

3.2.3.2.9 HSiS

Microwave data for $^1\text{H}^{28}\text{Si}^{32}\text{S}$

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)				
$13_{0,13} \leftarrow 12_{0,12}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	$12 \leftarrow 11$	215 461.114	97Bro
		$13 \leftarrow 12$	215 458.560	
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	215 387.274	
$13_{1,13} \leftarrow 12_{1,12}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	$14 \leftarrow 13$	215 384.710	
		$12 \leftarrow 11$	213 982.308	
		$13 \leftarrow 12$	213 979.622	
$13_{1,12} \leftarrow 12_{1,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	213 779.850	
		$14 \leftarrow 13$	213 777.191	
		$12 \leftarrow 11$	217 047.533	
$13_{2,12} \leftarrow 12_{2,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	217 046.117	
		$14 \leftarrow 13$	217 028.898	
		$12 \leftarrow 11$	215 551.753	
$13_{2,11} \leftarrow 12_{2,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	215 317.877	
		$14 \leftarrow 13$	215 312.426	
		$12 \leftarrow 11$	215 600.868	
$13_{3,11} \leftarrow 12_{3,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	215 375.630	
		$14 \leftarrow 13$	215 370.696	
		$12 \leftarrow 11$	215 622.149 ^{b)}	
$13_{3,10} \leftarrow 12_{3,9}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	215 620.444 ^{b)}	
		$13 \leftarrow 12$	215 174.907 ^{b)}	
		$14 \leftarrow 13$	215 173.595 ^{b)}	
$14_{0,14} \leftarrow 13_{0,13}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$12 \leftarrow 11$	215 622.149 ^{b)}	
		$13 \leftarrow 12$	215 620.444 ^{b)}	
		$13 \leftarrow 12$	215 174.907 ^{b)}	
$14_{1,14} \leftarrow 13_{1,13}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$14 \leftarrow 13$	215 173.595 ^{b)}	
		$13 \leftarrow 12$	232 013.262	
		$14 \leftarrow 13$	232 011.126	
$14_{1,13} \leftarrow 13_{1,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	231 940.218	
		$15 \leftarrow 14$	231 938.002	
		$13 \leftarrow 12$	230 421.559	
$14_{2,13} \leftarrow 13_{2,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	230 419.422	
		$15 \leftarrow 14$	230 221.699	
		$13 \leftarrow 12$	233 728.814	
$14_{2,12} \leftarrow 13_{2,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$14 \leftarrow 13$	233 727.935	
		$14 \leftarrow 13$	233 720.767	
		$15 \leftarrow 14$	233 719.830	
$14_{2,11} \leftarrow 13_{2,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	232 100.891	
		$14 \leftarrow 13$	232 093.545	
		$14 \leftarrow 13$	231 891.568	
$14_{2,10} \leftarrow 13_{2,9}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$15 \leftarrow 14$	231 884.357	
		$13 \leftarrow 12$	232 162.643	
		$14 \leftarrow 13$	232 156.227	

