

Table S1: Observed Transition Frequencies in MHz for Difluoriodomethane, CHF<sub>2</sub>I.

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$1_{0,1} \frac{7}{2} - 0_{0,0} \frac{5}{2}$	3977.3212	0.0004	0.002
$1_{0,1} \frac{3}{2} - 0_{0,0} \frac{5}{2}$	4144.4263	-0.0015	0.002
$1_{1,0} \frac{3}{2} - 0_{0,0} \frac{5}{2}$	12105.5148	0.0047	0.006
$1_{1,0} \frac{7}{2} - 0_{0,0} \frac{5}{2}$	12185.2596	-0.0002	0.006
$1_{1,0} \frac{5}{2} - 0_{0,0} \frac{5}{2}$	12369.5584	-0.0032	0.006
$1_{1,1} \frac{7}{2} - 1_{0,1} \frac{7}{2}$	7920.8256	0.0039	0.006
$1_{1,1} \frac{5}{2} - 1_{0,1} \frac{3}{2}$	7952.5825	0.0008	0.006
$1_{1,1} \frac{5}{2} - 1_{0,1} \frac{7}{2}$	8119.6872	-0.0016	0.006
$1_{1,1} \frac{7}{2} - 1_{0,1} \frac{5}{2}$	8301.7509	0.0025	0.006
$1_{1,1} \frac{3}{2} - 1_{0,1} \frac{5}{2}$	8305.7898	0.0000	0.006
$1_{1,1} \frac{5}{2} - 1_{0,1} \frac{5}{2}$	8500.6145	-0.0010	0.006
$1_{1,1} \frac{3}{2} - 1_{0,1} \frac{3}{2}$	7757.7600	0.0039	0.006
$2_{0,2} \frac{3}{2} - 1_{0,1} \frac{5}{2}$	8070.9660	-0.0037	0.006
$2_{0,2} \frac{5}{2} - 1_{0,1} \frac{5}{2}$	7921.8622	-0.0013	0.006
$2_{0,2} \frac{1}{2} - 1_{0,1} \frac{3}{2}$	7864.3252	0.0009	0.006
$2_{0,2} \frac{9}{2} - 1_{0,1} \frac{7}{2}$	7795.1712	-0.0020	0.006
$2_{0,2} \frac{7}{2} - 1_{0,1} \frac{5}{2}$	7811.5378	-0.0011	0.006
$2_{1,1} \frac{5}{2} - 1_{1,0} \frac{3}{2}$	8125.2225	-0.0046	0.006
$2_{1,1} \frac{9}{2} - 1_{1,0} \frac{7}{2}$	8177.2679	0.0005	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$2_{1,1\frac{3}{2}} - 1_{1,0\frac{3}{2}}$	8270.5218	-0.0023	0.006
$2_{1,1\frac{7}{2}} - 1_{1,0\frac{5}{2}}$	7816.4386	0.0131	0.006
$2_{1,1\frac{7}{2}} - 1_{1,0\frac{7}{2}}$	8000.7186	-0.0086	0.006
$2_{1,1\frac{3}{2}} - 1_{1,0\frac{5}{2}}$	8006.4786	0.0061	0.006
$2_{1,1\frac{1}{2}} - 1_{1,0\frac{3}{2}}$	8385.6723	-0.0009	0.006
$2_{1,1\frac{5}{2}} - 1_{1,0\frac{7}{2}}$	8045.4733	-0.0039	0.006
$2_{1,1\frac{5}{2}} - 1_{0,1\frac{3}{2}}$	16086.3110	0.0017	0.002
$2_{1,1\frac{7}{2}} - 1_{0,1\frac{7}{2}}$	16208.6680	0.0015	0.002
$2_{1,1\frac{3}{2}} - 1_{0,1\frac{3}{2}}$	16231.6108	0.0044	0.002
$2_{1,1\frac{5}{2}} - 1_{0,1\frac{7}{2}}$	16253.4175	0.0010	0.002
$2_{1,1\frac{1}{2}} - 1_{0,1\frac{3}{2}}$	16346.7598	0.0044	0.002
$2_{1,1\frac{9}{2}} - 1_{0,1\frac{7}{2}}$	16385.2129	0.0063	0.002
$2_{1,1\frac{7}{2}} - 1_{0,1\frac{5}{2}}$	16589.5958	0.0026	0.002
$2_{1,1\frac{5}{2}} - 1_{0,1\frac{5}{2}}$	16634.3438	0.0006	0.002
$2_{1,1\frac{3}{2}} - 1_{0,1\frac{5}{2}}$	16779.6406	0.0004	0.002
$2_{1,2\frac{9}{2}} - 2_{0,2\frac{7}{2}}$	8052.1515	0.0038	0.006
$2_{1,2\frac{5}{2}} - 2_{0,2\frac{7}{2}}$	7937.3386	0.0025	0.006
$2_{1,2\frac{7}{2}} - 2_{0,2\frac{5}{2}}$	7790.3346	-0.0004	0.006
$2_{1,2\frac{3}{2}} - 2_{0,2\frac{3}{2}}$	7809.6200	0.0011	0.006
$2_{1,2\frac{3}{2}} - 2_{0,2\frac{5}{2}}$	7958.7244	-0.0007	0.006
$2_{1,2\frac{5}{2}} - 2_{0,2\frac{5}{2}}$	7827.0137	0.0023	0.006
$2_{1,2\frac{7}{2}} - 2_{0,2\frac{7}{2}}$	7900.6612	0.0015	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$2_{1,2\frac{1}{2}} - 2_{0,2\frac{3}{2}}$	7907.0046	0.0010	0.006
$2_{2,0\frac{1}{2}} - 3_{1,2\frac{3}{2}}$	11548.9106	0.0091	0.006
$2_{2,0\frac{3}{2}} - 3_{1,2\frac{3}{2}}$	11776.7885	0.0031	0.006
$2_{2,0\frac{9}{2}} - 3_{1,2\frac{9}{2}}$	12077.0006	0.0009	0.006
$2_{2,0\frac{5}{2}} - 3_{1,2\frac{5}{2}}$	12202.8186	0.0040	0.006
$2_{2,0\frac{5}{2}} - 3_{1,2\frac{7}{2}}$	12336.0879	-0.0013	0.006
$2_{2,0\frac{7}{2}} - 3_{1,2\frac{7}{2}}$	12432.2649	-0.0086	0.006
$2_{2,0\frac{7}{2}} - 3_{1,2\frac{9}{2}}$	12433.8348	0.0006	0.006
$2_{2,1\frac{1}{2}} - 3_{1,3\frac{3}{2}}$	13337.2535	0.0016	0.006
$2_{2,1\frac{3}{2}} - 3_{1,3\frac{3}{2}}$	13565.5766	0.0000	0.006
$2_{2,1\frac{9}{2}} - 3_{1,3\frac{11}{2}}$	13607.1946	0.0002	0.006
$2_{2,1\frac{3}{2}} - 3_{1,3\frac{5}{2}}$	13718.0197	0.0006	0.006
$2_{2,1\frac{9}{2}} - 3_{1,3\frac{9}{2}}$	13841.2649	0.0072	0.006
$2_{2,1\frac{5}{2}} - 3_{1,3\frac{5}{2}}$	13978.9103	-0.0024	0.006
$2_{2,1\frac{5}{2}} - 3_{1,3\frac{7}{2}}$	14102.4265	-0.0041	0.006
$2_{2,1\frac{7}{2}} - 3_{1,3\frac{9}{2}}$	14198.2994	0.0013	0.006
$3_{0,3\frac{9}{2}} - 2_{0,2\frac{9}{2}}$	11303.8898	0.0000	0.006
$3_{0,3\frac{7}{2}} - 2_{0,2\frac{9}{2}}$	11307.8997	-0.0158	0.006
$3_{0,3\frac{3}{2}} - 2_{0,2\frac{1}{2}}$	11451.5085	-0.0030	0.006
$3_{0,3\frac{7}{2}} - 2_{0,2\frac{5}{2}}$	11562.1519	0.0000	0.006
$3_{0,3\frac{5}{2}} - 2_{0,2\frac{3}{2}}$	11583.2894	0.0032	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$3_{0,3}\frac{1}{2} - 2_{0,2}\frac{1}{2}$	11611.9601	-0.0012	0.006
