3	5	→	3	1	2	4	4941.06410	-0.00022
4	1	3	4	→	3	1	2	3	4941.15057	0.00051
4	3	2	4	→	3	3	1	3	5035.38026	-0.00009
4	3	2	5	→	3	3	1	4	5036.73750	-0.00017
4	3	2	3	→	3	3	1	2	5037.25063	0.00006
4	3	1	4	→	3	3	0	3	5336.02951	-0.00035
4	3	1	5	→	3	3	0	4	5337.59558	-0.00035
4	3	1	3	→	3	3	0	2	5338.15059	-0.00067
4	2	2	4	→	3	2	1	3	5503.09106	-0.00001
4	2	2	5	→	3	2	1	4	5503.57191	-0.00001
4	2	2	3	→	3	2	1	2	5503.65874	0.00043
6	1	6	6	→	5	1	5	5	5703.29101	0.00036
6	1	6	5	→	5	1	5	4	5703.30316	0.00036
6	1	6	7	→	5	1	5	6	5703.33489	-0.00028
6	0	6	6	→	5	0	5	5	5704.48221	-0.00096
6	0	6	5	→	5	0	5	4	5704.49338	0.00165
6	0	6	7	→	5	0	5	6	5704.52464	-0.00010
5	1	4	4	→	4	1	3	3	5780.23580	-0.00008
5	1	4	6	→	4	1	3	5	5780.29456	-0.00001
5	1	4	5	→	4	1	3	4	5780.34753	-0.00039
5	3	3	5	→	4	3	2	4	6215.05208	-0.00026
5	3	3	6	→	4	3	2	5	6215.67991	-0.00018
5	3	3	4	→	4	3	2	3	6215.82908	-0.00028
5	4	2	5	→	4	4	1	4	6382.96519	-0.00007
5	4	2	6	→	4	4	1	5	6384.24565	0.00123
5	4	2	4	→	4	4	1	3	6384.61335	0.00055
5	4	1	5	→	4	4	0	4	6519.22599	0.00062
5	4	1	6	→	4	4	0	5	6520.63652	0.00131
5	4	1	4	→	4	4	0	3	6521.02899	0.00071
6	2	5	6	→	5	2	4	5	6567.35890	-0.00019
6	2	5	5	→	5	2	4	4	6567.45807	-0.00213
6	2	5	7	→	5	2	4	6	6567.46838	0.00087
7	1	7	7	→	6	1	6	6	6581.03548	-0.00086

7	1	7	6	→	6	1	6	5	6581.04712	0.00127
7	1	7	8	→	6	1	6	7	6581.07007	-0.00014
7	0	7	7	→	6	0	6	6	6581.27006	-0.00154
7	0	7	6	→	6	0	6	5	6581.28209	0.00156
7	0	7	8	→	6	0	6	7	6581.30477	-0.00021
6	1	5	6	→	5	1	4	5	6611.10749	0.00032
6	1	5	5	→	5	1	4	4	6611.10749	0.00068
6	1	5	7	→	5	1	4	6	6611.13147	-0.00054
5	2	3	5	→	4	2	2	4	6699.79627	0.00041
5	2	3	4	→	4	2	2	3	6699.82016	-0.00146
5	2	3	6	→	4	2	2	5	6699.85613	-0.00021
5	3	2	5	→	4	3	1	4	6882.38697	-0.00023
5	3	2	6	→	4	3	1	5	6883.12615	-0.00001
5	3	2	4	→	4	3	1	3	6883.28018	-0.00025
6	3	4	6	→	5	3	3	5	7295.18294	0.00004
6	3	4	7	→	5	3	3	6	7295.48122	0.00005
6	3	4	5	→	5	3	3	4	7295.52316	-0.00045
7	2	6	7	→	6	2	5	6	7457.36018	0.00007
7	2	6	6	→	6	2	5	5	7457.41784	-0.00110
7	2	6	8	→	6	2	5	7	7457.43037	0.00050
8	1	8	8	→	7	1	7	7	7458.47669	-0.00026
8	1	8	7	→	7	1	7	6	7458.48604	0.00114
8	1	8	9	→	7	1	7	8	7458.50411	0.00021
8	0	8	8	→	7	0	7	7	7458.52064	-0.00058
8	0	8	7	→	7	0	7	6	7458.53073	0.00166
8	0	8	9	→	7	0	7	8	7458.54787	-0.00021
7	1	6	7	→	6	1	5	6	7469.12434	-0.00051
7	1	6	6	→	6	1	5	5	7469.16042	0.00067
7	1	6	8	→	6	1	5	7	7469.17376	-0.00027
6	2	4	5	→	5	2	3	4	7648.30989	0.00021
6	2	4	7	→	5	2	3	6	7648.36007	0.00007
6	2	4	6	→	5	2	3	5	7648.46422	0.00018
6	4	3	6	→	5	4	2	5	7659.48619	0.00017
6	4	3	7	→	5	4	2	6	7660.18736	0.00032
6	4	3	5	→	5	4	2	4	7660.33078	-0.00010
6	5	2	6	→	5	5	1	5	7682.48507	-0.00043
6	5	2	7	→	5	5	1	6	7683.66912	0.00032
6	5	2	5	→	5	5	1	4	7683.94543	-0.00014
6	5	1	6	→	5	5	0	5	7732.52508	0.00011
6	5	1	7	→	5	5	0	6	7733.76051	0.00012
6	5	1	5	→	5	5	0	4	7734.04531	-0.00032
6	4	2	6	→	5	4	1	5	8092.30629	-0.00018
6	4	2	7	→	5	4	1	6	8093.19318	0.00019
6	4	2	5	→	5	4	1	4	8093.36212	-0.00003
7	3	5	7	→	6	3	4	6	8281.70416	0.00004
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7	3	5	6	→	6	3	4	5	8281.85845	0.00146
6	3	3	6	→	5	3	2	5	8292.56267	-0.00006
6	3	3	7	→	5	3	2	6	8292.83084	0.00061
6	3	3	5	→	5	3	2	4	8292.85077	-0.00132
8	2	7	8	→	7	2	6	7	8337.51463	-0.00005
8	2	7	7	→	7	2	6	6	8337.55664	-0.00138
8	2	7	9	→	7	2	6	8	8337.56851	0.00057
8	1	7	8	→	7	1	6	7	8340.31344	-0.00028
8	1	7	7	→	7	1	6	6	8340.35156	-0.00041
8	1	7	9	→	7	1	6	8	8340.36300	0.00039
7	2	5	6	→	6	2	4	5	8452.48681	0.00027
7	2	5	8	→	6	2	4	7	8452.51660	0.00011
7	2	5	7	→	6	2	4	6	8452.58184	0.00020
7	4	4	7	→	6	4	3	6	8851.90947	-0.00010
7	4	4	8	→	6	4	3	7	8852.29103	0.00034
7	4	4	6	→	6	4	3	5	8852.34619	-0.00019
7	6	2	7	→	6	6	1	6	8959.23363	0.00090
7	6	2	8	→	6	6	1	7	8960.31831	0.00092
7	6	2	6	→	6	6	1	5	8960.53228	0.00057
7	6	1	7	→	6	6	0	6	8975.36775	0.00097
7	6	1	8	→	6	6	0	7	8976.46942	0.00124
7	6	1	6	→	6	6	0	5	8976.68531	0.00045
7	5	3	7	→	6	5	2	6	9021.10906	-0.00027
7	5	3	8	→	6	5	2	7	9021.84481	0.00038
7	5	3	6	→	6	5	2	5	9021.97507	-0.00041
8	3	6	8	→	7	3	5	7	9204.34000	-0.00012
8	3	6	7	→	7	3	5	6	9204.41960	0.00148
8	3	6	9	→	7	3	5	8	9204.41960	-0.00069
10	0	10	10	→	9	0	9	9	9213.28333	-0.00178
10	1	10	10	→	9	1	9	9	9213.28333	-0.00035
10	0	10	9	→	9	0	9	8	9213.29177	0.00091
10	1	10	9	→	9	1	9	8	9213.29177	0.00233
10	0	10	11	→	9	0	9	10	9213.30264	-0.00074
10	1	10	11	→	9	1	9	10	9213.30264	0.00068
9	2	8	9	→	8	2	7	8	9215.08290	0.00000
9	2	8	8	→	8	2	7	7	9215.11682	-0.00133
9	2	8	10	→	8	2	7	9	9215.12797	0.00106
9	1	8	9	→	8	1	7	8	9215.69803	-0.00018
9	1	8	8	→	8	1	7	7	9215.73137	-0.00109
9	1	8	10	→	8	1	7	9	9215.74257	0.00123
7	5	2	7	→	6	5	1	6	9238.14538	-0.00024
7	5	2	8	→	6	5	1	7	9239.01627	-0.00009
7	5	2	6	→	6	5	1	5	9239.16527	-0.00018
8	2	6	7	→	7	2	5	6	9264.24022	-0.00148
8	2	6	8	→	7	2	5	7	9264.24887	-0.00026
8	2	6	9	→	7	2	5	8	9264.25613	0.00106

7	3	4	6	→	6	3	3	5	9457.28402	0.00062
7	3	4	8	→	6	3	3	7	9457.30634	-0.00081
7	3	4	7	→	6	3	3	6	9457.31291	0.00048
7	4	3	7	→	6	4	2	6	9682.49373	-0.00020
7	4	3	8	→	6	4	2	7	9682.97290	0.00024
7	4	3	6	→	6	4	2	5	9683.03354	-0.00022
8	4	5	8	→	7	4	4	7	9937.57541	0.00022
8	4	5	9	→	7	4	4	8	9937.77375	0.00055
8	4	5	7	→	7	4	4	6	9937.79103	-0.00066
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11	1	11	11	→	10	1	10	10	10090.69809	-0.00062
11	0	11	10	→	10	0	10	9	10090.70411	0.00020
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11	1	11	12	→	10	1	10	11	10090.71485	0.00071
10	2	9	10	→	9	2	8	9	10092.18461	0.00031
10	2	9	9	→	9	2	8	8	10092.21274	-0.00126
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9	3	7	9	→	8	3	6	8	10095.43130	0.00053
9	3	7	8	→	8	3	6	7	10095.48050	-0.00153
9	3	7	10	→	8	3	6	9	10095.48722	0.00081
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8	7	2	8	→	7	7	1	7	10227.54077	-0.00017
8	7	2	9	→	7	7	1	8	10228.53474	0.00014
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8	7	1	8	→	7	7	0	7	10232.32737	-0.00027
8	7	1	9	→	7	7	0	8	10233.32615	0.00006
8	7	1	7	→	7	7	0	6	10233.49634	-0.00059
8	5	4	8	→	7	5	3	7	10311.09431	0.00007
8	5	4	9	→	7	5	3	8	10311.54674	0.00035
8	5	4	7	→	7	5	3	6	10311.60819	-0.00028
8	6	3	8	→	7	6	2	7	10327.21700	0.00005
8	6	3	9	→	7	6	2	8	10327.95222	0.00049
8	6	3	7	→	7	6	2	6	10328.06717	-0.00017
8	3	5	7	→	7	3	4	6	10355.58640	0.00062
8	3	5	9	→	7	3	4	8	10355.61714	-0.00009
8	3	5	8	→	7	3	4	7	10355.73222	0.00011
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8	6	2	7	→	7	6	1	6	10416.43560	-0.00002
8	5	3	8	→	7	5	2	7	10880.05545	-0.00019

8	5	3	9	→	7	5	2	8	10880.67677	-0.00032
8	5	3	7	→	7	5	2	6	10880.75719	0.00032
9	4	6	9	→	8	4	5	8	10925.82478	-0.00004
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8	4	4	8	→	7	4	3	7	11090.45612	0.00027
8	4	4	9	→	7	4	3	8	11090.62032	-0.00081
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9	3	6	8	→	8	3	5	7	11126.32414	-0.00002
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9	8	2	9	→	8	8	1	8	11493.51371	0.00066
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9	5	5	9	→	8	5	4	8	11508.11626	-0.00011
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9	7	3	9	→	8	7	2	8	11604.19462	-0.00043
9	7	3	10	→	8	7	2	9	11604.90785	-0.00003
9	7	3	8	→	8	7	2	7	11605.00795	-0.00034
9	7	2	9	→	8	7	1	8	11635.49982	0.00006
9	7	2	10	→	8	7	1	9	11636.23595	0.00004
9	7	2	8	→	8	7	1	7	11636.33863	-0.00022
9	6	4	9	→	8	6	3	8	11683.73035	0.00001
9	6	4	10	→	8	6	3	9	11684.22984	0.00000
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13	0	13	13	→	12	0	12	12	11845.54585	-0.00082
13	1	13	13	→	12	1	12	12	11845.54585	-0.00082
13	0	13	12	→	12	0	12	11	11845.55018	-0.00025
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13	1	13	14	→	12	1	12	13	11845.55905	0.00097
12	2	11	12	→	11	2	10	11	11846.48382	0.00041
12	1	11	12	→	11	1	10	11	11846.49046	0.00213
12	2	11	11	→	11	2	10	10	11846.50347	-0.00186
12	1	11	11	→	11	1	10	10	11846.51084	0.00060
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12	1	11	13	→	11	1	10	12	11846.51720	0.00101
10	4	7	10	→	9	4	6	9	11848.38895	0.00026
10	4	7	9	→	9	4	6	8	11848.44641	0.00103
10	4	7	11	→	9	4	6	10	11848.44641	-0.00047
11	3	9	11	→	10	3	8	10	11851.72957	-0.00068
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11	3	9	12	→	10	3	8	11	11851.77210	0.00164
11	2	9	11	→	10	2	8	10	11852.78583	0.00028
11	2	9	10	→	10	2	8	9	11852.81924	-0.00111
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9	6	3	10	→	8	6	2	9	11991.42195	0.00010
9	6	3	8	→	8	6	2	7	11991.49885	-0.00051
9	4	5	8	→	8	4	4	7	12213.65763	-0.00034
9	4	5	10	→	8	4	4	9	12213.67636	-0.00008
9	4	5	9	→	8	4	4	8	12213.71994	0.00062
9	5	4	9	→	8	5	3	8	12498.83111	-0.00007
9	5	4	10	→	8	5	3	9	12499.17806	0.00078
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14	0	14	14	→	13	0	13	13	12722.97535	-0.00050
14	1	14	14	→	13	1	13	13	12722.97535	-0.00050
14	0	14	13	→	13	0	13	12	12722.97895	-0.00021
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13	2	12	13	→	12	2	11	12	12723.73683	0.00055
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11	4	8	11	→	10	4	7	10	12738.31941	0.00015
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10	8	3	11	→	9	8	2	10	12870.10838	0.00037
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13	3	11	13	→	12	3	10	12	13604.43047	0.00071
13	3	11	12	→	12	3	10	11	13604.45744	-0.00110
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13	2	11	13	→	12	2	10	12	13604.48101	0.00079

13	2	11	12	→	12	2	10	11	13604.50783	-0.00113
13	2	11	14	→	12	2	10	13	13604.51229	-0.00019
12	4	9	12	→	11	4	8	11	13616.32934	0.00067
12	4	9	11	→	11	4	8	10	13616.36359	0.00100
12	4	9	13	→	11	4	8	12	13616.36359	-0.00177
12	3	9	12	→	11	3	8	11	13622.30250	0.00005
12	3	9	11	→	11	3	8	10	13622.32982	-0.00090
12	3	9	13	→	11	3	8	12	13622.33395	0.00005
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11	4	7	10	→	10	4	6	9	13801.07508	-0.00054
11	4	7	12	→	10	4	6	11	13801.09129	0.00153
11	4	7	11	→	10	4	6	10	13801.16396	0.00024
10	5	5	10	→	9	5	4	9	13891.67265	-0.00011
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11	9	3	11	→	10	9	2	10	14131.37785	0.00098
11	9	3	12	→	10	9	2	11	14132.02608	0.00107
11	9	3	10	→	10	9	2	9	14132.09945	-0.00106
11	9	2	11	→	10	9	1	10	14134.45622	-0.00092
11	9	2	12	→	10	9	1	11	14135.10805	0.00053
11	9	2	10	→	10	9	1	9	14135.18124	-0.00198
11	6	6	11	→	10	6	5	10	14177.67649	0.00030
11	6	6	12	→	10	6	5	11	14177.86911	-0.00046
11	6	6	10	→	10	6	5	9	14177.88555	0.00110
11	8	4	11	→	10	8	3	10	14270.53647	-0.00033
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14	3	12	13	→	13	3	11	12	14481.13571	-0.00179
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13	4	10	13	→	12	4	9	12	14491.37380	0.00042
13	4	10	12	→	12	4	9	11	14491.40576	0.00098
13	4	10	14	→	12	4	9	13	14491.40576	-0.00145
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13	3	10	14	→	12	3	9	13	14492.90466	-0.00141
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12	6	7	13	→	11	6	6	12	15257.97067	-0.00076
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11	6	5	10	→	10	6	4	9	15325.89993	0.00109
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17	0	17	16	→	16	0	16	15	15355.27307	-0.00174
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16	1	15	16	→	15	1	14	15	15355.71972	-0.00168
16	2	15	16	→	15	2	14	15	15355.71972	-0.00167
16	1	15	15	→	15	1	14	14	15355.73408	-0.00049
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15	3	13	15	→	14	3	12	14	15357.98133	0.00227
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13	4	9	13	→	12	4	8	12	15411.41050	-0.00147
13	4	9	12	→	12	4	8	11	15411.42157	0.00001
13	4	9	14	→	12	4	8	13	15411.42633	0.00116
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17	1	16	17	→	16	1	15	16	16233.09144	-0.00084
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16	3	14	16	→	15	3	13	15	16234.98009	0.00040

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13	6	8	13	→	12	6	7	12	16238.07679	-0.00029
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15	4	12	15	→	14	4	11	14	16241.68533	0.00082
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13	5	8	12	→	12	5	7	11	16476.25373	-0.00073
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13	5	8	13	→	12	5	7	12	16476.33861	-0.00055
12	7	5	12	→	11	7	4	11	16518.94703	-0.00004
12	7	5	13	→	11	7	4	12	16519.33709	0.00002
12	7	5	11	→	11	7	4	10	16519.36575	-0.00097
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13	10	4	13	→	12	10	3	12	16788.04816	0.00030
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13	10	4	12	→	12	10	3	11	16788.58932	-0.00026
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13	10	3	12	→	12	10	2	11	16794.36373	-0.00107
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13	7	7	12	→	12	7	6	11	16857.11142	0.00079
13	9	5	13	→	12	9	4	12	16953.95894	-0.00029
13	9	5	14	→	12	9	4	13	16954.36611	0.00004
13	9	5	12	→	12	9	4	11	16954.40135	-0.00032
13	9	4	13	→	12	9	3	12	17030.66971	0.00002
13	9	4	14	→	12	9	3	13	17031.11307	0.00012
13	9	4	12	→	12	9	3	11	17031.14299	-0.00103
13	8	6	13	→	12	8	5	12	17057.77711	0.00001
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15	5	11	15	→	14	5	10	14	17134.02701	0.00019
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15	5	11	16	→	14	5	10	15	17134.05362	-0.00092
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13	8	5	13	→	12	8	4	12	17572.12376	-0.00043
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13	8	5	12	→	12	8	4	11	17572.58605	-0.00065
13	6	7	12	→	12	6	6	11	17714.59409	-0.00130
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14	13	2	15	→	13	13	1	14	17825.22315	0.00044
14	13	1	15	→	13	13	0	14	17825.22315	-0.00097
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14	7	8	14	→	13	7	7	13	17929.78299	-0.00059
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19	1	18	20	→	18	1	17	19	17987.88041	0.00055
19	2	18	20	→	18	2	17	19	17987.88041	0.00055
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18	3	16	18	→	17	3	15	17	17989.24000	-0.00068
18	2	16	17	→	17	2	15	16	17989.26058	0.00264
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16	5	12	16	→	15	5	11	15	18007.19057	-0.00028
16	5	12	15	→	15	5	11	14	18007.21709	0.00092
16	5	12	17	→	15	5	11	16	18007.21709	-0.00065
16	4	12	16	→	15	4	11	15	18007.66555	-0.00019
16	4	12	15	→	15	4	11	14	18007.69189	0.00116
16	4	12	17	→	15	4	11	16	18007.69189	-0.00043
15	6	10	15	→	14	6	9	14	18036.79956	-0.00153
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14	11	4	14	→	13	11	3	13	18044.66984	0.00057
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15	5	10	16	→	14	5	9	15	18065.56565	0.00036
13	7	6	13	→	12	7	5	12	18158.94681	-0.00010
13	7	6	14	→	12	7	5	13	18159.15137	-0.00087
13	7	6	12	→	12	7	5	11	18159.16382	0.00073
14	10	5	14	→	13	10	4	13	18210.13946	0.00041
14	10	5	15	→	13	10	4	14	18210.54490	0.00057
14	10	5	13	→	13	10	4	12	18210.57720	-0.00045
14	8	7	14	→	13	8	6	13	18358.04179	0.00021
14	8	7	15	→	13	8	6	14	18358.23664	-0.00067
14	8	7	13	→	13	8	6	12	18358.25056	0.00069
14	9	6	14	→	13	9	5	13	18377.59645	-0.00025

14	9	6	15	→	13	9	5	14	18377.91597	0.00014
14	9	6	13	→	13	9	5	12	18377.93991	0.00010
14	6	8	13	→	13	6	7	12	18463.47276	-0.00091
14	6	8	15	→	13	6	7	14	18463.48827	0.00096
14	6	8	14	→	13	6	7	13	18463.60692	-0.00010
14	9	5	14	→	13	9	4	13	18631.04292	-0.00012
14	9	5	15	→	13	9	4	14	18631.44928	0.00056
14	9	5	13	→	13	9	4	12	18631.47837	-0.00025
21	0	21	21	→	20	0	20	20	18865.00710	0.00037
21	1	21	21	→	20	1	20	20	18865.00710	0.00037
21	0	21	20	→	20	0	20	19	18865.00710	-0.00123
21	1	21	20	→	20	1	20	19	18865.00710	-0.00123
21	0	21	22	→	20	0	20	21	18865.01178	0.00038
21	1	21	22	→	20	1	20	21	18865.01178	0.00038
20	1	19	20	→	19	1	18	19	18865.26551	-0.00068
20	2	19	20	→	19	2	18	19	18865.26551	-0.00068
20	1	19	19	→	19	1	18	18	18865.27561	0.00068
20	2	19	19	→	19	2	18	18	18865.27561	0.00068
20	1	19	21	→	19	1	18	20	18865.27821	0.00060
20	2	19	21	→	19	2	18	20	18865.27821	0.00060
19	2	17	19	→	18	2	16	18	18866.45647	-0.00061
19	3	17	19	→	18	3	16	18	18866.45647	-0.00061
19	2	17	18	→	18	2	16	17	18866.47551	0.00271
19	3	17	18	→	18	3	16	17	18866.47551	0.00271
19	2	17	20	→	18	2	16	19	18866.47551	0.00048
19	3	17	20	→	18	3	16	19	18866.47551	0.00048
18	4	15	18	→	17	4	14	17	18870.28958	-0.00019
18	3	15	18	→	17	3	14	17	18870.28958	-0.00095
18	4	15	17	→	17	4	14	16	18870.31327	0.00185
18	3	15	17	→	17	3	14	16	18870.31327	0.00110
18	4	15	19	→	17	4	14	18	18870.31327	0.00008
18	3	15	19	→	17	3	14	18	18870.31327	-0.00068
17	5	13	17	→	16	5	12	16	18881.19920	0.00007
17	5	13	16	→	16	5	12	15	18881.22483	0.00128
17	5	13	18	→	16	5	12	17	18881.22483	-0.00017
17	4	13	17	→	16	4	12	16	18881.31072	-0.00066
17	4	13	16	→	16	4	12	15	18881.33666	0.00093
17	4	13	18	→	16	4	12	17	18881.33666	-0.00052
15	7	9	15	→	14	7	8	14	18902.78975	0.00112
15	7	9	14	→	14	7	8	13	18902.82711	0.00009
15	7	9	16	→	14	7	8	15	18902.82711	-0.00028
16	6	11	16	→	15	6	10	15	18909.21928	-0.00163
16	6	11	15	→	15	6	10	14	18909.24229	0.00102
16	6	11	17	→	15	6	10	16	18909.24229	-0.00055
16	5	11	16	→	15	5	10	15	18917.63342	-0.00066
16	5	11	15	→	15	5	10	14	18917.65104	0.00183

16	5	11	17	→	15	5	10	16	18917.65104	-0.00008
15	6	9	14	→	14	6	8	13	19151.55851	-0.00164
15	6	9	16	→	14	6	8	15	19151.56997	0.00115
15	6	9	15	→	14	6	8	14	19151.64137	0.00024
14	8	6	14	→	13	8	5	13	19360.69375	-0.00014
14	8	6	15	→	13	8	5	14	19361.02020	-0.00028
14	8	6	13	→	13	8	5	12	19361.04136	0.00039
14	7	7	14	→	13	7	6	13	19491.91973	0.00021
14	7	7	13	→	13	7	6	12	19491.94323	0.00009
14	7	7	15	→	13	7	6	14	19491.94687	0.00021
15	8	8	15	→	14	8	7	14	19543.53243	0.00045
15	8	8	16	→	14	8	7	15	19543.64808	-0.00059
15	8	8	14	→	14	8	7	13	19543.65490	0.00063
15	10	6	15	→	14	10	5	14	19651.40319	0.00017
15	10	6	16	→	14	10	5	15	19651.73533	0.00017
15	10	6	14	→	14	10	5	13	19651.75960	0.00054
22	0	22	22	→	21	0	21	21	19742.44052	0.00072
22	1	22	22	→	21	1	21	21	19742.44052	0.00072
22	0	22	21	→	21	0	21	20	19742.44052	-0.00075
22	1	22	21	→	21	1	21	20	19742.44052	-0.00075
22	0	22	23	→	21	0	21	22	19742.44427	0.00019
22	1	22	23	→	21	1	21	22	19742.44427	0.00019
20	2	18	20	→	19	2	17	19	19743.71114	-0.00107
20	3	18	20	→	19	3	17	19	19743.71114	-0.00107
20	2	18	19	→	19	2	17	18	19743.72886	0.00227
20	3	18	19	→	19	3	17	18	19743.72886	0.00227
20	2	18	21	→	19	2	17	20	19743.72886	0.00019
20	3	18	21	→	19	3	17	20	19743.72886	0.00019
19	4	16	19	→	18	4	15	18	19746.98310	-0.00055
19	3	16	19	→	18	3	15	18	19746.98310	-0.00070
19	4	16	18	→	18	4	15	17	19747.00545	0.00180
19	3	16	18	→	18	3	15	17	19747.00545	0.00164
19	4	16	20	→	18	4	15	19	19747.00545	0.00012
19	3	16	20	→	18	3	15	19	19747.00545	-0.00003
17	5	12	17	→	16	5	11	16	19781.83489	-0.00088
17	5	12	16	→	16	5	11	15	19781.85630	0.00103
17	5	12	18	→	16	5	11	17	19781.85630	-0.00042
15	7	8	14	→	14	7	7	13	20456.79004	-0.00104
15	7	8	16	→	14	7	7	15	20456.80330	0.00104
15	7	8	15	→	14	7	7	14	20456.89722	-0.00026
16	8	9	16	→	15	8	8	15	20607.10866	0.00080
16	8	9	17	→	15	8	8	16	20607.16884	0.00064
16	8	9	15	→	15	8	8	14	20607.16884	-0.00073
21	2	19	21	→	20	2	18	20	20620.99600	-0.00107
21	3	19	21	→	20	3	18	20	20620.99600	-0.00107
21	2	19	20	→	20	2	18	19	20621.01254	0.00227

21	3	19	20	→	20	3	18	19	20621.01254	0.00227
21	2	19	22	→	20	2	18	21	20621.01254	0.00032
21	3	19	22	→	20	3	18	21	20621.01254	0.00032
20	3	17	20	→	19	3	16	19	20623.81892	-0.00192
20	4	17	20	→	19	4	16	19	20623.81892	-0.00189
20	4	17	19	→	19	4	16	18	20623.84133	0.00201
20	3	17	19	→	19	3	16	18	20623.84133	0.00198
20	4	17	21	→	19	4	16	20	20623.84133	0.00042
20	3	17	21	→	19	3	16	20	20623.84133	0.00039
18	6	13	18	→	17	6	12	17	20650.62922	-0.00155
18	6	13	17	→	17	6	12	16	20650.65330	0.00126
18	6	13	19	→	17	6	12	18	20650.65330	0.00006
18	5	13	18	→	17	5	12	17	20651.21810	-0.00114
18	5	13	17	→	17	5	12	16	20651.24154	0.00138
18	5	13	19	→	17	5	12	18	20651.24154	0.00016
17	7	11	17	→	16	7	10	16	20691.37642	-0.00140
17	7	11	16	→	16	7	10	15	20691.39447	0.00172
17	7	11	18	→	16	7	10	17	20691.39447	0.00019
15	8	7	15	→	14	8	6	14	20995.88685	0.00001
15	8	7	16	→	14	8	6	15	20996.04784	-0.00025
15	8	7	14	→	14	8	6	13	20996.05567	0.00086
16	9	8	16	→	15	9	7	15	21059.15328	-0.00009
16	9	8	17	→	15	9	7	16	21059.31240	0.00002
16	9	8	15	→	15	9	7	14	21059.32200	0.00113
16	7	9	15	→	15	7	8	14	21159.84361	-0.00053
16	7	9	17	→	15	7	8	16	21159.85640	0.00109
16	7	9	16	→	15	7	8	15	21159.97219	-0.00033
11	7	4	10	→	10	5	5	9	21494.20286	0.00083
11	7	4	12	→	10	5	5	11	21494.26612	-0.00004
11	7	4	11	→	10	5	5	10	21494.86832	-0.00124
23	1	22	23	→	22	1	21	22	21497.48842	-0.00077
23	2	22	23	→	22	2	21	22	21497.48842	-0.00077
23	1	22	22	→	22	1	21	21	21497.49816	0.00225
23	2	22	22	→	22	2	21	21	21497.49816	0.00225
23	1	22	24	→	22	1	21	23	21497.49816	0.00013
23	2	22	24	→	22	2	21	23	21497.49816	0.00013
22	2	20	22	→	21	2	19	21	21498.30379	-0.00128
22	3	20	22	→	21	3	19	21	21498.30379	-0.00128
22	2	20	21	→	21	2	19	20	21498.31919	0.00196
22	3	20	21	→	21	3	19	20	21498.31919	0.00196
22	2	20	23	→	21	2	19	22	21498.31919	0.00014
22	3	20	23	→	21	3	19	22	21498.31919	0.00014
21	3	18	21	→	20	3	17	20	21500.76512	-0.00094
21	4	18	21	→	20	4	17	20	21500.76512	-0.00094
21	3	18	20	→	20	3	17	19	21500.78530	0.00209
21	4	18	20	→	20	4	17	19	21500.78530	0.00210

21	3	18	22	→	20	3	17	21	21500.78530	0.00059
21	4	18	22	→	20	4	17	21	21500.78530	0.00059
19	6	14	19	→	18	6	13	18	21522.97309	-0.00102
19	6	14	18	→	18	6	13	17	21522.99666	0.00135
19	6	14	20	→	18	6	13	19	21522.99666	0.00026
19	5	14	19	→	18	5	13	18	21523.11768	-0.00086
19	5	14	18	→	18	5	13	17	21523.14114	0.00149
19	5	14	20	→	18	5	13	19	21523.14114	0.00039
18	7	12	18	→	17	7	11	17	21560.27000	-0.00187
18	7	12	17	→	17	7	11	16	21560.28856	0.00151
18	7	12	19	→	17	7	11	18	21560.28856	0.00015
18	6	12	18	→	17	6	11	17	21569.57626	-0.00076
18	6	12	17	→	17	6	11	16	21569.58918	0.00187
18	6	12	19	→	17	6	11	18	21569.58918	0.00026
17	8	10	17	→	16	8	9	16	21571.67727	0.00020
17	8	10	16	→	16	8	9	15	21571.70518	0.00076
17	8	10	18	→	16	8	9	17	21571.70518	0.00007
17	7	10	16	→	16	7	9	15	21826.82494	-0.00154
17	7	10	18	→	16	7	9	17	21826.83447	0.00101
17	7	10	17	→	16	7	9	16	21826.90456	0.00101

Table II(B). Microwave transitions of the $^{13}C_1$ isotopologue of PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
7	1	7	7	→	6	1	6	6	6572.87141	-0.00108
7	1	7	6	→	6	1	6	5	6572.88381	0.00181
7	1	7	8	→	6	1	6	7	6572.90640	-0.00004
7	0	7	7	→	6	0	6	6	6573.11622	-0.00131
7	0	7	6	→	6	0	6	5	6573.12774	0.00132
7	0	7	8	→	6	0	6	7	6573.15080	-0.00016
6	1	5	5	→	5	1	4	4	6603.58584	0.00066
6	1	5	6	→	5	1	4	5	6603.58584	-0.00049
6	1	5	7	→	5	1	4	6	6603.60975	-0.00087
7	2	6	7	→	6	2	5	6	7447.99523	0.00011
7	2	6	6	→	6	2	5	5	7448.05283	-0.00135
7	2	6	8	→	6	2	5	7	7448.06546	0.00030
8	1	8	8	→	7	1	7	7	7449.22654	-0.00041
8	1	8	7	→	7	1	7	6	7449.23774	0.00285
8	1	8	9	→	7	1	7	8	7449.25436	0.00041
8	0	8	8	→	7	0	7	7	7449.27220	-0.00119
8	0	8	7	→	7	0	7	6	7449.28278	0.00155
8	0	8	9	→	7	0	7	8	7449.30006	-0.00024
6	2	4	5	→	5	2	3	4	7639.91464	0.00133
6	2	4	7	→	5	2	3	6	7639.96338	0.00003
6	2	4	6	→	5	2	3	5	7640.06492	-0.00014
7	3	5	7	→	6	3	4	6	8269.93371	-0.00025
7	3	5	8	→	6	3	4	7	8270.07935	-0.00068
7	3	5	6	→	6	3	4	5	8270.08889	0.00077
7	2	5	6	→	6	2	4	5	8444.11823	-0.00044
7	2	5	8	→	6	2	4	7	8444.14818	-0.00065
7	2	5	7	→	6	2	4	6	8444.21490	0.00037
10	0	10	10	→	9	0	9	9	9201.85500	-0.00286
10	1	10	10	→	9	1	9	9	9201.85500	-0.00134
10	0	10	9	→	9	0	9	8	9201.86383	0.00022
10	1	10	9	→	9	1	9	8	9201.86383	0.00174
10	0	10	11	→	9	0	9	10	9201.87586	-0.00031
10	1	10	11	→	9	1	9	10	9201.87586	0.00120
9	2	8	9	→	8	2	7	8	9203.67078	-0.00031
9	2	8	8	→	8	2	7	7	9203.70466	-0.00172
9	2	8	10	→	8	2	7	9	9203.71634	0.00117
11	0	11	11	→	10	0	10	10	10078.18231	-0.00054
11	1	11	11	→	10	1	10	10	10078.18231	-0.00027
11	0	11	10	→	10	0	10	9	10078.18986	0.00206
11	1	11	10	→	10	1	10	9	10078.18986	0.00233
11	0	11	12	→	10	0	10	11	10078.19715	-0.00116
11	1	11	12	→	10	1	10	11	10078.19715	-0.00089
10	2	9	10	→	9	2	8	9	10079.68711	0.00112

10	2	9	9	→	9	2	8	8	10079.71423	-0.00148
10	2	9	11	→	9	2	8	10	10079.72370	0.00031
10	1	9	10	→	9	1	8	9	10079.82237	0.00131
10	1	9	9	→	9	1	8	8	10079.84926	-0.00133
10	1	9	11	→	9	1	8	10	10079.85901	0.00071
9	3	7	9	→	8	3	6	8	10082.79825	0.00056
9	3	7	8	→	8	3	6	7	10082.84740	-0.00178
9	3	7	10	→	8	3	6	9	10082.85439	0.00080
9	2	7	9	→	8	2	6	8	10100.77823	0.00035
9	2	7	8	→	8	2	6	7	10100.80395	-0.00144
9	2	7	10	→	8	2	6	9	10100.81410	0.00152
12	0	12	12	→	11	0	11	11	10954.51334	-0.00233
12	1	12	12	→	11	1	11	11	10954.51334	-0.00229
12	0	12	11	→	11	0	11	10	10954.51977	-0.00019
12	1	12	11	→	11	1	11	10	10954.51977	-0.00015
12	0	12	13	→	11	0	11	12	10954.53024	0.00135
12	1	12	13	→	11	1	11	12	10954.53024	0.00139
10	2	8	10	→	9	2	7	9	10966.17193	0.00076
10	2	8	9	→	9	2	7	8	10966.20558	-0.00112
10	2	8	11	→	9	2	7	10	10966.21267	0.00084
13	0	13	13	→	12	0	12	12	11830.85211	-0.00114
13	1	13	13	→	12	1	12	12	11830.85211	-0.00113
13	0	13	12	→	12	0	12	11	11830.85644	-0.00057
13	1	13	12	→	12	1	12	11	11830.85644	-0.00056
13	0	13	14	→	12	0	12	13	11830.86577	0.00108
13	1	13	14	→	12	1	12	13	11830.86577	0.00109
14	0	14	14	→	13	0	13	13	12707.19422	0.00033
14	0	14	13	→	13	0	13	12	12707.19422	-0.00298
14	1	14	14	→	13	1	13	13	12707.19422	0.00033
14	1	14	13	→	13	1	13	12	12707.19422	-0.00298
14	0	14	15	→	13	0	13	14	12707.20518	0.00130
14	1	14	15	→	13	1	13	14	12707.20518	0.00130
15	0	15	15	→	14	0	14	14	13583.53735	0.00082
15	0	15	14	→	14	0	14	13	13583.53735	-0.00211
15	1	15	15	→	14	1	14	14	13583.53735	0.00082
15	1	15	14	→	14	1	14	13	13583.53735	-0.00211
15	0	15	16	→	14	0	14	15	13583.54661	0.00129
15	1	15	16	→	14	1	14	15	13583.54661	0.00129