	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	231 962.953
		$15 \leftarrow 14$	231 956.685
$14_{3,12} \leftarrow 13_{3,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	232 153.458 ^{b)}
		$14 \leftarrow 13$	232 151.795 ^{b)}
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	231 759.486 ^{b)}
		$15 \leftarrow 14$	231 758.480 ^{b)}
$14_{3,11} \leftarrow 13_{3,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	232 153.458 ^{b)}
		$14 \leftarrow 13$	232 151.795 ^{b)}
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	231 759.486 ^{b)}
		$15 \leftarrow 14$	231 758.480 ^{b)}
$14_{4,11} \leftarrow 13_{4,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	232 201.682 ^{b)}
		$14 \leftarrow 13$	232 200.455 ^{b)}
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	231 545.964 ^{b,c)}
		$15 \leftarrow 14$	231 545.964 ^{b,c)}
$14_{4,10} \leftarrow 13_{4,9}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	232 201.682 ^{b)}
		$14 \leftarrow 13$	232 200.455 ^{b)}
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	231 545.964 ^{b,c)}
		$15 \leftarrow 14$	231 545.964 ^{b,c)}
$15_{0,15} \leftarrow 14_{0,14}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	248 559.974
		$15 \leftarrow 14$	248 558.158
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 489.338
		$16 \leftarrow 15$	248 487.440
$15_{1,15} \leftarrow 14_{1,14}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	246 859.378
		$15 \leftarrow 14$	246 857.483
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	246 665.391
		$16 \leftarrow 15$	246 663.597
$15_{1,14} \leftarrow 14_{1,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	250 408.365 ^{c)}
		$15 \leftarrow 14$	250 408.365 ^{c)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	250 412.195 ^{c)}
		$16 \leftarrow 15$	250 412.195 ^{c)}
$15_{2,14} \leftarrow 14_{2,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	248 650.568
		$15 \leftarrow 14$	248 640.167
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 462.558
		$16 \leftarrow 15$	248 452.259
$15_{2,13} \leftarrow 14_{2,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	248 726.949
		$15 \leftarrow 14$	248 718.467
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 549.384
		$16 \leftarrow 15$	248 540.855
$15_{3,13} \leftarrow 14_{3,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	248 689.490 ^{b)}
		$15 \leftarrow 14$	248 687.775 ^{b)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 338.810 ^{b)}
		$16 \leftarrow 15$	248 337.336 ^{b)}
$15_{3,12} \leftarrow 14_{3,11}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	248 689.490 ^{b)}
		$15 \leftarrow 14$	248 687.775 ^{b)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 338.810 ^{b)}
		$16 \leftarrow 15$	248 337.336 ^{b)}
$15_{4,12} \leftarrow 14_{4,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 133.452 ^{b,c)}
		$16 \leftarrow 15$	248 133.452 ^{b,c)}
$15_{4,11} \leftarrow 14_{4,10}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	248 133.452 ^{b,c)}
		$16 \leftarrow 15$	248 133.452 ^{b,c)}
$16_{0,16} \leftarrow 15_{0,15}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 098.520

		$16 \leftarrow 15$	265 097.113
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	265 034.317
		$17 \leftarrow 16$	265 032.639
$16_{1,16} \leftarrow 15_{1,15}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	263 295.194
		$16 \leftarrow 15$	263 293.735
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	263 104.290
		$17 \leftarrow 16$	263 102.830
$16_{1,15} \leftarrow 15_{1,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	267 086.081
		$16 \leftarrow 15$	267 087.104
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	267 112.240 ^{c)}
		$17 \leftarrow 16$	267 112.240 ^{c)}
$16_{2,15} \leftarrow 15_{2,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 199.974
		$16 \leftarrow 15$	265 184.077
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	265 016.501
$16_{2,14} \leftarrow 15_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 293.201
		$16 \leftarrow 15$	265 281.207
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	265 135.398
		$17 \leftarrow 16$	265 123.555
$16_{3,14} \leftarrow 15_{3,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 228.533 ^{b)}
		$16 \leftarrow 15$	265 226.553 ^{b)}
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	264 912.787 ^{b)}
		$17 \leftarrow 16$	264 911.240 ^{b)}
$16_{3,13} \leftarrow 15_{3,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 228.533 ^{b)}
		$16 \leftarrow 15$	265 226.553 ^{b)}
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	264 912.787 ^{b)}
		$17 \leftarrow 16$	264 911.240 ^{b)}
$16_{4,13} \leftarrow 15_{4,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 226.553 ^{b)}
		$16 \leftarrow 15$	265 225.274 ^{b)}
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	264 713.109 ^{b)}
		$17 \leftarrow 16$	264 712.163 ^{b)}
$16_{4,12} \leftarrow 15_{4,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	265 226.553 ^{b)}
		$16 \leftarrow 15$	265 225.274 ^{b)}
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	264 713.109 ^{b)}
		$17 \leftarrow 16$	264 712.163 ^{b)}
$17_{0,17} \leftarrow 16_{0,16}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	281 621.123 ^{c)}
		$17 \leftarrow 16$	281 621.123 ^{c)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	281 574.820
		$18 \leftarrow 17$	281 573.645
$17_{1,17} \leftarrow 16_{1,16}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	279 728.901
		$17 \leftarrow 16$	279 727.637
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	279 540.466
		$18 \leftarrow 17$	279 539.230
$17_{1,16} \leftarrow 16_{1,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	283 761.552
		$17 \leftarrow 16$	283 765.254
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	283 854.049
		$18 \leftarrow 17$	283 855.101
$17_{2,16} \leftarrow 16_{2,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	281 748.458
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	281 603.505
		$18 \leftarrow 17$	281 577.146
$17_{2,15} \leftarrow 16_{2,14}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	281 860.781
		$17 \leftarrow 16$	281 843.091

$$17\frac{1}{2} \leftarrow 16\frac{1}{2}$$

$$18 \leftarrow 17$$

$$281\ 705.111$$

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}$ where \mathbf{I} is the ^1H nuclear spin.