$3_{0,3}\frac{11}{2} - 2_{0,2}\frac{9}{2}$	11633.6408	0.0021	0.006
$3_{0,3}\frac{9}{2} - 2_{0,2}\frac{7}{2}$	11668.4554	0.0046	0.006
$3_{0,3}\frac{7}{2} - 2_{0,2}\frac{7}{2}$	11672.4789	0.0023	0.006
$3_{0,3}\frac{5}{2} - 2_{0,2}\frac{5}{2}$	11732.3936	0.0011	0.006
$3_{0,3}\frac{3}{2} - 2_{0,2}\frac{3}{2}$	11792.8950	-0.0049	0.006
$3_{0,3}\frac{5}{2} - 2_{0,2}\frac{7}{2}$	11842.7242	0.0071	0.006
$3_{0,3}\frac{1}{2} - 2_{0,2}\frac{3}{2}$	11953.3694	0.0197	0.006
$3_{0,3}\frac{5}{2} - 1_{1,1}\frac{3}{2}$	11348.4635	-0.0025	0.006
$3_{0,3}\frac{9}{2} - 1_{1,1}\frac{7}{2}$	11178.2365	-0.0048	0.006
$3_{0,3}\frac{3}{2} - 1_{1,1}\frac{3}{2}$	11558.0756	-0.0042	0.006
$3_{0,3}\frac{9}{2} - 2_{1,1}\frac{9}{2}$	2713.8557	-0.0006	0.002
$3_{0,3}\frac{7}{2} - 2_{1,1}\frac{5}{2}$	2849.6745	0.0022	0.002
$3_{0,3}\frac{5}{2} - 2_{1,1}\frac{3}{2}$	2874.6149	-0.0008	0.002
$3_{0,3}\frac{3}{2} - 2_{1,1}\frac{1}{2}$	2969.0773	-0.0031	0.002
$3_{0,3}\frac{5}{2} - 2_{1,1}\frac{5}{2}$	3019.9131	0.0002	0.002
$3_{0,3}\frac{3}{2} - 2_{1,1}\frac{3}{2}$	3084.2310	0.0014	0.002
$3_{1,2}\frac{7}{2} - 2_{1,1}\frac{9}{2}$	11881.4914	0.0028	0.006
$3_{1,2}\frac{5}{2} - 2_{1,1}\frac{3}{2}$	12001.2556	-0.0007	0.006
$3_{1,2}\frac{7}{2} - 2_{1,1}\frac{5}{2}$	12013.2814	0.0027	0.006
$3_{1,2}\frac{9}{2} - 2_{1,1}\frac{7}{2}$	12056.4604	-0.0076	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$3_{1,2}\frac{7}{2} - 2_{1,1}\frac{7}{2}$	12058.0270	-0.0016	0.006
$3_{1,2}\frac{11}{2} - 2_{1,1}\frac{9}{2}$	12136.7093	-0.0002	0.006
$3_{1,2}\frac{5}{2} - 2_{1,1}\frac{5}{2}$	12146.5540	0.0006	0.006
$3_{1,2}\frac{3}{2} - 2_{1,1}\frac{3}{2}$	12166.5464	0.0000	0.006
$3_{1,2}\frac{1}{2} - 2_{1,1}\frac{1}{2}$	12178.3665	-0.0027	0.006
$3_{1,2}\frac{5}{2} - 2_{1,1}\frac{7}{2}$	12191.3132	0.0098	0.006
$3_{1,2}\frac{3}{2} - 2_{1,1}\frac{5}{2}$	12311.8389	-0.0045	0.006
$3_{1,2}\frac{11}{2} - 3_{1,3}\frac{11}{2}$	1795.6594	-0.0002	0.002
$3_{1,3}\frac{3}{2} - 2_{1,2}\frac{3}{2}$	11268.5771	-0.0028	0.006
$3_{1,3}\frac{5}{2} - 2_{1,2}\frac{7}{2}$	11284.5303	0.0026	0.006
$3_{1,3}\frac{1}{2} - 2_{1,2}\frac{1}{2}$	11287.1929	-0.0005	0.006
$3_{1,3}\frac{9}{2} - 2_{1,2}\frac{9}{2}$	11009.4359	0.0025	0.006
$3_{1,3}\frac{5}{2} - 2_{1,2}\frac{3}{2}$	11116.1354	-0.0021	0.006
$3_{1,3}\frac{1}{2} - 2_{1,2}\frac{3}{2}$	11384.5760	-0.0021	0.006
$3_{1,3}\frac{3}{2} - 2_{1,2}\frac{5}{2}$	11400.2963	0.0026	0.006
$3_{1,3}\frac{7}{2} - 2_{1,2}\frac{5}{2}$	11124.3328	-0.0005	0.006
$3_{1,3}\frac{9}{2} - 2_{1,2}\frac{7}{2}$	11160.9180	-0.0033	0.006
$3_{1,3}\frac{3}{2} - 2_{1,2}\frac{1}{2}$	11171.1930	-0.0022	0.006
$3_{1,3}\frac{11}{2} - 2_{1,2}\frac{9}{2}$	11243.4981	0.0013	0.006
$3_{1,3}\frac{5}{2} - 2_{1,2}\frac{5}{2}$	11247.8492	-0.0021	0.006
$3_{2,1}\frac{9}{2} - 4_{1,3}\frac{11}{2}$	7789.1431	-0.0018	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$3_{2,1\frac{7}{2}} - 4_{1,3\frac{9}{2}}$	7812.9941	-0.0086	0.006
$3_{2,1\frac{9}{2}} - 2_{2,0\frac{9}{2}}$	11818.1525	-0.0168	0.006
$3_{2,1\frac{7}{2}} - 2_{2,0\frac{7}{2}}$	11453.6496	-0.0084	0.006
$3_{2,1\frac{9}{2}} - 2_{2,0\frac{7}{2}}$	11461.3309	-0.0039	0.006
$3_{2,1\frac{11}{2}} - 2_{2,0\frac{9}{2}}$	11809.1287	0.0007	0.006
$3_{2,1\frac{7}{2}} - 2_{2,0\frac{5}{2}}$	11549.8414	-0.0009	0.006
$3_{2,1\frac{5}{2}} - 2_{2,0\frac{5}{2}}$	11555.0746	-0.0004	0.006
$3_{2,1\frac{5}{2}} - 2_{2,0\frac{3}{2}}$	11815.8148	0.0006	0.006
$3_{2,2\frac{3}{2}} - 2_{2,1\frac{3}{2}}$	11787.4330	0.0040	0.006
$3_{2,2\frac{9}{2}} - 2_{2,1\frac{7}{2}}$	11430.1747	-0.0166	0.006
$3_{2,2\frac{7}{2}} - 2_{2,1\frac{5}{2}}$	11518.3456	-0.0024	0.006
$3_{2,2\frac{11}{2}} - 2_{2,1\frac{9}{2}}$	11777.0596	0.0005	0.006
$3_{2,2\frac{5}{2}} - 2_{2,1\frac{5}{2}}$	11523.1112	0.0021	0.006
$3_{2,2\frac{5}{2}} - 2_{2,1\frac{3}{2}}$	11783.9982	-0.0045	0.006
$3_{2,2\frac{9}{2}} - 2_{2,1\frac{9}{2}}$	11787.2283	-0.0034	0.006
$3_{2,2\frac{5}{2}} - 4_{1,4\frac{7}{2}}$	10635.3787	0.0001	0.006
$3_{2,2\frac{11}{2}} - 4_{1,4\frac{11}{2}}$	10703.6526	0.0009	0.006
$3_{2,2\frac{7}{2}} - 4_{1,4\frac{9}{2}}$	10735.9400	-0.0022	0.006
$3_{2,2\frac{9}{2}} - 4_{1,4\frac{9}{2}}$	10743.5611	-0.0034	0.006
$3_{2,2\frac{1}{2}} - 4_{1,4\frac{3}{2}}$	10316.5132	0.0065	0.006
$3_{2,2\frac{3}{2}} - 4_{1,4\frac{3}{2}}$	10318.7776	0.0011	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$3_{2,2} \frac{11}{2} - 4_{1,4} \frac{13}{2}$	10442.6461	0.0039	0.006