Table II(C). Microwave transitions of the $^{13}C_2$ isotopologue of PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
5	0	5	4	→	4	0	4	3	4822.58537	-0.00022
5	0	5	5	→	4	0	4	4	4822.58537	-0.00073
5	0	5	6	→	4	0	4	5	4822.63369	-0.00060
7	1	7	7	→	6	1	6	6	6571.58864	-0.00170
7	1	7	6	→	6	1	6	5	6571.60014	0.00027
7	1	7	8	→	6	1	6	7	6571.62377	-0.00035
7	0	7	7	→	6	0	6	6	6571.81212	-0.00198
7	0	7	6	→	6	0	6	5	6571.82388	0.00082
7	0	7	8	→	6	0	6	7	6571.84724	-0.00017
6	1	5	5	→	5	1	4	4	6600.84231	-0.00079
6	1	5	6	→	5	1	4	5	6600.84231	-0.00016
6	1	5	7	→	5	1	4	6	6600.86741	-0.00059
5	2	3	5	→	4	2	2	4	6692.70937	-0.00009
5	2	3	4	→	4	2	2	3	6692.72858	-0.00114
5	2	3	6	→	4	2	2	5	6692.76582	0.00043
6	3	4	6	→	5	3	3	5	7287.87056	0.00039
6	3	4	7	→	5	3	3	6	7288.16683	0.00028
6	3	4	5	→	5	3	3	4	7288.20807	-0.00060
7	2	6	7	→	6	2	5	6	7446.77983	-0.00021
7	2	6	6	→	6	2	5	5	7446.83786	-0.00075
7	2	6	8	→	6	2	5	7	7446.84984	0.00036
8	1	8	8	→	7	1	7	7	7447.76872	-0.00050
8	1	8	7	→	7	1	7	6	7447.77830	0.00112
8	1	8	9	→	7	1	7	8	7447.79629	0.00019
8	0	8	8	→	7	0	7	7	7447.81392	0.00296
8	0	8	7	→	7	0	7	6	7447.82175	0.00292
8	0	8	9	→	7	0	7	8	7447.83741	-0.00035
6	2	4	5	→	5	2	3	4	7636.00826	-0.00038
6	2	4	7	→	5	2	3	6	7636.05975	0.00051
6	2	4	6	→	5	2	3	5	7636.16582	0.00005
7	3	5	7	→	6	3	4	6	8271.50771	-0.00054
7	3	5	8	→	6	3	4	7	8271.65107	-0.00071
7	3	5	6	→	6	3	4	5	8271.66104	0.00145
6	3	3	6	→	5	3	2	5	8288.09480	0.00011
6	3	3	7	→	5	3	2	6	8288.35862	0.00090
6	3	3	5	→	5	3	2	4	8288.37801	-0.00067
7	2	5	6	→	6	2	4	5	8437.91703	0.00040
7	2	5	8	→	6	2	4	7	8437.94681	0.00051
7	2	5	7	→	6	2	4	6	8438.01039	-0.00029
10	0	10	10	→	9	0	9	9	9200.05747	-0.00208
10	1	10	10	→	9	1	9	9	9200.05747	-0.00075
10	0	10	9	→	9	0	9	8	9200.06595	0.00065
10	1	10	9	→	9	1	9	8	9200.06595	0.00197

10	0	10	11	→	9	0	9	10	9200.07653	-0.00124
10	1	10	11	→	9	1	9	10	9200.07653	0.00008
9	2	8	9	→	8	2	7	8	9201.83086	0.00024
9	2	8	8	→	8	2	7	7	9201.86370	-0.00213
9	2	8	10	→	8	2	7	9	9201.87633	0.00180
11	0	11	11	→	10	0	10	10	10076.21368	-0.00103
11	1	11	11	→	10	1	10	10	10076.21368	-0.00080
11	0	11	10	→	10	0	10	9	10076.22156	0.00190
11	1	11	10	→	10	1	10	9	10076.22156	0.00213
11	0	11	12	→	10	0	10	11	10076.22875	-0.00134
11	1	11	12	→	10	1	10	11	10076.22875	-0.00112
10	2	9	10	→	9	2	8	9	10077.67197	0.00021
10	2	9	9	→	9	2	8	8	10077.69974	-0.00168
10	2	9	11	→	9	2	8	10	10077.70928	0.00025
10	1	9	10	→	9	1	8	9	10077.79182	0.00037
10	1	9	9	→	9	1	8	8	10077.81922	-0.00172
10	1	9	11	→	9	1	8	10	10077.82900	0.00044
9	3	7	9	→	8	3	6	8	10081.05180	-0.00002
9	3	7	8	→	8	3	6	7	10081.10203	-0.00079
9	3	7	10	→	8	3	6	9	10081.10861	0.00143
9	2	7	9	→	8	2	6	8	10097.57430	0.00009
9	2	7	8	→	8	2	6	7	10097.60164	-0.00101
9	2	7	10	→	8	2	6	9	10097.61077	0.00114
12	0	12	12	→	11	0	11	11	10952.37568	-0.00166
12	1	12	12	→	11	1	11	11	10952.37568	-0.00163
12	0	12	11	→	11	0	11	10	10952.38199	0.00035
12	1	12	11	→	11	1	11	10	10952.38199	0.00039
12	0	12	13	→	11	0	11	12	10952.39197	0.00147
12	1	12	13	→	11	1	11	12	10952.39197	0.00150
10	2	8	10	→	9	2	7	9	10963.47212	0.00143
10	2	8	9	→	9	2	7	8	10963.50527	-0.00124
10	2	8	11	→	9	2	7	10	10963.51197	0.00044
13	0	13	13	→	12	0	12	12	11828.54300	-0.00153
13	1	13	13	→	12	1	12	12	11828.54300	-0.00152
13	0	13	12	→	12	0	12	11	11828.54869	0.00041
13	1	13	12	→	12	1	12	11	11828.54869	0.00041
13	0	13	14	→	12	0	12	13	11828.55730	0.00139
13	1	13	14	→	12	1	12	13	11828.55730	0.00140
14	0	14	14	→	13	0	13	13	12704.71452	-0.00010
14	0	14	13	→	13	0	13	12	12704.71452	-0.00340
14	1	14	14	→	13	1	13	13	12704.71452	-0.00010
14	1	14	13	→	13	1	13	12	12704.71452	-0.00340
14	0	14	15	→	13	0	13	14	12704.72636	0.00181
14	1	14	15	→	13	1	13	14	12704.72636	0.00181
13	2	12	13	→	12	2	11	12	12705.45989	0.00121
13	1	12	13	→	12	1	11	12	12705.45989	0.00037

13	2	12	12	→	12	2	11	11	12705.47648	-0.00126
13	1	12	12	→	12	1	11	11	12705.47648	-0.00211
13	2	12	14	→	12	2	11	13	12705.48402	0.00101
13	1	12	14	→	12	1	11	13	12705.48402	0.00017
15	0	15	15	→	14	0	14	14	13580.88666	0.00007
15	0	15	14	→	14	0	14	13	13580.88666	-0.00286
15	1	15	15	→	14	1	14	14	13580.88666	0.00007
15	1	15	14	→	14	1	14	13	13580.88666	-0.00286
15	0	15	16	→	14	0	14	15	13580.89660	0.00126
15	1	15	16	→	14	1	14	15	13580.89660	0.00126

Table II(D). Microwave transitions of the $^{13}C_3$ isotopologue of PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
5	0	5	4	→	4	0	4	3	4820.25070	0.00029
5	0	5	5	→	4	0	4	4	4820.25070	-0.00020
5	0	5	6	→	4	0	4	5	4820.29893	-0.00031
7	1	7	7	→	6	1	6	6	6568.36199	-0.00207
7	1	7	6	→	6	1	6	5	6568.37508	0.00143
7	1	7	8	→	6	1	6	7	6568.39706	-0.00091
7	0	7	7	→	6	0	6	6	6568.58971	-0.00151
7	0	7	6	→	6	0	6	5	6568.60119	0.00096
7	0	7	8	→	6	0	6	7	6568.62431	-0.00033
6	1	5	5	→	5	1	4	4	6597.84744	-0.00045
6	1	5	6	→	5	1	4	5	6597.84744	0.00022
6	1	5	7	→	5	1	4	6	6597.87218	-0.00067
5	2	3	5	→	4	2	2	4	6688.62485	-0.00060
5	2	3	4	→	4	2	2	3	6688.64855	0.00068
5	2	3	6	→	4	2	2	5	6688.68295	-0.00017
6	3	4	6	→	5	3	3	5	7283.28945	-0.00007
6	3	4	7	→	5	3	3	6	7283.58695	0.00027
6	3	4	5	→	5	3	3	4	7283.62842	-0.00053
7	2	6	7	→	6	2	5	6	7443.08497	-0.00018
7	2	6	6	→	6	2	5	5	7443.14346	-0.00055
7	2	6	8	→	6	2	5	7	7443.15499	0.00010
8	1	8	8	→	7	1	7	7	7444.11336	-0.00017
8	1	8	7	→	7	1	7	6	7444.12226	0.00073
8	1	8	9	→	7	1	7	8	7444.14070	0.00020
8	0	8	8	→	7	0	7	7	7444.15808	0.00206
8	0	8	7	→	7	0	7	6	7444.16767	0.00374
8	0	8	9	→	7	0	7	8	7444.18208	-0.00083
6	2	4	5	→	5	2	3	4	7632.68835	0.00023
6	2	4	7	→	5	2	3	6	7632.73864	0.00010
6	2	4	6	→	5	2	3	5	7632.84410	0.00027
7	3	5	7	→	6	3	4	6	8266.91228	0.00005
7	3	5	8	→	6	3	4	7	8267.05595	-0.00047
7	3	5	6	→	6	3	4	5	8267.06571	0.00140
8	2	7	8	→	7	2	6	7	8321.46235	0.00009
8	2	7	7	→	7	2	6	6	8321.50463	-0.00108
8	2	7	9	→	7	2	6	8	8321.51617	0.00058
7	2	5	6	→	6	2	4	5	8434.54887	-0.00029
7	2	5	8	→	6	2	4	7	8434.57897	0.00011
7	2	5	7	→	6	2	4	6	8434.64321	0.00011
10	0	10	10	→	9	0	9	9	9195.54183	-0.00149
10	1	10	10	→	9	1	9	9	9195.54183	-0.00014
10	0	10	9	→	9	0	9	8	9195.55025	0.00115

10	1	10	9	→	9	1	9	8	9195.55025	0.00250
10	0	10	11	→	9	0	9	10	9195.55999	-0.00162
10	1	10	11	→	9	1	9	10	9195.55999	-0.00027
9	2	8	9	→	8	2	7	8	9197.32056	-0.00050
9	2	8	8	→	8	2	7	7	9197.35325	-0.00317
9	2	8	10	→	8	2	7	9	9197.36726	0.00212
11	0	11	11	→	10	0	10	10	10071.26706	-0.00108
11	1	11	11	→	10	1	10	10	10071.26706	-0.00085
11	0	11	10	→	10	0	10	9	10071.27493	0.00181
11	1	11	10	→	10	1	10	9	10071.27493	0.00205
11	0	11	12	→	10	0	10	11	10071.28220	-0.00138
11	1	11	12	→	10	1	10	11	10071.28220	-0.00114
10	2	9	10	→	9	2	8	9	10072.73311	0.00056
10	2	9	9	→	9	2	8	8	10072.76037	-0.00197
10	2	9	11	→	9	2	8	10	10072.77011	0.00015
10	1	9	10	→	9	1	8	9	10072.85538	0.00069
10	1	9	9	→	9	1	8	8	10072.88261	-0.00169
10	1	9	11	→	9	1	8	10	10072.89201	0.00007
9	3	7	9	→	8	3	6	8	10076.06824	0.00031
9	3	7	8	→	8	3	6	7	10076.11798	-0.00124
9	3	7	10	→	8	3	6	9	10076.12475	0.00118
12	0	12	12	→	11	0	11	11	10946.99920	-0.00130
12	1	12	12	→	11	1	11	11	10946.99920	-0.00126
12	0	12	11	→	11	0	11	10	10947.00473	-0.00008
12	1	12	11	→	11	1	11	10	10947.00473	-0.00004
12	0	12	13	→	11	0	11	12	10947.01517	0.00147
12	1	12	13	→	11	1	11	12	10947.01517	0.00151
10	2	8	10	→	9	2	7	9	10958.18357	0.00107
10	2	8	9	→	9	2	7	8	10958.21793	-0.00052
10	2	8	11	→	9	2	7	10	10958.22418	0.00070
13	0	13	13	→	12	0	12	12	11822.73619	-0.00125
13	1	13	13	→	12	1	12	12	11822.73619	-0.00124
13	0	13	12	→	12	0	12	11	11822.74146	0.00025
13	1	13	12	→	12	1	12	11	11822.74146	0.00025
13	0	13	14	→	12	0	12	13	11822.74956	0.00070
13	1	13	14	→	12	1	12	13	11822.74956	0.00071
14	0	14	14	→	13	0	13	13	12698.47764	0.00032
14	0	14	13	→	13	0	13	12	12698.47764	-0.00300
14	1	14	14	→	13	1	13	13	12698.47764	0.00032
14	1	14	13	→	13	1	13	12	12698.47764	-0.00300
14	0	14	15	→	13	0	13	14	12698.48860	0.00131
14	1	14	15	→	13	1	13	14	12698.48860	0.00131
13	2	12	13	→	12	2	11	12	12699.22653	0.00113
13	1	12	13	→	12	1	11	12	12699.22653	0.00026
13	2	12	12	→	12	2	11	11	12699.24363	-0.00091
13	1	12	12	→	12	1	11	11	12699.24363	-0.00178

13	2	12	14	→	12	2	11	13	12699.25129	0.00147
13	1	12	14	→	12	1	11	13	12699.25129	0.00061
15	0	15	15	→	14	0	14	14	13574.21942	0.00031
15	0	15	14	→	14	0	14	13	13574.21942	-0.00263
15	1	15	15	→	14	1	14	14	13574.21942	0.00031
15	1	15	14	→	14	1	14	13	13574.21942	-0.00263
15	0	15	16	→	14	0	14	15	13574.22917	0.00128
15	1	15	16	→	14	1	14	15	13574.22917	0.00128

Table II(E). Microwave transitions of the $^{13}C_4$ isotopologue of PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
5	0	5	4	→	4	0	4	3	4819.42279	0.00126
5	0	5	5	→	4	0	4	4	4819.42279	-0.00034
5	0	5	6	→	4	0	4	5	4819.46988	-0.00093
6	1	5	5	→	5	1	4	4	6598.10553	0.00272
6	1	5	6	→	5	1	4	5	6598.10553	0.00006
6	1	5	7	→	5	1	4	6	6598.12813	-0.00044
7	2	6	7	→	6	2	5	6	7441.17599	-0.00019
7	2	6	6	→	6	2	5	5	7441.23504	0.00013
7	2	6	8	→	6	2	5	7	7441.24572	-0.00025
8	1	8	8	→	7	1	7	7	7442.48949	-0.00075
8	1	8	7	→	7	1	7	6	7442.50200	0.00393
8	1	8	9	→	7	1	7	8	7442.51765	0.00052
8	0	8	8	→	7	0	7	7	7442.53703	-0.00126
8	0	8	7	→	7	0	7	6	7442.54605	0.00003
8	0	8	9	→	7	0	7	8	7442.56440	-0.00069
6	2	4	5	→	5	2	3	4	7633.75335	0.00016
6	2	4	7	→	5	2	3	6	7633.80348	0.00013
6	2	4	6	→	5	2	3	5	7633.90459	-0.00007
7	3	5	7	→	6	3	4	6	8261.37659	-0.00015
7	3	5	8	→	6	3	4	7	8261.52281	-0.00044
7	3	5	6	→	6	3	4	5	8261.53239	0.00103
7	2	5	6	→	6	2	4	5	8437.99538	0.00004
7	2	5	8	→	6	2	4	7	8438.02579	-0.00006
7	2	5	7	→	6	2	4	6	8438.09288	-0.00015
10	0	10	10	→	9	0	9	9	9193.53347	-0.00161
10	1	10	10	→	9	1	9	9	9193.53347	-0.00003
10	0	10	9	→	9	0	9	8	9193.54122	0.00046
10	1	10	9	→	9	1	9	8	9193.54122	0.00204
10	0	10	11	→	9	0	9	10	9193.55212	-0.00120
10	1	10	11	→	9	1	9	10	9193.55212	0.00038
9	2	8	9	→	8	2	7	8	9195.36167	0.00039
9	2	8	8	→	8	2	7	7	9195.39433	-0.00195
9	2	8	10	→	8	2	7	9	9195.40597	0.00085
11	0	11	11	→	10	0	10	10	10069.06581	-0.00098
11	1	11	11	→	10	1	10	10	10069.06581	-0.00070
11	0	11	10	→	10	0	10	9	10069.07337	0.00169
11	1	11	10	→	10	1	10	9	10069.07337	0.00197
11	0	11	12	→	10	0	10	11	10069.08097	-0.00122
11	1	11	12	→	10	1	10	11	10069.08097	-0.00094
10	2	9	10	→	9	2	8	9	10070.58546	0.00051
10	2	9	9	→	9	2	8	8	10070.61219	-0.00225
10	2	9	11	→	9	2	8	10	10070.62222	0.00007

10	1	9	10	→	9	1	8	9	10070.72563	0.00028
10	1	9	9	→	9	1	8	8	10070.75321	-0.00143
10	1	9	11	→	9	1	8	10	10070.76272	0.00035
9	3	7	9	→	8	3	6	8	10073.59807	0.00002
9	3	7	8	→	8	3	6	7	10073.64765	-0.00158
9	3	7	10	→	8	3	6	9	10073.65477	0.00108
12	0	12	12	→	11	0	11	11	10944.60508	-0.00132
12	1	12	12	→	11	1	11	11	10944.60508	-0.00127
12	0	12	11	→	11	0	11	10	10944.61113	0.00048
12	1	12	11	→	11	1	11	10	10944.61113	0.00053
12	0	12	13	→	11	0	11	12	10944.62124	0.00167
12	1	12	13	→	11	1	11	12	10944.62124	0.00172
10	2	8	10	→	9	2	7	9	10956.44586	0.00071
10	2	8	9	→	9	2	7	8	10956.47908	-0.00107
10	2	8	11	→	9	2	7	10	10956.48622	0.00087
13	0	13	13	→	12	0	12	12	11820.14951	-0.00128
13	1	13	13	→	12	1	12	12	11820.14951	-0.00127
13	0	13	12	→	12	0	12	11	11820.15412	-0.00038
13	1	13	12	→	12	1	12	11	11820.15412	-0.00037
13	0	13	14	→	12	0	12	13	11820.16315	0.00097
13	1	13	14	→	12	1	12	13	11820.16315	0.00098
14	0	14	14	→	13	0	13	13	12695.69771	-0.00051
14	0	14	13	→	13	0	13	12	12695.69771	-0.00378
14	1	14	14	→	13	1	13	13	12695.69771	-0.00051
14	1	14	13	→	13	1	13	12	12695.69771	-0.00378
14	0	14	15	→	13	0	13	14	12695.70942	0.00125
14	1	14	15	→	13	1	13	14	12695.70942	0.00125
13	2	12	13	→	12	2	11	12	12696.47815	0.00139
13	1	12	13	→	12	1	11	12	12696.47815	0.00033
13	2	12	12	→	12	2	11	11	12696.49520	-0.00054
13	1	12	12	→	12	1	11	11	12696.49520	-0.00159
13	2	12	14	→	12	2	11	13	12696.50314	0.00208
13	1	12	14	→	12	1	11	13	12696.50314	0.00103
15	0	15	15	→	14	0	14	14	13571.24798	0.00035
15	0	15	14	→	14	0	14	13	13571.24798	-0.00255
15	1	15	15	→	14	1	14	14	13571.24798	0.00035
15	1	15	14	→	14	1	14	13	13571.24798	-0.00255
15	0	15	16	→	14	0	14	15	13571.25804	0.00165
15	1	15	16	→	14	1	14	15	13571.25804	0.00165

Table II(F). Microwave transitions of the $^{13}C_5$ isotopologue of PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
5	0	5	4	→	4	0	4	3	4801.08732	0.00278
5	0	5	5	→	4	0	4	4	4801.08732	-0.00019
5	0	5	6	→	4	0	4	5	4801.13484	0.00037
7	1	7	7	→	6	1	6	6	6541.55260	-0.00128
7	1	7	6	→	6	1	6	5	6541.56375	0.00076
7	1	7	8	→	6	1	6	7	6541.58715	-0.00050
7	0	7	7	→	6	0	6	6	6541.83626	-0.00181
7	0	7	6	→	6	0	6	5	6541.84723	0.00074
7	0	7	8	→	6	0	6	7	6541.87086	-0.00040
7	2	6	7	→	6	2	5	6	7412.05938	-0.00001
7	2	6	6	→	6	2	5	5	7412.11764	-0.00049
7	2	6	8	→	6	2	5	7	7412.12941	-0.00002
8	1	8	8	→	7	1	7	7	7413.74130	-0.00043
8	1	8	7	→	7	1	7	6	7413.75080	0.00144
8	1	8	9	→	7	1	7	8	7413.76853	-0.00005
8	0	8	8	→	7	0	7	7	7413.79607	-0.00100
8	0	8	7	→	7	0	7	6	7413.80578	0.00119
8	0	8	9	→	7	0	7	8	7413.82295	-0.00087
6	2	4	5	→	5	2	3	4	7607.13293	-0.00130
6	2	4	7	→	5	2	3	6	7607.18528	0.00116
6	2	4	6	→	5	2	3	5	7607.27973	-0.00080
7	3	5	7	→	6	3	4	6	8224.81810	0.00061
7	3	5	8	→	6	3	4	7	8224.96624	-0.00089
7	3	5	6	→	6	3	4	5	8224.97649	0.00096
7	2	5	6	→	6	2	4	5	8411.77221	0.00065
7	2	5	8	→	6	2	4	7	8411.80284	-0.00023
7	2	5	7	→	6	2	4	6	8411.87374	0.00012
10	0	10	10	→	9	0	9	9	9158.01828	-0.00132
10	1	10	10	→	9	1	9	9	9158.01828	0.00059
10	0	10	9	→	9	0	9	8	9158.02662	0.00146
10	1	10	9	→	9	1	9	8	9158.02662	0.00336
10	0	10	11	→	9	0	9	10	9158.03659	-0.00123
10	1	10	11	→	9	1	9	10	9158.03659	0.00068
9	2	8	9	→	8	2	7	8	9159.89637	-0.00001
9	2	8	8	→	8	2	7	7	9159.92985	-0.00118
9	2	8	10	→	8	2	7	9	9159.94104	0.00102
11	0	11	11	→	10	0	10	10	10030.16527	-0.00163
11	1	11	11	→	10	1	10	10	10030.16527	-0.00129
11	0	11	10	→	10	0	10	9	10030.17197	0.00027
11	1	11	10	→	10	1	10	9	10030.17197	0.00061
11	0	11	12	→	10	0	10	11	10030.18328	0.00099
11	1	11	12	→	10	1	10	11	10030.18328	0.00134

10	2	9	10	→	9	2	8	9	10031.74644	0.00056
10	2	9	9	→	9	2	8	8	10031.77264	-0.00244
10	2	9	11	→	9	2	8	10	10031.78334	0.00043
10	1	9	10	→	9	1	8	9	10031.91122	0.00051
10	1	9	9	→	9	1	8	8	10031.93739	-0.00229
10	1	9	11	→	9	1	8	10	10031.94789	0.00035
9	2	7	9	→	8	2	6	8	10054.92512	0.00167
9	2	7	8	→	8	2	6	7	10054.94628	-0.00154
9	2	7	10	→	8	2	6	9	10054.95590	0.00036
12	0	12	12	→	11	0	11	11	10902.32193	-0.00067
12	1	12	12	→	11	1	11	11	10902.32193	-0.00061
12	0	12	11	→	11	0	11	10	10902.32679	0.00002
12	1	12	11	→	11	1	11	10	10902.32679	0.00008
12	0	12	13	→	11	0	11	12	10902.33622	0.00046
12	1	12	13	→	11	1	11	12	10902.33622	0.00052
10	2	8	10	→	9	2	7	9	10914.95904	0.00045
10	2	8	9	→	9	2	7	8	10914.99188	-0.00061
10	2	8	11	→	9	2	7	10	10914.99912	0.00121
13	0	13	13	→	12	0	12	12	11774.48276	-0.00061
13	0	13	12	→	12	0	12	11	11774.48276	-0.00426
13	1	13	13	→	12	1	12	12	11774.48276	-0.00059
13	1	13	12	→	12	1	12	11	11774.48276	-0.00425
13	0	13	14	→	12	0	12	13	11774.49634	0.00159
13	1	13	14	→	12	1	12	13	11774.49634	0.00160
14	0	14	14	→	13	0	13	13	12646.64593	-0.00145
14	0	14	13	→	13	0	13	12	12646.64593	-0.00467
14	1	14	14	→	13	1	13	13	12646.64593	-0.00145
14	1	14	13	→	13	1	13	12	12646.64593	-0.00467
14	0	14	15	→	13	0	13	14	12646.66007	0.00275
14	1	14	15	→	13	1	13	14	12646.66007	0.00275
15	0	15	15	→	14	0	14	14	13518.81359	0.00006
15	0	15	14	→	14	0	14	13	13518.81359	-0.00279
15	1	15	15	→	14	1	14	14	13518.81359	0.00006
15	1	15	14	→	14	1	14	13	13518.81359	-0.00279
15	0	15	16	→	14	0	14	15	13518.82421	0.00193
15	1	15	16	→	14	1	14	15	13518.82421	0.00193

Table II(G). Microwave transitions of the ^{15}N isotopologue of PFBN in MHz

J'	$K_{a'}$	$K_{c'}$	→	J"	$K_{a"}$	$K_{c"}$	$\nu_{obs.}$	$\nu_{obs. - calc.}$
7	2	6	→	6	2	5	7364.76191	0.00380
8	1	8	→	7	1	7	7367.08546	0.00041
8	0	8	→	7	0	7	7367.15458	0.00032
7	1	6	→	6	1	5	7380.53567	0.00009
9	1	9	→	8	1	8	8233.72603	-0.00120
9	0	9	→	8	0	8	8233.74167	0.00095
8	2	7	→	7	2	6	8235.24969	0.00322
8	1	7	→	7	1	6	8239.28610	0.00192
10	0	10	→	9	0	9	9100.37433	0.00078
10	1	10	→	9	1	9	9100.37433	0.00334
9	2	8	→	8	2	7	9102.34863	0.00315
9	1	8	→	8	1	7	9103.30106	0.00250
11	0	11	→	10	0	10	9967.02542	0.00060
11	1	11	→	10	1	10	9967.02542	0.00107
10	2	9	→	9	2	8	9968.72322	0.00293
10	1	9	→	9	1	8	9968.93534	0.00251
12	1	12	→	11	1	11	10833.68674	0.00122
12	0	12	→	11	0	11	10833.68674	0.00113
11	2	10	→	10	2	9	10835.04765	0.00273
11	1	10	→	10	1	9	10835.09371	0.00336
13	0	13	→	12	0	12	11700.35264	0.00053
13	1	13	→	12	1	12	11700.35264	0.00054
12	2	11	→	11	2	10	11701.44423	0.00303
12	1	11	→	11	1	10	11701.45551	0.00491
14	0	14	→	13	0	13	12567.02333	0.00102
14	1	14	→	13	1	13	12567.02333	0.00103
13	2	12	→	12	2	11	12567.91226	0.00380
13	1	12	→	12	1	11	12567.91226	0.00191
15	0	15	→	14	0	14	13433.69613	0.00119
15	1	15	→	14	1	14	13433.69613	0.00119

Appendix III. Microwave transitions of 2-fluorobenzonitrile (2FBN) and its minor isotopologues

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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Table III(A). Microwave transitions of the parent 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
2	0	2	2	→	1	0	1	2	4905.86534	-0.00053
2	0	2	1	→	1	0	1	0	4905.98867	0.00087
2	0	2	2	→	1	0	1	1	4907.12284	0.00245
2	0	2	3	→	1	0	1	2	4907.15418	0.00022
2	0	2	1	→	1	0	1	1	4909.12529	0.00070
2	1	1	2	→	1	1	0	1	5535.70300	0.00038
2	1	1	3	→	1	1	0	2	5537.00533	0.00104
2	1	1	1	→	1	1	0	0	5538.28810	0.00202
3	0	3	3	→	2	1	2	2	6075.45601	-0.00009
3	0	3	4	→	2	1	2	3	6076.09376	0.00028
3	0	3	2	→	2	1	2	1	6076.18579	-0.00086
3	1	3	3	→	2	1	2	3	6696.42411	-0.00056
3	1	3	3	→	2	1	2	2	6697.05762	0.00006
3	1	3	2	→	2	1	2	1	6697.40678	-0.00180
3	1	3	4	→	2	1	2	3	6697.41517	0.00092
3	1	3	2	→	2	1	2	2	6698.39328	-0.00071
3	0	3	3	→	2	0	2	3	7104.31487	-0.00063
3	0	3	2	→	2	0	2	1	7105.31542	0.00005
3	0	3	4	→	2	0	2	3	7105.58636	0.00058
3	0	3	3	→	2	0	2	2	7105.60303	-0.00056
3	0	3	2	→	2	0	2	2	7107.31906	-0.00051
7	2	5	7	→	7	2	6	7	7254.83259	0.00030
7	2	5	8	→	7	2	6	8	7254.97781	0.00123
7	2	5	6	→	7	2	6	6	7254.99484	-0.00254
3	2	2	3	→	2	2	1	2	7532.99562	0.00036
3	2	2	4	→	2	2	1	3	7534.33989	0.00088
3	2	2	2	→	2	2	1	1	7535.08634	0.00039
3	1	3	2	→	2	0	2	1	7726.53763	0.00034
3	1	3	4	→	2	0	2	3	7726.90673	0.00019
3	1	3	3	→	2	0	2	2	7727.20511	0.00005
4	2	3	3	→	4	1	4	3	7789.31030	-0.00024
4	2	3	5	→	4	1	4	5	7789.45829	-0.00155
4	2	3	4	→	4	1	4	4	7790.04021	-0.00031
3	2	1	3	→	2	2	0	2	7961.44373	0.00013
3	2	1	4	→	2	2	0	3	7962.85588	0.00076
3	2	1	2	→	2	2	0	1	7963.61407	-0.00018
4	2	3	3	→	4	0	4	3	8110.26973	0.00008
4	2	3	5	→	4	0	4	5	8110.44911	-0.00011
4	2	3	4	→	4	0	4	4	8111.14688	-0.00048
3	1	2	3	→	2	1	1	3	8221.73116	-0.00121

3	1	2	3	→	2	1	1	2	8222.44406	0.00051
3	1	2	2	→	2	1	1	1	8222.77286	0.00149
3	1	2	4	→	2	1	1	3	8222.79502	0.00017
3	1	2	2	→	2	1	1	2	8223.87746	-0.00077
4	0	4	4	→	3	1	3	3	8506.55045	0.00031
4	0	4	3	→	3	1	3	2	8506.79155	0.00097
4	0	4	5	→	3	1	3	4	8506.81455	-0.00002
4	3	2	3	→	4	2	3	3	8771.10089	0.00023
4	3	2	5	→	4	2	3	5	8771.36333	0.00006
4	3	2	4	→	4	2	3	4	8772.38488	0.00049
4	1	4	4	→	3	1	3	4	8826.66620	-0.00120
4	1	4	4	→	3	1	3	3	8827.65692	-0.00006
4	1	4	3	→	3	1	3	2	8827.74925	-0.00044
4	1	4	5	→	3	1	3	4	8827.80433	0.00038
4	1	4	3	→	3	1	3	3	8829.08543	-0.00070
4	0	4	4	→	3	0	3	4	9126.87957	-0.00175
4	0	4	3	→	3	0	3	2	9128.01240	-0.00010
4	0	4	5	→	3	0	3	4	9128.13572	0.00039
4	0	4	4	→	3	0	3	3	9128.15141	-0.00019
4	0	4	3	→	3	0	3	3	9129.72697	-0.00151
5	2	4	4	→	5	1	5	4	9183.83911	0.00072
5	2	4	6	→	5	1	5	6	9183.91482	-0.00052
5	2	4	5	→	5	1	5	5	9184.29320	0.00009
5	2	4	4	→	5	0	5	4	9332.13773	-0.00031
5	2	4	6	→	5	0	5	6	9332.22403	-0.00034
5	2	4	5	→	5	0	5	5	9332.64752	-0.00049
4	1	4	3	→	3	0	3	2	9448.97132	-0.00030
4	1	4	5	→	3	0	3	4	9449.12497	0.00026
4	1	4	4	→	3	0	3	3	9449.25825	-0.00019
6	1	5	5	→	6	1	6	5	9647.39347	-0.00301
6	1	5	7	→	6	1	6	7	9647.40628	0.00127
6	1	5	6	→	6	1	6	6	9647.45640	0.00088
2	2	1	3	→	1	1	0	2	9820.71753	0.00080
2	2	1	1	→	1	1	0	0	9820.85904	0.00267
2	2	1	2	→	1	1	0	1	9821.47104	0.00100
8	2	6	8	→	8	2	7	8	9848.20562	0.00059
8	2	6	9	→	8	2	7	9	9848.29744	-0.00160
8	2	6	7	→	8	2	7	7	9848.31427	0.00341
4	2	3	4	→	3	2	2	3	9953.91287	-0.00037
4	2	3	5	→	3	2	2	4	9954.46977	0.00061
4	2	3	3	→	3	2	2	2	9954.61141	-0.00058
4	3	2	4	→	3	3	1	3	10233.96318	0.00022
4	3	2	5	→	3	3	1	4	10235.22606	0.00107

4	3	2	3	→	3	3	1	2	10235.70957	-0.00058
4	3	1	4	→	3	3	0	3	10330.93092	0.00009
4	3	1	5	→	3	3	0	4	10332.21870	0.00092
4	3	1	3	→	3	3	0	2	10332.70824	-0.00031
5	1	4	5	→	4	2	3	4	10399.85695	0.00056
5	1	4	6	→	4	2	3	5	10400.51728	0.00142
5	1	4	4	→	4	2	3	3	10400.62002	-0.00039
2	2	0	3	→	1	1	1	2	10450.41614	0.00132
2	2	0	1	→	1	1	1	0	10450.69694	0.00212
2	2	0	2	→	1	1	1	1	10451.04108	0.00181
5	0	5	5	→	4	1	4	4	10758.11227	-0.00009
5	0	5	4	→	4	1	4	3	10758.19463	-0.00070
5	0	5	6	→	4	1	4	5	10758.23241	0.00063
4	1	3	4	→	3	1	2	4	10785.80684	-0.00145
4	1	3	4	→	3	1	2	3	10786.87089	0.00013
4	1	3	3	→	3	1	2	2	10786.92779	0.00015
4	1	3	5	→	3	1	2	4	10786.99510	0.00051
4	1	3	3	→	3	1	2	3	10788.36145	-0.00088
6	2	5	5	→	6	0	6	5	10864.90153	-0.00191
6	2	5	7	→	6	0	6	7	10864.95180	0.00002
6	2	5	6	→	6	0	6	6	10865.23677	-0.00115
4	2	2	4	→	3	2	1	4	10869.03183	-0.00065
4	2	2	4	→	3	2	1	3	10869.15633	0.00043
4	2	2	5	→	3	2	1	4	10869.75988	0.00077
4	2	2	3	→	3	2	1	2	10869.90308	0.00045
4	2	2	3	→	3	2	1	3	10870.06938	-0.00028
5	1	5	5	→	4	1	4	5	10905.32989	-0.00083
5	1	5	5	→	4	1	4	4	10906.46778	0.00052
5	1	5	4	→	4	1	4	3	10906.49353	-0.00144
5	1	5	6	→	4	1	4	5	10906.54126	0.00045
5	1	5	4	→	4	1	4	4	10907.92172	-0.00240
5	0	5	5	→	4	0	4	5	11077.96357	-0.00162
5	0	5	4	→	4	0	4	3	11079.15447	0.00002
5	0	5	6	→	4	0	4	5	11079.22043	-0.00073
5	0	5	5	→	4	0	4	4	11079.22043	0.00123
5	0	5	4	→	4	0	4	4	11080.72943	-0.00189
5	3	3	4	→	5	1	4	4	11181.79892	-0.00076
5	3	3	6	→	5	1	4	6	11182.00940	-0.00050
5	3	3	5	→	5	1	4	5	11183.04106	-0.00082
6	3	4	5	→	6	1	5	5	11221.09636	-0.00093
6	3	4	7	→	6	1	5	7	11221.20555	-0.00103
6	3	4	6	→	6	1	5	6	11221.85333	-0.00057
5	1	5	4	→	4	0	4	3	11227.45370	-0.00039

5	1	5	6	→	4	0	4	5	11227.53142	0.00124
5	1	5	5	→	4	0	4	4	11227.57316	-0.00094
7	3	5	6	→	7	1	6	6	11768.52030	-0.00087
7	3	5	8	→	7	1	6	8	11768.57914	-0.00019
7	3	5	7	→	7	1	6	7	11768.98165	-0.00079
3	2	2	2	→	2	1	1	1	11817.65696	0.00072
3	2	2	4	→	2	1	1	3	11818.05209	0.00063
3	2	2	3	→	2	1	1	2	11818.76222	-0.00046
7	1	6	6	→	7	1	7	6	11960.80354	-0.00307
7	1	6	8	→	7	1	7	8	11960.82218	0.00154
7	1	6	7	→	7	1	7	7	11960.91820	0.00032
5	2	4	5	→	4	2	3	5	12300.16263	-0.00136
5	2	4	5	→	4	2	3	4	12300.72018	0.00032
5	2	4	6	→	4	2	3	5	12300.99691	0.00061
5	2	4	4	→	4	2	3	3	12301.02204	-0.00079
5	2	4	4	→	4	2	3	4	12301.72124	-0.00076
7	2	6	6	→	7	0	7	6	12609.52606	0.00140
7	2	6	8	→	7	0	7	8	12609.55476	-0.00100
7	2	6	7	→	7	0	7	7	12609.76957	-0.00156
8	3	6	7	→	8	1	7	7	12808.39598	0.00170
8	3	6	9	→	8	1	7	9	12808.42527	-0.00130
8	3	6	8	→	8	1	7	8	12808.68250	-0.00031
5	3	3	5	→	4	3	2	4	12810.51412	0.00024
5	3	3	6	→	4	3	2	5	12811.16288	0.00038
5	3	3	4	→	4	3	2	3	12811.31890	-0.00053
5	4	2	5	→	4	4	1	4	12811.61583	0.00123
5	4	2	6	→	4	4	1	5	12812.76528	0.00141
5	4	2	4	→	4	4	1	3	12813.10485	0.00083
5	4	1	5	→	4	4	0	4	12827.28989	-0.00034
5	4	1	6	→	4	4	0	5	12828.44381	-0.00008
5	4	1	4	→	4	4	0	3	12828.78443	-0.00046
6	0	6	6	→	5	1	5	5	12884.18750	-0.00063
6	0	6	5	→	5	1	5	4	12884.21591	0.00026
6	0	6	7	→	5	1	5	6	12884.24783	0.00003
6	1	6	6	→	5	1	5	6	12946.67643	-0.00128
6	1	6	6	→	5	1	5	5	12947.88522	-0.00258
6	1	6	5	→	5	1	5	4	12947.89673	0.00133
6	1	6	5	→	5	1	5	5	12949.35128	-0.00098
6	0	6	6	→	5	0	5	6	13031.28598	-0.00109
6	0	6	5	→	5	0	5	4	13032.51593	0.00063
6	0	6	6	→	5	0	5	5	13032.54204	-0.00100
6	0	6	7	→	5	0	5	6	13032.55708	0.00026
6	0	6	5	→	5	0	5	5	13034.02594	-0.00148