^{b)} K -type doubling not resolved for lines with $K \geq 3$.

^{c)} Nuclear spin splitting not resolved.

Molecular parameters for $^1\text{H}^{28}\text{Si}^{32}\text{S}$

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)			
A	[MHz]	305 690.5(25) ^{a)}	MW
B	[MHz]	8 411.426 4(186)	97Bro
C	[MHz]	8 167.476 2(182)	
Δ_K	[MHz]	19.7 ^{b)}	
Δ_{NK}	[MHz]	0.443 437(177)	
Δ_N	[kHz]	5.239 2(33)	
δ_K	[MHz]	0.278 2(87)	
δ_N	[kHz]	0.154 8(44)	
Φ_K	[MHz]	0.0 ^{b)}	
Φ_{KN}	[kHz]	- 0.286 2(123)	
Φ_{NK}	[kHz]	0.0 ^{b)}	
Φ_N	[kHz]	0.0 ^{b)}	
ϕ_K	[kHz]	0.0 ^{b)}	
ϕ_{NK}	[kHz]	0.0 ^{b)}	
ϕ_N	[kHz]	0.0 ^{b)}	
ε_{aa}	[MHz]	9 507.8(45)	
ε_{bb}	[MHz]	105.990(87)	
ε_{cc}	[MHz]	- 251.206(86)	
ε_{ab}	[MHz]	302.580(97)	
Δ_K^s	[MHz]	- 17.02(37)	
$\Delta_{KN}^s + \Delta_{NK}^s$	[MHz]	- 0.293 2(92)	
Δ_{NK}^s	[MHz]	0.0 ^{b)}	
Δ_N^s	[kHz]	- 0.284(90)	
δ_K^s	[MHz]	0.0 ^{b)}	
δ_N^s	[MHz]	0.0 ^{b)}	
$a_F(^1\text{H})$	[MHz]	335 74(109)	
$T_{aa}(^1\text{H})$	[MHz]	3.7(42)	
$T_{bb}(^1\text{H})$	[MHz]	5.5(50)	
$T_{ab}(^1\text{H})$	[MHz]	4.4(28)	
$r_0(\text{H-Si})$	[nm]	0.151 40 ^{b)}	
$r_0(\text{Si-S})$	[nm]	0.195 37(17)	
$\angle_0(\text{H-S-C})$	[deg]	118.8(17)	

^{a)} The numbers in parentheses represent 3 standard deviations of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter constrained to this value.

^{c)} The signs of ε_{ab} and $T_{ab}(^1\text{H})$ are relatively correct.

Reference for HSiS

97Bro Brown, F.X., Yamamoto, S., Saito, S. : J. Molec. Struct. **413-414** (1997)537.