$3_{2,2} \frac{9}{2} - 4_{1,4} \frac{11}{2}$	10713.8194	-0.0049	0.006
$3_{2,2} \frac{5}{2} - 4_{1,4} \frac{5}{2}$	10473.7821	-0.0048	0.006
$3_{2,2} \frac{3}{2} - 4_{1,4} \frac{5}{2}$	10477.2156	0.0024	0.006
$3_{2,2} \frac{7}{2} - 4_{1,4} \frac{7}{2}$	10630.6150	-0.0025	0.006
$4_{0,4} \frac{11}{2} - 3_{0,3} \frac{11}{2}$	15139.0550	-0.0082	0.006
$4_{0,4} \frac{5}{2} - 3_{0,3} \frac{3}{2}$	15373.2966	-0.0021	0.006
$4_{0,4} \frac{7}{2} - 3_{0,3} \frac{5}{2}$	15386.5765	0.0029	0.006
$4_{0,4} \frac{3}{2} - 3_{0,3} \frac{1}{2}$	15404.7482	-0.0037	0.006
$4_{0,4} \frac{9}{2} - 3_{0,3} \frac{7}{2}$	15428.9604	-0.0008	0.006
$4_{0,4} \frac{9}{2} - 3_{0,3} \frac{9}{2}$	15432.9834	-0.0036	0.006
$4_{0,4} \frac{13}{2} - 3_{0,3} \frac{11}{2}$	15458.1005	0.0007	0.006
$4_{0,4} \frac{11}{2} - 3_{0,3} \frac{9}{2}$	15468.8112	-0.0009	0.006
$4_{0,4} \frac{7}{2} - 3_{0,3} \frac{7}{2}$	15556.8143	0.0001	0.006
$4_{0,4} \frac{3}{2} - 3_{0,3} \frac{3}{2}$	15565.2100	0.0082	0.006
$4_{0,4} \frac{5}{2} - 3_{0,3} \frac{5}{2}$	15582.9113	-0.0012	0.006
$4_{1,3} \frac{11}{2} - 3_{1,2} \frac{11}{2}$	15849.2209	-0.0215	0.006
$4_{1,3} \frac{11}{2} - 3_{1,2} \frac{9}{2}$	16106.0194	-0.0046	0.006
$4_{1,3} \frac{13}{2} - 3_{1,2} \frac{11}{2}$	16131.8718	0.0033	0.006
$4_{1,4} \frac{7}{2} - 3_{1,3} \frac{5}{2}$	14866.6432	0.0000	0.006
$4_{1,4} \frac{5}{2} - 3_{1,3} \frac{3}{2}$	14875.7946	0.0021	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$4_{1,4}\frac{9}{2} - 3_{1,3}\frac{7}{2}$	14884.8379	0.0013	0.006
$4_{1,4}\frac{11}{2} - 3_{1,3}\frac{9}{2}$	14914.6655	0.0004	0.006
$4_{1,4}\frac{3}{2} - 3_{1,3}\frac{1}{2}$	14918.2326	0.0016	0.006
$4_{1,4}\frac{13}{2} - 3_{1,3}\frac{11}{2}$	14941.6100	-0.0011	0.006
$4_{1,4}\frac{7}{2} - 3_{1,3}\frac{7}{2}$	14990.1561	-0.0050	0.006
$4_{1,4}\frac{5}{2} - 3_{1,3}\frac{5}{2}$	15028.2336	-0.0012	0.006
$4_{1,4}\frac{3}{2} - 3_{1,3}\frac{3}{2}$	15034.2268	-0.0023	0.006
$4_{2,2}\frac{5}{2} - 3_{2,1}\frac{3}{2}$	15649.1675	-0.0159	0.006
$4_{2,2}\frac{13}{2} - 3_{2,1}\frac{11}{2}$	15667.9962	0.0021	0.006
$4_{2,2}\frac{7}{2} - 3_{2,1}\frac{5}{2}$	15570.6659	-0.0022	0.006
$4_{2,2}\frac{9}{2} - 3_{2,1}\frac{7}{2}$	15522.5787	-0.0008	0.006
$4_{2,2}\frac{11}{2} - 3_{2,1}\frac{9}{2}$	15533.3401	0.0023	0.006
$4_{2,3}\frac{9}{2} - 3_{2,2}\frac{7}{2}$	15442.8202	-0.0033	0.006
$4_{2,3}\frac{11}{2} - 3_{2,2}\frac{9}{2}$	15453.1262	-0.0001	0.006
$4_{2,3}\frac{5}{2} - 3_{2,2}\frac{3}{2}$	15569.3838	0.0164	0.006
$4_{2,3}\frac{13}{2} - 3_{2,2}\frac{11}{2}$	15587.5208	0.0030	0.006
$4_{2,3}\frac{7}{2} - 3_{2,2}\frac{5}{2}$	15491.3084	-0.0101	0.006
$4_{3,1}\frac{13}{2} - 3_{3,0}\frac{11}{2}$	15673.8753	0.0055	0.006
$4_{3,1}\frac{9}{2} - 3_{3,0}\frac{7}{2}$	15383.5372	-0.0070	0.006
$4_{3,2}\frac{9}{2} - 3_{3,1}\frac{7}{2}$	15382.6613	0.0107	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$4_{3,2} \frac{11}{2} - 3_{3,1} \frac{9}{2}$	15372.3796	-0.0038	0.006
$5_{0,5} \frac{7}{2} - 4_{1,3} \frac{7}{2}$	9610.4150	0.0020	0.006
$5_{0,5} \frac{5}{2} - 4_{1,3} \frac{5}{2}$	9645.1822	0.0002	0.006
$5_{0,5} \frac{13}{2} - 4_{1,3} \frac{13}{2}$	9177.5547	-0.0031	0.006
$5_{0,5} \frac{11}{2} - 4_{1,3} \frac{11}{2}$	9402.4837	0.0023	0.006
$5_{0,5} \frac{9}{2} - 4_{1,3} \frac{7}{2}$	9423.9464	-0.0025	0.006
$5_{0,5} \frac{11}{2} - 4_{1,3} \frac{9}{2}$	9434.0171	0.0011	0.006
$5_{0,5} \frac{7}{2} - 4_{1,3} \frac{5}{2}$	9436.5541	-0.0004	0.006
$5_{0,5} \frac{13}{2} - 4_{1,3} \frac{11}{2}$	9460.1845	0.0006	0.006
$5_{0,5} \frac{5}{2} - 4_{1,3} \frac{3}{2}$	9474.1630	-0.0026	0.006
$5_{0,5} \frac{15}{2} - 4_{1,3} \frac{13}{2}$	9488.2152	-0.0007	0.006
$5_{0,5} \frac{9}{2} - 4_{1,3} \frac{9}{2}$	9536.6340	0.0011	0.006
$5_{1,4} \frac{15}{2} - 5_{1,5} \frac{15}{2}$	4471.5247	-0.0024	0.002
$5_{2,4} \frac{15}{2} - 6_{1,6} \frac{17}{2}$	4463.0981	-0.0005	0.002
$5_{2,4} \frac{9}{2} - 6_{1,6} \frac{11}{2}$	4566.9669	0.0026	0.002
$5_{2,4} \frac{11}{2} - 6_{1,6} \frac{13}{2}$	4584.1485	-0.0023	0.002
$5_{2,4} \frac{7}{2} - 6_{1,6} \frac{9}{2}$	4518.9594	0.0028	0.002
$6_{0,6} \frac{15}{2} - 5_{1,4} \frac{15}{2}$	12069.9657	-0.0026	0.006
$6_{0,6} \frac{13}{2} - 5_{1,4} \frac{13}{2}$	12291.6112	0.0001	0.006
$6_{0,6} \frac{11}{2} - 5_{1,4} \frac{9}{2}$	12334.5107	-0.0005	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$6_{0,6}\frac{9}{2} - 5_{1,4}\frac{7}{2}$	12339.3404	-0.0029	0.006
$6_{0,6}\frac{13}{2} - 5_{1,4}\frac{11}{2}$	12344.5019	-0.0019	0.006
$6_{0,6}\frac{7}{2} - 5_{1,4}\frac{5}{2}$	12361.5704	-0.0025	0.006