6	1	6	5	→	5	0	5	4	13096.19492	-0.00012
6	1	6	7	→	5	0	5	6	13096.24138	0.00191
6	1	6	6	→	5	0	5	5	13096.24138	-0.00132
5	3	2	5	→	4	3	1	4	13123.76954	0.00035
5	3	2	6	→	4	3	1	5	13124.46401	0.00057
5	3	2	4	→	4	3	1	3	13124.62823	0.00033
5	1	4	5	→	4	1	3	5	13162.03043	-0.00126
5	1	4	4	→	4	1	3	3	13163.18879	-0.00084
5	1	4	5	→	4	1	3	4	13163.21836	0.00036
5	1	4	6	→	4	1	3	5	13163.24738	0.00034
5	1	4	4	→	4	1	3	4	13164.68006	-0.00113
6	1	5	6	→	5	2	4	5	13411.05014	-0.00007
6	1	5	7	→	5	2	4	6	13411.42122	0.00111
6	1	5	5	→	5	2	4	4	13411.45196	-0.00152
4	2	3	3	→	3	1	2	2	13549.49635	-0.00050
4	2	3	5	→	3	1	2	4	13549.72660	0.00083
4	2	3	4	→	3	1	2	3	13550.23304	0.00067
5	2	3	5	→	4	2	2	5	13761.83780	-0.00135
5	2	3	5	→	4	2	2	4	13762.56517	-0.00061
5	2	3	6	→	4	2	2	5	13762.85758	-0.00028
5	2	3	4	→	4	2	2	3	13762.87869	0.00024
5	2	3	4	→	4	2	2	4	13763.79046	-0.00175
3	2	1	2	→	2	1	2	1	13904.05689	0.00175
3	2	1	4	→	2	1	2	3	13904.36367	-0.00037
3	2	1	3	→	2	1	2	2	13904.87302	-0.00051
8	1	7	7	→	8	1	8	7	14167.56427	0.00103
8	1	7	9	→	8	1	8	9	14167.58041	0.00159
8	1	7	8	→	8	1	8	8	14167.70124	-0.00126
6	2	5	6	→	5	2	4	6	14564.29897	-0.00165
6	2	5	6	→	5	2	4	5	14565.13316	0.00022
6	2	5	5	→	5	2	4	4	14565.28074	0.00004
6	2	5	7	→	5	2	4	6	14565.28542	0.00119
6	2	5	5	→	5	2	4	5	14566.28127	-0.00157
7	0	7	7	→	6	1	6	6	14940.53475	-0.00038
7	0	7	6	→	6	1	6	5	14940.54617	0.00265
7	0	7	8	→	6	1	6	7	14940.56907	-0.00034
7	1	7	6	→	6	1	6	5	14966.57981	-0.00095
7	1	7	7	→	6	1	6	6	14966.57981	0.00043
7	1	7	8	→	6	1	6	7	14966.60779	0.00025
7	0	7	6	→	6	0	6	5	15004.22203	-0.00124
7	0	7	7	→	6	0	6	6	15004.23495	0.00015
7	0	7	8	→	6	0	6	7	15004.25261	0.00056
7	1	7	6	→	6	0	6	5	15030.25956	-0.00095

7	1	7	7	→	6	0	6	6	15030.27808	-0.00097
7	1	7	8	→	6	0	6	7	15030.29104	0.00085
5	2	4	4	→	4	1	3	3	15063.59146	-0.00058
5	2	4	6	→	4	1	3	5	15063.72783	0.00035
5	2	4	5	→	4	1	3	4	15064.08221	0.00074
6	1	5	5	→	5	1	4	4	15311.85709	0.00119
6	1	5	7	→	5	1	4	6	15311.89969	-0.00086
6	1	5	6	→	5	1	4	5	15311.91412	0.00044
6	3	4	6	→	5	3	3	5	15350.72737	0.00167
6	3	4	7	→	5	3	3	6	15351.09872	0.00149
6	3	4	5	→	5	3	3	4	15351.15441	0.00090
6	5	2	6	→	5	5	1	5	15362.23200	-0.00010
6	5	2	7	→	5	5	1	6	15363.27474	0.00154
6	5	2	5	→	5	5	1	4	15363.52379	-0.00060
6	5	1	6	→	5	5	0	5	15364.35909	-0.00052
6	5	1	7	→	5	5	0	6	15365.40171	0.00041
6	5	1	5	→	5	5	0	4	15365.65239	-0.00019
6	4	3	6	→	5	4	2	5	15440.18142	0.00006
6	4	3	7	→	5	4	2	6	15440.85713	0.00081
6	4	3	5	→	5	4	2	4	15440.99876	-0.00057
6	4	2	6	→	5	4	1	5	15507.79116	-0.00001
6	4	2	7	→	5	4	1	6	15508.47915	0.00039
6	4	2	5	→	5	4	1	4	15508.62311	-0.00056
3	3	1	4	→	2	2	0	3	15909.30822	0.00083
3	3	1	2	→	2	2	0	1	15909.41855	0.00012
3	3	1	3	→	2	2	0	2	15909.74803	0.00147
3	3	0	4	→	2	2	1	3	16041.70658	-0.00041
3	3	0	2	→	2	2	1	1	16041.85302	0.00114
3	3	0	3	→	2	2	1	2	16042.08334	0.00112
6	3	3	6	→	5	3	2	5	16068.83235	-0.00026
6	3	3	7	→	5	3	2	6	16069.26068	0.00040
6	3	3	5	→	5	3	2	4	16069.32084	-0.00244
6	2	5	5	→	5	1	4	4	16465.68358	0.00047
6	2	5	7	→	5	1	4	6	16465.76408	-0.00059
6	2	5	6	→	5	1	4	5	16465.99614	-0.00027
6	2	4	6	→	5	2	3	5	16533.03655	0.00009
6	2	4	5	→	5	2	3	4	16533.16443	-0.00121
6	2	4	7	→	5	2	3	6	16533.17852	0.00109
7	2	6	7	→	6	2	5	6	16748.76793	-0.00008
7	2	6	6	→	6	2	5	5	16748.84327	-0.00122
7	2	6	8	→	6	2	5	7	16748.85696	0.00093
8	1	8	7	→	7	1	7	6	16973.27093	-0.00023
8	1	8	8	→	7	1	7	7	16973.27093	-0.00047

8	1	8	9	→	7	1	7	8	16973.29249	0.00046
8	0	8	7	→	7	0	7	6	16989.02348	-0.00140
8	0	8	8	→	7	0	7	7	16989.03093	0.00122
8	0	8	9	→	7	0	7	8	16989.04594	-0.00043
8	1	8	7	→	7	0	7	6	16999.30633	-0.00207
8	1	8	8	→	7	0	7	7	16999.31664	0.00098
8	1	8	9	→	7	0	7	8	16999.33107	0.00090
7	1	6	6	→	6	1	5	5	17279.99155	0.00065
7	1	6	8	→	6	1	5	7	17280.02369	0.00052
7	1	6	7	→	6	1	5	6	17280.04185	0.00011
7	3	5	7	→	6	3	4	6	17827.17044	0.00016
7	3	5	8	→	6	3	4	7	17827.39648	0.00056
7	3	5	6	→	6	3	4	5	17827.41450	-0.00028
7	2	6	6	→	6	1	5	5	17902.67167	-0.00004
7	2	6	8	→	6	1	5	7	17902.71926	-0.00089
7	2	6	7	→	6	1	5	6	17902.85197	0.00124
7	5	3	7	→	6	5	2	6	17994.92253	0.00058
7	5	3	8	→	6	5	2	7	17995.58802	0.00038
7	5	3	6	→	6	5	2	5	17995.71133	0.00017
7	5	2	7	→	6	5	1	6	18006.29127	-0.00046
7	5	2	8	→	6	5	1	7	18006.95956	-0.00012
7	5	2	6	→	6	5	1	5	18007.08338	-0.00014
7	4	4	7	→	6	4	3	6	18078.21441	0.00021
7	4	4	8	→	6	4	3	7	18078.64374	0.00055
7	4	4	6	→	6	4	3	5	18078.70966	0.00076
4	3	2	3	→	3	2	1	2	18181.51497	0.00064
4	3	2	5	→	3	2	1	4	18181.67736	0.00010
4	3	2	4	→	3	2	1	3	18182.26672	0.00080
7	4	3	7	→	6	4	2	6	18287.32100	-0.00042
7	4	3	8	→	6	4	2	7	18287.77708	-0.00009
7	4	3	6	→	6	4	2	5	18287.84549	-0.00080
8	2	7	8	→	7	2	6	7	18863.42039	-0.00004
8	2	7	7	→	7	2	6	6	18863.46095	-0.00106
8	2	7	9	→	7	2	6	8	18863.47492	0.00012
9	1	9	8	→	8	1	8	7	18974.30052	0.00006
9	1	9	9	→	8	1	8	8	18974.30052	-0.00038
9	1	9	10	→	8	1	8	9	18974.31636	-0.00074
9	0	9	8	→	8	0	8	7	18980.62654	0.00046
9	0	9	9	→	8	0	8	8	18980.62654	-0.00157
9	0	9	10	→	8	0	8	9	18980.64283	-0.00008
7	3	4	7	→	6	3	3	6	19100.63053	-0.00009
7	3	4	8	→	6	3	3	7	19100.90284	0.00141
7	3	4	6	→	6	3	3	5	19100.92109	-0.00239

7	2	5	7	→	6	2	4	6	19114.57701	0.00051
7	2	5	6	→	6	2	4	5	19114.61276	0.00041
7	2	5	8	→	6	2	4	7	19114.63290	0.00017
8	1	7	7	→	7	1	6	6	19180.02922	0.00143
8	1	7	9	→	7	1	6	8	19180.04894	-0.00127
8	1	7	8	→	7	1	6	7	19180.05638	0.00035
8	3	6	8	→	7	3	5	7	20219.75674	0.00034
8	3	6	9	→	7	3	5	8	20219.89891	0.00146
8	3	6	7	→	7	3	5	6	20219.89891	-0.00199
8	6	3	8	→	7	6	2	7	20536.51025	-0.00057
8	6	3	9	→	7	6	2	8	20537.15427	0.00088
8	6	3	7	→	7	6	2	6	20537.25936	0.00046
8	6	2	8	→	7	6	1	7	20538.16026	0.00040
8	6	2	9	→	7	6	1	8	20538.80173	-0.00103
8	6	2	7	→	7	6	1	6	20538.90781	-0.00050
8	5	4	8	→	7	5	3	7	20654.14172	0.00027
8	5	4	9	→	7	5	3	8	20654.59492	0.00060
8	5	4	7	→	7	5	3	6	20654.65917	-0.00048
8	5	3	8	→	7	5	2	7	20697.59510	0.00019
8	5	3	9	→	7	5	2	8	20698.05466	0.00043
8	5	3	7	→	7	5	2	6	20698.12039	0.00011
8	4	5	8	→	7	4	4	7	20702.14348	0.00038
8	4	5	9	→	7	4	4	8	20702.42974	0.00088
8	4	5	7	→	7	4	4	6	20702.45777	-0.00208
9	2	8	9	→	8	2	7	8	20927.03302	-0.00004
9	2	8	10	→	8	2	7	9	20927.07055	0.00124
10	1	10	9	→	9	1	9	8	20972.88932	-0.00097
10	1	10	10	→	9	1	9	9	20972.88932	-0.00123
10	1	10	11	→	9	1	9	10	20972.90555	0.00171
10	0	10	9	→	9	0	9	8	20975.35439	-0.00077
10	0	10	10	→	9	0	9	9	20975.35439	-0.00156
10	0	10	11	→	9	0	9	10	20975.37050	0.00174
9	1	8	9	→	8	1	7	8	21092.48816	-0.00071
9	1	8	10	→	8	1	7	9	21092.49772	0.00218
8	4	4	8	→	7	4	3	7	21208.82633	0.00020
8	4	4	9	→	7	4	3	8	21209.15679	0.00189
8	4	4	7	→	7	4	3	6	21209.18906	-0.00143
8	3	5	8	→	7	3	4	7	22081.81342	-0.00023
8	3	5	9	→	7	3	4	8	22081.97696	0.00171
8	3	5	7	→	7	3	4	6	22081.97696	-0.00102
9	3	7	9	→	8	3	6	8	22519.23883	-0.00076
9	3	7	8	→	8	3	6	7	22519.32759	0.00172
9	3	7	10	→	8	3	6	9	22519.32759	-0.00136

10	2	9	10	→	9	2	8	9	22957.79988	0.00043
10	2	9	11	→	9	2	8	10	22957.82657	0.00073
11	1	11	10	→	10	1	10	9	22970.51058	-0.00115
11	1	11	11	→	10	1	10	10	22970.51058	-0.00119
11	1	11	12	→	10	1	10	11	22970.52588	0.00291
11	0	11	10	→	10	0	10	9	22971.44915	-0.00137
11	0	11	11	→	10	0	10	10	22971.44915	-0.00161
11	0	11	12	→	10	0	10	11	22971.46516	0.00337
10	1	9	10	→	9	1	8	9	23036.90272	-0.00051
10	1	9	9	→	9	1	8	8	23036.90272	-0.00168
10	1	9	11	→	9	1	8	10	23036.91790	0.00145
9	4	6	9	→	8	4	5	8	23282.68542	0.00090
9	4	6	10	→	8	4	5	9	23282.87879	-0.00039
9	4	6	8	→	8	4	5	7	23282.89473	0.00171
9	2	7	8	→	8	2	6	7	23546.51059	0.00036
9	2	7	10	→	8	2	6	9	23546.53080	0.00073
9	2	7	9	→	8	2	6	8	23546.55135	-0.00154
9	4	5	9	→	8	4	4	8	24277.14024	0.00118
9	4	5	10	→	8	4	4	9	24277.38536	0.00067
9	4	5	8	→	8	4	4	7	24277.40251	-0.00048
10	3	8	10	→	9	3	7	9	24728.36485	-0.00206
10	3	8	9	→	9	3	7	8	24728.41737	-0.00123
10	3	8	11	→	9	3	7	10	24728.42639	0.00212
9	3	6	9	→	8	3	5	8	24895.52780	-0.00161
9	3	6	8	→	8	3	5	7	24895.60570	-0.00183
12	1	12	12	→	11	1	11	11	24967.78088	-0.00226
12	1	12	11	→	11	1	11	10	24967.78088	-0.00237
12	1	12	13	→	11	1	11	12	24967.79463	0.00190
12	0	12	12	→	11	0	11	11	24968.13194	-0.00245
12	0	12	11	→	11	0	11	10	24968.13194	-0.00249

Table III(B). Microwave transitions of the $^{13}C_1$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
3	1	3	3	→	2	1	2	2	6692.91526	0.00034
3	1	3	4	→	2	1	2	3	6693.27229	0.00043
3	0	3	2	→	2	0	2	1	7100.79991	-0.00066
3	0	3	4	→	2	0	2	3	7101.07178	0.00096
3	0	3	3	→	2	0	2	2	7101.08540	-0.00240
3	1	2	3	→	2	1	1	2	8217.84685	0.00022
3	1	2	4	→	2	1	1	3	8218.19763	-0.00044
4	1	4	4	→	3	1	3	3	8822.09975	-0.00017
4	1	4	3	→	3	1	3	2	8822.19318	0.00042
4	1	4	5	→	3	1	3	4	8822.24729	0.00012
4	0	4	3	→	3	0	3	2	9122.00987	-0.00011
4	0	4	5	→	3	0	3	4	9122.13332	0.00059
4	0	4	4	→	3	0	3	3	9122.14779	-0.00041
4	2	3	4	→	3	2	2	3	9948.09425	0.00089
4	2	3	5	→	3	2	2	4	9948.64961	0.00017
4	2	3	3	→	3	2	2	2	9948.79257	0.00027
4	1	3	4	→	3	1	2	3	10780.60620	0.00041
4	1	3	3	→	3	1	2	2	10780.66314	-0.00018
4	1	3	5	→	3	1	2	4	10780.73043	0.00045
4	2	2	4	→	3	2	1	3	10863.56780	-0.00004
4	2	2	5	→	3	2	1	4	10864.17074	0.00034
4	2	2	3	→	3	2	1	2	10864.31320	-0.00068
5	1	5	5	→	4	1	4	4	10899.50651	0.00119
5	1	5	4	→	4	1	4	3	10899.53156	-0.00165
5	1	5	6	→	4	1	4	5	10899.57949	0.00036
5	0	5	4	→	4	0	4	3	11071.82581	-0.00083
5	0	5	6	→	4	0	4	5	11071.89286	-0.00049
5	0	5	5	→	4	0	4	4	11071.89286	0.00208
5	2	4	5	→	4	2	3	4	12293.37086	0.00126
5	2	4	6	→	4	2	3	5	12293.64682	0.00053
5	2	4	4	→	4	2	3	3	12293.67049	-0.00236
6	1	6	6	→	5	1	5	5	12939.54520	-0.00157
6	1	6	5	→	5	1	5	4	12939.55678	0.00223
6	0	6	5	→	5	0	5	4	13023.94332	0.00034
6	0	6	6	→	5	0	5	5	13023.96908	-0.00125
6	0	6	7	→	5	0	5	6	13023.98477	0.00024
5	3	2	5	→	4	3	1	4	13116.99216	-0.00120
5	3	2	6	→	4	3	1	5	13117.68775	0.00062
5	3	2	4	→	4	3	1	3	13117.85180	0.00027
5	1	4	4	→	4	1	3	3	13155.12218	-0.00108
5	1	4	5	→	4	1	3	4	13155.15178	0.00093

5	1	4	6	→	4	1	3	5	13155.18093	0.00047

Table III(C). Microwave transitions of the $^{13}C_2$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$

3	1	3	3	→	2	1	2	2	6689.63540	0.00065
3	1	3	4	→	2	1	2	3	6689.99236	0.00021
3	0	3	4	→	2	0	2	3	7096.37044	0.00047
3	0	3	3	→	2	0	2	2	7096.38788	0.00018
3	1	2	3	→	2	1	1	2	8218.89197	-0.00036
3	1	2	2	→	2	1	1	1	8219.22096	0.00010
3	1	2	4	→	2	1	1	3	8219.24323	-0.00079
4	1	4	4	→	3	1	3	3	8816.78019	-0.00090
4	1	4	3	→	3	1	3	2	8816.87309	-0.00076
4	1	4	5	→	3	1	3	4	8816.92789	-0.00051
4	0	4	3	→	3	0	3	2	9113.89521	-0.00057
4	0	4	5	→	3	0	3	4	9114.01821	-0.00035
4	0	4	4	→	3	0	3	3	9114.03516	0.00100
4	2	3	4	→	3	2	2	3	9946.71606	0.00096
4	2	3	5	→	3	2	2	4	9947.27244	0.00043
4	2	3	3	→	3	2	2	2	9947.41374	-0.00135
4	1	3	4	→	3	1	2	3	10779.55937	-0.00043
4	1	3	3	→	3	1	2	2	10779.61644	0.00000
4	1	3	5	→	3	1	2	4	10779.68368	0.00027
4	2	2	5	→	3	2	1	4	10870.55036	-0.00190
4	2	2	3	→	3	2	1	2	10870.69884	0.00302
5	1	5	5	→	4	1	4	4	10891.94322	0.00141
5	1	5	4	→	4	1	4	3	10891.96811	-0.00150
5	1	5	6	→	4	1	4	5	10892.01613	0.00051
5	0	5	4	→	4	0	4	3	11061.54718	0.00087
5	0	5	6	→	4	0	4	5	11061.61203	-0.00096
5	0	5	5	→	4	0	4	4	11061.61203	0.00191
5	2	4	5	→	4	2	3	4	12290.03450	-0.00055
5	2	4	6	→	4	2	3	5	12290.31263	0.00069
5	2	4	4	→	4	2	3	3	12290.33721	-0.00129
6	1	6	6	→	5	1	5	5	12929.78130	-0.00254
6	1	6	5	→	5	1	5	4	12929.79273	0.00114
6	0	6	5	→	5	0	5	4	13012.32778	0.00135
6	0	6	6	→	5	0	5	5	13012.35277	-0.00067
6	0	6	7	→	5	0	5	6	13012.36844	0.00047
5	3	2	6	→	4	3	1	5	13125.12856	0.00025
5	1	4	4	→	4	1	3	3	13149.49681	0.00004
5	1	4	5	→	4	1	3	4	13149.52520	-0.00041
5	1	4	6	→	4	1	3	5	13149.55461	0.00038

Table III(D). Microwave transitions of the $^{13}C_3$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
3	1	3	3	→	2	1	2	2	6652.37469	0.00083
3	1	3	4	→	2	1	2	3	6652.73278	0.00082
3	1	2	3	→	2	1	1	2	8166.71792	0.00082
3	1	2	2	→	2	1	1	1	8167.04656	0.00062
3	1	2	4	→	2	1	1	3	8167.06967	-0.00023
4	1	4	4	→	3	1	3	3	8768.92841	0.00003
4	1	4	3	→	3	1	3	2	8769.02131	-0.00014
4	1	4	5	→	3	1	3	4	8769.07596	0.00014
4	0	4	3	→	3	0	3	2	9067.72384	-0.00028
4	0	4	5	→	3	0	3	4	9067.84733	-0.00026
4	0	4	4	→	3	0	3	3	9067.86483	0.00032
4	2	3	4	→	3	2	2	3	9886.90211	0.00046
4	2	3	5	→	3	2	2	4	9887.46088	0.00093
4	2	3	3	→	3	2	2	2	9887.60251	-0.00088
4	1	3	4	→	3	1	2	3	10714.17183	-0.00117
4	1	3	3	→	3	1	2	2	10714.22959	-0.00016
4	1	3	5	→	3	1	2	4	10714.29693	-0.00027
4	2	2	4	→	3	2	1	3	10794.64782	-0.00132
4	2	2	5	→	3	2	1	4	10795.25517	-0.00036
4	2	2	3	→	3	2	1	2	10795.40065	0.00092
5	1	5	5	→	4	1	4	4	10834.07888	0.00120
5	1	5	4	→	4	1	4	3	10834.10350	-0.00189
5	1	5	6	→	4	1	4	5	10834.15192	0.00057
5	0	5	4	→	4	0	4	3	11006.05622	-0.00173
5	0	5	6	→	4	0	4	5	11006.12411	-0.00087
5	0	5	5	→	4	0	4	4	11006.12411	0.00062
5	2	4	5	→	4	2	3	4	12218.18784	0.00031
5	2	4	6	→	4	2	3	5	12218.46598	0.00092
5	2	4	4	→	4	2	3	3	12218.48943	-0.00225
6	1	6	6	→	5	1	5	5	12862.08076	-0.00155
6	1	6	5	→	5	1	5	4	12862.09170	0.00189
6	0	6	5	→	5	0	5	4	12946.45478	0.00126
6	0	6	6	→	5	0	5	5	12946.48029	-0.00142
6	0	6	7	→	5	0	5	6	12946.49600	0.00078
5	3	2	6	→	4	3	1	5	13034.56141	0.00113
5	3	2	4	→	4	3	1	3	13034.72464	-0.00086
5	1	4	4	→	4	1	3	3	13075.20939	0.00163
5	1	4	5	→	4	1	3	4	13075.23696	0.00024
5	1	4	6	→	4	1	3	5	13075.26518	-0.00039

Table III(E). Microwave transitions of the $^{13}C_4$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
3	1	3	4	→	2	1	2	3	6616.98772	0.00129
3	0	3	4	→	2	0	2	3	7025.02536	0.00020
3	0	3	3	→	2	0	2	2	7025.03886	-0.00139
3	1	2	3	→	2	1	1	2	8102.75830	0.00152
3	1	2	4	→	2	1	1	3	8103.11039	0.00038
4	1	4	4	→	3	1	3	3	8725.68852	-0.00036
4	1	4	3	→	3	1	3	2	8725.78248	-0.00018
4	1	4	5	→	3	1	3	4	8725.83725	0.00042
4	0	4	3	→	3	0	3	2	9033.25787	0.00034
4	0	4	5	→	3	0	3	4	9033.38199	0.00022
4	0	4	4	→	3	0	3	3	9033.39809	0.00070
4	2	3	4	→	3	2	2	3	9819.95351	-0.00019
4	2	3	5	→	3	2	2	4	9820.51262	0.00172
4	2	3	3	→	3	2	2	2	9820.65125	-0.00281
4	1	3	4	→	3	1	2	3	10639.47790	-0.00083
4	1	3	3	→	3	1	2	2	10639.54017	0.00057
4	1	3	5	→	3	1	2	4	10639.60658	0.00070
4	2	2	5	→	3	2	1	4	10691.23714	-0.00106
4	2	2	3	→	3	2	1	2	10691.38156	-0.00102
5	1	5	5	→	4	1	4	4	10784.57151	0.00130
5	1	5	4	→	4	1	4	3	10784.59667	-0.00185
5	1	5	6	→	4	1	4	5	10784.64493	0.00055
5	0	5	4	→	4	0	4	3	10966.23456	0.00029
5	0	5	6	→	4	0	4	5	10966.30119	-0.00046
5	0	5	5	→	4	0	4	4	10966.30119	0.00029
5	2	4	5	→	4	2	3	4	12141.74365	-0.00008
5	2	4	6	→	4	2	3	5	12142.02152	-0.00017
5	2	4	4	→	4	2	3	3	12142.04495	-0.00350
6	1	6	6	→	5	1	5	5	12806.44708	-0.00177
6	1	6	5	→	5	1	5	4	12806.45798	0.00133
6	0	6	5	→	5	0	5	4	12897.83723	0.00093
6	0	6	6	→	5	0	5	5	12897.86462	-0.00108
6	0	6	7	→	5	0	5	6	12897.87934	0.00108
5	3	2	5	→	4	3	1	4	12910.15651	-0.00078
5	3	2	6	→	4	3	1	5	12910.84913	0.00057
5	3	2	4	→	4	3	1	3	12911.01546	0.00277
5	1	4	4	→	4	1	3	3	13000.75389	-0.00087
5	1	4	5	→	4	1	3	4	13000.77941	0.00111
5	1	4	6	→	4	1	3	5	13000.81201	0.00041

Table IIIF. Microwave transitions of the $^{13}C_5$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	3	→	2	1	2	2	6631.70847	0.00064
3	1	3	4	→	2	1	2	3	6632.06168	-0.00083
3	0	3	2	→	2	0	2	1	7035.69022	0.00187
3	0	3	4	→	2	0	2	3	7035.95806	0.00124
3	1	2	3	→	2	1	1	2	8143.43673	-0.00093
3	1	2	4	→	2	1	1	3	8143.78651	-0.00032
4	1	4	4	→	3	1	3	3	8741.27673	-0.00008
4	1	4	3	→	3	1	3	2	8741.36876	-0.00029
4	1	4	5	→	3	1	3	4	8741.42323	0.00006
4	0	4	3	→	3	0	3	2	9038.05886	-0.00121
4	0	4	5	→	3	0	3	4	9038.18220	0.00023
4	0	4	4	→	3	0	3	3	9038.19764	0.00054
4	2	3	4	→	3	2	2	3	9857.63000	-0.00030
4	2	3	5	→	3	2	2	4	9858.18307	0.00029
4	2	3	3	→	3	2	2	2	9858.32471	-0.00002
4	1	3	4	→	3	1	2	3	10682.64224	0.00007
4	1	3	3	→	3	1	2	2	10682.69962	0.00020
4	1	3	5	→	3	1	2	4	10682.76512	-0.00045
4	2	2	4	→	3	2	1	3	10765.92919	-0.00004
4	2	2	5	→	3	2	1	4	10766.52768	0.00002
4	2	2	3	→	3	2	1	2	10766.67078	0.00060
5	1	5	5	→	4	1	4	4	10799.50552	0.00025
5	1	5	4	→	4	1	4	3	10799.53118	-0.00184
5	1	5	6	→	4	1	4	5	10799.57850	-0.00018
5	0	5	4	→	4	0	4	3	10969.86746	0.00056
5	0	5	6	→	4	0	4	5	10969.93207	-0.00109
5	0	5	5	→	4	0	4	4	10969.93207	0.00169
5	2	4	5	→	4	2	3	4	12181.34266	-0.00064
5	2	4	6	→	4	2	3	5	12181.61877	0.00055
5	2	4	4	→	4	2	3	3	12181.64249	-0.00213
6	1	6	6	→	5	1	5	5	12820.71248	-0.00227
6	1	6	5	→	5	1	5	4	12820.72451	0.00197
6	0	6	5	→	5	0	5	4	12904.07476	0.00082
6	0	6	6	→	5	0	5	5	12904.10085	-0.00010
6	0	6	7	→	5	0	5	6	12904.11582	0.00059
5	3	2	5	→	4	3	1	4	12999.05801	0.00016
5	3	2	6	→	4	3	1	5	12999.74842	0.00134
5	3	2	4	→	4	3	1	3	12999.90992	-0.00048

5	1	4	4	→	4	1	3	3	13034.95026	-0.00110
5	1	4	5	→	4	1	3	4	13034.97958	0.00092
5	1	4	6	→	4	1	3	5	13035.00853	0.00039

Table III(G). Microwave transitions of the $^{13}C_6$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	1	3	3	→	2	1	2	2	6671.76071	0.00008
3	1	3	4	→	2	1	2	3	6672.11680	0.00052
3	0	3	4	→	2	0	2	3	7074.54313	0.00070
3	0	3	3	→	2	0	2	2	7074.56108	0.00006
3	1	2	3	→	2	1	1	2	8208.42322	0.00014
3	1	2	4	→	2	1	1	3	8208.77217	-0.00032
4	1	4	4	→	3	1	3	3	8790.94431	0.00023
4	1	4	3	→	3	1	3	2	8791.03545	-0.00056
4	1	4	5	→	3	1	3	4	8791.09060	0.00007
4	0	4	3	→	3	0	3	2	9081.21986	-0.00051
4	0	4	5	→	3	0	3	4	9081.34143	-0.00076
4	0	4	4	→	3	0	3	3	9081.35791	0.00065
4	2	3	4	→	3	2	2	3	9928.06948	-0.00010
4	2	3	5	→	3	2	2	4	9928.62400	0.00018
4	2	3	3	→	3	2	2	2	9928.76457	-0.00165
4	1	3	4	→	3	1	2	3	10760.22099	-0.00069
4	1	3	3	→	3	1	2	2	10760.27895	0.00259
4	1	3	5	→	3	1	2	4	10760.34304	-0.00019
5	1	5	5	→	4	1	4	4	10857.77132	0.00106
5	1	5	4	→	4	1	4	3	10857.79577	-0.00201
5	1	5	6	→	4	1	4	5	10857.84370	0.00002
4	2	2	4	→	3	2	1	3	10867.54552	-0.00091
4	2	2	5	→	3	2	1	4	10868.14722	0.00068
4	2	2	3	→	3	2	1	2	10868.28866	-0.00038
5	0	5	4	→	4	0	4	3	11021.01324	0.00006
5	0	5	6	→	4	0	4	5	11021.07790	-0.00135
5	0	5	5	→	4	0	4	4	11021.07790	0.00265
5	2	4	5	→	4	2	3	4	12263.23890	0.00105
5	2	4	6	→	4	2	3	5	12263.51431	0.00126
5	2	4	4	→	4	2	3	3	12263.53853	-0.00088
6	1	6	6	→	5	1	5	5	12887.45477	-0.00183
6	1	6	5	→	5	1	5	4	12887.46648	0.00210
6	0	6	5	→	5	0	5	4	12965.76571	0.00079
6	0	6	6	→	5	0	5	5	12965.78895	-0.00171
6	0	6	7	→	5	0	5	6	12965.80689	0.00080
5	1	4	4	→	4	1	3	3	13115.86666	-0.00164
5	1	4	5	→	4	1	3	4	13115.89891	-0.00017
5	1	4	6	→	4	1	3	5	13115.92622	0.00053

5	3	2	5	→	4	3	1	4	13121.23427	-0.00020
5	3	2	6	→	4	3	1	5	13121.92999	0.00088
5	3	2	4	→	4	3	1	3	13122.09300	-0.00043

Table III(H). Microwave transitions of the $^{13}C_7$ isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
3	0	3	2	→	2	0	2	1	7050.58484	0.00147
3	0	3	4	→	2	0	2	3	7050.85418	0.00017
3	0	3	3	→	2	0	2	2	7050.86919	-0.00142
3	1	2	3	→	2	1	1	2	8144.98783	0.00012
3	1	2	2	→	2	1	1	1	8145.31851	0.00118
3	1	2	4	→	2	1	1	3	8145.34011	-0.00057
4	1	4	4	→	3	1	3	3	8758.60520	0.00006
4	1	4	3	→	3	1	3	2	8758.69881	0.00024
4	1	4	5	→	3	1	3	4	8758.75296	0.00013
4	0	4	3	→	3	0	3	2	9062.30950	-0.00099
4	0	4	5	→	3	0	3	4	9062.43484	0.00067
4	0	4	4	→	3	0	3	3	9062.44990	-0.00056
4	2	3	4	→	3	2	2	3	9865.94845	0.00019
4	2	3	5	→	3	2	2	4	9866.50613	0.00024
4	2	3	3	→	3	2	2	2	9866.64848	-0.00068
4	1	3	4	→	3	1	2	3	10690.44173	0.00087
4	1	3	3	→	3	1	2	2	10690.49871	-0.00107
4	1	3	5	→	3	1	2	4	10690.56748	0.00089
4	2	2	4	→	3	2	1	3	10755.90956	-0.00075
4	2	2	5	→	3	2	1	4	10756.51549	0.00001
4	2	2	3	→	3	2	1	2	10756.65913	-0.00062
5	1	5	5	→	4	1	4	4	10823.32850	0.00155
5	1	5	4	→	4	1	4	3	10823.35253	-0.00245
5	1	5	6	→	4	1	4	5	10823.40204	0.00116
5	0	5	4	→	4	0	4	3	11000.45877	0.00072
5	0	5	6	→	4	0	4	5	11000.52437	-0.00088
5	0	5	5	→	4	0	4	4	11000.52437	0.00025
5	2	4	5	→	4	2	3	4	12195.53917	0.00021
5	2	4	6	→	4	2	3	5	12195.81749	0.00082
5	2	4	4	→	4	2	3	3	12195.84129	-0.00207
6	1	6	6	→	5	1	5	5	12850.91676	-0.00105
6	1	6	5	→	5	1	5	4	12850.92684	0.00137
6	0	6	5	→	5	0	5	4	12938.93722	0.00027
6	0	6	6	→	5	0	5	5	12938.96495	-0.00078
6	0	6	7	→	5	0	5	6	12938.97891	0.00014
5	3	2	5	→	4	3	1	4	12987.90038	-0.00046
5	3	2	6	→	4	3	1	5	12988.59555	0.00054
5	3	2	4	→	4	3	1	3	12988.76043	0.00080

5	1	4	4	→	4	1	3	3	13054.87707	-0.00119
5	1	4	5	→	4	1	3	4	13054.90575	0.00139
5	1	4	6	→	4	1	3	5	13054.93545	-0.00010

Table III(I). Microwave transitions of the ^{15}N isotopologue of 2FBN in MHz

J'	$K_{a'}$	$K_{c'}$	→	J"	$K_{a"}$	$K_{c"}$	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	→	3	1	3	8654.55771	0.00062
4	0	4	→	3	0	3	8964.58562	-0.00040
4	2	3	→	3	2	2	9731.36118	-0.00059
4	1	3	→	3	1	2	10541.89651	0.00031
5	1	5	→	4	1	4	10698.48865	0.00020
5	0	5	→	4	0	4	10883.93060	-0.00061
5	2	4	→	4	2	3	12034.89119	0.00063
6	1	6	→	5	1	5	12705.75512	-0.00019
6	0	6	→	5	0	5	12800.19931	0.00025
5	1	4	→	4	1	3	12889.36679	0.00018
5	2	3	→	4	2	2	13405.74187	-0.00030
6	2	5	→	5	2	4	14262.42713	-0.00009

Appendix IV. Microwave transitions of 3-fluorobenzonitrile (3FBN) and its minor isotopologues