3.2.3.2.10 HO₂Microwave data for ¹H¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)				
$7_{17} \leftarrow 8_{08}$	$7\frac{1}{2} \leftarrow 8\frac{1}{2}$	$8 \leftarrow 9$	27 474.24(6) ^{b)}	77Sai
		$7 \leftarrow 8$	27 477.60(4)	
	$6\frac{1}{2} \leftarrow 7\frac{1}{2}$	$6 \leftarrow 7$	35 350.88(3)	
$9_{09} \leftarrow 8_{18}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 8$	35 535.41(4)	
		$9 \leftarrow 8$	37 138.59(7)	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	$8 \leftarrow 7$	37 142.60(5)	
$1_{01} \leftarrow 0_{00}$	$1\frac{1}{2} \leftarrow \frac{1}{2}$	$9 \leftarrow 8$	44 069.56(4)	
		$10 \leftarrow 9$	44 073.10(1)	
		$1 \leftarrow 0$	65 070.85(8)	
	$\frac{1}{2} \leftarrow \frac{1}{2}$	$2 \leftarrow 1$	65 081.82(4)	
		$1 \leftarrow 1$	65 098.44(9)	
		$1 \leftarrow 0$	65 373.01(10)	
$6_{16} \leftarrow 7_{07}$	$6\frac{1}{2} \leftarrow 7\frac{1}{2}$	$0 \leftarrow 1$	65 396.15(10)	
		$1 \leftarrow 1$	65 400.63(10)	
	$5\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 8$	98 117.82(5)	
$10_{0,10} \leftarrow 9_{19}$	$6\frac{1}{2} \leftarrow 7\frac{1}{2}$	$6 \leftarrow 7$	98 121.15(5)	
		$5 \leftarrow 6$	107 635.51(10)	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	$6 \leftarrow 7$	107 640.22(10)	
		$10 \leftarrow 9$	110 472.20(4)	
$2_{12} \leftarrow 1_{11}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	$9 \leftarrow 8$	110 476.90(7)	
		$10 \leftarrow 9$	116 448.40(10)	
	$1\frac{1}{2} \leftarrow \frac{1}{2}$	$11 \leftarrow 10$	116 451.73(10)	
		$1 \leftarrow 1$	119 137.04(7)	
$2_{11} \leftarrow 1_{10}$	$1\frac{1}{2} \leftarrow \frac{1}{2}$	$2 \leftarrow 1$	119 153.74(4)	
		$1 \leftarrow 0$	119 159.19(7)	
	$1 \leftarrow 1$	122 856.61(9)		
$2_{02} \leftarrow 1_{01}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$2 \leftarrow 1$	122 858.26(7)	
		$1 \leftarrow 0$	122 858.92(5)	
	$1\frac{1}{2} \leftarrow \frac{1}{2}$	$2 \leftarrow 1$	122 858.92(5)	
		$2 \leftarrow 1$	130 258.13(20)	
$2_{12} \leftarrow 1_{11}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$3 \leftarrow 2$	130 260.07(20)	
		$1 \leftarrow 0$	130 463.68(20)	
	$2 \leftarrow 1$	130 467.41(20)		
$2_{11} \leftarrow 1_{10}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$2 \leftarrow 1$	130 467.41(20)	
		$2 \leftarrow 1$	132 959.56(8)	
$5_{15} \leftarrow 6_{06}$	$5\frac{1}{2} \leftarrow 6\frac{1}{2}$	$3 \leftarrow 2$	132 961.99(8)	
		$2 \leftarrow 1$	132 961.99(8)	
	$4\frac{1}{2} \leftarrow 5\frac{1}{2}$	$2 \leftarrow 1$	136 491.96(12)	
$3_{22} \leftarrow 2_{21}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$3 \leftarrow 2$	136 495.97(9)	
		$6 \leftarrow 7$	167 765.03(10)	
	$5 \leftarrow 6$	167 768.28(10)		
$3_{21} \leftarrow 2_{20}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$4 \leftarrow 5$	179 233.33(10)	
		$5 \leftarrow 6$	179 238.50(10)	
	$3 \leftarrow 2$	184 194.55(10)		
$3_{21} \leftarrow 2_{20}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$2 \leftarrow 1$	184 196.76(10)	
		$3 \leftarrow 2$	184 212.64(10)	