$6_{0,6}\frac{15}{2} - 5_{1,4}\frac{13}{2}$	12363.0998	-0.0003	0.006
$6_{0,6}\frac{17}{2} - 5_{1,4}\frac{15}{2}$	12373.9201	-0.0026	0.006
$6_{0,6}\frac{11}{2} - 5_{1,4}\frac{11}{2}$	12430.1668	0.0033	0.006
$6_{0,6}\frac{9}{2} - 5_{1,4}\frac{9}{2}$	12513.4187	-0.0087	0.006
$6_{0,6}\frac{7}{2} - 5_{1,4}\frac{7}{2}$	12558.1300	0.0049	0.006
$6_{1,6}\frac{17}{2} - 6_{0,6}\frac{17}{2}$	5499.5048	0.0023	0.002
$6_{3,3}\frac{11}{2} - 8_{1,8}\frac{13}{2}$	13062.4955	0.0093	0.006
$6_{3,3}\frac{7}{2} - 7_{2,5}\frac{9}{2}$	12935.4911	0.0033	0.006
$6_{3,3}\frac{17}{2} - 7_{2,5}\frac{19}{2}$	12960.0258	-0.0054	0.006
$6_{3,3}\frac{9}{2} - 7_{2,5}\frac{11}{2}$	13068.6591	-0.0082	0.006
$6_{3,3}\frac{15}{2} - 7_{2,5}\frac{17}{2}$	13103.1192	-0.0113	0.006
$6_{3,3}\frac{13}{2} - 7_{2,5}\frac{15}{2}$	13139.3838	-0.0046	0.006
$6_{3,3}\frac{11}{2} - 7_{2,5}\frac{13}{2}$	13161.4003	-0.0230	0.006
$6_{3,4}\frac{7}{2} - 7_{2,6}\frac{9}{2}$	13922.6321	0.0079	0.006
$6_{3,4}\frac{17}{2} - 7_{2,6}\frac{19}{2}$	13953.7695	0.0000	0.006
$6_{3,4}\frac{15}{2} - 7_{2,6}\frac{17}{2}$	14084.2836	0.0105	0.006
$6_{3,4}\frac{11}{2} - 7_{2,6}\frac{13}{2}$	14093.2361	-0.0060	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$6_{3,4} \frac{13}{2} - 7_{2,6} \frac{15}{2}$	14120.8737	-0.0085	0.006
$7_{0,7} \frac{15}{2} - 6_{1,5} \frac{15}{2}$	14901.3433	-0.0014	0.006
$7_{0,7} \frac{11}{2} - 6_{1,5} \frac{9}{2}$	14961.2579	-0.0037	0.006
$7_{0,7} \frac{13}{2} - 6_{1,5} \frac{11}{2}$	14963.8833	-0.0037	0.006
$7_{0,7} \frac{9}{2} - 6_{1,5} \frac{7}{2}$	14973.6028	-0.0038	0.006
$7_{0,7} \frac{15}{2} - 6_{1,5} \frac{13}{2}$	14973.8178	-0.0028	0.006
$7_{0,7} \frac{17}{2} - 6_{1,5} \frac{15}{2}$	14982.0528	-0.0024	0.006
$7_{0,7} \frac{19}{2} - 6_{1,5} \frac{17}{2}$	14988.4923	-0.0019	0.006
$7_{0,7} \frac{13}{2} - 6_{1,5} \frac{13}{2}$	15047.2707	0.0023	0.006
$7_{0,7} \frac{11}{2} - 6_{1,5} \frac{11}{2}$	15136.7010	0.0080	0.006
$7_{0,7} \frac{9}{2} - 6_{1,5} \frac{9}{2}$	15186.5539	0.0030	0.006
$7_{1,7} \frac{13}{2} - 7_{0,7} \frac{11}{2}$	4647.4465	-0.0005	0.002
$7_{1,7} \frac{15}{2} - 7_{0,7} \frac{17}{2}$	4744.8847	-0.0030	0.002
$7_{1,7} \frac{15}{2} - 7_{0,7} \frac{13}{2}$	4752.1493	-0.0012	0.002
$7_{1,7} \frac{9}{2} - 7_{0,7} \frac{9}{2}$	4791.4336	0.0042	0.002
$7_{1,7} \frac{19}{2} - 7_{0,7} \frac{19}{2}$	4798.8244	0.0011	0.002
$7_{1,7} \frac{11}{2} - 7_{0,7} \frac{11}{2}$	4807.2438	0.0015	0.002
$7_{1,7} \frac{17}{2} - 7_{0,7} \frac{17}{2}$	4818.9572	-0.0017	0.002
$7_{1,7} \frac{13}{2} - 7_{0,7} \frac{13}{2}$	4820.2528	-0.0002	0.002
$7_{1,7} \frac{15}{2} - 7_{0,7} \frac{15}{2}$	4825.5961	-0.0021	0.002
$7_{1,7} \frac{13}{2} - 7_{0,7} \frac{15}{2}$	4893.7013	0.0006	0.002
$7_{1,7} \frac{17}{2} - 7_{0,7} \frac{15}{2}$	4899.6716	0.0021	0.002

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$7_{1,7} \frac{11}{2} - 7_{0,7} \frac{13}{2}$	4980.0515	0.0033	0.002
$7_{3,5} \frac{13}{2} - 9_{0,9} \frac{15}{2}$	10395.9926	-0.0098	0.006
$7_{3,4} \frac{13}{2} - 8_{2,6} \frac{15}{2}$	8763.9193	-0.0034	0.006
$7_{3,4} \frac{11}{2} - 8_{2,6} \frac{13}{2}$	8710.1399	0.0034	0.006
$7_{3,4} \frac{15}{2} - 8_{2,6} \frac{17}{2}$	8780.3273	-0.0031	0.006
$7_{3,4} \frac{9}{2} - 8_{2,6} \frac{11}{2}$	8627.7564	0.0024	0.006
$7_{3,4} \frac{19}{2} - 8_{2,6} \frac{21}{2}$	8649.0387	0.0118	0.006
$7_{3,4} \frac{17}{2} - 8_{2,6} \frac{19}{2}$	8748.2906	-0.0014	0.006
$7_{3,5} \frac{19}{2} - 8_{2,7} \frac{21}{2}$	10246.7691	-0.0005	0.006
$7_{3,5} \frac{17}{2} - 8_{2,7} \frac{19}{2}$	10342.8232	-0.0081	0.006
$7_{3,5} \frac{15}{2} - 8_{2,7} \frac{17}{2}$	10372.6539	-0.0066	0.006
$7_{3,5} \frac{11}{2} - 8_{2,7} \frac{13}{2}$	10325.2692	-0.0033	0.006
$7_{3,5} \frac{9}{2} - 8_{2,7} \frac{11}{2}$	10233.1771	0.0031	0.006
$7_{3,5} \frac{13}{2} - 8_{2,7} \frac{15}{2}$	10326.3368	-0.0142	0.006
$8_{1,7} \frac{13}{2} - 8_{1,8} \frac{11}{2}$	10405.8738	0.0042	0.006
$8_{1,7} \frac{17}{2} - 8_{1,8} \frac{15}{2}$	10581.4167	-0.0138	0.006
$8_{1,7} \frac{15}{2} - 8_{1,8} \frac{13}{2}$	10436.1155	0.0110	0.006
$8_{1,7} \frac{17}{2} - 7_{2,5} \frac{15}{2}$	10479.3122	0.0054	0.006
$8_{1,7} \frac{13}{2} - 7_{2,5} \frac{11}{2}$	10544.7545	-0.0136	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$8_{1,7} \frac{21}{2} - 7_{2,5} \frac{19}{2}$	10548.3879	-0.0080	0.006
$8_{1,7} \frac{17}{2} - 7_{2,5} \frac{17}{2}$	10414.7081	-0.0092	0.006
$8_{1,7} \frac{19}{2} - 7_{2,5} \frac{17}{2}$	10503.1692	-0.0062	0.006
$8_{1,7} \frac{15}{2} - 7_{2,5} \frac{13}{2}$	10535.0222	-0.0194	0.006