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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Table IV(A). Microwave transitions of the parent 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
5	1	4	4	→	5	0	5	4	5392.32817	-0.00015
5	1	4	6	→	5	0	5	6	5392.36221	-0.00060
5	1	4	5	→	5	0	5	5	5392.53837	-0.00068
3	1	3	3	→	2	1	2	2	5715.89227	0.00012
3	1	3	2	→	2	1	2	1	5716.20931	0.00217
3	1	3	4	→	2	1	2	3	5716.22290	-0.00020
5	2	3	4	→	5	1	4	4	5869.27798	-0.00067
5	2	3	6	→	5	1	4	6	5869.34455	-0.00036
5	2	3	5	→	5	1	4	5	5869.66963	-0.00068
6	2	4	5	→	6	1	5	5	5936.56422	-0.00009
6	2	4	7	→	6	1	5	7	5936.60089	-0.00036
6	2	4	6	→	6	1	5	6	5936.81964	-0.00051
2	1	2	1	→	1	0	1	0	6023.35268	0.00074
4	2	2	3	→	4	1	3	3	6023.81037	-0.00024
4	2	2	5	→	4	1	3	5	6023.94114	-0.00068
4	2	2	4	→	4	1	3	4	6024.45169	-0.00061
2	1	2	3	→	1	0	1	2	6024.65773	0.00044
2	1	2	2	→	1	0	1	1	6025.12630	0.00121
3	0	3	2	→	2	0	2	1	6077.31319	-0.00013
3	0	3	3	→	2	0	2	2	6077.50087	0.00039
3	0	3	4	→	2	0	2	3	6077.54261	0.00022
3	2	2	3	→	2	2	1	2	6195.08037	0.00044
3	2	2	4	→	2	2	1	3	6196.26688	0.00061
3	2	2	2	→	2	2	1	1	6196.92640	0.00068
7	2	5	6	→	7	1	6	6	6294.69821	0.00003
7	2	5	8	→	7	1	6	8	6294.71989	-0.00039
7	2	5	7	→	7	1	6	7	6294.87345	-0.00022
4	0	4	4	→	3	1	3	3	6413.33281	0.00017
4	0	4	3	→	3	1	3	2	6413.59890	0.00128
4	0	4	5	→	3	1	3	4	6413.61511	-0.00015
6	1	5	5	→	6	0	6	5	6858.45312	0.00055
6	1	5	7	→	6	0	6	7	6858.47695	-0.00019
6	1	5	6	→	6	0	6	6	6858.62184	-0.00055
8	2	6	7	→	8	1	7	7	6995.09505	0.00110
8	2	6	9	→	8	1	7	9	6995.10754	-0.00049
8	2	6	8	→	8	1	7	8	6995.21929	-0.00021
4	1	4	4	→	3	1	3	4	7589.36306	-0.00092
4	1	4	4	→	3	1	3	3	7590.33416	-0.00025
4	1	4	3	→	3	1	3	2	7590.42900	-0.00053
4	1	4	5	→	3	1	3	4	7590.48209	0.00023
4	1	4	3	→	3	1	3	3	7591.73902	-0.00101
3	1	3	3	→	2	0	2	3	7639.25254	-0.00019
3	1	3	2	→	2	0	2	1	7639.90405	-0.00040

3	1	3	4	→	2	0	2	3	7640.22342	0.00026
3	1	3	3	→	2	0	2	2	7640.43768	0.00002
3	1	3	2	→	2	0	2	2	7641.74784	-0.00031
4	0	4	4	→	3	0	3	4	7975.04208	-0.00090
4	0	4	3	→	3	0	3	2	7976.18846	-0.00030
4	0	4	4	→	3	0	3	3	7976.26930	-0.00051
4	0	4	5	→	3	0	3	4	7976.29640	0.00037
4	0	4	3	→	3	0	3	3	7977.84462	-0.00067
9	2	7	8	→	9	1	8	8	8069.50309	-0.00237
9	2	7	10	→	9	1	8	10	8069.51626	0.00132
9	2	7	9	→	9	1	8	9	8069.59915	-0.00045
6	1	5	6	→	5	2	4	5	8116.55609	0.00037
6	1	5	7	→	5	2	4	6	8116.93341	0.00010
6	1	5	5	→	5	2	4	4	8116.97041	0.00015
4	2	3	4	→	3	2	2	3	8237.50502	-0.00060
4	2	3	5	→	3	2	2	4	8238.00798	-0.00006
4	2	3	3	→	3	2	2	2	8238.13598	-0.00064
4	3	2	4	→	3	3	1	3	8315.52771	0.00008
4	3	2	5	→	3	3	1	4	8316.62723	0.00157
4	3	2	3	→	3	3	1	2	8317.05134	0.00033
4	3	1	4	→	3	3	0	3	8326.54811	0.00005
4	3	1	5	→	3	3	0	4	8327.64766	0.00094
4	3	1	3	→	3	3	0	2	8328.07201	-0.00020
4	2	2	4	→	3	2	1	3	8522.47300	-0.00016
4	2	2	5	→	3	2	1	4	8522.97847	0.00053
4	2	2	3	→	3	2	1	2	8523.10686	-0.00043
7	1	6	6	→	7	0	7	6	8597.13186	0.00144
7	1	6	8	→	7	0	7	8	8597.14826	-0.00107
7	1	6	7	→	7	0	7	7	8597.28056	0.00048
5	0	5	5	→	4	1	4	4	8618.71018	0.00017
5	0	5	4	→	4	1	4	3	8618.83557	0.00028
5	0	5	6	→	4	1	4	5	8618.86528	0.00033
10	3	7	9	→	10	2	8	9	8903.05801	0.00015
10	3	7	11	→	10	2	8	11	8903.07176	-0.00007
10	3	7	10	→	10	2	8	10	8903.21077	-0.00021
9	3	6	8	→	9	2	7	8	9090.23744	0.00001
9	3	6	10	→	9	2	7	10	9090.25771	-0.00067
9	3	6	9	→	9	2	7	9	9090.44571	-0.00024
4	1	4	3	→	3	0	3	2	9153.01984	-0.00083
4	1	4	5	→	3	0	3	4	9153.16263	0.00000
4	1	4	4	→	3	0	3	3	9153.27128	-0.00030
5	1	5	5	→	4	1	4	5	9441.88842	-0.00088
5	1	5	5	→	4	1	4	4	9443.00779	0.00061
5	1	5	4	→	4	1	4	3	9443.04284	-0.00169
5	1	5	6	→	4	1	4	5	9443.08837	0.00048
5	1	5	4	→	4	1	4	4	9444.45035	0.00020

5	2	4	4	→	5	1	5	4	9473.63291	0.00017
5	2	4	6	→	5	1	5	6	9473.72059	-0.00031
5	2	4	5	→	5	1	5	5	9474.15353	-0.00030
8	3	5	7	→	8	2	6	7	9516.32963	-0.00104
8	3	5	9	→	8	2	6	9	9516.36262	0.00030
8	3	5	8	→	8	2	6	8	9516.61351	-0.00028
10	2	8	9	→	10	1	9	9	9517.77190	-0.00243
10	2	8	11	→	10	1	9	11	9517.78310	0.00185
10	2	8	10	→	10	1	9	10	9517.85016	0.00030
12	3	9	11	→	12	2	10	11	9576.97441	-0.00200
12	3	9	13	→	12	2	10	13	9576.98399	0.00130
12	3	9	12	→	12	2	10	12	9577.05834	0.00060
5	0	5	5	→	4	0	4	5	9794.45818	-0.00054
5	0	5	4	→	4	0	4	3	9795.66644	-0.00076
5	0	5	5	→	4	0	4	4	9795.71223	0.00045
5	0	5	6	→	4	0	4	5	9795.73158	0.00003
5	0	5	4	→	4	0	4	4	9797.24194	-0.00074
7	3	4	6	→	7	2	5	6	10070.08334	0.00060
7	3	4	8	→	7	2	5	8	10070.13044	-0.00093
7	3	4	7	→	7	2	5	7	10070.46783	-0.00083
5	2	4	5	→	4	2	3	5	10259.15750	-0.00054
5	2	4	5	→	4	2	3	4	10259.66046	0.00011
5	2	4	6	→	4	2	3	5	10259.92443	0.00072
5	2	4	4	→	4	2	3	3	10259.94989	-0.00106
5	2	4	4	→	4	2	3	4	10260.58101	-0.00122
5	2	4	4	→	5	0	5	4	10297.84263	0.00064
5	2	4	6	→	5	0	5	6	10297.94263	-0.00121
5	3	3	5	→	4	3	2	4	10411.67150	-0.00071
5	3	3	6	→	4	3	2	5	10412.24012	-0.00043
5	3	3	4	→	4	3	2	3	10412.37954	-0.00022
5	3	2	5	→	4	3	1	4	10449.72874	-0.00034
5	3	2	6	→	4	3	1	5	10450.29885	0.00009
5	3	2	4	→	4	3	1	3	10450.43797	-0.00024
6	2	5	5	→	6	1	6	5	10457.29388	0.00127
6	2	5	7	→	6	1	6	7	10457.34723	-0.00068
6	2	5	6	→	6	1	6	6	10457.67578	0.00033
8	1	7	7	→	8	0	8	7	10526.56322	0.00106
8	1	7	9	→	8	0	8	9	10526.57690	-0.00102
8	1	7	8	→	8	0	8	8	10526.70294	-0.00025
5	1	5	4	→	4	0	4	3	10619.87655	0.00011
5	1	5	6	→	4	0	4	5	10619.95466	0.00017
5	1	5	5	→	4	0	4	4	10620.00930	0.00035
6	3	3	5	→	6	2	4	5	10635.25832	-0.00127
6	3	3	7	→	6	2	4	7	10635.33698	0.00012
6	3	3	6	→	6	2	4	6	10635.79421	-0.00048
6	0	6	6	→	5	1	5	5	10732.08705	-0.00012

6	0	6	5	→	5	1	5	4	10732.15069	0.00026
6	0	6	7	→	5	1	5	6	10732.17698	-0.00008
5	2	3	5	→	4	2	2	5	10789.34855	-0.00152
5	2	3	5	→	4	2	2	4	10789.85824	-0.00010
5	2	3	6	→	4	2	2	5	10790.12159	0.00033
5	2	3	4	→	4	2	2	3	10790.14610	-0.00147
5	2	3	4	→	4	2	2	4	10790.78553	-0.00131
7	1	6	7	→	6	2	5	6	10886.10601	-0.00061
7	1	6	8	→	6	2	5	7	10886.35838	-0.00012
7	1	6	6	→	6	2	5	5	10886.37262	0.00053
5	1	4	5	→	4	1	3	5	10943.62035	-0.00123
5	1	4	5	→	4	1	3	4	10944.64013	-0.00019
5	1	4	4	→	4	1	3	3	10944.67924	-0.00030
5	1	4	6	→	4	1	3	5	10944.71828	0.00011
5	1	4	4	→	4	1	3	4	10945.95925	-0.00124
2	2	1	3	→	1	1	0	2	11044.34635	0.00158
2	2	1	1	→	1	1	0	0	11044.58283	0.00183
2	2	1	2	→	1	1	0	1	11044.93638	0.00186
9	2	7	9	→	8	3	6	8	11090.16508	-0.00023
9	2	7	10	→	8	3	6	9	11090.47022	0.00056
9	2	7	8	→	8	3	6	7	11090.49067	-0.00137
5	3	2	4	→	5	2	3	4	11115.18514	0.00039
5	3	2	6	→	5	2	3	6	11115.31441	-0.00075
5	3	2	5	→	5	2	3	5	11115.95484	-0.00065
6	1	6	6	→	5	1	5	5	11273.84773	-0.00087
6	1	6	5	→	5	1	5	4	11273.86615	0.00087
6	1	6	7	→	5	1	5	6	11273.89868	0.00002
4	3	1	3	→	4	2	2	3	11454.89422	0.00010
4	3	1	5	→	4	2	2	5	11455.13763	-0.00003
4	3	1	4	→	4	2	2	4	11456.08470	-0.00005
6	0	6	5	→	5	0	5	4	11556.35952	-0.00016
6	0	6	6	→	5	0	5	5	11556.38330	-0.00104
6	0	6	7	→	5	0	5	6	11556.40058	0.00057
7	2	6	6	→	7	1	7	6	11599.49458	-0.00128
7	2	6	8	→	7	1	7	8	11599.53337	-0.00018
7	2	6	7	→	7	1	7	7	11599.79540	0.00044
4	3	2	3	→	4	2	3	3	11875.59354	0.00083
4	3	2	5	→	4	2	3	5	11875.83341	-0.00102
4	3	2	4	→	4	2	3	4	11876.77684	0.00046
6	1	6	5	→	5	0	5	4	12098.07627	0.00174
6	1	6	7	→	5	0	5	6	12098.12180	0.00020
6	1	6	6	→	5	0	5	5	12098.14551	-0.00026
6	2	5	6	→	5	2	4	6	12256.60415	-0.00040
6	2	5	6	→	5	2	4	5	12257.37051	0.00029
6	2	5	5	→	5	2	4	4	12257.52582	0.00067
6	2	5	7	→	5	2	4	6	12257.52582	0.00016

6	2	5	5	→	5	2	4	5	12258.44670	-0.00034
6	3	4	5	→	6	2	5	5	12281.37275	-0.00181
6	3	4	7	→	6	2	5	7	12281.45193	-0.00014
6	3	4	6	→	6	2	5	6	12281.91096	-0.00019
6	4	3	6	→	5	4	2	5	12492.82066	-0.00022
6	4	3	7	→	5	4	2	6	12493.40354	0.00008
6	4	3	5	→	5	4	2	4	12493.52855	0.00004
6	4	2	6	→	5	4	1	5	12496.16955	-0.00038
6	4	2	7	→	5	4	1	6	12496.75249	-0.00019
6	4	2	5	→	5	4	1	4	12496.87804	0.00028
6	3	4	6	→	5	3	3	5	12510.49380	0.00068
6	3	4	7	→	5	3	3	6	12510.82662	0.00016
6	3	4	5	→	5	3	3	4	12510.87853	0.00034
6	3	3	6	→	5	3	2	5	12609.45680	0.00007
6	3	3	7	→	5	3	2	6	12609.79224	-0.00013
6	3	3	5	→	5	3	2	4	12609.84459	0.00017
7	3	5	6	→	7	2	6	6	12660.94068	-0.00090
7	3	5	8	→	7	2	6	8	12660.99225	0.00071
7	3	5	7	→	7	2	6	7	12661.33821	0.00011
7	0	7	7	→	6	1	6	6	12746.50209	0.00009
7	0	7	6	→	6	1	6	5	12746.53346	-0.00083
7	0	7	8	→	6	1	6	7	12746.55790	0.00082
3	2	2	2	→	2	1	1	1	12801.47582	0.00119
3	2	2	4	→	2	1	1	3	12801.77920	0.00053
3	2	2	3	→	2	1	1	2	12802.32634	0.00074
8	2	7	7	→	8	1	8	7	12886.08882	-0.00115
8	2	7	9	→	8	1	8	9	12886.11768	0.00032
8	2	7	8	→	8	1	8	8	12886.33419	-0.00069
6	1	5	6	→	5	1	4	6	13021.37018	-0.00091
6	1	5	6	→	5	1	4	5	13022.46739	-0.00029
6	1	5	5	→	5	1	4	4	13022.48509	0.00116
6	1	5	7	→	5	1	4	6	13022.51451	0.00018
6	1	5	5	→	5	1	4	5	13023.80320	-0.00090
7	1	7	7	→	6	1	6	6	13084.85248	-0.00052
7	1	7	6	→	6	1	6	5	13084.86229	0.00128
7	1	7	8	→	6	1	6	7	13084.88664	-0.00023
6	2	4	6	→	5	2	3	5	13089.61743	-0.00009
6	2	4	5	→	5	2	3	4	13089.77035	0.00076
6	2	4	7	→	5	2	3	6	13089.77035	-0.00032
8	3	6	7	→	8	2	7	7	13187.53647	-0.00030
8	3	6	9	→	8	2	7	9	13187.57127	0.00036
8	3	6	8	→	8	2	7	8	13187.84252	0.00038
7	0	7	6	→	6	0	6	5	13288.24888	-0.00025
7	0	7	7	→	6	0	6	6	13288.26335	-0.00007
7	0	7	8	→	6	0	6	7	13288.27879	0.00012
8	1	7	8	→	7	2	6	7	13603.04152	-0.00005

8	1	7	9	→	7	2	6	8	13603.21477	0.00147
8	1	7	7	→	7	2	6	6	13603.21477	-0.00146
7	1	7	6	→	6	0	6	5	13626.57665	0.00079
7	1	7	8	→	6	0	6	7	13626.60758	-0.00089
7	1	7	7	→	6	0	6	6	13626.61505	0.00063
3	2	1	2	→	2	1	2	1	13873.82533	0.00127
3	2	1	4	→	2	1	2	3	13874.17910	0.00067
3	2	1	3	→	2	1	2	2	13874.81231	-0.00212
9	3	7	8	→	9	2	8	8	13875.65846	-0.00039
9	3	7	10	→	9	2	8	10	13875.68292	-0.00037
9	3	7	9	→	9	2	8	9	13875.90262	0.00064
7	2	6	7	→	6	2	5	6	14226.97189	-0.00062
7	2	6	6	→	6	2	5	5	14227.06209	-0.00216
7	2	6	8	→	6	2	5	7	14227.07346	0.00094
9	2	8	8	→	9	1	9	8	14298.03612	0.00041
9	2	8	10	→	9	1	9	10	14298.05651	-0.00012
9	2	8	9	→	9	1	9	9	14298.24401	0.00023
7	4	4	7	→	6	4	3	6	14602.66905	-0.00072
7	4	4	8	→	6	4	3	7	14603.04086	0.00002
7	4	4	6	→	6	4	3	5	14603.09840	-0.00044
7	3	5	7	→	6	3	4	6	14606.39925	-0.00021
7	3	5	8	→	6	3	4	7	14606.61171	-0.00028
7	3	5	6	→	6	3	4	5	14606.63165	0.00038
7	4	3	7	→	6	4	2	6	14613.69743	-0.00053
7	4	3	8	→	6	4	2	7	14614.06990	0.00047
7	4	3	6	→	6	4	2	5	14614.12613	-0.00135
8	0	8	8	→	7	1	7	7	14676.13313	-0.00021
8	0	8	7	→	7	1	7	6	14676.14972	-0.00020
8	0	8	9	→	7	1	7	8	14676.16906	0.00013
7	3	4	7	→	6	3	3	6	14819.64831	-0.00030
7	3	4	8	→	6	3	3	7	14819.86476	0.00036
7	3	4	6	→	6	3	3	5	14819.88433	0.00032
8	1	8	8	→	7	1	7	7	14879.36100	-0.00051
8	1	8	7	→	7	1	7	6	14879.36551	-0.00009
8	1	8	9	→	7	1	7	8	14879.38616	0.00015
8	0	8	7	→	7	0	7	6	15014.47443	-0.00222
8	0	8	8	→	7	0	7	7	15014.48468	0.00034
8	0	8	9	→	7	0	7	8	15014.49976	0.00104
7	1	6	7	→	6	1	5	6	15026.92026	-0.00086
7	1	6	6	→	6	1	5	5	15026.92772	0.00074
7	1	6	8	→	6	1	5	7	15026.95064	-0.00022
8	1	8	7	→	7	0	7	6	15217.69250	0.00018
8	1	8	8	→	7	0	7	7	15217.71167	-0.00084
8	1	8	9	→	7	0	7	8	15217.71639	0.00059
7	2	5	7	→	6	2	4	6	15384.97316	-0.00148
7	2	5	6	→	6	2	4	5	15385.06004	-0.00081

7	2	5	8	→	6	2	4	7	15385.07120	0.00131
5	2	4	4	→	4	1	3	3	15850.19344	0.00023
5	2	4	6	→	4	1	3	5	15850.29912	-0.00008
5	2	4	5	→	4	1	3	4	15850.55200	-0.00028
8	2	7	8	→	7	2	6	7	16165.90172	0.00029
8	2	7	7	→	7	2	6	6	16165.95800	-0.00171
8	2	7	9	→	7	2	6	8	16165.97056	0.00075
9	1	8	9	→	8	2	7	8	16208.40762	-0.00023
9	1	8	8	→	8	2	7	7	16208.52442	0.00108
9	1	8	10	→	8	2	7	9	16208.52442	-0.00121
9	0	9	9	→	8	1	8	8	16542.67614	-0.00046
9	0	9	8	→	8	1	8	7	16542.68692	0.00173
9	0	9	10	→	8	1	8	9	16542.70046	-0.00052
9	1	9	9	→	8	1	8	8	16661.19902	0.00044
9	1	9	8	→	8	1	8	7	16661.19902	-0.00179
9	1	9	10	→	8	1	8	9	16661.21799	0.00075
8	5	4	8	→	7	5	3	7	16669.90929	0.00081
8	5	4	9	→	7	5	3	8	16670.29781	0.00151
8	5	4	7	→	7	5	3	6	16670.35367	0.00048
8	5	3	8	→	7	5	2	7	16670.84575	0.00003
8	5	3	9	→	7	5	2	8	16671.23401	0.00044
8	5	3	7	→	7	5	2	6	16671.29056	0.00009
4	2	2	3	→	3	1	3	2	16680.72409	-0.00012
4	2	2	5	→	3	1	3	4	16680.93355	0.00027
4	2	2	4	→	3	1	3	3	16681.39581	0.00037
8	3	6	8	→	7	3	5	7	16692.40584	0.00038
8	3	6	9	→	7	3	5	8	16692.54871	-0.00047
8	3	6	7	→	7	3	5	6	16692.55696	0.00207
8	4	5	8	→	7	4	4	7	16721.91270	0.00068
8	4	5	9	→	7	4	4	8	16722.16394	0.00067
8	4	5	7	→	7	4	4	6	16722.19190	0.00046
9	0	9	8	→	8	0	8	7	16745.89982	-0.00104
9	0	9	9	→	8	0	8	8	16745.90648	0.00171
9	0	9	10	→	8	0	8	9	16745.91744	-0.00062
8	4	4	8	→	7	4	3	7	16751.66664	0.00014
8	4	4	9	→	7	4	3	8	16751.91900	0.00045
8	4	4	7	→	7	4	3	6	16751.94672	-0.00010
9	1	9	8	→	8	0	8	7	16864.41700	0.00052
9	1	9	9	→	8	0	8	8	16864.42487	-0.00188
9	1	9	10	→	8	0	8	9	16864.43513	0.00081
8	1	7	8	→	7	1	6	7	16943.90815	0.00069
8	1	7	7	→	7	1	6	6	16943.90815	-0.00024
8	1	7	9	→	7	1	6	8	16943.92711	-0.00021
8	3	5	8	→	7	3	4	7	17090.39855	0.00013
8	3	5	9	→	7	3	4	8	17090.54555	-0.00048
8	3	5	7	→	7	3	4	6	17090.55372	0.00162

6	2	5	5	→	5	1	4	4	17163.03893	0.00010
6	2	5	7	→	5	1	4	6	17163.10714	0.00045
6	2	5	6	→	5	1	4	5	17163.28268	0.00051
8	2	6	8	→	7	2	5	7	17644.25204	-0.00125
8	2	6	7	→	7	2	5	6	17644.30582	0.00165
8	2	6	9	→	7	2	5	8	17644.31570	0.00063
3	3	0	4	→	2	2	1	3	17995.33356	0.00198
3	3	0	2	→	2	2	1	1	17995.45317	0.00057
3	3	0	3	→	2	2	1	2	17995.68483	0.00223
9	2	8	9	→	8	2	7	8	18073.10743	-0.00006
9	2	8	8	→	8	2	7	7	18073.14671	0.00016
9	2	8	10	→	8	2	7	9	18073.15657	0.00006
10	0	10	10	→	9	1	9	9	18366.38150	-0.00081
10	0	10	9	→	9	1	9	8	18366.38617	-0.00068
10	0	10	11	→	9	1	9	10	18366.40104	0.00100
7	2	6	6	→	6	1	5	5	18367.61856	-0.00059
7	2	6	8	→	6	1	5	7	18367.66477	-0.00011
7	2	6	7	→	6	1	5	6	18367.78682	-0.00018
10	1	10	10	→	9	1	9	9	18433.96116	0.00104
10	1	10	9	→	9	1	9	8	18433.96116	-0.00029
10	1	10	11	→	9	1	9	10	18433.97368	-0.00125
10	0	10	9	→	9	0	9	8	18484.90380	0.00133
10	0	10	10	→	9	0	9	9	18484.90380	-0.00049
10	0	10	11	→	9	0	9	10	18484.91537	-0.00093
10	1	10	9	→	9	0	9	8	18552.47527	-0.00180
10	1	10	10	→	9	0	9	9	18552.48320	0.00110
10	1	10	11	→	9	0	9	10	18552.49169	0.00049
10	1	9	10	→	9	2	8	9	18660.21750	-0.00140
10	1	9	9	→	9	2	8	8	18660.29446	-0.00040
10	1	9	11	→	9	2	8	10	18660.30098	0.00137
9	3	7	9	→	8	3	6	8	18761.16676	-0.00057
9	3	7	8	→	8	3	6	7	18761.26858	-0.00005
9	3	7	10	→	8	3	6	9	18761.26858	-0.00030
9	1	8	8	→	8	1	7	7	18771.26780	0.00098
9	1	8	9	→	8	1	7	8	18771.26780	0.00009
9	1	8	10	→	8	1	7	9	18771.28156	-0.00058
9	4	6	9	→	8	4	5	8	18848.58322	0.00037
9	4	6	10	→	8	4	5	9	18848.76150	0.00055
9	4	6	8	→	8	4	5	7	18848.77364	-0.00097
9	4	5	9	→	8	4	4	8	18917.97749	0.00011
9	4	5	10	→	8	4	4	9	18918.15617	-0.00074
9	4	5	8	→	8	4	4	7	18918.17222	0.00150
9	3	6	9	→	8	3	5	8	19419.47975	-0.00021
9	3	6	8	→	8	3	5	7	19419.58526	0.00017
9	3	6	10	→	8	3	5	9	19419.58526	0.00015
8	2	7	7	→	7	1	6	6	19506.65210	0.00023

8	2	7	9	→	7	1	6	8	19506.68290	-0.00093
8	2	7	8	→	7	1	6	7	19506.76745	0.00014
9	2	7	9	→	8	2	6	8	19845.64808	0.00028
9	2	7	8	→	8	2	6	7	19845.67642	-0.00192
9	2	7	10	→	8	2	6	9	19845.68969	0.00063
5	2	3	4	→	4	1	4	3	19880.44279	0.00054
5	2	3	6	→	4	1	4	5	19880.57257	-0.00011
5	2	3	5	→	4	1	4	4	19880.91946	0.00009
10	2	9	10	→	9	2	8	9	19949.31181	0.00084
10	2	9	9	→	9	2	8	8	19949.33647	-0.00187
10	2	9	11	→	9	2	8	10	19949.34851	0.00098
4	3	2	3	→	3	2	1	2	19965.13288	0.00123
4	3	2	5	→	3	2	1	4	19965.24677	0.00073
4	3	2	4	→	3	2	1	3	19965.68873	-0.00045
4	3	1	3	→	3	2	2	2	20126.59963	0.00054
4	3	1	5	→	3	2	2	4	20126.71304	0.00102
4	3	1	4	→	3	2	2	3	20127.15087	0.00014
11	0	11	11	→	10	1	10	10	20162.75088	-0.00026
11	0	11	10	→	10	1	10	9	20162.75088	-0.00278
11	0	11	12	→	10	1	10	11	20162.76626	0.00149
11	1	11	11	→	10	1	10	10	20200.60387	-0.00066
11	1	11	10	→	10	1	10	9	20200.60387	-0.00157
11	1	11	12	→	10	1	10	11	20200.61782	0.00114
11	0	11	10	→	10	0	10	9	20230.32744	-0.00082
11	0	11	11	→	10	0	10	10	20230.32744	-0.00151
11	0	11	12	→	10	0	10	11	20230.34121	0.00155
11	1	11	10	→	10	0	10	9	20268.18050	0.00047
11	1	11	11	→	10	0	10	10	20268.18050	-0.00185
11	1	11	12	→	10	0	10	11	20268.19248	0.00090
10	1	9	9	→	9	1	8	8	20524.91739	-0.00067
10	1	9	10	→	9	1	8	9	20524.91739	-0.00115
10	1	9	11	→	9	1	8	10	20524.93248	0.00199
9	2	8	8	→	8	1	7	7	20635.88955	-0.00048
9	2	8	10	→	8	1	7	9	20635.91369	0.00066
9	2	8	9	→	8	1	7	8	20635.96648	-0.00086
10	3	8	10	→	9	3	7	9	20805.88608	-0.00055
10	3	8	9	→	9	3	7	8	20805.96078	0.00287
10	3	8	11	→	9	3	7	10	20805.96078	-0.00007
11	1	10	11	→	10	2	9	10	20945.42176	0.00038
11	1	10	10	→	10	2	9	9	20945.46981	-0.00130
11	1	10	12	→	10	2	9	11	20945.47717	0.00029
10	4	6	10	→	9	4	5	9	21123.09954	0.00109
10	4	6	11	→	9	4	5	10	21123.23155	0.00005
10	4	6	9	→	9	4	5	8	21123.23909	0.00124
10	3	7	10	→	9	3	6	9	21785.93250	-0.00134
10	3	7	9	→	9	3	6	8	21786.01041	0.00305

10	3	7	11	→	9	3	6	10	21786.01041	0.00016
11	2	10	11	→	10	2	9	10	21796.96632	-0.00078
11	2	10	10	→	10	2	9	9	21796.98569	-0.00138
11	2	10	12	→	10	2	9	11	21796.99623	0.00090
10	2	9	9	→	9	1	8	8	21813.96098	-0.00056
10	2	9	11	→	9	1	8	10	21813.97875	0.00033
10	2	9	10	→	9	1	8	9	21814.01025	-0.00036
5	3	3	4	→	4	2	2	3	21854.40431	0.00019
5	3	3	6	→	4	2	2	5	21854.50861	-0.00004
5	3	3	5	→	4	2	2	4	21854.88742	-0.00081
12	0	12	12	→	11	1	11	11	21942.43160	-0.00067
12	0	12	11	→	11	1	11	10	21942.43160	-0.00218
12	0	12	13	→	11	1	11	12	21942.44437	0.00114
12	1	12	12	→	11	1	11	11	21963.33367	-0.00113
12	1	12	11	→	11	1	11	10	21963.33367	-0.00184
12	1	12	13	→	11	1	11	12	21963.34643	0.00141
10	2	8	10	→	9	2	7	9	21973.16817	-0.00063
10	2	8	9	→	9	2	7	8	21973.18584	-0.00109
10	2	8	11	→	9	2	7	10	21973.19806	0.00126
12	0	12	11	→	11	0	11	10	21980.28433	-0.00123
12	0	12	12	→	11	0	11	11	21980.28433	-0.00133
12	0	12	13	→	11	0	11	12	21980.29658	0.00144
12	1	12	11	→	11	0	11	10	22001.18602	-0.00126
12	1	12	12	→	11	0	11	11	22001.18602	-0.00218
12	1	12	13	→	11	0	11	12	22001.19769	0.00076
11	1	10	11	→	10	1	9	10	22234.51299	-0.00047
11	1	10	10	→	10	1	9	9	22234.51299	-0.00161
11	1	10	12	→	10	1	9	11	22234.52645	0.00165
5	3	2	4	→	4	2	3	3	22338.90162	0.00094
5	3	2	6	→	4	2	3	5	22339.00357	0.00082
5	3	2	5	→	4	2	3	4	22339.37356	-0.00063
6	3	4	5	→	5	2	3	4	23575.13353	-0.00121
6	3	4	7	→	5	2	3	6	23575.21304	-0.00082
6	3	4	6	→	5	2	3	5	23575.52306	0.00005
13	0	13	13	→	12	1	12	12	23712.26132	-0.00093
13	0	13	12	→	12	1	12	11	23712.26132	-0.00194
13	0	13	14	→	12	1	12	13	23712.27370	0.00232
13	1	13	13	→	12	1	12	12	23723.66821	-0.00128
13	1	13	12	→	12	1	12	11	23723.66821	-0.00189
13	1	13	14	→	12	1	12	13	23723.67901	0.00077
13	0	13	13	→	12	0	12	12	23733.16396	-0.00083
13	0	13	12	→	12	0	12	11	23733.16396	-0.00102
13	0	13	14	→	12	0	12	13	23733.17612	0.00295
13	1	13	12	→	12	0	12	11	23744.56980	-0.00202
13	1	13	13	→	12	0	12	12	23744.56980	-0.00223
13	1	13	14	→	12	0	12	13	23744.58142	0.00139

12	1	11	12	→	11	1	10	11	23929.87150	-0.00042
12	1	11	11	→	11	1	10	10	23929.87150	-0.00343
12	1	11	13	→	11	1	10	12	23929.88530	0.00190

Table IV(B). Microwave transitions of the $^{13}C_1$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	7578.20806	-0.00018
4	1	4	3	→	3	1	3	2	7578.30278	-0.00064
4	1	4	5	→	3	1	3	4	7578.35619	0.00036
4	0	4	3	→	3	0	3	2	7963.58687	-0.00061
4	0	4	4	→	3	0	3	3	7963.66769	-0.00056
4	0	4	5	→	3	0	3	4	7963.69524	0.00049
5	0	5	4	→	4	0	4	3	9780.91927	-0.00023
5	0	5	5	→	4	0	4	4	9780.96367	0.00008
5	0	5	6	→	4	0	4	5	9780.98371	0.00029
5	2	4	5	→	4	2	3	4	10241.84549	0.00057
5	2	4	6	→	4	2	3	5	10242.10897	0.00075
5	2	4	4	→	4	2	3	3	10242.13555	0.00028
5	1	5	4	→	4	0	4	3	10609.50590	-0.00023
5	1	5	6	→	4	0	4	5	10609.58498	0.00084
5	1	5	5	→	4	0	4	4	10609.63679	-0.00130
6	0	6	6	→	5	1	5	5	10710.84672	0.00034
6	0	6	5	→	5	1	5	4	10710.90943	-0.00015
6	0	6	7	→	5	1	5	6	10710.93647	0.00020
5	2	3	5	→	4	2	2	4	10768.47606	-0.00049
5	2	3	6	→	4	2	2	5	10768.73964	0.00028
5	2	3	4	→	4	2	2	3	10768.76418	-0.00150
5	1	4	5	→	4	1	3	4	10924.89354	0.00047
5	1	4	4	→	4	1	3	3	10924.93298	0.00048
5	1	4	6	→	4	1	3	5	10924.97162	0.00054
6	1	6	6	→	5	1	5	5	11256.37548	0.00069
6	1	6	5	→	5	1	5	4	11256.39102	-0.00052
6	1	6	7	→	5	1	5	6	11256.42391	-0.00105
6	0	6	5	→	5	0	5	4	11539.49538	-0.00084
6	0	6	6	→	5	0	5	5	11539.52193	0.00104
6	0	6	7	→	5	0	5	6	11539.53663	-0.00036
6	1	6	5	→	5	0	5	4	12084.97767	-0.00051
6	1	6	7	→	5	0	5	6	12085.02720	0.00152
6	1	6	6	→	5	0	5	5	12085.04924	-0.00005
6	2	5	6	→	5	2	4	5	12236.40124	0.00108
6	2	5	5	→	5	2	4	4	12236.55615	0.00091
6	2	5	7	→	5	2	4	6	12236.55615	0.00041
6	1	5	6	→	5	1	4	5	12999.72793	0.00073
6	1	5	5	→	5	1	4	4	12999.74102	-0.00267
6	1	5	7	→	5	1	4	6	12999.77443	0.00038
6	2	4	6	→	5	2	3	5	13063.57231	-0.00042
6	2	4	5	→	5	2	3	4	13063.72583	0.00110
6	2	4	7	→	5	2	3	6	13063.72583	0.00002
7	1	7	7	→	6	1	6	6	13064.83874	-0.00111
7	1	7	6	→	6	1	6	5	13064.84839	0.00046

7	1	7	8	→	6	1	6	7	13064.87400	0.00017
7	1	7	6	→	6	0	6	5	13610.33010	0.00021
7	1	7	8	→	6	0	6	7	13610.36116	-0.00135
7	1	7	7	→	6	0	6	6	13610.36938	0.00113

Table IV(C). Microwave transitions of the $^{13}C_2$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	7582.50697	-0.00022
4	1	4	3	→	3	1	3	2	7582.60235	-0.00018
4	1	4	5	→	3	1	3	4	7582.65510	0.00003
4	0	4	3	→	3	0	3	2	7967.55937	-0.00033
4	0	4	4	→	3	0	3	3	7967.64067	-0.00021
4	0	4	5	→	3	0	3	4	7967.66768	0.00043
5	0	5	4	→	4	0	4	3	9783.14014	-0.00202
5	0	5	5	→	4	0	4	4	9783.18600	0.00123
5	0	5	6	→	4	0	4	5	9783.20149	-0.00024
5	2	4	5	→	4	2	3	4	10252.86708	0.00066
5	2	4	6	→	4	2	3	5	10253.12853	-0.00005
5	2	4	4	→	4	2	3	3	10253.15150	-0.00137
5	1	5	4	→	4	0	4	3	10591.46584	-0.00129
5	1	5	6	→	4	0	4	5	10591.54824	0.00302
5	1	5	5	→	4	0	4	4	10591.59713	-0.00180
5	1	4	5	→	4	1	3	4	10939.33670	0.00053
5	1	4	4	→	4	1	3	3	10939.37552	0.00000
5	1	4	6	→	4	1	3	5	10939.41484	0.00063
6	1	6	6	→	5	1	5	5	11260.79226	0.00094
6	1	6	5	→	5	1	5	4	11260.80763	-0.00043
6	1	6	7	→	5	1	5	6	11260.84114	-0.00042
6	0	6	5	→	5	0	5	4	11540.16641	0.00148
6	0	6	6	→	5	0	5	5	11540.19193	0.00059
6	0	6	7	→	5	0	5	6	11540.21071	0.00043
6	1	6	5	→	5	0	5	4	12069.13076	-0.00227
6	1	6	7	→	5	0	5	6	12069.18762	0.00257
6	1	6	6	→	5	0	5	5	12069.20512	-0.00036
6	2	5	6	→	5	2	4	5	12248.40532	-0.00005
6	2	5	5	→	5	2	4	4	12248.56117	0.00044
6	2	5	7	→	5	2	4	6	12248.56117	-0.00008
7	0	7	7	→	6	1	6	6	12740.07298	0.00003
7	0	7	6	→	6	1	6	5	12740.10518	0.00028
7	0	7	8	→	6	1	6	7	12740.12802	0.00019
6	1	5	6	→	5	1	4	5	13014.12546	0.00029
6	1	5	5	→	5	1	4	4	13014.13995	-0.00153
6	1	5	7	→	5	1	4	6	13014.17243	0.00050
7	1	7	7	→	6	1	6	6	13068.98548	-0.00224
7	1	7	6	→	6	1	6	5	13068.99620	0.00042
7	1	7	8	→	6	1	6	7	13069.02208	0.00035
7	1	7	6	→	6	0	6	5	13597.96375	-0.00013
7	1	7	8	→	6	0	6	7	13597.99502	-0.00148
7	1	7	7	→	6	0	6	6	13598.00358	0.00173