		$2 \leftarrow 1$	184 214.87(10)
$11_{0,11} \leftarrow 10_{1,10}$	$10 \frac{1}{2} \leftarrow 9 \frac{1}{2}$	$11 \leftarrow 10$	184 373.81(10)
		$10 \leftarrow 9$	184 378.30(10)
$25_{1,24} \leftarrow 24_{2,23}$	$25 \frac{1}{2} \leftarrow 24 \frac{1}{2}$	$25 \leftarrow 24$	186 590.82(10)
		$26 \leftarrow 25$	186 594.26(10)
$3_{13} \leftarrow 2_{21}$	$2 \frac{1}{2} \leftarrow 1 \frac{1}{2}$	$3 \leftarrow 2$	188 350.71(10)
		$2 \leftarrow 1$	188 351.58(10)
$11_{0,11} \leftarrow 10_{1,10}$	$11 \frac{1}{2} \leftarrow 10 \frac{1}{2}$	$11 \leftarrow 10$	189 596.64(10)
		$12 \leftarrow 11$	189 600.00(10)
$3_{12} \leftarrow 2_{11}$	$2 \frac{1}{2} \leftarrow 1 \frac{1}{2}$	$2 \leftarrow 2$	193 937.06(10)
		$2 \leftarrow 1$	193 939.56(10)
	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$3 \leftarrow 2$	193 940.83(10)
		$3 \leftarrow 2$	195 219.21(10)
$3_{03} \leftarrow 2_{02}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	195 220.22(10)
		$3 \leftarrow 2$	195 422.64(10)
	$2 \frac{1}{2} \leftarrow 1 \frac{1}{2}$	$4 \leftarrow 3$	195 423.56(10)
		$2 \leftarrow 1$	195 628.34(10)
$3_{12} \leftarrow 2_{11}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$3 \leftarrow 2$	195 629.55(10)
		$3 \leftarrow 2$	200 615.72(10)
$3_{22} \leftarrow 2_{21}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	200 617.47(10)
		$3 \leftarrow 2$	202 869.98(10)
$3_{21} \leftarrow 2_{20}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	202 872.19(10)
		$3 \leftarrow 2$	202 885.94(10)
		$4 \leftarrow 3$	202 888.18(10)
$19_{2,18} \leftarrow 20_{1,19}$	$19 \frac{1}{2} \leftarrow 20 \frac{1}{2}$	$20 \leftarrow 21$	235 399.96(10)
		$19 \leftarrow 20$	235 403.51(10)
$4_{14} \leftarrow 5_{05}$	$4 \frac{1}{2} \leftarrow 5 \frac{1}{2}$	$5 \leftarrow 6$	236 280.92(10)
		$4 \leftarrow 5$	236 284.42(10)
$19_{2,18} \leftarrow 20_{1,19}$	$18 \frac{1}{2} \leftarrow 19 \frac{1}{2}$	$18 \leftarrow 19$	243 470.60(10)
		$19 \leftarrow 20$	243 474.69(10)
$4_{32} \leftarrow 3_{31}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	248 431.39(10) ^{c)}
		$3 \leftarrow 2$	248 433.15(10) ^{c)}
$4_{31} \leftarrow 3_{30}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	248 431.39(10) ^{c)}
		$3 \leftarrow 2$	248 433.15(10) ^{c)}
$4_{14} \leftarrow 5_{05}$	$3 \frac{1}{2} \leftarrow 4 \frac{1}{2}$	$3 \leftarrow 4$	250 496.86(10)
		$4 \leftarrow 5$	250 502.47(10)
$4_{23} \leftarrow 3_{22}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	253 189.10(10) ^{d)}
		$3 \leftarrow 2$	
$4_{22} \leftarrow 3_{21}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	253 233.72(10) ^{d)}
		$3 \leftarrow 2$	
$4_{14} \leftarrow 3_{13}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	254 551.53(10) ^{d)}
		$3 \leftarrow 2$	
	$4 \frac{1}{2} \leftarrow 3 \frac{1}{2}$	$5 \leftarrow 4$	258 522.94(10) ^{d)}
		$4 \leftarrow 3$	
$12_{0,12} \leftarrow 11_{1,11}$	$11 \frac{1}{2} \leftarrow 10 \frac{1}{2}$	$12 \leftarrow 11$	258 872.75(10)
		$11 \leftarrow 10$	258 877.05(10)
$4_{04} \leftarrow 3_{03}$	$4 \frac{1}{2} \leftarrow 3 \frac{1}{2}$	$5 \leftarrow 4$	260 565.86(10) ^{d)}
		$4 \leftarrow 3$	
	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	260 770.14(10) ^{d)}
		$3 \leftarrow 2$	
$4_{13} \leftarrow 3_{12}$	$3 \frac{1}{2} \leftarrow 2 \frac{1}{2}$	$4 \leftarrow 3$	262 004.09(10) ^{d)}