$8_{1,7} \frac{11}{2} - 7_{2,5} \frac{9}{2}$	10561.7321	-0.0078	0.006
$8_{1,8} \frac{19}{2} - 8_{0,8} \frac{19}{2}$	4109.3901	-0.0044	0.002
$8_{1,8} \frac{17}{2} - 8_{0,8} \frac{17}{2}$	4119.9843	-0.0027	0.002
$8_{1,8} \frac{11}{2} - 8_{0,8} \frac{11}{2}$	4126.9392	-0.0046	0.002
$9_{1,8} \frac{19}{2} - 8_{2,6} \frac{17}{2}$	14911.1199	0.0013	0.006
$9_{1,8} \frac{17}{2} - 8_{2,6} \frac{15}{2}$	14913.9218	-0.0009	0.006
$9_{1,8} \frac{21}{2} - 8_{2,6} \frac{19}{2}$	14928.9591	0.0018	0.006
$9_{1,8} \frac{23}{2} - 8_{2,6} \frac{21}{2}$	14967.9541	-0.0037	0.006
$9_{1,8} \frac{15}{2} - 8_{2,6} \frac{13}{2}$	14934.0863	-0.0005	0.006
$10_{4,6} \frac{25}{2} - 11_{3,8} \frac{27}{2}$	13957.8943	-0.0003	0.006
$11_{2,10} \frac{25}{2} - 11_{1,10} \frac{25}{2}$	15491.6128	-0.0092	0.006
$11_{2,10} \frac{27}{2} - 11_{1,10} \frac{27}{2}$	15502.3103	0.0044	0.006
$11_{2,10} \frac{17}{2} - 11_{1,10} \frac{17}{2}$	15508.5201	-0.0005	0.006
$11_{2,10} \frac{19}{2} - 11_{1,10} \frac{19}{2}$	15529.1013	-0.0150	0.006
$11_{2,10} \frac{21}{2} - 11_{1,10} \frac{21}{2}$	15536.0553	-0.0185	0.006
$11_{2,10} \frac{23}{2} - 11_{1,10} \frac{23}{2}$	15551.9796	0.0105	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$12_{1,12} \frac{19}{2} - 11_{2,10} \frac{17}{2}$	9580.6556	0.0054	0.006
$12_{1,12} \frac{29}{2} - 11_{2,10} \frac{27}{2}$	9594.1474	-0.0037	0.006
$12_{1,12} \frac{23}{2} - 11_{2,10} \frac{21}{2}$	9574.7873	-0.0109	0.006
$12_{2,11} \frac{19}{2} - 12_{1,11} \frac{19}{2}$	14061.1711	0.0144	0.006
$12_{2,11} \frac{29}{2} - 12_{1,11} \frac{29}{2}$	14063.8503	0.0070	0.006
$12_{2,11} \frac{21}{2} - 12_{1,11} \frac{21}{2}$	14079.9973	0.0015	0.006
$12_{2,11} \frac{27}{2} - 12_{1,11} \frac{27}{2}$	14088.7437	0.0107	0.006
$12_{2,11} \frac{23}{2} - 12_{1,11} \frac{23}{2}$	14092.0844	-0.0047	0.006
$12_{2,11} \frac{25}{2} - 12_{1,11} \frac{25}{2}$	14095.9876	-0.0041	0.006
$13_{2,12} \frac{29}{2} - 13_{1,12} \frac{29}{2}$	12618.5745	-0.0008	0.006
$13_{2,12} \frac{25}{2} - 13_{1,12} \frac{25}{2}$	12622.2486	-0.0056	0.006
$13_{2,12} \frac{21}{2} - 13_{1,12} \frac{21}{2}$	12595.2218	0.0028	0.006
$13_{2,12} \frac{27}{2} - 13_{1,12} \frac{27}{2}$	12625.3439	-0.0054	0.006
$13_{2,12} \frac{31}{2} - 13_{1,12} \frac{31}{2}$	12597.5818	-0.0017	0.006
$13_{2,12} \frac{23}{2} - 13_{1,12} \frac{23}{2}$	12611.7258	-0.0087	0.006
$14_{1,14} \frac{33}{2} - 13_{2,12} \frac{31}{2}$	12958.1779	-0.0060	0.006
$14_{2,13} \frac{25}{2} - 14_{1,13} \frac{25}{2}$	11145.7931	0.0063	0.006
$14_{2,13} \frac{31}{2} - 14_{1,13} \frac{31}{2}$	11151.2780	-0.0072	0.006
$14_{2,13} \frac{27}{2} - 14_{1,13} \frac{27}{2}$	11154.2216	-0.0044	0.006
$14_{2,13} \frac{33}{2} - 14_{1,13} \frac{33}{2}$	11132.6440	0.0067	0.006

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$14_{2,13} \frac{29}{2} - 14_{1,13} \frac{29}{2}$	11156.8466	-0.0060	0.006
$14_{2,13} \frac{23}{2} - 14_{1,13} \frac{23}{2}$	11132.0160	0.0155	0.006
$15_{2,14} \frac{31}{2} - 15_{1,14} \frac{31}{2}$	9720.1444	-0.0045	0.006
$15_{2,14} \frac{25}{2} - 15_{1,14} \frac{25}{2}$	9697.6525	0.0040	0.006
$15_{2,14} \frac{35}{2} - 15_{1,14} \frac{35}{2}$	9699.7722	0.0042	0.006
$15_{2,14} \frac{27}{2} - 15_{1,14} \frac{27}{2}$	9710.2961	0.0000	0.006
$15_{2,14} \frac{33}{2} - 15_{1,14} \frac{33}{2}$	9714.4137	-0.0065	0.006
$15_{2,14} \frac{29}{2} - 15_{1,14} \frac{29}{2}$	9718.2937	0.0024	0.006
$16_{2,15} \frac{29}{2} - 16_{1,15} \frac{29}{2}$	8338.5685	-0.0001	0.006
$16_{2,15} \frac{35}{2} - 16_{1,15} \frac{35}{2}$	8341.9059	0.0038	0.006
$16_{2,15} \frac{31}{2} - 16_{1,15} \frac{31}{2}$	8345.2793	0.0003	0.006
$16_{2,15} \frac{33}{2} - 16_{1,15} \frac{33}{2}$	8346.7937	0.0027	0.006
$16_{2,15} \frac{27}{2} - 16_{1,15} \frac{27}{2}$	8327.7805	0.0047	0.006
$16_{2,15} \frac{37}{2} - 16_{1,15} \frac{37}{2}$	8329.3556	0.0028	0.006
$16_{16,0} \frac{37}{2} - 15_{15,0} \frac{35}{2}$	316091.5366	-0.0167	0.030
$16_{16,0} \frac{35}{2} - 15_{15,0} \frac{33}{2}$	316092.9469	-0.0161	0.030
$16_{16,0} \frac{27}{2} - 15_{15,0} \frac{25}{2}$	316095.8613	-0.0244	0.030
$16_{16,0} \frac{33}{2} - 15_{15,0} \frac{31}{2}$	316096.9404	-0.0200	0.030
$16_{16,0} \frac{31}{2} - 15_{15,0} \frac{29}{2}$	316100.5065	-0.0329	0.030
$16_{16,0} \frac{29}{2} - 15_{15,0} \frac{27}{2}$	316100.9839	0.0085	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$19_{19,0} \frac{35}{2} - 19_{18,2} \frac{35}{2}$	303061.1103	0.0138	0.030
$19_{19,0} \frac{41}{2} - 19_{18,2} \frac{41}{2}$	303079.1190	-0.0017	0.030