Table IV(D). Microwave transitions of the $^{13}C_3$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	7561.11046	0.00012
4	1	4	3	→	3	1	3	2	7561.20499	-0.00029
4	1	4	5	→	3	1	3	4	7561.25721	-0.00041
4	0	4	3	→	3	0	3	2	7945.71144	-0.00008
4	0	4	4	→	3	0	3	3	7945.79129	-0.00053
4	0	4	5	→	3	0	3	4	7945.81905	0.00056
5	0	5	4	→	4	0	4	3	9759.43326	-0.00058
5	0	5	5	→	4	0	4	4	9759.47741	-0.00009
5	0	5	6	→	4	0	4	5	9759.49814	0.00072
5	2	4	5	→	4	2	3	4	10217.82130	0.00137
5	2	4	6	→	4	2	3	5	10218.08314	0.00064
5	2	4	4	→	4	2	3	3	10218.10874	-0.00067
5	1	5	4	→	4	0	4	3	10589.85562	-0.00083
5	1	5	6	→	4	0	4	5	10589.93582	0.00163
5	1	5	5	→	4	0	4	4	10589.98728	-0.00025
6	0	6	6	→	5	1	5	5	10684.00832	-0.00022
6	0	6	5	→	5	1	5	4	10684.07184	0.00037
6	0	6	7	→	5	1	5	6	10684.09756	-0.00057
5	2	3	5	→	4	2	2	4	10741.51120	0.00014
5	2	3	6	→	4	2	2	5	10741.77320	0.00019
5	2	3	4	→	4	2	2	3	10741.79917	-0.00008
5	1	4	5	→	4	1	3	4	10898.78672	-0.00055
5	1	4	4	→	4	1	3	3	10898.82609	-0.00066
5	1	4	6	→	4	1	3	5	10898.86552	0.00035
6	1	6	6	→	5	1	5	5	11231.32468	0.00091
6	1	6	5	→	5	1	5	4	11231.33949	-0.00104
6	1	6	7	→	5	1	5	6	11231.37395	0.00007
6	0	6	5	→	5	0	5	4	11514.49381	-0.00027
6	0	6	6	→	5	0	5	5	11514.51817	-0.00040
6	0	6	7	→	5	0	5	6	11514.53496	0.00006
6	1	6	5	→	5	0	5	4	12061.76234	-0.00080
6	1	6	7	→	5	0	5	6	12061.81197	0.00133
6	1	6	6	→	5	0	5	5	12061.83337	-0.00043
6	2	5	6	→	5	2	4	5	12207.89815	-0.00005
6	2	5	5	→	5	2	4	4	12208.05398	0.00104
6	2	5	7	→	5	2	4	6	12208.05398	0.00054
7	0	7	7	→	6	1	6	6	12693.17146	0.00107
7	0	7	6	→	6	1	6	5	12693.20250	-0.00008
7	0	7	8	→	6	1	6	7	12693.22595	0.00057
6	1	5	6	→	5	1	4	5	12969.14917	0.00037
6	1	5	5	→	5	1	4	4	12969.16372	-0.00171
6	1	5	7	→	5	1	4	6	12969.19619	0.00052
6	2	4	6	→	5	2	3	5	13030.78821	-0.00051

6	2	4	5	→	5	2	3	4	13030.94135	0.00114
6	2	4	7	→	5	2	3	6	13030.94135	0.00007
7	1	7	7	→	6	1	6	6	13035.93433	-0.00217
7	1	7	6	→	6	1	6	5	13035.94511	0.00050
7	1	7	8	→	6	1	6	7	13035.97054	0.00009
7	1	7	6	→	6	0	6	5	13583.21384	0.00017
7	1	7	8	→	6	0	6	7	13583.24519	-0.00101
7	1	7	7	→	6	0	6	6	13583.25282	0.00110

Table IV(E). Microwave transitions of the $^{13}C_4$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	7540.00358	-0.00056
4	1	4	3	→	3	1	3	2	7540.09957	-0.00013
4	1	4	5	→	3	1	3	4	7540.15206	0.00012
4	0	4	3	→	3	0	3	2	7923.40949	0.00049
4	0	4	4	→	3	0	3	3	7923.48986	-0.00164
4	0	4	5	→	3	0	3	4	7923.51685	-0.00004
5	0	5	4	→	4	0	4	3	9731.41541	-0.00028
5	0	5	5	→	4	0	4	4	9731.46238	0.00099
5	0	5	6	→	4	0	4	5	9731.48022	0.00013
5	2	4	5	→	4	2	3	4	10190.51691	-0.00098
5	2	4	6	→	4	2	3	5	10190.78333	0.00126
5	2	4	4	→	4	2	3	3	10190.80813	-0.00111
5	1	5	4	→	4	0	4	3	10554.58829	-0.00115
5	1	5	6	→	4	0	4	5	10554.66935	0.00106
5	1	5	5	→	4	0	4	4	10554.72588	0.00010
6	0	6	6	→	5	1	5	5	10657.73868	0.00043
6	0	6	5	→	5	1	5	4	10657.80267	-0.00030
6	0	6	7	→	5	1	5	6	10657.82941	0.00000
5	2	3	5	→	4	2	2	4	10715.08101	0.00151
5	2	3	6	→	4	2	2	5	10715.34511	0.00070
5	2	3	4	→	4	2	2	3	10715.37019	-0.00071
5	1	4	5	→	4	1	3	4	10870.30353	-0.00033
5	1	4	4	→	4	1	3	3	10870.34278	0.00015
5	1	4	6	→	4	1	3	5	10870.38206	0.00034
6	1	6	6	→	5	1	5	5	11199.51349	0.00045
6	1	6	5	→	5	1	5	4	11199.52913	-0.00047
6	1	6	7	→	5	1	5	6	11199.56285	-0.00015
6	0	6	5	→	5	0	5	4	11480.97621	-0.00051
6	0	6	6	→	5	0	5	5	11481.00366	0.00102
6	0	6	7	→	5	0	5	6	11481.01701	-0.00060
6	1	6	5	→	5	0	5	4	12022.70252	-0.00082
6	1	6	7	→	5	0	5	6	12022.75264	0.00143
6	1	6	6	→	5	0	5	5	12022.77771	0.00028
6	2	5	6	→	5	2	4	5	12175.01089	0.00019
6	2	5	5	→	5	2	4	4	12175.16711	0.00106
6	2	5	7	→	5	2	4	6	12175.16711	0.00051
7	0	7	7	→	6	1	6	6	12659.98193	0.00115
7	0	7	6	→	6	1	6	5	12660.01427	0.00046
7	0	7	8	→	6	1	6	7	12660.03695	0.00043
6	1	5	6	→	5	1	4	5	12934.60825	0.00033
6	1	5	5	→	5	1	4	4	12934.62285	-0.00068
6	1	5	7	→	5	1	4	6	12934.65483	0.00056
7	1	7	7	→	6	1	6	6	12998.78209	-0.00284

7	1	7	6	→	6	1	6	5	12998.79222	-0.00052
7	1	7	8	→	6	1	6	7	12998.81918	0.00054
6	2	4	6	→	5	2	3	5	12998.81940	0.00010
6	2	4	5	→	5	2	3	4	12998.97161	-0.00112
6	2	4	7	→	5	2	3	6	12998.97161	-0.00220
7	1	7	6	→	6	0	6	5	13540.51960	0.00024
7	1	7	8	→	6	0	6	7	13540.55137	-0.00087
7	1	7	7	→	6	0	6	6	13540.56060	0.00088

Table IV(F). Microwave transitions of the $^{13}C_5$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	7549.17218	-0.00040
4	1	4	3	→	3	1	3	2	7549.26821	0.00027
4	1	4	5	→	3	1	3	4	7549.32036	-0.00007
4	0	4	3	→	3	0	3	2	7931.11631	-0.00057
4	0	4	4	→	3	0	3	3	7931.19788	-0.00141
4	0	4	5	→	3	0	3	4	7931.22448	-0.00026
5	0	5	4	→	4	0	4	3	9732.48189	0.00011
5	0	5	5	→	4	0	4	4	9732.52618	-0.00026
5	0	5	6	→	4	0	4	5	9732.54470	-0.00014
5	2	4	5	→	4	2	3	4	10219.39558	0.00055
5	2	4	6	→	4	2	3	5	10219.65921	0.00063
5	2	4	4	→	4	2	3	3	10219.68461	-0.00046
5	1	5	4	→	4	0	4	3	10492.59307	-0.00045
5	1	5	6	→	4	0	4	5	10492.67328	0.00157
5	1	5	5	→	4	0	4	4	10492.72626	0.00025
6	0	6	6	→	5	1	5	5	10716.06266	0.00079
6	0	6	5	→	5	1	5	4	10716.12424	0.00028
6	0	6	7	→	5	1	5	6	10716.15109	0.00022
5	2	3	6	→	4	2	2	5	10776.77327	0.00004
5	2	3	4	→	4	2	2	3	10776.79798	-0.00164
5	1	4	5	→	4	1	3	4	10909.46179	0.00077
5	1	4	4	→	4	1	3	3	10909.50091	0.00122
5	1	4	6	→	4	1	3	5	10909.53964	0.00099
6	1	6	6	→	5	1	5	5	11206.84606	0.00095
6	1	6	5	→	5	1	5	4	11206.85968	-0.00197
6	1	6	7	→	5	1	5	6	11206.89517	0.00001
6	0	6	5	→	5	0	5	4	11476.23476	-0.00094
6	0	6	6	→	5	0	5	5	11476.26307	0.00163
6	0	6	7	→	5	0	5	6	11476.27748	-0.00026
6	1	6	5	→	5	0	5	4	11966.97238	-0.00101
6	1	6	7	→	5	0	5	6	11967.02406	0.00203
6	1	6	6	→	5	0	5	5	11967.04354	-0.00114
6	2	5	6	→	5	2	4	5	12205.77995	0.00015
6	2	5	5	→	5	2	4	4	12205.93531	0.00021
6	2	5	7	→	5	2	4	6	12205.93531	-0.00034
7	0	7	7	→	6	1	6	6	12703.24881	-0.00007
7	0	7	6	→	6	1	6	5	12703.28020	0.00006
7	0	7	8	→	6	1	6	7	12703.30393	0.00080
6	1	5	6	→	5	1	4	5	12972.15754	-0.00001
6	1	5	5	→	5	1	4	4	12972.17196	-0.00098
6	1	5	7	→	5	1	4	6	12972.20323	-0.00038
7	1	7	7	→	6	1	6	6	13004.19868	-0.00094
7	1	7	6	→	6	1	6	5	13004.20722	-0.00028

7	1	7	8	→	6	1	6	7	13004.23402	0.00057
6	2	4	6	→	5	2	3	5	13074.22998	-0.00093
6	2	4	5	→	5	2	3	4	13074.38497	0.00148
6	2	4	7	→	5	2	3	6	13074.38497	0.00029
7	1	7	6	→	6	0	6	5	13494.94548	0.00028
7	1	7	8	→	6	0	6	7	13494.97614	-0.00161
7	1	7	7	→	6	0	6	6	13494.98383	0.00097

Table IV(G). Microwave transitions of the $^{13}C_6$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	7563.81382	-0.00070
4	1	4	3	→	3	1	3	2	7563.90706	-0.00183
4	1	4	5	→	3	1	3	4	7563.96164	0.00065
4	0	4	3	→	3	0	3	2	7947.30097	0.00060
4	0	4	4	→	3	0	3	3	7947.37968	-0.00115
4	0	4	5	→	3	0	3	4	7947.40708	0.00018
5	0	5	4	→	4	0	4	3	9755.52245	-0.00125
5	0	5	5	→	4	0	4	4	9755.56806	0.00118
5	0	5	6	→	4	0	4	5	9755.58534	-0.00039
5	2	4	5	→	4	2	3	4	10232.96339	0.00189
5	2	4	6	→	4	2	3	5	10233.22327	0.00110
5	2	4	4	→	4	2	3	3	10233.24806	-0.00020
5	1	5	4	→	4	0	4	3	10540.94700	-0.00035
5	1	5	6	→	4	0	4	5	10541.02582	0.00129
5	1	5	5	→	4	0	4	4	10541.07667	-0.00031
6	0	6	6	→	5	1	5	5	10720.14740	0.00056
6	0	6	5	→	5	1	5	4	10720.20809	-0.00021
6	0	6	7	→	5	1	5	6	10720.23568	0.00068
5	2	3	5	→	4	2	2	4	10778.93764	-0.00001
5	2	3	6	→	4	2	2	5	10779.19943	0.00086
5	2	3	4	→	4	2	2	3	10779.22364	-0.00102
5	1	4	5	→	4	1	3	4	10920.83000	-0.00107
5	1	4	4	→	4	1	3	3	10920.86941	-0.00056
5	1	4	6	→	4	1	3	5	10920.90845	0.00017
6	1	6	6	→	5	1	5	5	11230.98576	0.00161
6	1	6	5	→	5	1	5	4	11231.00027	-0.00044
6	1	6	7	→	5	1	5	6	11231.03289	-0.00102
6	0	6	5	→	5	0	5	4	11505.63151	-0.00045
6	0	6	6	→	5	0	5	5	11505.65789	0.00096
6	0	6	7	→	5	0	5	6	11505.67350	-0.00030
6	1	6	5	→	5	0	5	4	12016.42351	-0.00086
6	1	6	7	→	5	0	5	6	12016.47449	0.00178
6	1	6	6	→	5	0	5	5	12016.49370	-0.00055
6	2	5	6	→	5	2	4	5	12223.41651	0.00031
6	2	5	5	→	5	2	4	4	12223.57067	0.00061
6	2	5	7	→	5	2	4	6	12223.57067	0.00010
7	0	7	7	→	6	1	6	6	12717.79037	-0.00065
7	0	7	6	→	6	1	6	5	12717.82221	0.00004
7	0	7	8	→	6	1	6	7	12717.84578	0.00083
6	1	5	6	→	5	1	4	5	12989.17248	-0.00052
6	1	5	5	→	5	1	4	4	12989.18658	-0.00244
6	1	5	7	→	5	1	4	6	12989.21997	0.00079

7	1	7	7	→	6	1	6	6	13033.38449	-0.00133
7	1	7	6	→	6	1	6	5	13033.39261	-0.00120
7	1	7	8	→	6	1	6	7	13033.41980	0.00027
6	2	4	6	→	5	2	3	5	13076.92203	-0.00012
6	2	4	5	→	5	2	3	4	13077.07489	0.00214
6	2	4	7	→	5	2	3	6	13077.07489	0.00100
7	1	7	6	→	6	0	6	5	13544.18697	0.00075
7	1	7	8	→	6	0	6	7	13544.21788	-0.00056
7	1	7	7	→	6	0	6	6	13544.22383	0.00070

Table IV(H). Microwave transitions of the $^{13}C_7$ isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	7514.35432	-0.00039
4	1	4	3	→	3	1	3	2	7514.44924	-0.00090
4	1	4	5	→	3	1	3	4	7514.50258	0.00017
4	0	4	3	→	3	0	3	2	7897.10252	-0.00038
4	0	4	4	→	3	0	3	3	7897.18475	0.00037
4	0	4	5	→	3	0	3	4	7897.21167	0.00121
5	0	5	4	→	4	0	4	3	9702.69764	-0.00051
5	0	5	5	→	4	0	4	4	9702.74342	0.00066
5	0	5	6	→	4	0	4	5	9702.76172	-0.00003
5	2	4	5	→	4	2	3	4	10148.83333	0.00045
5	2	4	6	→	4	2	3	5	10149.09664	0.00029
5	2	4	4	→	4	2	3	3	10149.12231	-0.00086
5	1	5	4	→	4	0	4	3	10551.63752	-0.00050
5	1	5	6	→	4	0	4	5	10551.71738	0.00074
5	1	5	5	→	4	0	4	4	10551.77254	-0.00066
6	0	6	6	→	5	1	5	5	10600.77158	-0.00049
6	0	6	5	→	5	1	5	4	10600.83648	-0.00046
6	0	6	7	→	5	1	5	6	10600.86351	0.00016
5	2	3	5	→	4	2	2	4	10658.28839	-0.00023
5	2	3	6	→	4	2	2	5	10658.55349	0.00102
5	2	3	4	→	4	2	2	3	10658.57790	-0.00099
5	1	4	5	→	4	1	3	4	10822.14156	-0.00047
5	1	4	4	→	4	1	3	3	10822.18105	-0.00021
5	1	4	6	→	4	1	3	5	10822.22063	0.00054
6	1	6	6	→	5	1	5	5	11164.04580	0.00164
6	1	6	5	→	5	1	5	4	11164.05988	-0.00093
6	1	6	7	→	5	1	5	6	11164.09444	0.00020
6	0	6	5	→	5	0	5	4	11449.77695	0.00014
6	0	6	6	→	5	0	5	5	11449.80291	0.00039
6	0	6	7	→	5	0	5	6	11449.81798	-0.00026
6	1	6	5	→	5	0	5	4	12012.99973	-0.00095
6	1	6	7	→	5	0	5	6	12013.05070	0.00157
6	1	6	6	→	5	0	5	5	12013.07383	-0.00078
6	2	5	6	→	5	2	4	5	12126.74148	0.00105
6	2	5	5	→	5	2	4	4	12126.89661	0.00093
6	2	5	7	→	5	2	4	6	12126.89661	0.00041
7	0	7	7	→	6	1	6	6	12603.74041	0.00065
7	0	7	6	→	6	1	6	5	12603.77296	-0.00016
7	0	7	8	→	6	1	6	7	12603.79601	0.00025
6	1	5	6	→	5	1	4	5	12880.96935	0.00022
6	1	5	5	→	5	1	4	4	12880.98363	-0.00174
6	1	5	7	→	5	1	4	6	12881.01597	0.00006

6	2	4	6	→	5	2	3	5	12929.33590	0.00019
6	2	4	5	→	5	2	3	4	12929.48947	0.00085
6	2	4	7	→	5	2	3	6	12929.48947	-0.00019
7	1	7	7	→	6	1	6	6	12958.93243	-0.00193
7	1	7	6	→	6	1	6	5	12958.94237	0.00001
7	1	7	8	→	6	1	6	7	12958.96834	0.00014
7	1	7	6	→	6	0	6	5	13522.16674	0.00051
7	1	7	8	→	6	0	6	7	13522.19826	-0.00083
7	1	7	7	→	6	0	6	6	13522.20743	0.00098

Table IV(I). Microwave transitions of the ^{15}N isotopologue of 3FBN in MHz

J'	$K_{a'}$	$K_{c'}$	→	J"	$K_{a"}$	$K_{c"}$	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	→	3	1	3	7424.91475	-0.00011
4	0	4	→	3	0	3	7803.72556	-0.00041
4	2	3	→	3	2	2	8043.12589	-0.00033
4	2	2	→	3	2	1	8303.79844	-0.00055
4	1	3	→	3	1	2	8593.88643	0.00007
4	1	4	→	3	0	3	9030.00396	0.00075
5	1	5	→	4	1	4	9239.73747	-0.00012
5	0	5	→	4	0	4	9592.18409	0.00020
5	2	4	→	4	2	3	10019.76505	0.00009
5	3	3	→	4	3	2	10159.08952	-0.00114
6	0	6	→	5	1	5	10448.78478	0.00022
5	1	5	→	4	0	4	10466.01404	-0.00080
5	2	3	→	4	2	2	10507.55246	0.00036
5	1	4	→	4	1	3	10679.87076	0.00067
6	1	6	→	5	1	5	11034.13732	-0.00002
6	0	6	→	5	0	5	11322.61595	0.00044
6	1	6	→	5	0	5	11907.96858	0.00029
6	2	5	→	5	2	4	11974.18152	0.00000
7	0	7	→	6	1	6	12436.87237	0.00048
6	1	5	→	5	1	4	12715.82356	0.00072
6	2	4	→	5	2	3	12745.50237	0.00026
7	1	7	→	6	1	6	12809.68873	0.00026
7	1	7	→	6	0	6	13395.04067	-0.00058
7	2	6	→	6	2	5	13902.88095	0.00020
8	0	8	→	7	1	7	14340.91990	-0.00014
7	3	4	→	6	3	3	14438.63682	-0.00098

Appendix V. Microwave transitions of 2,3-difluorobenzonitrile (23DFBN) and its minor isotopologues

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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Table V(A). Microwave transitions of the parent 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs. - calc.}$
3	2	1	3	→	2	2	0	2	6226.90827	0.00024
3	2	1	4	→	2	2	0	3	6228.19557	0.00106
3	2	1	2	→	2	2	0	1	6228.89327	0.00038
3	1	2	3	→	2	1	1	2	6419.09933	0.00012
3	1	2	2	→	2	1	1	1	6419.41638	-0.00175
3	1	2	4	→	2	1	1	3	6419.42781	0.00057
3	3	1	2	→	3	2	2	2	6455.45925	-0.00022
3	3	1	4	→	3	2	2	4	6456.02004	-0.00053
3	3	1	3	→	3	2	2	3	6457.62247	0.00003
4	0	4	4	→	3	1	3	3	6641.26380	-0.00003
4	0	4	3	→	3	1	3	2	6641.46696	-0.00110
4	0	4	5	→	3	1	3	4	6641.49909	0.00048
4	3	2	3	→	4	2	3	3	6685.44894	0.00011
4	3	2	5	→	4	2	3	5	6685.69523	0.00018
4	3	2	4	→	4	2	3	4	6686.65282	0.00037
8	4	4	7	→	8	3	5	7	6715.17524	-0.00043
8	4	4	9	→	8	3	5	9	6715.22667	-0.00060
8	4	4	8	→	8	3	5	8	6715.63686	-0.00043
4	1	4	4	→	3	1	3	3	6869.30985	0.00001
4	1	4	3	→	3	1	3	2	6869.39796	-0.00023
4	1	4	5	→	3	1	3	4	6869.45255	0.00007
4	0	4	3	→	3	0	3	2	7093.78742	-0.00014
4	0	4	4	→	3	0	3	3	7093.89295	-0.00156
4	0	4	5	→	3	0	3	4	7093.90026	0.00124
5	3	3	4	→	5	2	4	4	7101.02925	-0.00001
5	3	3	6	→	5	2	4	6	7101.15576	-0.00007
5	3	3	5	→	5	2	4	5	7101.77725	0.00006
5	2	4	4	→	5	1	5	4	7109.86194	0.00008
5	2	4	6	→	5	1	5	6	7109.94645	-0.00023
5	2	4	5	→	5	1	5	5	7110.36322	0.00009
4	1	4	3	→	3	0	3	2	7321.71747	-0.00022
4	1	4	5	→	3	0	3	4	7321.85299	0.00010
4	1	4	4	→	3	0	3	3	7321.94029	-0.00023
7	4	3	6	→	7	3	4	6	7378.69828	-0.00025
7	4	3	8	→	7	3	4	8	7378.77960	-0.00050
7	4	3	7	→	7	3	4	7	7379.34547	-0.00031
2	2	1	1	→	1	1	0	1	7555.37060	0.00008
2	2	1	3	→	1	1	0	2	7556.66091	0.00082
2	2	1	1	→	1	1	0	0	7556.87037	0.00218
2	2	1	2	→	1	1	0	1	7557.30550	0.00101
2	2	1	2	→	1	1	0	2	7557.90304	-0.00038
6	1	5	5	→	6	0	6	5	7613.45108	0.00027
6	1	5	7	→	6	0	6	7	7613.47568	-0.00158

6	1	5	6	→	6	0	6	6	7613.63349	-0.00035
6	3	4	5	→	6	2	5	5	7737.68765	-0.00007
6	3	4	7	→	6	2	5	7	7737.75935	-0.00014
6	3	4	6	→	6	2	5	6	7738.18453	-0.00010
4	2	3	4	→	3	2	2	3	7761.70934	0.00003
4	2	3	5	→	3	2	2	4	7762.22756	0.00052
4	2	3	3	→	3	2	2	2	7762.35994	-0.00010
4	3	2	4	→	3	3	1	3	7990.73963	0.00031
4	3	2	5	→	3	3	1	4	7991.90239	0.00087
4	3	2	3	→	3	3	1	2	7992.34966	0.00026
6	4	2	5	→	6	3	3	5	8027.42362	-0.00022
6	4	2	7	→	6	3	3	7	8027.54863	-0.00077
6	4	2	6	→	6	3	3	6	8028.29282	-0.00034
2	2	0	1	→	1	1	1	1	8056.92324	0.00023
2	2	0	3	→	1	1	1	2	8058.15451	0.00075
2	2	0	1	→	1	1	1	0	8058.32754	0.00132
2	2	0	2	→	1	1	1	1	8058.79836	0.00055
2	2	0	2	→	1	1	1	2	8059.35895	-0.00011
4	3	1	4	→	3	3	0	3	8073.47786	0.00069
4	3	1	5	→	3	3	0	4	8074.65963	0.00095
4	3	1	3	→	3	3	0	2	8075.11111	0.00023
6	2	4	6	→	5	3	3	5	8168.48087	0.00075
6	2	4	7	→	5	3	3	6	8169.33505	0.00081
6	2	4	5	→	5	3	3	4	8169.47291	0.00012
5	1	4	5	→	4	2	3	4	8210.12619	0.00005
5	1	4	6	→	4	2	3	5	8210.69967	-0.00021
5	1	4	4	→	4	2	3	3	8210.78945	0.00046
5	0	5	5	→	4	1	4	4	8380.81446	0.00024
5	0	5	4	→	4	1	4	3	8380.88561	-0.00020
5	0	5	6	→	4	1	4	5	8380.92349	0.00001
4	1	3	4	→	3	1	2	4	8411.56012	-0.00103
4	1	3	4	→	3	1	2	3	8412.49056	-0.00010
4	1	3	3	→	3	1	2	2	8412.55662	-0.00134
4	1	3	5	→	3	1	2	4	8412.61322	0.00024
4	1	3	3	→	3	1	2	3	8413.81235	-0.00084
6	2	5	5	→	6	0	6	5	8427.53043	0.00025
6	2	5	7	→	6	0	6	7	8427.58509	-0.00044
6	2	5	6	→	6	0	6	6	8427.91290	-0.00030
5	1	5	5	→	4	1	4	5	8482.38554	-0.00084
5	1	5	5	→	4	1	4	4	8483.50748	0.00049
5	1	5	4	→	4	1	4	3	8483.53678	-0.00011
5	1	5	6	→	4	1	4	5	8483.58201	0.00036
5	1	5	4	→	4	1	4	4	8484.94540	-0.00063
4	2	2	4	→	3	2	1	3	8503.02370	0.00015
4	2	2	5	→	3	2	1	4	8503.56582	0.00034
4	2	2	3	→	3	2	1	2	8503.69780	0.00066

6	3	4	5	→	6	1	5	5	8551.76612	-0.00097
6	3	4	7	→	6	1	5	7	8551.86671	-0.00104
6	3	4	6	→	6	1	5	6	8552.46351	-0.00048
5	0	5	5	→	4	0	4	5	8607.64635	-0.00113
5	0	5	4	→	4	0	4	3	8608.81564	-0.00030
5	0	5	5	→	4	0	4	4	8608.86063	0.00040
5	0	5	6	→	4	0	4	5	8608.87738	0.00002
5	0	5	4	→	4	0	4	4	8610.34035	-0.00060
5	1	5	4	→	4	0	4	3	8711.46669	-0.00034
5	1	5	6	→	4	0	4	5	8711.53578	0.00026
5	1	5	5	→	4	0	4	4	8711.55292	-0.00008
7	3	5	6	→	7	1	6	6	9033.53468	-0.00077
7	3	5	8	→	7	1	6	8	9033.59096	-0.00050
7	3	5	7	→	7	1	6	7	9033.97943	-0.00026
3	2	2	2	→	2	1	1	1	9109.13307	0.00058
3	2	2	4	→	2	1	1	3	9109.46670	-0.00013
3	2	2	3	→	2	1	1	2	9110.06820	-0.00017
7	1	6	6	→	7	0	7	6	9373.79334	0.00118
7	1	6	8	→	7	0	7	8	9373.81643	-0.00140
7	1	6	7	→	7	0	7	7	9373.99567	-0.00002
5	2	4	5	→	4	2	3	5	9585.40678	-0.00092
5	2	4	5	→	4	2	3	4	9585.92560	0.00023
5	2	4	6	→	4	2	3	5	9586.18700	0.00048
5	2	4	4	→	4	2	3	3	9586.21155	-0.00041
5	2	4	4	→	4	2	3	4	9586.86245	-0.00067
8	3	6	7	→	8	1	7	7	9895.80455	-0.00103
8	3	6	9	→	8	1	7	9	9895.83913	0.00001
8	3	6	8	→	8	1	7	8	9896.10537	0.00008
5	3	3	5	→	4	3	2	4	10001.04982	-0.00029
5	3	3	6	→	4	3	2	5	10001.64758	0.00028
5	3	3	4	→	4	3	2	3	10001.79217	-0.00022
5	4	2	5	→	4	4	1	4	10005.54699	0.00033
5	4	2	6	→	4	4	1	5	10006.60491	0.00043
5	4	2	4	→	4	4	1	3	10006.91815	-0.00011
5	4	1	5	→	4	4	0	4	10019.49124	0.00037
5	4	1	6	→	4	4	0	5	10020.55379	0.00140
5	4	1	4	→	4	4	0	3	10020.86635	-0.00056
6	0	6	6	→	5	1	5	5	10025.72660	-0.00038
6	0	6	5	→	5	1	5	4	10025.75233	-0.00067
6	0	6	7	→	5	1	5	6	10025.78562	0.00070
6	1	6	6	→	5	1	5	6	10067.52247	-0.00095
6	1	6	6	→	5	1	5	5	10068.71840	-0.00029
6	1	6	5	→	5	1	5	4	10068.73067	0.00047
6	1	6	7	→	5	1	5	6	10068.76459	0.00036
6	1	6	5	→	5	1	5	5	10070.16842	-0.00081
6	0	6	6	→	5	0	5	6	10127.18877	-0.00111

6	0	6	5	→	5	0	5	4	10128.40529	0.00120
6	0	6	6	→	5	0	5	5	10128.42002	0.00027
6	0	6	7	→	5	0	5	6	10128.44337	0.00028
6	0	6	5	→	5	0	5	5	10129.88414	-0.00066
8	3	5	8	→	7	4	4	7	10150.24419	-0.00005
8	3	5	9	→	7	4	4	8	10150.98701	0.00066
8	3	5	7	→	7	4	4	6	10151.07452	-0.00090
6	1	6	5	→	5	0	5	4	10171.38177	0.00049
6	1	6	6	→	5	0	5	5	10171.41184	0.00038
6	1	6	7	→	5	0	5	6	10171.42266	0.00026
5	1	4	5	→	4	1	3	5	10249.26082	-0.00131
5	1	4	4	→	4	1	3	3	10250.30158	-0.00386
5	1	4	5	→	4	1	3	4	10250.31434	0.00038
5	1	4	6	→	4	1	3	5	10250.35386	0.00033
5	1	4	4	→	4	1	3	4	10251.62698	-0.00099
5	3	2	5	→	4	3	1	4	10266.43557	-0.00035
5	3	2	6	→	4	3	1	5	10267.06725	-0.00016
5	3	2	4	→	4	3	1	3	10267.21830	0.00019
4	2	3	3	→	3	1	2	2	10452.07460	0.00019
4	2	3	5	→	3	1	2	4	10452.26657	-0.00006
4	2	3	4	→	3	1	2	3	10452.67829	-0.00018
6	1	5	6	→	5	2	4	5	10528.99784	0.00015
6	1	5	7	→	5	2	4	6	10529.31608	0.00057
6	1	5	5	→	5	2	4	4	10529.34174	-0.00021
5	2	3	5	→	4	2	2	5	10758.73391	-0.00134
5	2	3	5	→	4	2	2	4	10759.35831	-0.00004
5	2	3	6	→	4	2	2	5	10759.61975	0.00072
5	2	3	4	→	4	2	2	3	10759.63721	-0.00153
5	2	3	4	→	4	2	2	4	10760.42134	-0.00104
3	2	1	2	→	2	1	2	1	10773.76480	0.00085
3	2	1	4	→	2	1	2	3	10774.09339	0.00073
3	2	1	3	→	2	1	2	2	10774.65306	-0.00036
6	2	5	6	→	5	2	4	5	11343.27741	0.00036
6	2	5	5	→	5	2	4	4	11343.42348	0.00216
6	2	5	7	→	5	2	4	6	11343.42348	-0.00029
7	0	7	7	→	6	1	6	6	11619.64335	-0.00092
7	0	7	6	→	6	1	6	5	11619.65531	0.00074
7	0	7	8	→	6	1	6	7	11619.68042	0.00046
5	2	4	4	→	4	1	3	3	11625.72836	-0.00005
5	2	4	6	→	4	1	3	5	11625.84041	0.00024
5	2	4	5	→	4	1	3	4	11626.11286	-0.00032
7	1	7	7	→	6	1	6	6	11636.78704	-0.00114
7	1	7	6	→	6	1	6	5	11636.79431	0.00078
7	1	7	8	→	6	1	6	7	11636.81992	0.00036
7	0	7	6	→	6	0	6	5	11662.63070	-0.00107
7	0	7	7	→	6	0	6	6	11662.63738	0.00140

7	0	7	8	→	6	0	6	7	11662.65924	-0.00003
7	1	7	6	→	6	0	6	5	11679.76963	-0.00110
7	1	7	7	→	6	0	6	6	11679.78172	0.00182
7	1	7	8	→	6	0	6	7	11679.79860	-0.00027
6	1	5	5	→	5	1	4	4	11904.76419	-0.00073
6	1	5	6	→	5	1	4	5	11904.79565	-0.00126
6	1	5	7	→	5	1	4	6	11904.80351	0.00136
6	3	4	6	→	5	3	3	5	11979.68422	-0.00026
6	3	4	7	→	5	3	3	6	11980.02834	0.00090
6	3	4	5	→	5	3	3	4	11980.07892	-0.00087
6	5	2	6	→	5	5	1	5	11997.54908	0.00009
6	5	2	7	→	5	5	1	6	11998.50823	0.00073
6	5	2	5	→	5	5	1	4	11998.73890	-0.00032
6	5	1	6	→	5	5	0	5	11999.52027	-0.00007
6	5	1	7	→	5	5	0	6	12000.47963	0.00025
6	5	1	5	→	5	5	0	4	12000.71066	-0.00052
6	4	3	6	→	5	4	2	5	12059.95550	0.00013
6	4	3	7	→	5	4	2	6	12060.57605	0.00059
6	4	3	5	→	5	4	2	4	12060.70692	-0.00042
6	4	2	6	→	5	4	1	5	12119.86810	0.00023
6	4	2	7	→	5	4	1	6	12120.49869	0.00024
6	4	2	5	→	5	4	1	4	12120.63176	-0.00014
3	3	1	4	→	2	2	0	3	12239.02356	0.00040
3	3	1	2	→	2	2	0	1	12239.13320	0.00113
3	3	1	3	→	2	2	0	2	12239.42057	0.00077
3	3	0	4	→	2	2	1	3	12348.38819	0.00040
3	3	0	2	→	2	2	1	1	12348.52091	0.00079
3	3	0	3	→	2	2	1	2	12348.74038	0.00047
6	3	3	6	→	5	3	2	5	12580.49994	-0.00047
6	3	3	7	→	5	3	2	6	12580.88328	0.00061
6	3	3	5	→	5	3	2	4	12580.93819	-0.00137
7	1	6	7	→	6	2	5	6	12608.71835	-0.00012
7	1	6	8	→	6	2	5	7	12608.89262	0.00105
7	1	6	6	→	6	2	5	5	12608.89262	-0.00113
6	2	5	5	→	5	1	4	4	12718.84427	-0.00002
6	2	5	7	→	5	1	4	6	12718.90996	-0.00045
6	2	5	6	→	5	1	4	5	12719.07597	-0.00030
6	2	4	6	→	5	2	3	5	12910.39929	-0.00013
6	2	4	5	→	5	2	3	4	12910.51629	-0.00158
6	2	4	7	→	5	2	3	6	12910.52788	0.00067
7	2	6	7	→	6	2	5	6	13036.06471	0.00036
7	2	6	6	→	6	2	5	5	13036.14122	-0.00220
7	2	6	8	→	6	2	5	7	13036.15384	0.00046
8	0	8	8	→	7	1	7	7	13189.46530	-0.00077
8	0	8	7	→	7	1	7	6	13189.47235	0.00136
8	0	8	9	→	7	1	7	8	13189.49057	-0.00057

8	1	8	8	→	7	1	7	7	13196.07376	0.00261
8	1	8	7	→	7	1	7	6	13196.07376	-0.00064
8	1	8	9	→	7	1	7	8	13196.09424	-0.00050
8	0	8	7	→	7	0	7	6	13206.61027	0.00032
8	0	8	8	→	7	0	7	7	13206.61027	0.00029
8	0	8	9	→	7	0	7	8	13206.62995	-0.00078
8	1	8	7	→	7	0	7	6	13213.21481	0.00144
8	1	8	8	→	7	0	7	7	13213.21481	-0.00025
8	1	8	9	→	7	0	7	8	13213.23359	-0.00075
7	1	6	6	→	6	1	5	5	13422.97405	0.00093
7	1	6	7	→	6	1	5	6	13422.99862	0.00079
7	1	6	8	→	6	1	5	7	13422.99862	-0.00121
7	2	6	6	→	6	1	5	5	13850.22231	-0.00048
7	2	6	8	→	6	1	5	7	13850.26209	0.00045
7	2	6	7	→	6	1	5	6	13850.34345	-0.00026
8	2	6	8	→	7	3	5	7	13888.58409	0.00033
8	2	6	9	→	7	3	5	8	13888.95305	0.00034
8	2	6	7	→	7	3	5	6	13888.98595	-0.00018
7	3	5	7	→	6	3	4	6	13904.51351	-0.00002
7	3	5	8	→	6	3	4	7	13904.72412	0.00058
7	3	5	6	→	6	3	4	5	13904.74070	-0.00077
4	3	2	3	→	3	2	1	2	14002.58894	0.00036
4	3	2	5	→	3	2	1	4	14002.73030	0.00012
4	3	2	4	→	3	2	1	3	14003.25124	0.00015
7	5	3	7	→	6	5	2	6	14056.38250	0.00031
7	5	3	8	→	6	5	2	7	14056.99458	0.00053
7	5	3	6	→	6	5	2	5	14057.10824	0.00031
7	5	2	7	→	6	5	1	6	14066.89138	0.00047
7	5	2	8	→	6	5	1	7	14067.50506	0.00028
7	5	2	6	→	6	5	1	5	14067.61962	0.00067
7	4	4	7	→	6	4	3	6	14120.20025	-0.00024
7	4	4	8	→	6	4	3	7	14120.59412	0.00032
7	4	4	6	→	6	4	3	5	14120.65359	-0.00080
7	4	3	7	→	6	4	2	6	14304.17874	-0.00062
7	4	3	8	→	6	4	2	7	14304.59531	0.00087
7	4	3	6	→	6	4	2	5	14304.65616	-0.00166
8	1	7	8	→	7	2	6	7	14470.53772	0.00023
8	1	7	7	→	7	2	6	6	14470.62447	-0.00213
8	1	7	9	→	7	2	6	8	14470.63451	0.00137
4	3	1	3	→	3	2	2	2	14544.91855	0.00011
4	3	1	5	→	3	2	2	4	14545.02592	0.00086
4	3	1	4	→	3	2	2	3	14545.43929	0.00036
8	2	7	8	→	7	2	6	7	14674.89788	-0.00078
8	2	7	7	→	7	2	6	6	14674.94523	-0.00038
8	2	7	9	→	7	2	6	8	14674.95816	0.00128
9	0	9	9	→	8	1	8	8	14748.85613	0.00322