$19_{19,0} \frac{37}{2} - 19_{18,2} \frac{37}{2}$	303105.9711	0.0703	0.030
$19_{19,1} \frac{39}{2} - 19_{18,1} \frac{39}{2}$	303113.8924	0.0642	0.030
$20_{15,5} \frac{35}{2} - 19_{14,5} \frac{33}{2}$	315227.6287	-0.0061	0.030
$20_{15,5} \frac{45}{2} - 19_{14,5} \frac{43}{2}$	315228.8514	-0.0062	0.030
$20_{15,5} \frac{37}{2} - 19_{14,5} \frac{35}{2}$	315243.6115	0.0113	0.030
$20_{15,5} \frac{43}{2} - 19_{14,5} \frac{41}{2}$	315245.4894	0.0082	0.030
$20_{15,5} \frac{39}{2} - 19_{14,5} \frac{37}{2}$	315252.3064	-0.0124	0.030
$20_{15,5} \frac{41}{2} - 19_{14,5} \frac{39}{2}$	315253.1295	-0.0115	0.030
$20_{19,2} \frac{35}{2} - 20_{18,2} \frac{35}{2}$	302985.5072	-0.0314	0.030
$20_{19,1} \frac{45}{2} - 20_{18,3} \frac{45}{2}$	302994.8408	-0.0212	0.030
$20_{19,1} \frac{43}{2} - 20_{18,3} \frac{43}{2}$	303069.8753	-0.0163	0.030
$20_{19,2} \frac{39}{2} - 20_{18,2} \frac{39}{2}$	303094.6220	0.0191	0.030
$20_{19,1} \frac{41}{2} - 20_{18,3} \frac{41}{2}$	303101.5012	0.0194	0.030
$21_{19,2} \frac{37}{2} - 21_{18,4} \frac{37}{2}$	302984.0757	-0.0513	0.030
$21_{19,2} \frac{47}{2} - 21_{18,4} \frac{47}{2}$	302992.0683	-0.0361	0.030
$21_{19,2} \frac{39}{2} - 21_{18,4} \frac{39}{2}$	303046.6710	-0.0307	0.030
$24_{19,5} \frac{47}{2} - 24_{18,7} \frac{47}{2}$	303046.6710	0.0425	0.030
$21_{19,2} \frac{45}{2} - 21_{18,4} \frac{45}{2}$	303060.2881	-0.0065	0.030
$21_{19,3} \frac{41}{2} - 21_{18,3} \frac{41}{2}$	303083.1974	0.0275	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$21_{19,2} \frac{43}{2} - 21_{18,4} \frac{43}{2}$	303089.2002	0.0250	0.030
$22_{19,3} \frac{39}{2} - 22_{18,5} \frac{39}{2}$	302981.0784	-0.0198	0.030
$22_{19,3} \frac{41}{2} - 22_{18,5} \frac{41}{2}$	303038.2923	-0.0097	0.030
$22_{19,3} \frac{43}{2} - 22_{18,5} \frac{43}{2}$	303071.4603	0.0097	0.030
$22_{19,3} \frac{45}{2} - 22_{18,5} \frac{45}{2}$	303076.7229	0.0003	0.030
$23_{19,4} \frac{51}{2} - 23_{18,6} \frac{51}{2}$	302982.4741	-0.0491	0.030
$27_{19,8} \frac{51}{2} - 27_{18,10} \frac{51}{2}$	302982.4741	0.0481	0.030
$23_{19,4} \frac{43}{2} - 23_{18,6} \frac{43}{2}$	303029.0110	-0.0365	0.030
$23_{19,4} \frac{49}{2} - 23_{18,6} \frac{49}{2}$	303039.5590	0.0170	0.030
$23_{19,5} \frac{45}{2} - 23_{18,5} \frac{45}{2}$	303059.3183	0.0077	0.030
$23_{19,4} \frac{47}{2} - 23_{18,6} \frac{47}{2}$	303063.9420	-0.0208	0.030
$24_{19,6} \frac{43}{2} - 24_{18,6} \frac{43}{2}$	302970.5216	-0.0062	0.030
$24_{19,5} \frac{53}{2} - 24_{18,7} \frac{53}{2}$	302975.7216	-0.0332	0.030
$24_{19,6} \frac{51}{2} - 24_{18,6} \frac{51}{2}$	303028.2029	0.0211	0.030
$25_{14,11} \frac{45}{2} - 24_{13,11} \frac{43}{2}$	318231.1432	0.0255	0.030
$25_{14,11} \frac{55}{2} - 24_{13,11} \frac{53}{2}$	318232.9360	0.0458	0.030
$25_{14,11} \frac{47}{2} - 24_{13,11} \frac{45}{2}$	318246.6488	-0.0026	0.030
$25_{14,11} \frac{53}{2} - 24_{13,11} \frac{51}{2}$	318249.8469	0.0092	0.030
$25_{14,11} \frac{49}{2} - 24_{13,11} \frac{47}{2}$	318255.6315	-0.0012	0.030
$25_{14,11} \frac{51}{2} - 24_{13,11} \frac{49}{2}$	318257.0412	-0.0081	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$25_{19,6} \frac{45}{2} - 25_{18,8} \frac{45}{2}$	302963.0743	-0.0029	0.030
$25_{19,6} \frac{55}{2} - 25_{18,8} \frac{55}{2}$	302967.6229	-0.0520	0.030
$25_{19,6} \frac{47}{2} - 25_{18,8} \frac{47}{2}$	303007.7868	0.0134	0.030
$25_{19,6} \frac{53}{2} - 25_{18,8} \frac{53}{2}$	303016.0219	-0.0170	0.030
$25_{19,7} \frac{49}{2} - 25_{18,7} \frac{49}{2}$	303033.2869	-0.0046	0.030
$25_{19,7} \frac{51}{2} - 25_{18,7} \frac{51}{2}$	303036.9777	0.0119	0.030
$26_{19,7} \frac{47}{2} - 26_{18,9} \frac{47}{2}$	302954.2081	0.0033	0.030
$26_{19,7} \frac{57}{2} - 26_{18,9} \frac{57}{2}$	302958.2611	-0.0097	0.030
$26_{19,7} \frac{49}{2} - 26_{18,9} \frac{49}{2}$	302995.6312	-0.0087	0.030
$26_{19,7} \frac{55}{2} - 26_{18,9} \frac{55}{2}$	303003.0187	-0.0050	0.030
$26_{19,7} \frac{53}{2} - 26_{18,9} \frac{53}{2}$	303022.4591	-0.0208	0.030
$27_{19,8} \frac{49}{2} - 27_{18,10} \frac{49}{2}$	302943.9201	0.0151	0.030
$29_{19,10} \frac{61}{2} - 29_{18,12} \frac{59}{2}$	302943.9201	0.0516	0.030
$27_{19,8} \frac{59}{2} - 27_{18,10} \frac{59}{2}$	302947.5464	0.0277	0.030
$27_{19,8} \frac{57}{2} - 27_{18,10} \frac{57}{2}$	302989.0430	-0.0052	0.030
$27_{19,8} \frac{53}{2} - 27_{18,10} \frac{53}{2}$	303004.2356	0.0012	0.030
$27_{19,8} \frac{55}{2} - 27_{18,10} \frac{55}{2}$	303007.1738	-0.0106	0.030
$28_{19,9} \frac{51}{2} - 28_{18,11} \frac{51}{2}$	302932.1758	0.0170	0.030