9	0	9	8	→	8	1	8	7	14748.85613	0.00016
9	0	9	10	→	8	1	8	9	14748.87072	-0.00146
9	1	9	9	→	8	1	8	8	14751.33431	0.00127
9	1	9	8	→	8	1	8	7	14751.33431	-0.00124
9	1	9	10	→	8	1	8	9	14751.34997	-0.00184
9	0	9	9	→	8	0	8	8	14755.45910	0.00112
9	0	9	8	→	8	0	8	7	14755.45910	-0.00028
9	0	9	10	→	8	0	8	9	14755.47509	-0.00069
9	1	9	9	→	8	0	8	8	14757.93938	0.00126
9	1	9	8	→	8	0	8	7	14757.93938	0.00042
9	1	9	10	→	8	0	8	9	14757.95383	-0.00159
8	1	7	7	→	7	1	6	6	14897.87476	-0.00151
8	1	7	8	→	7	1	6	7	14897.88527	0.00190
8	1	7	9	→	7	1	6	8	14897.89551	0.00056
7	2	5	7	→	6	2	4	6	14903.90809	-0.00017
7	2	5	6	→	6	2	4	5	14903.94718	0.00055
7	2	5	8	→	6	2	4	7	14903.96342	-0.00008
7	3	4	7	→	6	3	3	6	14953.12688	0.00014
7	3	4	8	→	6	3	3	7	14953.36371	-0.00003
7	3	4	6	→	6	3	3	5	14953.38120	-0.00192
8	2	7	7	→	7	1	6	6	15102.19584	0.00056
8	2	7	9	→	7	1	6	8	15102.21960	0.00092
8	2	7	8	→	7	1	6	7	15102.24491	0.00037
8	3	6	8	→	7	3	5	7	15760.00987	0.00090
8	3	6	9	→	7	3	5	8	15760.14324	0.00063
8	3	6	7	→	7	3	5	6	15760.14324	-0.00317
8	6	3	8	→	7	6	2	7	16040.97579	-0.00012
8	6	3	9	→	7	6	2	8	16041.56744	0.00053
8	6	3	7	→	7	6	2	6	16041.66390	-0.00031
8	6	2	8	→	7	6	1	7	16042.56421	0.00018
8	6	2	9	→	7	6	1	8	16043.15562	0.00029
8	6	2	7	→	7	6	1	6	16043.25240	-0.00027
8	5	4	8	→	7	5	3	7	16136.23652	-0.00032
8	5	4	9	→	7	5	3	8	16136.65233	0.00022
8	5	4	7	→	7	5	3	6	16136.71237	0.00008
8	4	5	8	→	7	4	4	7	16166.01631	-0.00013
8	4	5	9	→	7	4	4	8	16166.27901	0.00080
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8	5	3	8	→	7	5	2	7	16176.23355	0.00013
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8	5	3	7	→	7	5	2	6	16176.71416	-0.00099
9	1	8	9	→	8	2	7	8	16183.43985	-0.00027
9	1	8	8	→	8	2	7	7	16183.48627	-0.00182
9	1	8	10	→	8	2	7	9	16183.49815	0.00121
9	2	8	9	→	8	2	7	8	16274.89532	0.00004
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9	2	8	10	→	8	2	7	9	16274.93757	0.00102
10	0	10	10	→	9	1	9	9	16304.00595	0.00158
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10	1	10	10	→	9	1	9	9	16304.91835	0.00115
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10	1	10	10	→	9	0	9	9	16307.39846	0.00113
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10	1	10	11	→	9	0	9	10	16307.41127	-0.00104
9	1	8	9	→	8	1	7	8	16387.80041	-0.00089
9	1	8	8	→	8	1	7	7	16387.80843	0.00133
9	1	8	10	→	8	1	7	9	16387.81965	-0.00102
9	2	7	9	→	8	3	6	8	16425.99418	0.00037
9	2	7	10	→	8	3	6	9	16426.22288	0.00089
9	2	7	8	→	8	3	6	7	16426.23485	-0.00067
9	2	8	8	→	8	1	7	7	16479.24760	0.00264
9	2	8	9	→	8	1	7	8	16479.25507	-0.00139
9	2	8	10	→	8	1	7	9	16479.26152	0.00124
8	4	4	8	→	7	4	3	7	16606.25956	-0.00025
8	4	4	9	→	7	4	3	8	16606.55546	0.00028
8	4	4	7	→	7	4	3	6	16606.58727	-0.00011
8	2	6	7	→	7	2	5	6	16700.38624	-0.00173
8	2	6	8	→	7	2	5	7	16700.39527	0.00188
8	2	6	9	→	7	2	5	8	16700.40551	-0.00044
6	3	4	5	→	5	2	3	4	16721.12439	-0.00048
6	3	4	7	→	5	2	3	6	16721.21999	-0.00042
6	3	4	6	→	5	2	3	5	16721.60327	-0.00051
5	3	2	4	→	4	2	3	3	17049.77643	-0.00008
5	3	2	6	→	4	2	3	5	17049.86585	0.00043
5	3	2	5	→	4	2	3	4	17050.16604	0.00050
8	3	5	8	→	7	3	4	7	17269.96892	0.00062
8	3	5	9	→	7	3	4	8	17270.10869	0.00068
8	3	5	7	→	7	3	4	6	17270.10869	-0.00155
9	3	7	9	→	8	3	6	8	17539.98639	0.00078
9	3	7	8	→	8	3	6	7	17540.07214	0.00128
9	3	7	10	→	8	3	6	9	17540.07214	-0.00093
7	3	5	6	→	6	2	4	5	17715.35009	0.00161
7	3	5	8	→	6	2	4	7	17715.41665	-0.00009
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10	1	9	10	→	9	2	8	9	17811.65770	0.00005
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10	2	9	10	→	9	2	8	9	17850.67846	0.00022
10	2	9	9	→	9	2	8	8	17850.69809	-0.00237
10	2	9	11	→	9	2	8	10	17850.71110	0.00124
11	0	11	11	→	10	1	10	10	17857.52937	0.00086
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11	1	11	12	→	10	1	10	11	17857.87369	0.00151
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11	0	11	10	→	10	0	10	9	17858.44189	-0.00129
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11	1	11	11	→	10	0	10	10	17858.77279	0.00082
11	1	11	10	→	10	0	10	9	17858.77279	-0.00097
11	1	11	12	→	10	0	10	11	17858.78444	-0.00041
10	1	9	10	→	9	1	8	9	17903.11382	0.00101
10	1	9	9	→	9	1	8	8	17903.12059	-0.00392
10	1	9	11	→	9	1	8	10	17903.13522	0.00018
10	2	9	10	→	9	1	8	9	17942.13237	-0.00103
10	2	9	9	→	9	1	8	8	17942.14023	0.00191
10	2	9	11	→	9	1	8	10	17942.14872	-0.00076
9	6	4	9	→	8	6	3	8	18116.89410	0.00055
9	6	4	10	→	8	6	3	9	18117.31447	0.00068
9	6	4	8	→	8	6	3	7	18117.36998	-0.00009
9	6	3	9	→	8	6	2	8	18124.04397	0.00022
9	6	3	10	→	8	6	2	9	18124.46559	0.00052
9	6	3	8	→	8	6	2	7	18124.52131	-0.00015
9	4	6	9	→	8	4	5	8	18173.08503	0.00011
9	4	6	10	→	8	4	5	9	18173.26365	-0.00005
9	4	6	8	→	8	4	5	7	18173.27715	0.00052
9	5	5	9	→	8	5	4	8	18230.25905	-0.00053
9	5	5	10	→	8	5	4	9	18230.55405	0.00033
9	5	5	8	→	8	5	4	7	18230.58658	-0.00020
9	2	7	8	→	8	2	6	7	18297.39698	0.00118
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9	2	7	9	→	8	2	6	8	18297.41993	0.00091
9	5	4	9	→	8	5	3	8	18350.62060	0.00024
9	5	4	10	→	8	5	3	9	18350.92743	0.00019
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8	3	6	7	→	7	2	5	6	18571.54769	-0.00056
8	3	6	9	→	7	2	5	8	18571.59604	0.00019
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10	2	8	10	→	9	3	7	9	18649.81411	0.00016
10	2	8	11	→	9	3	7	10	18649.94943	0.00143
10	2	8	9	→	9	3	7	8	18649.94943	-0.00153
5	4	2	4	→	4	3	1	3	18739.21450	0.00063

5	4	2	6	→	4	3	1	5	18739.26671	0.00049
5	4	2	5	→	4	3	1	4	18739.63171	0.00045
5	4	1	4	→	4	3	2	3	18852.05913	-0.00005
5	4	1	6	→	4	3	2	5	18852.10492	0.00093
5	4	1	5	→	4	3	2	4	18852.43957	0.00079
9	4	5	9	→	8	4	4	8	19021.10640	-0.00038
9	4	5	10	→	8	4	4	9	19021.32308	0.00072
9	4	5	8	→	8	4	4	7	19021.33708	-0.00133
10	3	8	10	→	9	3	7	9	19248.28833	0.00111
10	3	8	9	→	9	3	7	8	19248.34014	-0.00158
10	3	8	11	→	9	3	7	10	19248.34761	0.00130
11	1	10	11	→	10	2	9	10	19397.15937	0.00083
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12	0	12	12	→	11	1	11	11	19410.46259	0.00072
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12	0	12	13	→	11	1	11	12	19410.47344	0.00039
12	1	12	12	→	11	1	11	11	19410.58042	0.00035
12	1	12	11	→	11	1	11	10	19410.58042	-0.00145
12	1	12	13	→	11	1	11	12	19410.59128	0.00005
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12	1	12	13	→	11	0	11	12	19410.92268	0.00086
9	3	7	8	→	8	2	6	7	19411.23093	-0.00021
9	3	7	10	→	8	2	6	9	19411.26280	-0.00017
9	3	7	9	→	8	2	6	8	19411.41089	0.00007
11	2	10	11	→	10	2	9	10	19413.22209	0.00087
11	2	10	10	→	10	2	9	9	19413.23640	-0.00237
11	2	10	12	→	10	2	9	11	19413.24772	0.00074
11	1	10	11	→	10	1	9	10	19436.18005	0.00092
11	1	10	10	→	10	1	9	9	19436.18986	-0.00262
11	1	10	12	→	10	1	9	11	19436.20160	0.00051
9	3	6	9	→	8	3	5	8	19441.19409	-0.00195
9	3	6	8	→	8	3	5	7	19441.26351	-0.00080
9	3	6	10	→	8	3	5	9	19441.27096	0.00110
11	2	10	11	→	10	1	9	10	19452.24263	0.00082
11	2	10	10	→	10	1	9	9	19452.24988	-0.00271
11	2	10	12	→	10	1	9	11	19452.26167	0.00025
10	2	8	9	→	9	2	7	8	19763.78787	0.00157
10	2	8	11	→	9	2	7	10	19763.79781	-0.00127
10	2	8	10	→	9	2	7	9	19763.80688	0.00113
10	4	7	10	→	9	4	6	9	20119.20833	0.00064
10	4	7	11	→	9	4	6	10	20119.33054	-0.00058

10	4	7	9	→	9	4	6	8	20119.33691	0.00102
10	5	6	10	→	9	5	5	9	20323.83884	0.00014
10	5	6	11	→	9	5	5	10	20324.05371	0.00105
10	5	6	9	→	9	5	5	8	20324.06999	-0.00099
11	2	9	11	→	10	3	8	10	20600.63988	-0.00031
11	2	9	10	→	10	3	8	9	20600.71675	0.00054
11	2	9	12	→	10	3	8	11	20600.71675	-0.00146
10	5	5	10	→	9	5	4	9	20623.27108	-0.00016
10	5	5	11	→	9	5	4	10	20623.50900	0.00066
10	5	5	9	→	9	5	4	8	20623.52807	-0.00068
12	1	11	12	→	11	2	10	11	20962.90601	0.00134
12	1	11	11	→	11	2	10	10	20962.91805	-0.00228
12	1	11	13	→	11	2	10	12	20962.92819	0.00078
12	2	11	12	→	11	2	10	11	20969.33461	0.00065
12	2	11	11	→	11	2	10	10	20969.34621	-0.00246
12	2	11	13	→	11	2	10	12	20969.35698	0.00116
12	1	11	12	→	11	1	10	11	20978.96764	0.00029
12	1	11	11	→	11	1	10	10	20978.97790	-0.00254
12	1	11	13	→	11	1	10	12	20978.98885	0.00112
12	2	11	12	→	11	1	10	11	20985.39718	0.00054
12	2	11	11	→	11	1	10	10	20985.40709	-0.00169
12	2	11	13	→	11	1	10	12	20985.41766	0.00151
11	2	9	10	→	10	2	8	9	21199.10452	-0.00245
11	2	9	11	→	10	2	8	10	21199.11770	0.00424
11	2	9	12	→	10	2	8	11	21199.11770	0.00118
10	3	7	10	→	9	3	6	9	21414.24430	0.00121
10	3	7	9	→	9	3	6	8	21414.26072	-0.00221
10	3	7	11	→	9	3	6	10	21414.27265	0.00074
10	4	6	10	→	9	4	5	9	21466.47407	0.00020
10	4	6	11	→	9	4	5	10	21466.62243	-0.00101
10	4	6	9	→	9	4	5	8	21466.63053	0.00092
11	3	9	10	→	10	2	8	9	21495.47078	-0.00136
11	3	9	12	→	10	2	8	11	21495.48615	0.00115
11	3	9	11	→	10	2	8	10	21495.51806	-0.00004
7	4	4	6	→	6	3	3	5	22072.41853	0.00059
7	4	4	8	→	6	3	3	7	22072.48481	-0.00059
7	4	4	7	→	6	3	3	6	22072.85096	0.00016
12	2	10	12	→	11	3	9	11	22364.33482	0.00012
12	2	10	11	→	11	3	9	10	22364.37877	0.00013
12	2	10	13	→	11	3	9	12	22364.38400	0.00147
12	3	10	12	→	11	3	9	11	22502.54405	0.00152
12	3	10	11	→	11	3	9	10	22502.56758	-0.00130
12	3	10	13	→	11	3	9	12	22502.57539	0.00125
13	1	12	13	→	12	2	11	12	22520.15238	0.00185
13	1	12	12	→	12	2	11	11	22520.16177	-0.00186
13	1	12	14	→	12	2	11	13	22520.17123	0.00136

13	2	12	13	→	12	2	11	12	22522.66617	-0.00013
13	2	12	12	→	12	2	11	11	22522.67721	-0.00184
13	2	12	14	→	12	2	11	13	22522.68714	0.00183
13	1	12	13	→	12	1	11	12	22526.57897	-0.00085
13	1	12	12	→	12	1	11	11	22526.58982	-0.00215
13	1	12	14	→	12	1	11	13	22526.59993	0.00165
13	2	12	13	→	12	1	11	12	22529.09568	0.00009
13	2	12	12	→	12	1	11	11	22529.10553	-0.00186
13	2	12	14	→	12	1	11	13	22529.11514	0.00141

Table V(B). Microwave transitions of the $^{13}C_1$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	6858.88044	0.00017
4	1	4	3	→	3	1	3	2	6858.96789	-0.00068
4	1	4	5	→	3	1	3	4	6859.02272	-0.00012
4	0	4	3	→	3	0	3	2	7083.69607	-0.00032
4	0	4	4	→	3	0	3	3	7083.80124	-0.00130
4	0	4	5	→	3	0	3	4	7083.80858	0.00099
4	1	4	3	→	3	0	3	2	7312.82561	-0.00091
4	2	3	4	→	3	2	2	3	7748.72904	-0.00024
4	2	3	5	→	3	2	2	4	7749.24645	0.00049
4	2	3	3	→	3	2	2	2	7749.37863	-0.00006
5	0	5	5	→	4	1	4	4	8367.45340	0.00024
5	0	5	4	→	4	1	4	3	8367.52363	-0.00116
5	0	5	6	→	4	1	4	5	8367.56288	0.00045
4	1	3	4	→	3	1	2	3	8398.34121	0.00028
4	1	3	3	→	3	1	2	2	8398.40981	0.00095
4	1	3	5	→	3	1	2	4	8398.46363	0.00014
5	1	5	5	→	4	1	4	4	8470.88219	-0.00023
5	1	5	4	→	4	1	4	3	8470.91298	0.00056
5	1	5	6	→	4	1	4	5	8470.95711	-0.00003
5	0	5	4	→	4	0	4	3	8596.65492	-0.00001
5	0	5	5	→	4	0	4	4	8596.69962	0.00076
5	0	5	6	→	4	0	4	5	8596.71620	-0.00005
5	1	5	4	→	4	0	4	3	8700.04285	0.00029
5	1	5	6	→	4	0	4	5	8700.11110	0.00015
5	1	5	5	→	4	0	4	4	8700.12720	-0.00093
6	0	6	6	→	5	1	5	5	10010.55156	-0.00009
6	0	6	5	→	5	1	5	4	10010.57689	-0.00090
6	0	6	7	→	5	1	5	6	10010.60957	-0.00011
6	0	6	5	→	5	0	5	4	10113.96777	0.00235
6	0	6	6	→	5	0	5	5	10113.98289	0.00197
6	0	6	7	→	5	0	5	6	10114.00225	-0.00213
6	1	6	5	→	5	0	5	4	10157.33089	-0.00129
6	1	6	6	→	5	0	5	5	10157.36145	-0.00075
6	1	6	7	→	5	0	5	6	10157.37515	0.00190
5	2	3	5	→	4	2	2	4	10739.33063	0.00034
5	2	3	6	→	4	2	2	5	10739.59096	0.00057
5	2	3	4	→	4	2	2	3	10739.60741	-0.00276
6	2	5	6	→	5	2	4	5	11325.36716	0.00027
6	2	5	5	→	5	2	4	4	11325.51319	0.00202
6	2	5	7	→	5	2	4	6	11325.51319	-0.00038
7	0	7	7	→	6	1	6	6	11602.49516	0.00022
7	0	7	6	→	6	1	6	5	11602.50613	0.00079
7	0	7	8	→	6	1	6	7	11602.53069	-0.00002
7	0	7	6	→	6	0	6	5	11645.87124	-0.00085

7	0	7	7	→	6	0	6	6	11645.87753	0.00131
7	0	7	8	→	6	0	6	7	11645.89888	-0.00070
7	1	7	6	→	6	0	6	5	11663.19777	-0.00068
7	1	7	7	→	6	0	6	6	11663.20886	0.00132
7	1	7	8	→	6	0	6	7	11663.22614	-0.00044
7	1	6	7	→	6	2	5	6	12585.35458	0.00002
7	1	6	8	→	6	2	5	7	12585.52821	0.00054
7	1	6	6	→	6	2	5	5	12585.52821	-0.00166
6	2	5	5	→	5	1	4	4	12706.25778	-0.00052
6	2	5	7	→	5	1	4	6	12706.32406	-0.00006
6	2	5	6	→	5	1	4	5	12706.48899	0.00022
6	2	4	6	→	5	2	3	5	12887.48724	0.00046
6	2	4	5	→	5	2	3	4	12887.60426	-0.00114
6	2	4	7	→	5	2	3	6	12887.61632	0.00173
7	2	6	7	→	6	2	5	6	13016.06111	-0.00074
7	2	6	6	→	6	2	5	5	13016.14116	0.00010
7	2	6	8	→	6	2	5	7	13016.15129	0.00031
8	0	8	8	→	7	1	7	7	13170.21516	-0.00136
8	0	8	7	→	7	1	7	6	13170.22259	0.00107
8	0	8	9	→	7	1	7	8	13170.24206	0.00041
8	1	8	8	→	7	1	7	7	13176.90677	0.00068
8	1	8	7	→	7	1	7	6	13176.90677	-0.00264
8	1	8	9	→	7	1	7	8	13176.92943	-0.00031
8	1	8	7	→	7	0	7	6	13194.23670	0.00093
8	1	8	8	→	7	0	7	7	13194.23670	-0.00071
8	1	8	9	→	7	0	7	8	13194.25709	0.00036

Table V(C). Microwave transitions of the $^{13}C_2$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	6866.48705	0.00011
4	1	4	3	→	3	1	3	2	6866.57523	0.00004
4	1	4	5	→	3	1	3	4	6866.62934	-0.00013
4	0	4	3	→	3	0	3	2	7090.05163	-0.00054
4	0	4	4	→	3	0	3	3	7090.15820	-0.00099
4	0	4	5	→	3	0	3	4	7090.16519	0.00161
4	1	4	3	→	3	0	3	2	7316.03597	0.00063
4	1	4	5	→	3	0	3	4	7316.17060	0.00019
4	1	4	4	→	3	0	3	3	7316.25831	0.00045
4	2	3	4	→	3	2	2	3	7759.95617	0.00024
4	2	3	5	→	3	2	2	4	7760.47406	0.00053
4	2	3	3	→	3	2	2	2	7760.60659	0.00010
5	0	5	5	→	4	1	4	4	8378.13028	0.00022
5	0	5	4	→	4	1	4	3	8378.19782	-0.00353
5	0	5	6	→	4	1	4	5	8378.23951	0.00047
4	1	3	4	→	3	1	2	3	8410.67924	-0.00024
4	1	3	3	→	3	1	2	2	8410.74612	-0.00023
4	1	3	5	→	3	1	2	4	8410.80149	0.00002
5	1	5	5	→	4	1	4	4	8479.71278	-0.00042
5	1	5	4	→	4	1	4	3	8479.74326	0.00023
5	1	5	6	→	4	1	4	5	8479.78796	0.00019
5	0	5	4	→	4	0	4	3	8604.18465	0.00014
5	0	5	5	→	4	0	4	4	8604.22952	0.00080
5	0	5	6	→	4	0	4	5	8604.24586	-0.00002
5	1	5	4	→	4	0	4	3	8705.72669	0.00049
5	1	5	6	→	4	0	4	5	8705.79554	0.00094
5	1	5	5	→	4	0	4	4	8705.81073	-0.00113
6	0	6	6	→	5	1	5	5	10021.54864	0.00096
6	0	6	5	→	5	1	5	4	10021.57295	-0.00061
6	0	6	7	→	5	1	5	6	10021.60546	-0.00002
6	0	6	5	→	5	0	5	4	10123.11578	0.00054
6	0	6	6	→	5	0	5	5	10123.13243	0.00161
6	0	6	7	→	5	0	5	6	10123.15193	-0.00228
6	1	6	5	→	5	0	5	4	10165.53159	-0.00050
6	1	6	6	→	5	0	5	5	10165.56215	0.00006
6	1	6	7	→	5	0	5	6	10165.57205	-0.00111
6	2	5	6	→	5	2	4	5	11339.43647	-0.00007
6	2	5	5	→	5	2	4	4	11339.58280	0.00216
6	2	5	7	→	5	2	4	6	11339.58280	-0.00030
7	0	7	7	→	6	1	6	6	11614.27710	0.00052
7	0	7	6	→	6	1	6	5	11614.28749	0.00067
7	0	7	8	→	6	1	6	7	11614.31245	0.00025
7	1	7	7	→	6	1	6	6	11631.15848	-0.00082

7	1	7	6	→	6	1	6	5	11631.16611	0.00147
7	1	7	8	→	6	1	6	7	11631.19058	-0.00007
7	0	7	6	→	6	0	6	5	11656.70311	-0.00056
7	0	7	7	→	6	0	6	6	11656.70868	0.00084
7	0	7	8	→	6	0	6	7	11656.73011	-0.00104
7	1	7	6	→	6	0	6	5	11673.58117	-0.00032
7	1	7	7	→	6	0	6	6	11673.59153	0.00096
7	1	7	8	→	6	0	6	7	11673.60946	-0.00015
6	2	5	5	→	5	1	4	4	12705.53239	0.00016
6	2	5	7	→	5	1	4	6	12705.59728	-0.00100
6	2	5	6	→	5	1	4	5	12705.76421	0.00028
6	2	4	6	→	5	2	3	5	12909.05692	-0.00015
6	2	4	5	→	5	2	3	4	12909.17398	-0.00110
6	2	4	7	→	5	2	3	6	12909.18557	0.00108
7	2	6	7	→	6	2	5	6	13030.95222	-0.00030
7	2	6	6	→	6	2	5	5	13031.03270	0.00126
7	2	6	8	→	6	2	5	7	13031.04039	-0.00103
8	0	8	8	→	7	1	7	7	13183.11388	-0.00139
8	0	8	7	→	7	1	7	6	13183.12163	0.00146
8	0	8	9	→	7	1	7	8	13183.14060	0.00029
8	0	8	7	→	7	0	7	6	13199.99826	0.00026
8	0	8	8	→	7	0	7	7	13199.99826	0.00026
8	0	8	9	→	7	0	7	8	13200.01772	-0.00104

Table V(D). Microwave transitions of the $^{13}C_3$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	6845.91552	-0.00028
4	1	4	3	→	3	1	3	2	6846.00380	-0.00058
4	1	4	5	→	3	1	3	4	6846.05863	-0.00005
4	0	4	3	→	3	0	3	2	7072.09462	-0.00031
4	0	4	4	→	3	0	3	3	7072.20024	-0.00121
4	0	4	5	→	3	0	3	4	7072.20773	0.00131
4	1	4	3	→	3	0	3	2	7304.90536	0.00046
4	1	4	5	→	3	0	3	4	7305.04026	-0.00006
4	2	3	4	→	3	2	2	3	7730.94280	-0.00021
4	2	3	5	→	3	2	2	4	7731.46096	0.00038
4	2	3	3	→	3	2	2	2	7731.59258	-0.00095
5	0	5	5	→	4	1	4	4	8349.92697	0.00002
5	0	5	4	→	4	1	4	3	8349.99913	-0.00021
5	0	5	6	→	4	1	4	5	8350.03793	0.00101
4	1	3	4	→	3	1	2	3	8378.84369	0.00076
4	1	3	3	→	3	1	2	2	8378.91109	-0.00045
4	1	3	5	→	3	1	2	4	8378.96688	0.00071
5	1	5	5	→	4	1	4	4	8455.54344	-0.00037
5	1	5	4	→	4	1	4	3	8455.57437	0.00045
5	1	5	6	→	4	1	4	5	8455.61891	0.00023
5	0	5	4	→	4	0	4	3	8582.80885	-0.00047
5	0	5	5	→	4	0	4	4	8582.85409	0.00038
5	0	5	6	→	4	0	4	5	8582.87066	-0.00017
5	1	5	4	→	4	0	4	3	8688.38316	-0.00073
5	1	5	6	→	4	0	4	5	8688.45259	0.00000
5	1	5	5	→	4	0	4	4	8688.46974	-0.00083
6	0	6	6	→	5	1	5	5	9991.73237	0.00103
6	0	6	5	→	5	1	5	4	9991.75474	-0.00305
6	0	6	7	→	5	1	5	6	9991.78933	-0.00036
6	0	6	5	→	5	0	5	4	10097.33368	0.00131
6	0	6	6	→	5	0	5	5	10097.34980	0.00160
6	0	6	7	→	5	0	5	6	10097.37121	-0.00024
6	1	6	5	→	5	0	5	4	10141.83620	0.00067
6	1	6	6	→	5	0	5	5	10141.86585	-0.00033
6	1	6	7	→	5	0	5	6	10141.87806	0.00129
5	2	3	5	→	4	2	2	4	10709.31885	-0.00099
5	2	3	6	→	4	2	2	5	10709.58175	0.00084
5	2	3	4	→	4	2	2	3	10709.60008	-0.00079
6	2	5	6	→	5	2	4	5	11302.14871	0.00057
6	2	5	5	→	5	2	4	4	11302.29518	0.00234
6	2	5	7	→	5	2	4	6	11302.29518	-0.00004
7	0	7	7	→	6	1	6	6	11581.84985	-0.00053
7	0	7	6	→	6	1	6	5	11581.86073	-0.00015

7	0	7	8	→	6	1	6	7	11581.88622	-0.00005
7	1	7	6	→	6	0	6	5	11644.23048	-0.00081
7	1	7	7	→	6	0	6	6	11644.24143	0.00072
7	1	7	8	→	6	0	6	7	11644.25930	-0.00020
7	1	6	7	→	6	2	5	6	12550.30064	0.00027
7	1	6	8	→	6	2	5	7	12550.47534	0.00025
7	1	6	6	→	6	2	5	5	12550.47534	-0.00215
6	2	5	5	→	5	1	4	4	12700.08007	-0.00059
6	2	5	7	→	5	1	4	6	12700.14674	-0.00009
6	2	5	6	→	5	1	4	5	12700.31295	0.00006
6	2	4	6	→	5	2	3	5	12854.40045	0.00047
6	2	4	5	→	5	2	3	4	12854.51855	-0.00107
6	2	4	7	→	5	2	3	6	12854.52979	0.00109
7	2	6	7	→	6	2	5	6	12990.90161	-0.00006
7	2	6	6	→	6	2	5	5	12990.98215	0.00101
7	2	6	8	→	6	2	5	7	12990.99008	-0.00099
8	0	8	8	→	7	1	7	7	13147.36021	-0.00087
8	0	8	7	→	7	1	7	6	13147.36779	0.00171
8	0	8	9	→	7	1	7	8	13147.38693	0.00069
8	1	8	8	→	7	1	7	7	13154.29397	0.00105
8	1	8	7	→	7	1	7	6	13154.29397	-0.00224
8	1	8	9	→	7	1	7	8	13154.31673	0.00017
8	0	8	7	→	7	0	7	6	13165.23313	-0.00021
8	0	8	8	→	7	0	7	7	13165.23313	-0.00029
8	0	8	9	→	7	0	7	8	13165.25303	-0.00112
8	1	8	7	→	7	0	7	6	13172.16505	0.00159
8	1	8	8	→	7	0	7	7	13172.16505	-0.00022
8	1	8	9	→	7	0	7	8	13172.18420	-0.00027

Table V(E). Microwave transitions of the $^{13}C_4$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	6821.81601	0.00033
4	1	4	3	→	3	1	3	2	6821.90374	-0.00069
4	1	4	5	→	3	1	3	4	6821.95924	0.00050
4	0	4	3	→	3	0	3	2	7045.73405	-0.00108
4	0	4	4	→	3	0	3	3	7045.84774	0.00279
4	0	4	5	→	3	0	3	4	7045.84774	0.00011
4	1	4	3	→	3	0	3	2	7274.35526	-0.00056
4	1	4	5	→	3	0	3	4	7274.49286	0.00022
4	1	4	4	→	3	0	3	3	7274.58481	0.00047
4	2	3	4	→	3	2	2	3	7706.29209	0.00095
4	2	3	5	→	3	2	2	4	7706.81378	0.00140
4	2	3	3	→	3	2	2	2	7706.94727	0.00100
5	0	5	5	→	4	1	4	4	8321.93405	-0.00043
5	0	5	4	→	4	1	4	3	8322.00571	-0.00136
5	0	5	6	→	4	1	4	5	8322.04536	0.00071
4	1	3	4	→	3	1	2	3	8352.31366	0.00020
4	1	3	3	→	3	1	2	2	8352.37980	-0.00006
4	1	3	5	→	3	1	2	4	8352.43621	0.00026
5	1	5	5	→	4	1	4	4	8425.22738	-0.00036
5	1	5	4	→	4	1	4	3	8425.25793	0.00047
5	1	5	6	→	4	1	4	5	8425.30234	0.00002
5	0	5	4	→	4	0	4	3	8550.62802	0.00026
5	0	5	5	→	4	0	4	4	8550.67390	0.00004
5	0	5	6	→	4	0	4	5	8550.68962	-0.00004
5	1	5	4	→	4	0	4	3	8653.87830	0.00015
5	1	5	6	→	4	0	4	5	8653.94798	0.00064
5	1	5	5	→	4	0	4	4	8653.96662	-0.00051
6	0	6	6	→	5	1	5	5	9956.47732	0.00047
6	0	6	5	→	5	1	5	4	9956.50038	-0.00262
6	0	6	7	→	5	1	5	6	9956.53518	0.00023
6	0	6	5	→	5	0	5	4	10059.75479	0.00140
6	0	6	6	→	5	0	5	5	10059.77132	0.00121
6	0	6	7	→	5	0	5	6	10059.78910	-0.00353
6	1	6	5	→	5	0	5	4	10103.09998	-0.00095
6	1	6	6	→	5	0	5	5	10103.13178	-0.00086
6	1	6	7	→	5	0	5	6	10103.14342	0.00107
5	2	3	5	→	4	2	2	4	10679.56274	0.00026
5	2	3	6	→	4	2	2	5	10679.82610	0.00011
5	2	3	4	→	4	2	2	3	10679.84231	-0.00348
6	2	5	6	→	5	2	4	5	11263.84321	-0.00121
6	2	5	5	→	5	2	4	4	11263.99169	0.00265
6	2	5	7	→	5	2	4	6	11263.99169	0.00010

7	0	7	7	→	6	1	6	6	11540.02831	0.00014
7	0	7	6	→	6	1	6	5	11540.03971	0.00141
7	0	7	8	→	6	1	6	7	11540.06418	0.00043
7	1	7	7	→	6	1	6	6	11557.36627	-0.00085
7	1	7	6	→	6	1	6	5	11557.37339	0.00127
7	1	7	8	→	6	1	6	7	11557.39751	-0.00071
7	0	7	6	→	6	0	6	5	11583.38482	-0.00102
7	0	7	7	→	6	0	6	6	11583.39219	0.00149
7	0	7	8	→	6	0	6	7	11583.41305	-0.00042
7	1	7	6	→	6	0	6	5	11600.72007	0.00041
7	1	7	7	→	6	0	6	6	11600.72983	0.00018
7	1	7	8	→	6	0	6	7	11600.74804	0.00009
7	1	6	7	→	6	2	5	6	12515.35129	0.00079
7	1	6	8	→	6	2	5	7	12515.52692	0.00093
7	1	6	6	→	6	2	5	5	12515.52692	-0.00145
6	2	5	5	→	5	1	4	4	12640.76638	-0.00029
6	2	5	7	→	5	1	4	6	12640.83450	0.00034
6	2	5	6	→	5	1	4	5	12641.00558	-0.00028
6	2	4	6	→	5	2	3	5	12816.29237	0.00044
6	2	4	5	→	5	2	3	4	12816.41067	-0.00068
6	2	4	7	→	5	2	3	6	12816.42266	0.00175
7	2	6	7	→	6	2	5	6	12945.62777	-0.00050
7	2	6	6	→	6	2	5	5	12945.70778	0.00065
7	2	6	8	→	6	2	5	7	12945.71607	-0.00117
8	0	8	8	→	7	1	7	7	13099.41068	-0.00099
8	0	8	7	→	7	1	7	6	13099.41737	0.00102
8	0	8	9	→	7	1	7	8	13099.43653	-0.00001
8	1	8	8	→	7	1	7	7	13106.11031	0.00034
8	1	8	7	→	7	1	7	6	13106.11031	-0.00262
8	1	8	9	→	7	1	7	8	13106.13317	-0.00015
8	0	8	7	→	7	0	7	6	13116.74980	-0.00037
8	0	8	8	→	7	0	7	7	13116.74980	-0.00082
8	0	8	9	→	7	0	7	8	13116.77130	0.00028
8	1	8	7	→	7	0	7	6	13123.44939	0.00265
8	1	8	8	→	7	0	7	7	13123.44939	0.00047
8	1	8	9	→	7	0	7	8	13123.46774	-0.00005

Table V(F). Microwave transitions of the $^{13}C_5$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	6823.19980	0.00004
4	1	4	3	→	3	1	3	2	6823.28783	0.00018
4	1	4	5	→	3	1	3	4	6823.34229	0.00007
4	0	4	3	→	3	0	3	2	7036.30502	0.00047
4	0	4	4	→	3	0	3	3	7036.41558	0.00177
4	0	4	5	→	3	0	3	4	7036.41558	-0.00094
4	1	4	3	→	3	0	3	2	7241.26834	0.00016
4	1	4	5	→	3	0	3	4	7241.40336	0.00009
4	1	4	4	→	3	0	3	3	7241.48922	-0.00102
4	2	3	4	→	3	2	2	3	7726.87957	-0.00013
4	2	3	5	→	3	2	2	4	7727.40112	0.00008
4	2	3	3	→	3	2	2	2	7727.53340	-0.00156
5	0	5	5	→	4	1	4	4	8333.05705	0.00023
5	0	5	4	→	4	1	4	3	8333.12465	-0.00092
5	0	5	6	→	4	1	4	5	8333.16441	0.00058
4	1	3	4	→	3	1	2	3	8375.51378	-0.00043
4	1	3	3	→	3	1	2	2	8375.57614	-0.00010
4	1	3	5	→	3	1	2	4	8375.63308	-0.00019
5	1	5	5	→	4	1	4	4	8422.87316	-0.00062
5	1	5	4	→	4	1	4	3	8422.90366	0.00065
5	1	5	6	→	4	1	4	5	8422.94820	0.00022
5	0	5	4	→	4	0	4	3	8538.08934	0.00013
5	0	5	5	→	4	0	4	4	8538.13391	0.00065
5	0	5	6	→	4	0	4	5	8538.14987	-0.00070
5	1	5	4	→	4	0	4	3	8627.86634	-0.00030
5	1	5	6	→	4	0	4	5	8627.93484	0.00012
5	1	5	5	→	4	0	4	4	8627.95089	0.00067
6	0	6	6	→	5	1	5	5	9957.36579	0.00054
6	0	6	5	→	5	1	5	4	9957.38664	-0.00308
6	0	6	7	→	5	1	5	6	9957.42186	-0.00006
6	0	6	5	→	5	0	5	4	10047.16766	0.00051
6	0	6	6	→	5	0	5	5	10047.18263	0.00042
6	0	6	7	→	5	0	5	6	10047.20574	-0.00033
6	1	6	5	→	5	0	5	4	10083.73783	-0.00011
6	1	6	6	→	5	0	5	5	10083.76507	-0.00134
6	1	6	7	→	5	0	5	6	10083.78036	0.00154
5	2	3	5	→	4	2	2	4	10740.12588	-0.00069
5	2	3	6	→	4	2	2	5	10740.38673	-0.00022
5	2	3	4	→	4	2	2	3	10740.40873	0.00300
6	2	5	6	→	5	2	4	5	11276.79726	0.00008
6	2	5	5	→	5	2	4	4	11276.94241	0.00192
6	2	5	7	→	5	2	4	6	11276.94241	-0.00079