$28_{19,9} \frac{53}{2} - 28_{18,11} \frac{53}{2}$	302968.0697	0.0053	0.030
$28_{19,10} \frac{55}{2} - 28_{18,10} \frac{55}{2}$	302988.3014	-0.0129	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$28_{19,10} \frac{57}{2} - 28_{18,10} \frac{57}{2}$	302990.9861	0.0136	0.030
$29_{19,10} \frac{53}{2} - 29_{18,12} \frac{53}{2}$	302918.9174	-0.0179	0.030
$29_{19,10} \frac{63}{2} - 29_{18,12} \frac{63}{2}$	302921.7919	-0.0353	0.030
$31_{19,12} \frac{65}{2} - 31_{18,14} \frac{65}{2}$	302921.7919	-0.0175	0.030
$29_{19,10} \frac{55}{2} - 29_{18,12} \frac{55}{2}$	302952.4865	0.0015	0.030
$29_{19,10} \frac{61}{2} - 29_{18,12} \frac{61}{2}$	302957.8531	-0.0166	0.030
$29_{19,10} \frac{57}{2} - 29_{18,12} \frac{57}{2}$	302971.3590	0.0211	0.030
$29_{19,10} \frac{59}{2} - 29_{18,12} \frac{57}{2}$	302976.5681	0.0403	0.030
$30_{19,12} \frac{55}{2} - 30_{18,12} \frac{55}{2}$	302904.2055	0.0105	0.030
$30_{19,11} \frac{65}{2} - 30_{18,13} \frac{65}{2}$	302906.8139	0.0170	0.030
$30_{19,11} \frac{63}{2} - 30_{18,13} \frac{63}{2}$	302940.5039	0.0104	0.030
$30_{19,11} \frac{59}{2} - 30_{18,13} \frac{59}{2}$	302953.2102	0.0004	0.030
$30_{19,11} \frac{61}{2} - 30_{18,13} \frac{61}{2}$	302955.3747	-0.0142	0.030
$31_{19,12} \frac{57}{2} - 31_{18,14} \frac{57}{2}$	302887.9266	0.0377	0.030
$31_{19,12} \frac{67}{2} - 31_{18,14} \frac{67}{2}$	302890.2387	0.0010	0.030
$31_{19,12} \frac{59}{2} - 31_{18,14} \frac{59}{2}$	302917.3731	-0.0031	0.030
$31_{19,12} \frac{61}{2} - 31_{18,14} \frac{61}{2}$	302933.8212	-0.0143	0.030
$32_{19,13} \frac{59}{2} - 32_{18,15} \frac{59}{2}$	302869.9482	-0.0133	0.030
$32_{19,13} \frac{69}{2} - 32_{18,15} \frac{69}{2}$	302872.0924	0.0047	0.030
$32_{19,13} \frac{61}{2} - 32_{18,15} \frac{61}{2}$	302897.7153	0.0242	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$32_{19,13} \frac{67}{2} - 32_{18,15} \frac{67}{2}$	302901.7554	0.0268	0.030
$32_{19,13} \frac{63}{2} - 32_{18,15} \frac{63}{2}$	302913.1030	-0.0169	0.030
$32_{19,13} \frac{65}{2} - 32_{18,15} \frac{65}{2}$	302914.9169	-0.0088	0.030
$33_{12,21} \frac{61}{2} - 32_{11,21} \frac{59}{2}$	316313.2979	0.0095	0.030
$33_{12,21} \frac{71}{2} - 32_{11,21} \frac{69}{2}$	316314.5288	0.0102	0.030
$33_{12,21} \frac{63}{2} - 32_{11,21} \frac{61}{2}$	316324.0634	-0.0010	0.030
$33_{12,21} \frac{69}{2} - 32_{11,21} \frac{67}{2}$	316326.4338	-0.0019	0.030
$33_{12,21} \frac{65}{2} - 32_{11,21} \frac{63}{2}$	316330.3525	-0.0233	0.030
$33_{12,21} \frac{67}{2} - 32_{11,21} \frac{65}{2}$	316331.4168	-0.0218	0.030
$33_{19,14} \frac{61}{2} - 33_{18,16} \frac{61}{2}$	302850.3838	0.0324	0.030
$33_{19,14} \frac{71}{2} - 33_{18,16} \frac{71}{2}$	302852.3053	0.0265	0.030
$33_{19,15} \frac{63}{2} - 33_{18,15} \frac{63}{2}$	302876.4404	-0.0363	0.030
$33_{19,14} \frac{69}{2} - 33_{18,16} \frac{69}{2}$	302880.1473	-0.0110	0.030
$33_{19,14} \frac{67}{2} - 33_{18,16} \frac{65}{2}$	302890.9755	0.0327	0.030
$33_{19,14} \frac{67}{2} - 33_{18,16} \frac{67}{2}$	302892.6125	-0.0019	0.030
$34_{19,16} \frac{63}{2} - 34_{18,16} \frac{63}{2}$	302829.0587	0.0679	0.030
$35_{19,16} \frac{67}{2} - 35_{18,18} \frac{67}{2}$	302829.0587	-0.0599	0.030
$34_{19,15} \frac{73}{2} - 34_{18,17} \frac{73}{2}$	302830.7425	0.0097	0.030
$34_{19,15} \frac{65}{2} - 34_{18,17} \frac{65}{2}$	302853.6625	0.0141	0.030
$34_{19,15} \frac{71}{2} - 34_{18,17} \frac{71}{2}$	302857.0116	0.0151	0.030
$34_{19,15} \frac{67}{2} - 34_{18,17} \frac{67}{2}$	302867.2759	0.0018	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$34_{19,15} \frac{69}{2} - 34_{18,17} \frac{69}{2}$	302868.7467	-0.0267	0.030
$35_{19,16} \frac{65}{2} - 35_{18,18} \frac{65}{2}$	302805.8575	0.0504	0.030
$36_{19,17} \frac{75}{2} - 36_{18,19} \frac{75}{2}$	302805.8575	-0.0260	0.030
$35_{19,16} \frac{75}{2} - 35_{18,18} \frac{75}{2}$	302807.3136	0.0218	0.030
$35_{19,16} \frac{73}{2} - 35_{18,18} \frac{73}{2}$	302832.0118	0.0075	0.030
$35_{19,16} \frac{71}{2} - 35_{18,18} \frac{71}{2}$	302843.1409	-0.0173	0.030
$36_{19,17} \frac{69}{2} - 36_{18,19} \frac{69}{2}$	302802.7953	-0.0022	0.030
$36_{19,17} \frac{71}{2} - 36_{18,19} \frac{71}{2}$	302815.0416	-0.0199	0.030
$36_{19,17} \frac{73}{2} - 36_{18,19} \frac{73}{2}$	302816.3970	-0.0484	0.030
$37_{19,19} \frac{79}{2} - 37_{18,19} \frac{77}{2}$	302841.8532	0.0121	0.030
$37_{11,26} \frac{69}{2} - 36_{10,26} \frac{67}{2}$	315102.6925	0.0058	0.030
$37_{11,27} \frac{69}{2} - 36_{10,27} \frac{67}{2}$	315102.6925	-0.0161	0.030
$37_{11,26} \frac{79}{2} - 36_{10,26} \frac{77}{2}$	315103.4358	0.0125	0.030
$37_{11,27} \frac{79}{2} - 36_{10,27} \frac{77}{2}$	315103.4358	-0.0100	0.030
$37_{11,26} \frac{71}{2} - 36_{10,26} \frac{69}{2}$	315111.1249	-0.0015	0.030
$37_{11,27} \frac{71}{2} - 36_{10,27} \frac{69}{2}$	315111.1249	-0.0234	0.030
$37_{11,26} \frac{77}{2} - 36_{10,26} \frac{75}{2}$	315113.2726	0.0057	0.030
$37_{11,27} \frac{77}{2} - 36_{10,27} \frac{75}{2}$	315113.2726	-0.0171	0.030
$37_{11,26} \frac{73}{2} - 36_{10,26} \frac{71}{2}$	315116.4127	0.0464	0.030
$37_{11,27} \frac{73}{2} - 36_{10,27} \frac{71}{2}$	315116.4127	0.0243	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$37_{11,26} \frac{75}{2} - 36_{10,26} \frac{73}{2}$	315117.3860	0.0166	0.030
$37_{11,27} \frac{75}{2} - 36_{10,27} \frac{73}{2}$	315117.3860	-0.0059	0.030
$42_{10,32} \frac{79}{2} - 41_{9,32} \frac{77}{2}$	317132.3127	0.0546	0.030
$42_{10,32} \frac{89}{2} - 41_{9,32} \frac{87}{2}$	317134.3370	0.0374	0.030
$42_{10,33} \frac{79}{2} - 41_{9,33} \frac{77}{2}$	317138.3813	0.0418	0.030
$42_{10,32} \frac{81}{2} - 41_{9,32} \frac{79}{2}$	317139.7555	-0.0136	0.030
$42_{10,33} \frac{89}{2} - 41_{9,33} \frac{87}{2}$	317140.4585	0.0766	0.030
$42_{10,32} \frac{87}{2} - 41_{9,32} \frac{85}{2}$	317140.4585	-0.0546	0.030
$42_{10,32} \frac{83}{2} - 41_{9,32} \frac{81}{2}$	317144.5514	0.0715	0.030
$42_{10,32} \frac{85}{2} - 41_{9,32} \frac{83}{2}$	317144.5514	-0.1438	0.030
$42_{10,33} \frac{81}{2} - 41_{9,33} \frac{79}{2}$	317145.8073	-0.0367	0.030
$42_{10,33} \frac{83}{2} - 41_{9,33} \frac{81}{2}$	317150.6164	0.0629	0.030
$42_{10,33} \frac{85}{2} - 41_{9,33} \frac{83}{2}$	317150.6164	-0.1534	0.030
$50_{8,42} \frac{95}{2} - 49_{7,42} \frac{93}{2}$	303041.9389	0.0213	0.030
$50_{8,42} \frac{105}{2} - 49_{7,42} \frac{103}{2}$	303042.5752	0.0241	0.030
$50_{8,42} \frac{97}{2} - 49_{7,42} \frac{95}{2}$	303049.3473	-0.0124	0.030
$50_{8,42} \frac{103}{2} - 49_{7,42} \frac{101}{2}$	303050.6212	0.0392	0.030
$50_{8,42} \frac{99}{2} - 49_{7,42} \frac{97}{2}$	303053.4676	-0.0686	0.030
$50_{8,42} \frac{101}{2} - 49_{7,42} \frac{99}{2}$	303054.0556	-0.0275	0.030
$54_{5,49} \frac{107}{2} - 53_{4,49} \frac{105}{2}$	316988.5061	0.0175	0.030
$54_{5,49} \frac{109}{2} - 53_{4,49} \frac{107}{2}$	316988.5061	0.0181	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1} F' - J''_{K-1,K+1} F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$54_{5,49} \frac{105}{2} - 53_{4,49} \frac{103}{2}$	316990.9850	0.0119	0.030
$54_{5,49} \frac{111}{2} - 53_{4,49} \frac{109}{2}$	316990.9850	-0.0050	0.030
$54_{5,49} \frac{103}{2} - 53_{4,49} \frac{101}{2}$	316995.9134	0.0230	0.030
$54_{5,49} \frac{113}{2} - 53_{4,49} \frac{111}{2}$	316995.9134	-0.0624	0.030
$56_{20,37} \frac{109}{2} - 56_{19,37} \frac{109}{2}$	318242.4420	-0.0124	0.030
$56_{20,36} \frac{115}{2} - 56_{19,38} \frac{115}{2}$	318243.2819	-0.0076	0.030
$56_{20,36} \frac{111}{2} - 56_{19,38} \frac{111}{2}$	318247.7327	0.0063	0.030
$56_{20,36} \frac{113}{2} - 56_{19,38} \frac{113}{2}$	318248.0771	-0.0274	0.030
$58_{8,50} \frac{111}{2} - 57_{7,50} \frac{109}{2}$	316423.1552	0.0488	0.030
$58_{8,50} \frac{113}{2} - 57_{7,50} \frac{111}{2}$	316428.8187	0.0053	0.030
$58_{8,50} \frac{119}{2} - 57_{7,50} \frac{117}{2}$	316429.6427	0.0127	0.030
$58_{8,50} \frac{115}{2} - 57_{7,50} \frac{113}{2}$	316431.9703	-0.0123	0.030
$58_{8,50} \frac{117}{2} - 57_{7,50} \frac{115}{2}$	316432.2958	-0.0428	0.030
$60_{20,41} \frac{125}{2} - 60_{19,41} \frac{125}{2}$	317896.2745	0.0163	0.030
$60_{20,40} \frac{117}{2} - 60_{19,42} \frac{117}{2}$	317904.5764	-0.0132	0.030
$60_{20,40} \frac{123}{2} - 60_{19,42} \frac{123}{2}$	317905.2673	-0.0112	0.030
$60_{20,40} \frac{119}{2} - 60_{19,42} \frac{119}{2}$	317909.1938	0.0027	0.030
$67_{20,47} \frac{129}{2} - 67_{19,49} \frac{129}{2}$	317135.7045	0.1505	0.030
$67_{20,47} \frac{139}{2} - 67_{19,49} \frac{139}{2}$	317135.7045	-0.0273	0.030
$67_{20,47} \frac{131}{2} - 67_{19,49} \frac{131}{2}$	317142.4899	-0.0311	0.030

*continued*

Supplementary Data Table 1. (continued)

$J'_{K-1,K+1}F' - J''_{K-1,K+1}F''$	Observed	O-C <sup>a</sup>	Unc. <sup>b</sup>
$67_{20,47} \frac{137}{2} - 67_{19,49} \frac{137}{2}$	317143.0439	-0.0028	0.030

<sup>a</sup>Observed - calculated.

<sup>b</sup>2 kHz uncertainties are attributed to the cavity FTMW measurements, 6 kHz to the chirped pulse FTMW transitions, and 30 kHz to the broadband millimeter-wave measurements.