7	0	7	7	→	6	1	6	6	11534.41276	-0.00037
7	0	7	6	→	6	1	6	5	11534.42393	0.00121
7	0	7	8	→	6	1	6	7	11534.44858	0.00035
7	1	7	7	→	6	1	6	6	11548.61101	-0.00093
7	1	7	6	→	6	1	6	5	11548.61800	0.00092
7	1	7	8	→	6	1	6	7	11548.64323	0.00006
7	0	7	6	→	6	0	6	5	11570.99345	-0.00006
7	0	7	7	→	6	0	6	6	11570.99866	0.00134
7	0	7	8	→	6	0	6	7	11571.02045	-0.00053
7	1	7	6	→	6	0	6	5	11585.18668	-0.00119
7	1	7	7	→	6	0	6	6	11585.19728	0.00114
7	1	7	8	→	6	0	6	7	11585.21590	-0.00001
6	2	5	5	→	5	1	4	4	12538.75934	-0.00022
6	2	5	7	→	5	1	4	6	12538.82576	-0.00001
6	2	5	6	→	5	1	4	5	12538.99207	0.00051
7	1	6	7	→	6	2	5	6	12581.46418	0.00068
7	1	6	8	→	6	2	5	7	12581.63149	0.00048
7	1	6	6	→	6	2	5	5	12581.63149	-0.00080
6	2	4	6	→	5	2	3	5	12870.57018	-0.00041
6	2	4	5	→	5	2	3	4	12870.68447	-0.00005
6	2	4	7	→	5	2	3	6	12870.69430	-0.00082
7	2	6	7	→	6	2	5	6	12951.25634	-0.00039
7	2	6	6	→	6	2	5	5	12951.33498	0.00041
7	2	6	8	→	6	2	5	7	12951.34421	-0.00056
8	1	8	8	→	7	1	7	7	13095.12864	0.00090
8	1	8	7	→	7	1	7	6	13095.12864	-0.00229
8	1	8	9	→	7	1	7	8	13095.15036	-0.00093
8	0	8	7	→	7	0	7	6	13104.00137	-0.00027
8	0	8	8	→	7	0	7	7	13104.00137	0.00002
8	0	8	9	→	7	0	7	8	13104.02302	0.00070
8	1	8	7	→	7	0	7	6	13109.32640	0.00111
8	1	8	8	→	7	0	7	7	13109.32640	-0.00016
8	1	8	9	→	7	0	7	8	13109.34604	-0.00019

Table V(G). Microwave transitions of the $^{13}C_6$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	4	4	→	3	1	3	3	6839.16840	-0.00007
4	1	4	3	→	3	1	3	2	6839.25595	-0.00010
4	1	4	5	→	3	1	3	4	6839.31117	0.00074
4	0	4	3	→	3	0	3	2	7055.76535	-0.00072
4	0	4	4	→	3	0	3	3	7055.87010	-0.00111
4	0	4	5	→	3	0	3	4	7055.87818	0.00156
4	1	4	3	→	3	0	3	2	7267.51811	-0.00152
4	1	4	5	→	3	0	3	4	7267.65319	0.00025
4	1	4	4	→	3	0	3	3	7267.73651	0.00067
4	2	3	4	→	3	2	2	3	7739.73293	0.00063
4	2	3	5	→	3	2	2	4	7740.24826	0.00038
4	2	3	3	→	3	2	2	2	7740.37968	-0.00065
5	0	5	5	→	4	1	4	4	8350.12456	-0.00025
5	0	5	4	→	4	1	4	3	8350.19272	-0.00095
5	0	5	6	→	4	1	4	5	8350.23208	0.00035
4	1	3	4	→	3	1	2	3	8389.28027	-0.00025
4	1	3	3	→	3	1	2	2	8389.34664	0.00089
4	1	3	5	→	3	1	2	4	8389.40106	0.00034
5	1	5	5	→	4	1	4	4	8443.70084	-0.00043
5	1	5	4	→	4	1	4	3	8443.73090	-0.00006
5	1	5	6	→	4	1	4	5	8443.77616	0.00048
5	0	5	4	→	4	0	4	3	8561.94614	-0.00109
5	0	5	5	→	4	0	4	4	8561.99064	0.00120
5	0	5	6	→	4	0	4	5	8562.00787	-0.00019
5	1	5	4	→	4	0	4	3	8655.48426	-0.00026
5	1	5	6	→	4	0	4	5	8655.55253	0.00053
5	1	5	5	→	4	0	4	4	8655.56635	0.00045
6	0	6	6	→	5	1	5	5	9981.06868	0.00031
6	0	6	5	→	5	1	5	4	9981.09124	-0.00211
6	0	6	7	→	5	1	5	6	9981.12578	0.00041
6	0	6	5	→	5	0	5	4	10074.63193	0.00129
6	0	6	6	→	5	0	5	5	10074.64590	0.00107
6	0	6	7	→	5	0	5	6	10074.66752	-0.00180
6	1	6	5	→	5	0	5	4	10113.05059	-0.00075
6	1	6	6	→	5	0	5	5	10113.07753	-0.00137
6	1	6	7	→	5	0	5	6	10113.09372	0.00176
5	2	3	5	→	4	2	2	4	10749.27726	0.00015
5	2	3	6	→	4	2	2	5	10749.53355	-0.00085
5	2	3	4	→	4	2	2	3	10749.55298	-0.00051
6	2	5	6	→	5	2	4	5	11300.31039	-0.00013
6	2	5	5	→	5	2	4	4	11300.45519	0.00143
6	2	5	7	→	5	2	4	6	11300.45519	-0.00106

7	0	7	7	→	6	1	6	6	11563.62294	0.00033
7	0	7	6	→	6	1	6	5	11563.63270	0.00003
7	0	7	8	→	6	1	6	7	11563.65834	0.00028
7	1	7	7	→	6	1	6	6	11578.66196	-0.00062
7	1	7	6	→	6	1	6	5	11578.66932	0.00114
7	1	7	8	→	6	1	6	7	11578.69390	-0.00023
7	0	7	6	→	6	0	6	5	11602.05723	0.00386
7	0	7	7	→	6	0	6	6	11602.05723	0.00055
7	0	7	8	→	6	0	6	7	11602.08015	-0.00055
7	1	7	6	→	6	0	6	5	11617.08723	-0.00164
7	1	7	7	→	6	0	6	6	11617.09743	0.00077
7	1	7	8	→	6	0	6	7	11617.11721	0.00043
7	1	6	7	→	6	2	5	6	12594.23725	0.00009
7	1	6	8	→	6	2	5	7	12594.40479	0.00036
7	1	6	6	→	6	2	5	5	12594.40479	-0.00108
6	2	5	5	→	5	1	4	4	12596.26442	-0.00015
6	2	5	7	→	5	1	4	6	12596.32936	0.00013
6	2	5	6	→	5	1	4	5	12596.48838	-0.00039
6	2	4	6	→	5	2	3	5	12886.69227	0.00003
6	2	4	5	→	5	2	3	4	12886.80739	0.00036
6	2	4	7	→	5	2	3	6	12886.81707	0.00026
7	2	6	7	→	6	2	5	6	12980.80860	-0.00040
7	2	6	6	→	6	2	5	5	12980.88859	0.00107
7	2	6	8	→	6	2	5	7	12980.89707	-0.00038
8	0	8	8	→	7	1	7	7	13123.79435	-0.00058
8	0	8	7	→	7	1	7	6	13123.80084	0.00090
8	0	8	9	→	7	1	7	8	13123.81832	-0.00174
8	1	8	8	→	7	1	7	7	13129.48387	0.00199
8	1	8	7	→	7	1	7	6	13129.48387	-0.00155
8	1	8	9	→	7	1	7	8	13129.50563	-0.00007
8	0	8	8	→	7	0	7	7	13138.83565	0.00074
8	0	8	7	→	7	0	7	6	13138.83565	0.00021
8	0	8	9	→	7	0	7	8	13138.85603	-0.00010
8	1	8	7	→	7	0	7	6	13144.52141	0.00049
8	1	8	8	→	7	0	7	7	13144.52141	-0.00045
8	1	8	9	→	7	0	7	8	13144.54180	0.00002

Table V(H). Microwave transitions of the $^{13}C_7$ isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	$\nu_{obs.}$	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	6810.34709	0.00034
4	1	4	3	→	3	1	3	2	6810.43568	-0.00024
4	1	4	5	→	3	1	3	4	6810.49031	0.00000
4	0	4	3	→	3	0	3	2	7039.33363	0.00013
4	0	4	4	→	3	0	3	3	7039.43973	-0.00083
4	0	4	5	→	3	0	3	4	7039.44666	0.00107
4	1	4	3	→	3	0	3	2	7280.33874	0.00060
4	1	4	5	→	3	0	3	4	7280.47545	0.00077
4	1	4	4	→	3	0	3	3	7280.56427	-0.00026
4	2	3	4	→	3	2	2	3	7683.76386	-0.00009
4	2	3	5	→	3	2	2	4	7684.28294	-0.00030
4	2	3	3	→	3	2	2	2	7684.41619	-0.00044
5	0	5	5	→	4	1	4	4	8302.55255	0.00003
5	0	5	4	→	4	1	4	3	8302.62536	-0.00122
5	0	5	6	→	4	1	4	5	8302.66465	0.00061
4	1	3	4	→	3	1	2	3	8327.13616	0.00000
4	1	3	3	→	3	1	2	2	8327.20736	0.00093
4	1	3	5	→	3	1	2	4	8327.26049	-0.00046
5	1	5	5	→	4	1	4	4	8413.11614	0.00018
5	1	5	4	→	4	1	4	3	8413.14688	0.00054
5	1	5	6	→	4	1	4	5	8413.19146	0.00024
5	0	5	4	→	4	0	4	3	8543.63105	-0.00018
5	0	5	5	→	4	0	4	4	8543.67704	0.00055
5	0	5	6	→	4	0	4	5	8543.69268	-0.00045
5	1	5	4	→	4	0	4	3	8654.15077	-0.00022
5	1	5	6	→	4	0	4	5	8654.22060	0.00029
5	1	5	5	→	4	0	4	4	8654.23986	-0.00007
6	0	6	6	→	5	1	5	5	9939.94603	0.00057
6	0	6	5	→	5	1	5	4	9939.96966	-0.00299
6	0	6	7	→	5	1	5	6	9940.00510	0.00055
6	0	6	6	→	5	0	5	5	10050.50943	0.00053
6	0	6	7	→	5	0	5	6	10050.52903	-0.00270
6	1	6	5	→	5	0	5	4	10097.59685	-0.00048
6	1	6	6	→	5	0	5	5	10097.62888	-0.00043
6	1	6	7	→	5	0	5	6	10097.64034	0.00142
5	2	3	5	→	4	2	2	4	10631.91324	-0.00109
5	2	3	6	→	4	2	2	5	10632.17847	0.00113
6	2	5	6	→	5	2	4	5	11239.32156	0.00037
6	2	5	5	→	5	2	4	4	11239.46819	0.00137
6	2	5	7	→	5	2	4	6	11239.46819	-0.00097
7	0	7	7	→	6	1	6	6	11524.51446	0.00034
7	0	7	6	→	6	1	6	5	11524.52600	0.00113

7	0	7	8	→	6	1	6	7	11524.55032	-0.00001
7	1	7	7	→	6	1	6	6	11543.63844	-0.00018
7	1	7	6	→	6	1	6	5	11543.64508	0.00108
7	1	7	8	→	6	1	6	7	11543.66976	-0.00038
7	0	7	6	→	6	0	6	5	11571.62875	-0.00105
7	0	7	7	→	6	0	6	6	11571.63658	0.00205
7	0	7	8	→	6	0	6	7	11571.65705	-0.00046
7	1	7	6	→	6	0	6	5	11590.74879	-0.00014
7	1	7	7	→	6	0	6	6	11590.75924	0.00020
7	1	7	8	→	6	0	6	7	11590.77766	0.00033
7	1	6	7	→	6	2	5	6	12459.07353	-0.00035
7	1	6	8	→	6	2	5	7	12459.25313	0.00101
7	1	6	6	→	6	2	5	5	12459.25313	-0.00180
6	2	5	5	→	5	1	4	4	12674.54042	-0.00068
6	2	5	7	→	5	1	4	6	12674.60772	-0.00022
6	2	5	6	→	5	1	4	5	12674.77662	0.00002
6	2	4	6	→	5	2	3	5	12767.90970	0.00057
6	2	4	5	→	5	2	3	4	12768.02960	-0.00140
6	2	4	7	→	5	2	3	6	12768.04063	0.00083
7	2	6	7	→	6	2	5	6	12922.08738	0.00010
7	2	6	6	→	6	2	5	5	12922.16855	0.00117
7	2	6	8	→	6	2	5	7	12922.17716	-0.00014
8	0	8	8	→	7	1	7	7	13083.61772	-0.00107
8	0	8	7	→	7	1	7	6	13083.62478	0.00094
8	0	8	9	→	7	1	7	8	13083.64427	0.00021
8	1	8	8	→	7	1	7	7	13091.11896	0.00198
8	1	8	7	→	7	1	7	6	13091.11896	-0.00123
8	1	8	9	→	7	1	7	8	13091.14003	-0.00060
8	0	8	7	→	7	0	7	6	13102.74305	0.00008
8	0	8	8	→	7	0	7	7	13102.74305	-0.00024
8	0	8	9	→	7	0	7	8	13102.76387	-0.00001
8	1	8	7	→	7	0	7	6	13110.24039	0.00107
8	1	8	8	→	7	0	7	7	13110.24039	-0.00110
8	1	8	9	→	7	0	7	8	13110.25988	-0.00057

Table V(I). Microwave transitions of the ^{15}N isotopologue of 23DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	→	J"	$K_{a"}$	$K_{c"}$	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	0	4	→	3	1	3	6483.30002	-0.00005
4	1	4	→	3	1	3	6739.78844	-0.00051
4	0	4	→	3	0	3	6973.61163	-0.00030
4	1	4	→	3	0	3	7230.10107	0.00026
4	2	3	→	3	2	2	7591.69042	-0.00012
5	0	5	→	4	1	4	8208.58252	-0.00020
4	1	3	→	3	1	2	8225.69343	-0.00009
4	2	2	→	3	2	1	8275.90562	0.00017
5	1	5	→	4	1	4	8328.62521	-0.00012
5	0	5	→	4	0	4	8465.07183	0.00023
5	1	5	→	4	0	4	8585.11360	-0.00061
5	2	4	→	4	2	3	9384.14825	-0.00024
6	0	6	→	5	1	5	9836.71398	0.00045
6	1	6	→	5	1	5	9888.91919	0.00029
6	0	6	→	5	0	5	9956.75658	0.00045
6	1	6	→	5	0	5	10008.96154	0.00003
5	1	4	→	4	1	3	10045.24740	0.00008
5	2	3	→	4	2	2	10481.96415	0.00024
6	2	5	→	5	2	4	11115.16658	-0.00003
7	0	7	→	6	1	6	11410.00230	0.00083
7	1	7	→	6	1	6	11431.61657	-0.00021
7	0	7	→	6	0	6	11462.20684	-0.00001
7	1	7	→	6	0	6	11483.82208	-0.00008
6	1	5	→	5	1	4	11694.37221	-0.00005
7	1	6	→	6	2	5	12279.41112	-0.00007
6	2	4	→	5	2	3	12598.97933	-0.00013
6	2	5	→	5	1	4	12619.04761	-0.00020
7	2	6	→	6	2	5	12785.45216	0.00000
8	0	8	→	7	1	7	12956.24197	0.00012
8	1	8	→	7	1	7	12964.88516	-0.00083
8	0	8	→	7	0	7	12977.85752	0.00036
8	1	8	→	7	0	7	12986.50107	-0.00023
7	1	6	→	6	1	5	13204.08728	0.00054
7	2	6	→	6	1	5	13710.12776	0.00005
8	1	7	→	7	2	6	14151.04010	-0.00023

Appendix VI. Microwave transitions of 2,4-difluorobenzonitrile (BN) and its minor isotopologues

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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Table VI(A). Microwave transitions of the parent 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	4	4	→	3	1	3	3	6079.10150	0.00012
4	1	4	3	→	3	1	3	2	6079.21147	0.00016
4	1	4	5	→	3	1	3	4	6079.26165	0.00006
4	0	4	3	→	3	0	3	2	6389.74341	0.00019
4	0	4	4	→	3	0	3	3	6389.85815	-0.00172
4	0	4	5	→	3	0	3	4	6389.86929	0.00102
4	2	3	4	→	3	2	2	3	6548.75652	-0.00027
4	2	3	5	→	3	2	2	4	6549.32666	0.00043
4	2	3	3	→	3	2	2	2	6549.47197	-0.00047
4	3	2	4	→	3	3	1	3	6595.65196	-0.00001
4	3	2	5	→	3	3	1	4	6596.90616	0.00066
4	3	2	3	→	3	3	1	2	6597.38959	-0.00066
4	3	1	4	→	3	3	0	3	6601.03336	-0.00013
4	3	1	5	→	3	3	0	4	6602.29042	0.00161
4	3	1	3	→	3	3	0	2	6602.77366	-0.00032
5	0	5	5	→	4	1	4	4	6670.50706	0.00019
5	0	5	4	→	4	1	4	3	6670.72490	0.00126
5	0	5	6	→	4	1	4	5	6670.73744	-0.00049
4	2	2	4	→	3	2	1	3	6722.04968	0.00040
4	2	2	5	→	3	2	1	4	6722.64219	0.00001
4	2	2	3	→	3	2	1	2	6722.79176	0.00018
4	1	3	4	→	3	1	2	3	6974.84870	-0.00012
4	1	3	3	→	3	1	2	2	6974.94850	0.00004
4	1	3	5	→	3	1	2	4	6975.00997	-0.00009
5	1	5	5	→	4	1	4	4	7570.91437	0.00012
5	1	5	4	→	4	1	4	3	7570.95439	0.00014
5	1	5	6	→	4	1	4	5	7570.99822	-0.00010
5	0	5	4	→	4	0	4	3	7874.32376	0.00018
5	0	5	6	→	4	0	4	5	7874.39876	0.00089
5	0	5	5	→	4	0	4	4	7874.39876	-0.00192
5	2	4	5	→	4	2	3	4	8163.82687	0.00017
5	2	4	6	→	4	2	3	5	8164.12153	0.00004
5	2	4	4	→	4	2	3	3	8164.15132	0.00014
5	3	3	5	→	4	3	2	4	8256.40336	-0.00003
5	3	3	6	→	4	3	2	5	8257.05363	0.00013
5	3	3	4	→	4	3	2	3	8257.21210	-0.00006
5	3	2	5	→	4	3	1	4	8275.07388	-0.00036
5	3	2	6	→	4	3	1	5	8275.72808	-0.00021
5	3	2	4	→	4	3	1	3	8275.88704	-0.00057
6	0	6	6	→	5	1	5	5	8411.57397	-0.00077
6	0	6	5	→	5	1	5	4	8411.69724	0.00103
6	0	6	7	→	5	1	5	6	8411.71450	-0.00060
5	2	3	5	→	4	2	2	4	8493.11302	0.00017

5	2	3	6	→	4	2	2	5	8493.43191	-0.00036
5	2	3	4	→	4	2	2	3	8493.46346	-0.00042
5	1	4	5	→	4	1	3	4	8678.65137	-0.00059
5	1	4	4	→	4	1	3	3	8678.68320	0.00034
5	1	4	6	→	4	1	3	5	8678.73354	-0.00052
5	1	5	4	→	4	0	4	3	8774.55375	-0.00044
5	1	5	6	→	4	0	4	5	8774.65853	0.00027
5	1	5	5	→	4	0	4	4	8774.80756	-0.00050
6	1	6	6	→	5	1	5	5	9048.19962	0.00062
6	1	6	5	→	5	1	5	4	9048.21322	-0.00020
6	1	6	7	→	5	1	5	6	9048.24810	0.00009
6	0	6	5	→	5	0	5	4	9311.92744	0.00063
6	0	6	7	→	5	0	5	6	9311.97432	-0.00116
6	0	6	6	→	5	0	5	5	9311.98279	0.00066
6	2	5	6	→	5	2	4	5	9764.08256	-0.00079
6	2	5	5	→	5	2	4	4	9764.25436	0.00109
6	2	5	7	→	5	2	4	6	9764.25436	-0.00030
6	4	3	6	→	5	4	2	5	9904.99866	0.00024
6	4	3	7	→	5	4	2	6	9905.66477	0.00019
6	4	3	5	→	5	4	2	4	9905.80704	-0.00013
6	4	2	6	→	5	4	1	5	9906.33479	-0.00006
6	4	2	7	→	5	4	1	6	9907.00171	0.00039
6	4	2	5	→	5	4	1	4	9907.14363	-0.00033
6	3	4	6	→	5	3	3	5	9920.10655	-0.00039
6	3	4	7	→	5	3	3	6	9920.48906	-0.00007
6	3	4	5	→	5	3	3	4	9920.54785	-0.00020
6	1	6	5	→	5	0	5	4	9948.44381	-0.00022
6	1	6	7	→	5	0	5	6	9948.50880	0.00041
6	1	6	6	→	5	0	5	5	9948.60637	-0.00001
6	3	3	6	→	5	3	2	5	9969.08585	-0.00074
6	3	3	7	→	5	3	2	6	9969.47593	0.00015
6	3	3	5	→	5	3	2	4	9969.53547	-0.00020
7	0	7	7	→	6	1	6	6	10082.52297	-0.00047
7	0	7	6	→	6	1	6	5	10082.59096	0.00044
7	0	7	8	→	6	1	6	7	10082.60890	-0.00059
6	2	4	6	→	5	2	3	5	10295.54273	-0.00039
6	2	4	5	→	5	2	3	4	10295.73642	-0.00010
6	2	4	7	→	5	2	3	6	10295.73642	-0.00037
6	1	5	6	→	5	1	4	5	10350.89328	-0.00223
6	1	5	5	→	5	1	4	4	10350.90281	0.00369
6	1	5	7	→	5	1	4	6	10350.93967	0.00070
7	1	7	7	→	6	1	6	6	10511.53468	-0.00072
7	1	7	6	→	6	1	6	5	10511.53947	0.00051
7	1	7	8	→	6	1	6	7	10511.56578	-0.00020
7	0	7	6	→	6	0	6	5	10719.10772	-0.00002
7	0	7	8	→	6	0	6	7	10719.14173	-0.00067

7	0	7	7	→	6	0	6	6	10719.14860	0.00090
7	1	7	6	→	6	0	6	5	11148.05714	0.00096
7	1	7	8	→	6	0	6	7	11148.09928	0.00039
7	1	7	7	→	6	0	6	6	11148.15951	-0.00014
7	2	6	7	→	6	2	5	6	11347.12722	-0.00038
7	2	6	6	→	6	2	5	5	11347.22532	0.00053
7	2	6	8	→	6	2	5	7	11347.23472	-0.00014
7	5	3	7	→	6	5	2	6	11549.04671	0.00094
7	5	2	7	→	6	5	1	6	11549.12255	-0.00001
7	5	3	8	→	6	5	2	7	11549.70178	0.00073
7	5	2	8	→	6	5	1	7	11549.77694	-0.00093
7	5	3	6	→	6	5	2	5	11549.82511	0.00129
7	5	2	6	→	6	5	1	5	11549.90058	-0.00005
7	4	4	7	→	6	4	3	6	11573.09206	-0.00049
7	4	4	8	→	6	4	3	7	11573.51755	-0.00047
7	4	4	6	→	6	4	3	5	11573.58384	-0.00037
7	4	3	7	→	6	4	2	6	11577.51204	0.00025
7	4	3	8	→	6	4	2	7	11577.93797	-0.00006
7	4	3	6	→	6	4	2	5	11578.00464	0.00033
7	3	5	7	→	6	3	4	6	11584.11778	-0.00036
7	3	5	8	→	6	3	4	7	11584.36209	-0.00006
7	3	5	6	→	6	3	4	5	11584.38347	-0.00050
8	0	8	8	→	7	1	7	7	11684.32732	0.00050
8	0	8	7	→	7	1	7	6	11684.36200	-0.00035
8	0	8	9	→	7	1	7	8	11684.37870	-0.00093
7	3	4	7	→	6	3	3	6	11691.28452	0.00018
7	3	4	8	→	6	3	3	7	11691.53938	0.00016
7	3	4	6	→	6	3	3	5	11691.56201	-0.00029
8	1	8	7	→	7	1	7	6	11962.47245	0.00040
8	1	8	8	→	7	1	7	7	11962.47245	-0.00093
8	1	8	9	→	7	1	7	8	11962.49361	0.00014
7	1	6	6	→	6	1	5	5	11981.25182	0.00054
7	1	6	7	→	6	1	5	6	11981.26128	-0.00054
7	1	6	8	→	6	1	5	7	11981.28245	-0.00019
7	2	5	7	→	6	2	4	6	12109.12922	-0.00060
7	2	5	6	→	6	2	4	5	12109.24526	0.00124
7	2	5	8	→	6	2	4	7	12109.25349	-0.00062
8	0	8	7	→	7	0	7	6	12113.30967	-0.00112
8	0	8	9	→	7	0	7	8	12113.33733	0.00121
8	0	8	8	→	7	0	7	7	12113.33733	-0.00145
8	1	8	7	→	7	0	7	6	12391.41993	-0.00056
8	1	8	9	→	7	0	7	8	12391.45053	0.00057
8	1	8	8	→	7	0	7	7	12391.48552	0.00019
8	2	7	8	→	7	2	6	7	12910.99478	-0.00001
8	2	7	7	→	7	2	6	6	12911.05237	-0.00065
8	2	7	9	→	7	2	6	8	12911.06466	-0.00046

8	6	3	8	→	7	6	2	7	13193.86002	0.00197
8	6	2	8	→	7	6	1	7	13193.86002	-0.00187
8	6	3	9	→	7	6	2	8	13194.49375	0.00252
8	6	2	9	→	7	6	1	8	13194.49375	-0.00132
8	6	3	7	→	7	6	2	6	13194.59793	0.00186
8	6	2	7	→	7	6	1	6	13194.59793	-0.00198
8	5	4	8	→	7	5	3	7	13214.13240	0.00010
8	5	3	8	→	7	5	2	7	13214.43765	-0.00025
8	5	4	9	→	7	5	3	8	13214.57651	0.00030
8	5	4	7	→	7	5	3	6	13214.64085	-0.00025
8	5	3	9	→	7	5	2	8	13214.88230	0.00043
8	5	3	7	→	7	5	2	6	13214.94624	-0.00053
9	0	9	9	→	8	1	8	8	13228.15336	0.00002
9	0	9	8	→	8	1	8	7	13228.17046	-0.00040
9	0	9	10	→	8	1	8	9	13228.18539	-0.00061
8	3	6	8	→	7	3	5	7	13244.71368	0.00011
8	3	6	9	→	7	3	5	8	13244.87786	-0.00063
8	3	6	7	→	7	3	5	6	13244.88618	0.00124
8	4	5	8	→	7	4	4	7	13247.62205	-0.00063
8	4	5	9	→	7	4	4	8	13247.91160	-0.00028
8	4	5	7	→	7	4	4	6	13247.94411	0.00003
8	4	4	8	→	7	4	3	7	13259.62554	0.00055
8	4	4	9	→	7	4	3	8	13259.91512	-0.00063
8	4	4	7	→	7	4	3	6	13259.94845	0.00032
9	1	9	8	→	8	1	8	7	13403.13025	-0.00067
9	1	9	9	→	8	1	8	8	13403.13643	0.00206
9	1	9	10	→	8	1	8	9	13403.14726	-0.00093
5	2	4	4	→	4	1	3	3	13409.45103	0.00004
5	2	4	6	→	4	1	3	5	13409.60124	-0.00002
5	2	4	5	→	4	1	3	4	13410.00709	0.00048
8	3	5	8	→	7	3	4	7	13449.67601	-0.00014
8	3	5	9	→	7	3	4	8	13449.85537	-0.00062
8	3	5	7	→	7	3	4	6	13449.86549	0.00169
9	0	9	8	→	8	0	8	7	13506.28120	0.00065
9	0	9	9	→	8	0	8	8	13506.29952	-0.00037
9	0	9	10	→	8	0	8	9	13506.29952	-0.00032
8	1	7	7	→	7	1	6	6	13559.43330	-0.00034
8	1	7	8	→	7	1	6	7	13559.45073	-0.00215
8	1	7	9	→	7	1	6	8	13559.45964	0.00078
9	1	9	10	→	8	0	8	9	13681.26243	0.00040
9	1	9	9	→	8	0	8	8	13681.27926	-0.00167
8	2	6	8	→	7	2	5	7	13912.00913	0.00011
8	2	6	7	→	7	2	5	6	13912.07795	0.00061
8	2	6	9	→	7	2	5	8	13912.08951	-0.00072
10	1	9	10	→	9	2	8	9	14300.83631	0.00003
10	1	9	11	→	9	2	8	10	14300.98397	-0.00001

10	1	9	9	→	9	2	8	8	14300.98397	-0.00061
9	2	8	9	→	8	2	7	8	14454.39161	0.00010
9	2	8	8	→	8	2	7	7	14454.42821	0.00110
9	2	8	10	→	8	2	7	9	14454.43824	-0.00076
6	2	5	5	→	5	1	4	4	14495.02087	-0.00053
6	2	5	7	→	5	1	4	6	14495.12141	-0.00045
6	2	5	6	→	5	1	4	5	14495.43802	0.00002
10	0	10	10	→	9	1	9	9	14728.26302	-0.00025
10	0	10	9	→	9	1	9	8	14728.27308	0.00227
10	0	10	11	→	9	1	9	10	14728.28308	-0.00079
10	1	10	9	→	9	1	9	8	14835.79131	-0.00135
10	1	10	10	→	9	1	9	9	14835.79842	0.00156
10	1	10	11	→	9	1	9	10	14835.80664	-0.00017
9	3	7	9	→	8	3	6	8	14897.60894	0.00024
9	3	7	8	→	8	3	6	7	14897.72464	0.00067
9	3	7	10	→	8	3	6	9	14897.72464	0.00010
10	0	10	9	→	9	0	9	8	14903.23328	0.00240
10	0	10	10	→	9	0	9	9	14903.24547	0.00116
10	0	10	11	→	9	0	9	10	14903.24547	-0.00060
9	4	6	9	→	8	4	5	8	14928.11231	0.00024
9	4	6	10	→	8	4	5	9	14928.31864	0.00057
9	4	6	8	→	8	4	5	7	14928.33277	-0.00097
9	4	5	9	→	8	4	4	8	14956.38904	0.00031
9	4	5	10	→	8	4	4	9	14956.59873	0.00113
9	4	5	8	→	8	4	4	7	14956.61224	-0.00132
9	1	8	8	→	8	1	7	7	15078.40462	0.00024
9	1	8	10	→	8	1	7	9	15078.42422	-0.00063
9	1	8	9	→	8	1	7	8	15078.43019	0.00132
9	3	6	9	→	8	3	5	8	15248.85326	0.00041
9	3	6	10	→	8	3	5	9	15248.98748	0.00046
9	3	6	8	→	8	3	5	7	15248.98748	-0.00050
7	2	6	6	→	6	1	5	5	15491.34743	0.00036
7	2	6	8	→	6	1	5	7	15491.41764	-0.00011
7	2	6	7	→	6	1	5	6	15491.66934	-0.00075
9	2	7	9	→	8	2	6	8	15686.94359	0.00059
9	2	7	8	→	8	2	6	7	15686.98368	0.00126
9	2	7	10	→	8	2	6	9	15686.99476	-0.00082
10	2	9	10	→	9	2	8	9	15976.88668	0.00010
10	2	9	9	→	9	2	8	8	15976.90789	-0.00037
10	2	9	11	→	9	2	8	10	15976.91929	0.00006
11	0	11	10	→	10	1	10	9	16197.69644	-0.00112
11	0	11	11	→	10	1	10	10	16197.69664	0.00130
11	0	11	12	→	10	1	10	11	16197.70763	-0.00114
11	1	11	10	→	10	1	10	9	16262.56744	-0.00180
11	1	11	11	→	10	1	10	10	16262.57483	0.00131
11	1	11	12	→	10	1	10	11	16262.58299	0.00199

11	1	10	11	→	10	2	9	10	16274.98185	0.00004
11	1	10	10	→	10	2	9	9	16275.08500	0.00205
11	1	10	12	→	10	2	9	11	16275.08500	-0.00041
11	0	11	10	→	10	0	10	9	16305.21966	0.00025
11	0	11	11	→	10	0	10	10	16305.22857	-0.00037
11	0	11	12	→	10	0	10	11	16305.23258	0.00087
11	1	11	10	→	10	0	10	9	16370.09357	0.00249
11	1	11	12	→	10	0	10	11	16370.10405	0.00011
11	1	11	11	→	10	0	10	10	16370.10405	-0.00307
8	2	7	7	→	7	1	6	6	16421.14959	0.00078
8	2	7	9	→	7	1	6	8	16421.19990	-0.00034
8	2	7	8	→	7	1	6	7	16421.40305	-0.00001
10	3	8	10	→	9	3	7	9	16538.45137	0.00004
10	3	8	9	→	9	3	7	8	16538.52994	-0.00127
10	3	8	11	→	9	3	7	10	16538.53574	0.00088
10	1	9	9	→	9	1	8	8	16538.72311	0.00062
10	1	9	11	→	9	1	8	10	16538.73908	-0.00044
10	1	9	10	→	9	1	8	9	16538.74946	0.00037
10	4	7	10	→	9	4	6	9	16613.18578	0.00006
10	4	7	11	→	9	4	6	10	16613.33724	-0.00056
10	4	7	9	→	9	4	6	8	16613.34615	0.00126
10	4	6	10	→	9	4	5	9	16672.83825	-0.00026
10	4	6	11	→	9	4	5	10	16672.99530	-0.00011
10	4	6	9	→	9	4	5	8	16673.00474	0.00182
10	3	7	10	→	9	3	6	9	17085.56731	-0.00003
10	3	7	9	→	9	3	6	8	17085.67054	0.00216
10	3	7	11	→	9	3	6	10	17085.67054	-0.00016
9	2	8	8	→	8	1	7	7	17316.14152	-0.00076
9	2	8	10	→	8	1	7	9	17316.18118	0.00080
9	2	8	9	→	8	1	7	8	17316.34210	0.00042
10	2	8	10	→	9	2	7	9	17421.85242	-0.00019
10	2	8	9	→	9	2	7	8	17421.87253	-0.00020
10	2	8	11	→	9	2	7	10	17421.88554	0.00032
11	2	10	11	→	10	2	9	10	17479.01258	0.00075
11	2	10	10	→	10	2	9	9	17479.02304	-0.00163
11	2	10	12	→	10	2	9	11	17479.03457	0.00005
12	0	12	11	→	11	1	11	10	17646.65814	-0.00001
12	0	12	12	→	11	1	11	11	17646.65814	-0.00049
12	0	12	13	→	11	1	11	12	17646.66872	0.00093
12	1	12	11	→	11	1	11	10	17685.22104	-0.00177
12	1	12	12	→	11	1	11	11	17685.22741	0.00056
12	1	12	13	→	11	1	11	12	17685.23461	0.00188
12	0	12	11	→	11	0	11	10	17711.52787	-0.00196
12	0	12	12	→	11	0	11	11	17711.53766	0.00085
12	0	12	13	→	11	0	11	12	17711.54100	0.00098
12	1	12	11	→	11	0	11	10	17750.09349	-0.00099

12	1	12	13	→	11	0	11	12	17750.10520	0.00024
12	1	12	12	→	11	0	11	11	17750.10520	0.00016
11	1	10	10	→	10	1	9	9	17951.00734	0.00071
11	1	10	12	→	10	1	9	11	17951.02035	-0.00031
11	1	10	11	→	10	1	9	10	17951.03201	-0.00010
12	1	11	12	→	11	2	10	11	18129.18189	-0.00122
12	1	11	11	→	11	2	10	10	18129.24802	-0.00141
12	1	11	13	→	11	2	10	12	18129.25506	0.00144
11	3	9	11	→	10	3	8	10	18163.24508	0.00036
11	3	9	10	→	10	3	8	9	18163.29873	-0.00220
11	3	9	12	→	10	3	8	11	18163.30660	0.00066
11	6	6	11	→	10	6	5	10	18196.10541	0.00004
11	6	5	11	→	10	6	4	10	18196.31694	-0.00001
11	6	6	12	→	10	6	5	11	18196.35654	0.00093
11	6	6	10	→	10	6	5	9	18196.37748	-0.00053
11	6	5	12	→	10	6	4	11	18196.56749	0.00031
11	6	5	10	→	10	6	4	9	18196.58868	-0.00095
10	2	9	9	→	9	1	8	8	18214.64554	-0.00063
10	2	9	11	→	9	1	8	10	18214.67523	0.00046
10	2	9	10	→	9	1	8	9	18214.79978	0.00039
11	5	7	11	→	10	5	6	10	18246.67082	-0.00018
11	5	7	12	→	10	5	6	11	18246.84766	-0.00026
11	5	7	10	→	10	5	6	9	18246.85923	-0.00022
11	5	6	11	→	10	5	5	10	18253.39889	-0.00016
11	5	6	12	→	10	5	5	11	18253.57674	0.00013
11	5	6	10	→	10	5	5	9	18253.58755	-0.00064
11	4	8	11	→	10	4	7	10	18300.48787	0.00001
11	4	8	12	→	10	4	7	11	18300.60371	0.00056
11	4	8	10	→	10	4	7	9	18300.60371	-0.00170
11	4	7	11	→	10	4	6	10	18415.38677	-0.00036
11	4	7	12	→	10	4	6	11	18415.51089	0.00101
11	4	7	10	→	10	4	6	9	18415.51089	-0.00202
11	3	8	11	→	10	3	7	10	18946.12934	0.00141
11	3	8	10	→	10	3	7	9	18946.20140	-0.00254
11	3	8	12	→	10	3	7	11	18946.20902	0.00108
12	2	11	12	→	11	2	10	11	18962.22960	-0.00059
12	2	11	13	→	11	2	10	12	18962.24578	-0.00032
13	1	13	12	→	12	1	12	11	19105.10660	-0.00211
13	1	13	13	→	12	1	12	12	19105.11028	-0.00211
13	1	13	14	→	12	1	12	13	19105.11919	0.00201
11	2	9	11	→	10	2	8	10	19107.38134	-0.00080
11	2	9	10	→	10	2	8	9	19107.39115	0.00255
11	2	9	12	→	10	2	8	11	19107.39888	-0.00125
13	0	13	12	→	12	0	12	11	19121.02159	-0.00243
13	0	13	14	→	12	0	12	13	19121.03386	0.00124
12	1	11	11	→	11	1	10	10	19333.19173	0.00058

12	1	11	13	→	11	1	10	12	19333.20086	-0.00187
12	1	11	12	→	11	1	10	11	19333.21305	-0.00008
12	3	10	12	→	11	3	9	11	19768.66091	0.00009
12	3	10	11	→	11	3	9	10	19768.69861	-0.00193
12	3	10	13	→	11	3	9	12	19768.70751	0.00146
12	4	9	12	→	11	4	8	11	19986.72858	0.00059
12	4	9	13	→	11	4	8	12	19986.81716	-0.00008
12	4	9	11	→	11	4	8	10	19986.81716	-0.00015
12	4	8	12	→	11	4	7	11	20191.19259	-0.00037
12	4	8	13	→	11	4	7	12	20191.29300	0.00032
12	4	8	11	→	11	4	7	10	20191.29300	-0.00028
13	2	12	13	→	12	2	11	12	20428.75792	-0.00057
13	2	12	12	→	12	2	11	11	20428.76221	0.00021
13	2	12	14	→	12	2	11	13	20428.77054	0.00078
14	1	14	13	→	13	1	13	12	20523.20221	-0.00214
14	1	14	15	→	13	1	13	14	20523.21369	0.00204
14	0	14	13	→	13	0	13	12	20532.68340	-0.00229
14	0	14	15	→	13	0	13	14	20532.69457	0.00151
13	1	12	12	→	12	1	11	11	20703.61592	0.00133
13	1	12	14	→	12	1	11	13	20703.62231	-0.00187
13	1	12	13	→	12	1	11	12	20703.63247	0.00045
12	2	10	11	→	11	2	9	10	20735.11770	-0.00058
12	2	10	13	→	11	2	9	12	20735.13089	0.00186
12	3	9	12	→	11	3	8	11	20808.92440	-0.00011
12	3	9	11	→	11	3	8	10	20808.97888	-0.00141
12	3	9	13	→	11	3	8	12	20808.98606	0.00083
13	3	11	13	→	12	3	10	12	21352.25502	0.00079
13	3	11	12	→	12	3	10	11	21352.28075	-0.00139
13	3	11	14	→	12	3	10	13	21352.28843	0.00074
13	5	9	13	→	12	5	8	12	21635.25466	-0.00006
13	5	9	14	→	12	5	8	13	21635.36627	0.00169
13	5	9	12	→	12	5	8	11	21635.36627	-0.00150
13	5	8	13	→	12	5	7	12	21666.49289	-0.00067
13	5	8	14	→	12	5	7	13	21666.60692	0.00141
13	5	8	12	→	12	5	7	11	21666.60692	-0.00192
13	4	10	13	→	12	4	9	12	21667.88677	0.00045
13	4	10	12	→	12	4	9	11	21667.95509	0.00058
13	4	10	14	→	12	4	9	13	21667.95509	-0.00107
14	2	13	14	→	13	2	12	13	21881.27868	-0.00038
14	2	13	13	→	13	2	12	12	21881.27868	-0.00162
14	2	13	15	→	13	2	12	14	21881.28910	0.00193
15	1	15	14	→	14	1	14	13	21940.17915	0.00015
15	1	15	16	→	14	1	14	15	21940.18591	0.00055
15	0	15	14	→	14	0	14	13	21945.75635	-0.00057
15	0	15	15	→	14	0	14	14	21945.76293	0.00264
15	0	15	16	→	14	0	14	15	21945.76293	-0.00038

13	4	9	13	→	12	4	8	12	22006.27978	0.00063
13	4	9	12	→	12	4	8	11	22006.36219	0.00017
13	4	9	14	→	12	4	8	13	22006.36219	-0.00056
14	1	13	13	→	13	1	12	12	22075.22353	-0.00263
14	1	13	15	→	13	1	12	14	22075.23445	0.00029
14	1	13	14	→	13	1	12	13	22075.24019	0.00101
13	2	11	12	→	12	2	10	11	22298.07481	-0.00248
13	2	11	14	→	12	2	10	13	22298.08830	0.00174
13	2	11	13	→	12	2	10	12	22298.08830	-0.00036
13	3	10	13	→	12	3	9	12	22651.06800	0.00042
13	3	10	12	→	12	3	9	11	22651.10538	-0.00113
13	3	10	14	→	12	3	9	13	22651.11294	0.00100
14	3	12	14	→	13	3	11	13	22912.59972	0.00289
14	3	12	13	→	13	3	11	12	22912.61446	-0.00165
14	3	12	15	→	13	3	11	14	22912.62250	0.00101
15	2	14	14	→	14	2	13	13	23322.61097	-0.00054
15	2	14	15	→	14	2	13	14	23322.61097	-0.00065
15	2	14	16	→	14	2	13	15	23322.61894	0.00135

Table VI(B). Microwave transitions of the $^{13}C_1$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$

4	1	3	4	→	3	1	2	3	6964.66432	0.00031
4	1	3	3	→	3	1	2	2	6964.76372	0.00059
4	1	3	5	→	3	1	2	4	6964.82518	0.00031
5	1	5	5	→	4	1	4	4	7560.45013	-0.00034
5	1	5	4	→	4	1	4	3	7560.48930	-0.00103
5	1	5	6	→	4	1	4	5	7560.53435	0.00015
5	0	5	4	→	4	0	4	3	7863.53853	0.00041
5	0	5	6	→	4	0	4	5	7863.61388	0.00155
5	0	5	5	→	4	0	4	4	7863.61388	-0.00181
5	2	4	5	→	4	2	3	4	8152.17025	0.00027
5	2	4	6	→	4	2	3	5	8152.46447	0.00034
5	2	4	4	→	4	2	3	3	8152.49333	-0.00042
5	2	3	5	→	4	2	2	4	8480.45637	-0.00011
5	2	3	6	→	4	2	2	5	8480.77534	-0.00044
5	2	3	4	→	4	2	2	3	8480.80684	-0.00053
5	1	4	5	→	4	1	3	4	8666.05798	-0.00043
5	1	4	4	→	4	1	3	3	8666.09032	0.00139
5	1	4	6	→	4	1	3	5	8666.14024	0.00004
6	1	6	6	→	5	1	5	5	9035.74939	0.00141
6	1	6	5	→	5	1	5	4	9035.76087	-0.00141
6	1	6	7	→	5	1	5	6	9035.79655	-0.00017
6	0	6	5	→	5	0	5	4	9299.32073	0.00105
6	0	6	7	→	5	0	5	6	9299.36703	-0.00126
6	0	6	6	→	5	0	5	5	9299.37655	0.00106
6	2	4	6	→	5	2	3	5	10280.13023	-0.00025
6	2	4	5	→	5	2	3	4	10280.32447	0.00050
6	2	4	7	→	5	2	3	6	10280.32447	0.00025
6	1	5	6	→	5	1	4	5	10336.00421	-0.00180
6	1	5	5	→	5	1	4	4	10336.00992	0.00066
6	1	5	7	→	5	1	4	6	10336.05037	0.00122
7	1	7	7	→	6	1	6	6	10497.12849	-0.00112
7	1	7	6	→	6	1	6	5	10497.13433	0.00129
7	1	7	8	→	6	1	6	7	10497.16035	0.00040
7	0	7	6	→	6	0	6	5	10704.68769	-0.00035
7	0	7	8	→	6	0	6	7	10704.72204	-0.00062
7	0	7	7	→	6	0	6	6	10704.72926	0.00082
7	2	6	7	→	6	2	5	6	11331.07067	-0.00057
7	2	6	6	→	6	2	5	5	11331.16931	0.00122
7	2	6	8	→	6	2	5	7	11331.17824	0.00009
8	1	8	7	→	7	1	7	6	11946.13594	0.00043
8	1	8	8	→	7	1	7	7	11946.13594	-0.00104
8	1	8	9	→	7	1	7	8	11946.15685	0.00000
7	1	6	6	→	6	1	5	5	11964.21323	-0.00157
7	1	6	7	→	6	1	5	6	11964.22543	-0.00030
7	1	6	8	→	6	1	5	7	11964.24648	0.00028
8	0	8	7	→	7	0	7	6	12097.04488	-0.00085

8	0	8	9	→	7	0	7	8	12097.07210	0.00109
8	0	8	8	→	7	0	7	7	12097.07210	-0.00198
9	1	9	8	→	8	1	8	7	13384.87851	-0.00081
9	1	9	9	→	8	1	8	8	13384.88511	0.00221
9	1	9	10	→	8	1	8	9	13384.89556	-0.00096
9	0	9	8	→	8	0	8	7	13488.13353	0.00112
9	0	9	10	→	8	0	8	9	13488.15140	-0.00025
9	0	9	9	→	8	0	8	8	13488.15140	-0.00064

Table VI(C). Microwave transitions of the $^{13}C_2$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	3	4	→	3	1	2	3	6971.87379	-0.00020
4	1	3	3	→	3	1	2	2	6971.97311	0.00008
4	1	3	5	→	3	1	2	4	6972.03572	0.00089
5	1	5	5	→	4	1	4	4	7563.78536	-0.00047
5	1	5	4	→	4	1	4	3	7563.82570	0.00007
5	1	5	6	→	4	1	4	5	7563.86975	0.00022
5	0	5	4	→	4	0	4	3	7866.24022	0.00031
5	0	5	6	→	4	0	4	5	7866.31538	0.00121
5	0	5	5	→	4	0	4	4	7866.31538	-0.00235
5	2	4	5	→	4	2	3	4	8158.60416	0.00042
5	2	4	6	→	4	2	3	5	8158.89799	0.00002
5	2	4	4	→	4	2	3	3	8158.92765	0.00007
5	2	3	5	→	4	2	2	4	8491.19719	0.00015
5	2	3	6	→	4	2	2	5	8491.51626	-0.00037
5	2	3	4	→	4	2	2	3	8491.54831	0.00009
5	1	4	5	→	4	1	3	4	8674.42123	-0.00065
5	1	4	4	→	4	1	3	3	8674.45300	0.00077
5	1	4	6	→	4	1	3	5	8674.50373	0.00018
6	1	6	6	→	5	1	5	5	9039.31781	0.00030
6	1	6	5	→	5	1	5	4	9039.33073	-0.00101
6	1	6	7	→	5	1	5	6	9039.36568	-0.00053
6	0	6	5	→	5	0	5	4	9301.39614	0.00078
6	0	6	7	→	5	0	5	6	9301.44288	-0.00111
6	0	6	6	→	5	0	5	5	9301.45200	0.00074
6	2	4	5	→	5	2	3	4	10293.87350	-0.00001
6	2	4	7	→	5	2	3	6	10293.87350	-0.00029
6	1	5	6	→	5	1	4	5	10344.97718	-0.00124
6	1	5	5	→	5	1	4	4	10344.98123	-0.00018
6	1	5	7	→	5	1	4	6	10345.02185	0.00050
7	1	7	7	→	6	1	6	6	10500.82758	0.00039
7	1	7	6	→	6	1	6	5	10500.83132	0.00075
7	1	7	8	→	6	1	6	7	10500.85780	0.00030
7	0	7	6	→	6	0	6	5	10706.38174	0.00059
7	0	7	8	→	6	0	6	7	10706.41465	-0.00109
7	0	7	7	→	6	0	6	6	10706.42247	0.00098
7	2	6	7	→	6	2	5	6	11338.89772	-0.00043
7	2	6	6	→	6	2	5	5	11338.99623	0.00129
7	2	6	8	→	6	2	5	7	11339.00485	-0.00017
8	1	8	7	→	7	1	7	6	11949.90282	-0.00013
8	1	8	8	→	7	1	7	7	11949.90282	-0.00163
8	1	8	9	→	7	1	7	8	11949.92440	0.00010
7	1	6	6	→	6	1	5	5	11973.07557	-0.00018
7	1	6	7	→	6	1	5	6	11973.08669	-0.00032
7	1	6	8	→	6	1	5	7	11973.10735	0.00016
8	0	8	7	→	7	0	7	6	12098.73928	-0.00052

8	0	8	9	→	7	0	7	8	12098.76643	0.00137
8	0	8	8	→	7	0	7	7	12098.76643	-0.00159
9	1	9	8	→	8	1	8	7	13388.70223	-0.00067
9	1	9	9	→	8	1	8	8	13388.70818	0.00168
9	1	9	10	→	8	1	8	9	13388.71914	-0.00097
9	0	9	8	→	8	0	8	7	13490.12724	0.00062
9	0	9	10	→	8	0	8	9	13490.14558	-0.00027
9	0	9	9	→	8	0	8	8	13490.14558	-0.00052

Table VI(D). Microwave transitions of the $^{13}C_3$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	3	4	→	3	1	2	3	6958.81016	-0.00024
4	1	3	3	→	3	1	2	2	6958.90830	-0.00105
4	1	3	5	→	3	1	2	4	6958.97211	0.00066
5	1	5	5	→	4	1	4	4	7549.58887	-0.00030
5	1	5	4	→	4	1	4	3	7549.62676	-0.00223
5	1	5	6	→	4	1	4	5	7549.67260	-0.00028
5	0	5	4	→	4	0	4	3	7851.46973	0.00042
5	0	5	6	→	4	0	4	5	7851.54431	0.00056
5	0	5	5	→	4	0	4	4	7851.54431	-0.00345
5	2	4	5	→	4	2	3	4	8143.30584	0.00038
5	2	4	6	→	4	2	3	5	8143.60063	0.00048
5	2	4	4	→	4	2	3	3	8143.63004	0.00024
5	2	3	5	→	4	2	2	4	8475.29910	0.00024
5	2	3	6	→	4	2	2	5	8475.61953	0.00014
5	2	3	4	→	4	2	2	3	8475.65086	-0.00021
5	1	4	5	→	4	1	3	4	8658.16441	-0.00035
5	1	4	4	→	4	1	3	3	8658.19572	0.00082
5	1	4	6	→	4	1	3	5	8658.24596	-0.00048
6	1	6	6	→	5	1	5	5	9022.34982	0.00078
6	1	6	5	→	5	1	5	4	9022.36281	-0.00040
6	1	6	7	→	5	1	5	6	9022.39716	-0.00052
6	0	6	5	→	5	0	5	4	9283.92423	0.00057
6	0	6	7	→	5	0	5	6	9283.97154	-0.00086
6	0	6	6	→	5	0	5	5	9283.98049	0.00038
6	2	4	6	→	5	2	3	5	10274.41059	0.00011
6	2	4	5	→	5	2	3	4	10274.60490	0.00020
6	2	4	7	→	5	2	3	6	10274.60490	-0.00007
6	1	5	6	→	5	1	4	5	10325.58325	-0.00125
6	1	5	5	→	5	1	4	4	10325.58325	-0.00395
6	1	5	7	→	5	1	4	6	10325.62849	0.00119
7	1	7	7	→	6	1	6	6	10481.11100	-0.00161
7	1	7	6	→	6	1	6	5	10481.11631	0.00042
7	1	7	8	→	6	1	6	7	10481.14293	0.00010
7	0	7	6	→	6	0	6	5	10686.26814	0.00145
7	0	7	8	→	6	0	6	7	10686.30004	-0.00130
7	0	7	7	→	6	0	6	6	10686.30785	0.00037
7	2	6	7	→	6	2	5	6	11317.63041	-0.00019
7	2	6	6	→	6	2	5	5	11317.72904	0.00162
7	2	6	8	→	6	2	5	7	11317.73764	0.00011
8	1	8	7	→	7	1	7	6	11927.46696	0.00179
8	1	8	8	→	7	1	7	7	11927.46696	0.00018
8	1	8	9	→	7	1	7	8	11927.48657	0.00004
7	1	6	6	→	6	1	5	5	11950.62007	0.00000

7	1	6	7	→	6	1	5	6	11950.63173	0.00003
7	1	6	8	→	6	1	5	7	11950.65209	0.00045
8	0	8	7	→	7	0	7	6	12076.00731	-0.00142
8	0	8	9	→	7	0	7	8	12076.03626	0.00222
8	0	8	8	→	7	0	7	7	12076.03626	-0.00104
9	1	9	8	→	8	1	8	7	13363.56020	-0.00109
9	1	9	9	→	8	1	8	8	13363.56738	0.00238
9	1	9	10	→	8	1	8	9	13363.57743	-0.00108
9	0	9	8	→	8	0	8	7	13464.78378	0.00117
9	0	9	10	→	8	0	8	9	13464.80201	0.00014
9	0	9	9	→	8	0	8	8	13464.80201	-0.00035

Table VI(E). Microwave transitions of the $^{13}C_4$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	3	4	→	3	1	2	3	6934.73202	-0.00226
4	1	3	3	→	3	1	2	2	6934.83455	0.00032
4	1	3	5	→	3	1	2	4	6934.89567	-0.00022
5	1	5	5	→	4	1	4	4	7533.23488	0.00120
5	1	5	4	→	4	1	4	3	7533.27555	0.00172
5	1	5	6	→	4	1	4	5	7533.31786	-0.00009
5	0	5	4	→	4	0	4	3	7836.10841	-0.00119
5	0	5	6	→	4	0	4	5	7836.18491	0.00093
5	0	5	5	→	4	0	4	4	7836.18491	-0.00161
5	2	4	5	→	4	2	3	4	8119.49500	0.00138
5	2	4	6	→	4	2	3	5	8119.78919	0.00026
5	2	4	4	→	4	2	3	3	8119.81991	0.00121
5	2	3	5	→	4	2	2	4	8441.74321	0.00025
5	2	3	6	→	4	2	2	5	8442.06237	-0.00027
5	2	3	4	→	4	2	2	3	8442.09448	0.00018
5	1	4	5	→	4	1	3	4	8629.52126	-0.00069
5	1	4	4	→	4	1	3	3	8629.55344	0.00029
5	1	4	6	→	4	1	3	5	8629.60361	-0.00078
6	1	6	6	→	5	1	5	5	9003.70823	0.00067
6	1	6	5	→	5	1	5	4	9003.72034	-0.00176
6	1	6	7	→	5	1	5	6	9003.75530	-0.00143
6	0	6	5	→	5	0	5	4	9268.20836	0.00095
6	0	6	7	→	5	0	5	6	9268.25470	-0.00143
6	0	6	6	→	5	0	5	5	9268.26360	0.00089
6	2	4	6	→	5	2	3	5	10232.56311	-0.00011
6	2	4	5	→	5	2	3	4	10232.75709	0.00014
6	2	4	7	→	5	2	3	6	10232.75709	-0.00009
6	1	5	6	→	5	1	4	5	10293.58848	-0.00204
6	1	5	5	→	5	1	4	4	10293.59423	-0.00023
6	1	5	7	→	5	1	4	6	10293.63622	0.00189
7	1	7	7	→	6	1	6	6	10460.43307	-0.00087
7	1	7	6	→	6	1	6	5	10460.43889	0.00131
7	1	7	8	→	6	1	6	7	10460.46482	0.00019
7	0	7	6	→	6	0	6	5	10669.71148	0.00068
7	0	7	8	→	6	0	6	7	10669.74423	-0.00136
7	0	7	7	→	6	0	6	6	10669.75187	0.00095
7	2	6	7	→	6	2	5	6	11286.95186	0.00024
7	2	6	6	→	6	2	5	5	11287.04982	0.00073
7	2	6	8	→	6	2	5	7	11287.05899	-0.00016
8	1	8	7	→	7	1	7	6	11904.89330	0.00051
8	1	8	8	→	7	1	7	7	11904.89330	-0.00077
8	1	8	9	→	7	1	7	8	11904.91364	-0.00060
7	1	6	6	→	6	1	5	5	11916.88764	0.00228

7	1	6	7	→	6	1	5	6	11916.89460	-0.00090
7	1	6	8	→	6	1	5	7	11916.91647	-0.00026
8	0	8	7	→	7	0	7	6	12057.79349	-0.00166
8	0	8	9	→	7	0	7	8	12057.82260	0.00205
8	0	8	8	→	7	0	7	7	12057.82260	-0.00076
9	1	9	8	→	8	1	8	7	13339.13809	-0.00077
9	1	9	9	→	8	1	8	8	13339.14320	0.00092
9	1	9	10	→	8	1	8	9	13339.15479	-0.00136
9	0	9	8	→	8	0	8	7	13444.25716	0.00172
9	0	9	10	→	8	0	8	9	13444.27469	-0.00010
9	0	9	9	→	8	0	8	8	13444.27469	-0.00032

Table VI(F). Microwave transitions of the $^{13}C_5$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	3	4	→	3	1	2	3	6949.44398	-0.00050
4	1	3	3	→	3	1	2	2	6949.54375	0.00043
4	1	3	5	→	3	1	2	4	6949.60472	-0.00036
5	1	5	5	→	4	1	4	4	7535.56625	0.00005
5	1	5	4	→	4	1	4	3	7535.60577	-0.00013
5	1	5	6	→	4	1	4	5	7535.65038	0.00061
5	0	5	4	→	4	0	4	3	7836.21091	0.00130
5	0	5	6	→	4	0	4	5	7836.28505	0.00123
5	0	5	5	→	4	0	4	4	7836.28505	-0.00251
5	2	4	5	→	4	2	3	4	8130.62305	0.00000
5	2	4	6	→	4	2	3	5	8130.91701	0.00004
5	2	4	4	→	4	2	3	3	8130.94641	-0.00013
5	2	3	5	→	4	2	2	4	8465.60331	0.00015
5	2	3	6	→	4	2	2	5	8465.92277	0.00015
5	2	3	4	→	4	2	2	3	8465.95385	-0.00033
5	1	4	5	→	4	1	3	4	8645.98196	-0.00048
5	1	4	4	→	4	1	3	3	8646.01380	0.00121
5	1	4	6	→	4	1	3	5	8646.06381	-0.00008
6	1	6	6	→	5	1	5	5	9005.23093	0.00057
6	1	6	5	→	5	1	5	4	9005.24327	-0.00125
6	1	6	7	→	5	1	5	6	9005.27872	-0.00024
6	0	6	5	→	5	0	5	4	9264.92363	0.00108
6	0	6	7	→	5	0	5	6	9264.97023	-0.00091
6	0	6	6	→	5	0	5	5	9264.97967	0.00121
6	2	4	6	→	5	2	3	5	10263.10052	-0.00016
6	2	4	5	→	5	2	3	4	10263.29413	0.00012
6	2	4	7	→	5	2	3	6	10263.29413	-0.00019
6	1	5	6	→	5	1	4	5	10310.18129	-0.00148
6	1	5	5	→	5	1	4	4	10310.18585	0.00032
6	1	5	7	→	5	1	4	6	10310.22695	0.00149
7	1	7	7	→	6	1	6	6	10460.83768	-0.00114
7	1	7	6	→	6	1	6	5	10460.84255	0.00040
7	1	7	8	→	6	1	6	7	10460.86930	0.00024
7	0	7	6	→	6	0	6	5	10663.80885	0.00033
7	0	7	8	→	6	0	6	7	10663.84120	-0.00183
7	0	7	7	→	6	0	6	6	10663.84948	0.00073
7	2	6	7	→	6	2	5	6	11299.03536	-0.00032
7	2	6	6	→	6	2	5	5	11299.13296	0.00066
7	2	6	8	→	6	2	5	7	11299.14248	0.00011
8	1	8	7	→	7	1	7	6	11904.01589	0.00077
8	1	8	8	→	7	1	7	7	11904.01589	-0.00076
8	1	8	9	→	7	1	7	8	11904.03685	0.00040
7	1	6	6	→	6	1	5	5	11931.46535	-0.00205

7	1	6	7	→	6	1	5	6	11931.47967	0.00073
7	1	6	8	→	6	1	5	7	11931.49941	0.00057
8	0	8	7	→	7	0	7	6	12050.45232	-0.00094
8	0	8	9	→	7	0	7	8	12050.47913	0.00066
8	0	8	8	→	7	0	7	7	12050.47913	-0.00220
9	1	9	8	→	8	1	8	7	13336.94682	-0.00037
9	1	9	9	→	8	1	8	8	13336.95225	0.00144
9	1	9	10	→	8	1	8	9	13336.96346	-0.00093
9	0	9	8	→	8	0	8	7	13436.38753	0.00132
9	0	9	10	→	8	0	8	9	13436.40525	-0.00015
9	0	9	9	→	8	0	8	8	13436.40525	-0.00030

Table VI(G). Microwave transitions of the $^{13}C_6$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	3	4	→	3	1	2	3	6968.64224	-0.00038
4	1	3	3	→	3	1	2	2	6968.74186	0.00043
4	1	3	5	→	3	1	2	4	6968.80341	-0.00017
5	1	5	5	→	4	1	4	4	7551.08321	-0.00027
5	1	5	4	→	4	1	4	3	7551.12309	-0.00008
5	1	5	6	→	4	1	4	5	7551.16686	-0.00029
5	0	5	4	→	4	0	4	3	7851.39122	0.00071
5	0	5	5	→	4	0	4	4	7851.46931	-0.00003
5	2	4	6	→	4	2	3	5	8151.01685	0.00005
5	2	4	4	→	4	2	3	3	8151.04649	0.00005
5	1	4	5	→	4	1	3	4	8669.13028	-0.00077
5	1	4	4	→	4	1	3	3	8669.16310	0.00224
5	1	4	6	→	4	1	3	5	8669.21189	-0.00057
6	1	6	6	→	5	1	5	5	9023.27732	0.00032
6	1	6	5	→	5	1	5	4	9023.29064	-0.00041
6	1	6	7	→	5	1	5	6	9023.32547	-0.00011
6	0	6	5	→	5	0	5	4	9281.56537	0.00022
6	0	6	7	→	5	0	5	6	9281.61242	-0.00149
6	0	6	6	→	5	0	5	5	9281.62326	0.00161
6	2	4	6	→	5	2	3	5	10294.94001	0.00059
6	2	4	5	→	5	2	3	4	10295.13308	-0.00051
6	2	4	7	→	5	2	3	6	10295.13308	-0.00086
6	1	5	6	→	5	1	4	5	10336.57018	-0.00107
6	1	5	5	→	5	1	4	4	10336.57018	-0.00330
6	1	5	7	→	5	1	4	6	10336.61456	0.00091
7	1	7	7	→	6	1	6	6	10481.26797	-0.00153
7	1	7	6	→	6	1	6	5	10481.27316	0.00046
7	1	7	8	→	6	1	6	7	10481.29964	-0.00003
7	0	7	6	→	6	0	6	5	10682.17750	0.00105
7	0	7	8	→	6	0	6	7	10682.20948	-0.00154
7	0	7	7	→	6	0	6	6	10682.21758	0.00059
7	2	6	7	→	6	2	5	6	11325.62443	-0.00026
7	2	6	6	→	6	2	5	5	11325.72293	0.00153
7	2	6	8	→	6	2	5	7	11325.73212	0.00059
8	1	8	7	→	7	1	7	6	11926.74579	0.00088
8	1	8	8	→	7	1	7	7	11926.74579	-0.00079
8	1	8	9	→	7	1	7	8	11926.76653	0.00023
7	1	6	6	→	6	1	5	5	11960.15702	-0.00108
7	1	6	7	→	6	1	5	6	11960.17047	0.00014
7	1	6	8	→	6	1	5	7	11960.19004	0.00031
8	0	8	7	→	7	0	7	6	12070.98493	-0.00079
8	0	8	9	→	7	0	7	8	12071.01237	0.00139
8	0	8	8	→	7	0	7	7	12071.01237	-0.00156

9	1	9	8	→	8	1	8	7	13361.94709	-0.00055
9	1	9	9	→	8	1	8	8	13361.95268	0.00132
9	1	9	10	→	8	1	8	9	13361.96406	-0.00081
9	0	9	8	→	8	0	8	7	13459.42746	0.00083
9	0	9	10	→	8	0	8	9	13459.44583	-0.00002
9	0	9	9	→	8	0	8	8	13459.44583	-0.00019

Table VI(H). Microwave transitions of the $^{13}C_7$ isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	F'	→	J"	$K_{a"}$	$K_{c"}$	F"	ν_{obs}	$\nu_{obs.-calc.}$
4	1	3	4	→	3	1	2	3	6909.23163	-0.00005
4	1	3	3	→	3	1	2	2	6909.33296	0.00158
4	1	3	5	→	3	1	2	4	6909.39369	0.00065
5	1	5	5	→	4	1	4	4	7507.66187	0.00030
5	1	5	4	→	4	1	4	3	7507.70167	0.00000
5	1	5	6	→	4	1	4	5	7507.74563	-0.00003
5	0	5	4	→	4	0	4	3	7809.85557	0.00001
5	0	5	6	→	4	0	4	5	7809.93022	0.00038
5	0	5	5	→	4	0	4	4	7809.93022	-0.00230
5	2	4	6	→	4	2	3	5	8090.88288	0.00031
5	2	4	4	→	4	2	3	3	8090.91234	0.00005
5	2	3	6	→	4	2	2	5	8410.11199	-0.00082
5	2	3	4	→	4	2	2	3	8410.14377	-0.00067
5	1	4	5	→	4	1	3	4	8598.06794	-0.00036
5	1	4	4	→	4	1	3	3	8598.09979	0.00041
5	1	4	6	→	4	1	3	5	8598.15026	-0.00034
6	1	6	6	→	5	1	5	5	8973.34001	0.00029
6	1	6	5	→	5	1	5	4	8973.35354	-0.00069
6	1	6	7	→	5	1	5	6	8973.38841	-0.00035
6	0	6	5	→	5	0	5	4	9237.69330	0.00058
6	0	6	7	→	5	0	5	6	9237.74032	-0.00105
6	0	6	6	→	5	0	5	5	9237.74916	0.00101
6	2	4	6	→	5	2	3	5	10193.57264	-0.00023
6	2	4	5	→	5	2	3	4	10193.76728	0.00080
6	2	4	7	→	5	2	3	6	10193.76728	0.00058
6	1	5	6	→	5	1	4	5	10256.53361	-0.00182
6	1	5	5	→	5	1	4	4	10256.54051	0.00118
6	1	5	7	→	5	1	4	6	10256.58019	0.00102
7	1	7	7	→	6	1	6	6	10425.36341	-0.00168
7	1	7	6	→	6	1	6	5	10425.36999	0.00129
7	1	7	8	→	6	1	6	7	10425.39561	-0.00007
7	0	7	6	→	6	0	6	5	10634.92634	0.00062
7	0	7	8	→	6	0	6	7	10634.95919	-0.00131
7	0	7	7	→	6	0	6	6	10634.96684	0.00081
7	2	6	7	→	6	2	5	6	11247.28952	0.00019
7	2	6	6	→	6	2	5	5	11247.38649	-0.00012
7	2	6	8	→	6	2	5	7	11247.39700	0.00034
8	1	8	7	→	7	1	7	6	11865.19168	0.00100
8	1	8	8	→	7	1	7	7	11865.19168	-0.00033
8	1	8	9	→	7	1	7	8	11865.21255	0.00046
7	1	6	6	→	6	1	5	5	11874.69102	-0.00161
7	1	6	7	→	6	1	5	6	11874.70265	-0.00014
7	1	6	8	→	6	1	5	7	11874.72451	0.00054

8	0	8	7	→	7	0	7	6	12018.60116	-0.00129
8	0	8	9	→	7	0	7	8	12018.63059	0.00276
8	0	8	8	→	7	0	7	7	12018.63059	-0.00026
9	1	9	8	→	8	1	8	7	13294.84347	-0.00041
9	1	9	9	→	8	1	8	8	13294.84907	0.00172
9	1	9	10	→	8	1	8	9	13294.85985	-0.00129
9	0	9	8	→	8	0	8	7	13400.51561	0.00084
9	0	9	10	→	8	0	8	9	13400.53342	-0.00067
9	0	9	9	→	8	0	8	8	13400.53342	-0.00109

Table VI(I). Microwave transitions of the ^{15}N isotopologue of 24DFBN in MHz

J'	$K_{a'}$	$K_{c'}$	→	J"	$K_{a"}$	$K_{c"}$	$\nu_{obs.}$	$\nu_{obs. - calc.}$
4	1	3	→	3	1	2	6831.80393	-0.00054
5	1	5	→	4	1	4	7433.92785	0.00026
5	0	5	→	4	0	4	7734.79912	-0.00045
5	2	4	→	4	2	3	8004.69731	0.00021
5	2	3	→	4	2	2	8311.30424	-0.00020
5	1	4	→	4	1	3	8502.99404	0.00004
6	1	6	→	5	1	5	8886.13466	0.00052
6	0	6	→	5	0	5	9151.54259	-0.00019
6	2	5	→	5	2	4	9575.41265	-0.00031
6	2	4	→	5	2	3	10072.72080	0.00005
6	1	5	→	5	1	4	10145.32403	0.00005
7	1	7	→	6	1	6	10325.07166	-0.00012
7	0	7	→	6	0	6	10537.46582	0.00073
7	2	6	→	6	2	5	11130.18878	0.00023
7	1	6	→	6	1	5	11749.33184	-0.00009
8	1	8	→	7	1	7	11752.06838	-0.00021
7	2	5	→	6	2	4	11847.27008	0.00031
8	0	8	→	7	0	7	11909.07783	-0.00026
8	2	7	→	7	2	6	12667.11399	-0.00045
9	1	9	→	8	1	8	13169.02881	-0.00019
9	0	9	→	8	0	8	13278.21865	0.00005
8	1	7	→	7	1	6	13305.33771	0.00024
9	2	8	→	8	2	7	14184.87836	0.00015

Appendix VII. Ab initio geometry parameters for the 6 compounds under study

Investigation of Structural Trends in Mono-, Di- and Pentafluorobenzonitriles Using Fourier Transform Microwave Spectroscopy

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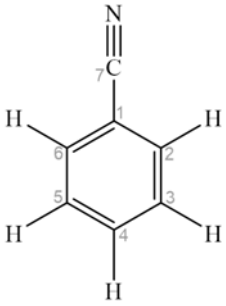
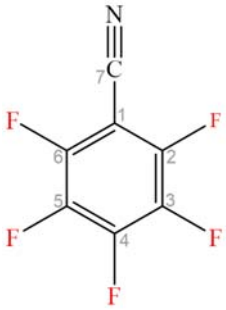
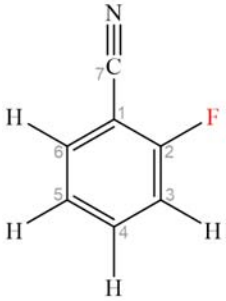
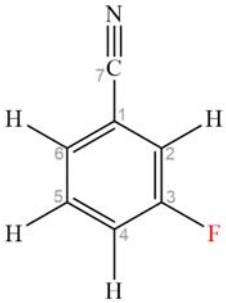
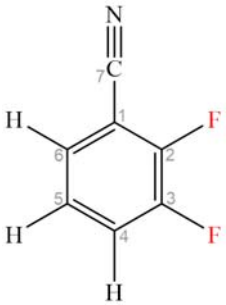
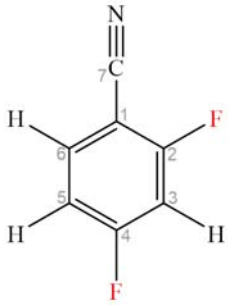
Table VII: Parameters (*ab initio*) involving H, F that were used in the r_o structural analysis. Bond lengths in Å; Angles in degrees.

BN	Structural parameter	*ab initio* value	PFBN	Structural parameter	*ab initio* value
	C2–H (also C6–H)	1.08034		C2–F (also C6–F)	1.33187
	C3–H (also C5–H)	1.08031		C3–F (also C5–F)	1.33016
	C4–H	1.08033		C4–F	1.32871
	∠(H–C2–C1) [also ∠(H–C6–C1)]	119.66703		∠(F–C2–C1) [also ∠(F–C6–C1)]	119.91551
	∠(H–C3–C2) [also ∠(H–C5–C6)]	119.58620		∠(F–C3–C2) [also ∠(F–C5–C6)]	120.55814

2FBN	Structural parameter	*ab initio* value	3FBN	Structural parameter	*ab initio* value
	C2–F	1.34426		C2–H	1.07939
	C3–H	1.07946		C3–F	1.34779
	C4–H	1.07994		C4–H	1.07932
	C5–H	1.07958		C5–H	1.07985
	C6–H	1.08003		C6–H	1.07960
	∠(F–C2–C3)	119.32742		∠(H–C2–C3)	120.48381
	∠(H–C3–C4)	121.94651		∠(F–C3–C4)	118.82722
	∠(H–C4–C3)	119.43009		∠(H–C5–C4)	119.53181
	∠(H–C5–C4)	120.18539		∠(H–C6–C5)	120.93080
	∠(H–C6–C1)	118.89834			

23DFBN	Structural parameter	*ab initio* value	24DFBN	Structural parameter	*ab initio* value
	C2–F	1.33554		C2–F	1.34129
	C3–F	1.33937		C3–H	1.07857
	C4–H	1.07949		C4–F	1.34548
	C5–H	1.07922		C5–H	1.07866
	C6–H	1.07937		C6–H	1.07961
	∠(F–C2–C3)	119.58850		∠(F–C2–C3)	118.80679
	∠(F–C3–C4)	120.45749		∠(H–C3–C4)	121.51327
	∠(H–C4–C3)	118.81103		∠(F–C4–C3)	118.29291
	∠(H–C5–C4)	119.61461		∠(H–C5–C4)	119.92107
	∠(H–C6–C1)	119.00174		∠(H–C6–C1)	118.97316