$12_{0,12} \leftarrow 11_{1,11}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	$3 \leftarrow 2$	
		$12 \leftarrow 11$	263 457.21(10)
$4_{23} \leftarrow 3_{22}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$13 \leftarrow 12$	263 460.52(10)
		$5 \leftarrow 4$	265 690.53(10) ^{d)}
$4_{22} \leftarrow 3_{21}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	
		$5 \leftarrow 4$	265 731.52(10) ^{d)}
$4_{13} \leftarrow 3_{12}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	
		$4 \leftarrow 3$	265 769.20(10)
$26_{1,25} \leftarrow 25_{2,24}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	$5 \leftarrow 4$	265 770.21(10)
		$26 \leftarrow 25$	268 124.79(10)
$4_{32} \leftarrow 3_{31}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$25 \leftarrow 24$	268 128.81(10)
		$4 \leftarrow 3$	269 498.83(10) ^{c)}
$4_{31} \leftarrow 3_{30}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$5 \leftarrow 4$	269 500.65(10) ^{c)}
		$4 \leftarrow 3$	269 498.83(10) ^{c)}
$26_{1,25} \leftarrow 25_{2,24}$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	$5 \leftarrow 4$	269 500.65(10) ^{c)}
		$26 \leftarrow 25$	273 013.19(10)
$3_{13} \leftarrow 4_{04}$	$3\frac{1}{2} \leftarrow 4\frac{1}{2}$	$27 \leftarrow 26$	273 016.56(10)
		$4 \leftarrow 5$	303 438.00(10)
$5_{42} \leftarrow 4_{41}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$3 \leftarrow 4$	303 441.59(10)
		$5 \leftarrow 4$	312 884.54(10) ^{c)}
$5_{41} \leftarrow 4_{40}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	312 886.24(10) ^{c)}
		$5 \leftarrow 4$	312 884.54(10) ^{c)}
$5_{33} \leftarrow 4_{32}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	312 886.24(10) ^{c)}
		$5 \leftarrow 4$	316 548.27(10) ^{c,d)}
$5_{32} \leftarrow 4_{31}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	
		$5 \leftarrow 4$	316 548.27(10) ^{c,d)}
$18_{2,17} \leftarrow 19_{1,18}$	$18\frac{1}{2} \leftarrow 19\frac{1}{2}$	$4 \leftarrow 3$	
		$19 \leftarrow 20$	317 603.71(10)
$5_{15} \leftarrow 4_{14}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$18 \leftarrow 19$	317 607.23(10)
		$5 \leftarrow 4$	319 694.62(10) ^{d)}
$5_{24} \leftarrow 4_{23}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	
		$5 \leftarrow 4$	320 631.39(10) ^{d)}
$5_{23} \leftarrow 4_{22}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	
		$5 \leftarrow 4$	320 720.20(10) ^{d)}
$3_{13} \leftarrow 4_{04}$	$2\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	
		$2 \leftarrow 3$	321 826.88(10)
$5_{15} \leftarrow 4_{14}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$3 \leftarrow 4$	321 833.31(10)
		$6 \leftarrow 5$	322 242.67(10) ^{d)}
$5_{05} \leftarrow 4_{04}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	325 680.17(10) ^{d)}
	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$5 \leftarrow 4$	
		$5 \leftarrow 4$	325 882.22(10) ^{d)}
$18_{2,17} \leftarrow 19_{1,18}$	$17\frac{1}{2} \leftarrow 18\frac{1}{2}$	$4 \leftarrow 3$	
		$17 \leftarrow 18$	326 354.31(10)
$5_{14} \leftarrow 4_{13}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$18 \leftarrow 19$	326 358.47(10)
		$5 \leftarrow 4$	328 995.55(10) ^{d)}
$5_{24} \leftarrow 4_{23}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$4 \leftarrow 3$	
		$6 \leftarrow 5$	329 373.04(10) ^{d)}
$5_{23} \leftarrow 4_{22}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	329 456.21(10) ^{d)}
		$5 \leftarrow 4$	

$5_{14} \leftarrow 4_{13}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	331 333.06(10) ^{d)}
$5_{33} \leftarrow 4_{32}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	329 456.21(10) ^{c,d)}
$5_{32} \leftarrow 4_{31}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	329 456.21(10) ^{c,d)}
$13_{0,13} \leftarrow 12_{1,12}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	333 936.32(10)
$5_{42} \leftarrow 4_{41}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$13 \leftarrow 12$	333 940.27(10)
		$12 \leftarrow 11$	335 321.98(10) ^{c)}
$5_{41} \leftarrow 4_{40}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	335 323.63(10) ^{c)}
$13_{0,13} \leftarrow 12_{1,12}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$5 \leftarrow 4$	335 321.98(10) ^{c)}
		$6 \leftarrow 5$	335 323.63(10) ^{c)}
$6_{43} \leftarrow 5_{42}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$13 \leftarrow 12$	337 974.55(10)
		$14 \leftarrow 13$	337 977.84(10)
$6_{42} \leftarrow 5_{41}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	380 375.03(10) ^{c,d)}
$6_{16} \leftarrow 5_{15}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	380 375.03(10) ^{c,d)}
		$5 \leftarrow 4$	
	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	384 392.68(10) ^{d)}
$6_{25} \leftarrow 5_{24}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	386 147.31(10) ^{d)}
$6_{24} \leftarrow 5_{23}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	
		$5 \leftarrow 4$	387 178.99(10) ^{d)}
$6_{06} \leftarrow 5_{05}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	
		$5 \leftarrow 4$	387 333.95(10) ^{d)}
	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	
		$7 \leftarrow 6$	390 758.87(10) ^{d)}
$6_{25} \leftarrow 5_{24}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	
		$5 \leftarrow 4$	390 958.23(10) ^{d)}
$6_{24} \leftarrow 5_{23}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	
		$7 \leftarrow 6$	393 543.30(10) ^{d)}
$6_{15} \leftarrow 5_{14}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	
		$5 \leftarrow 4$	393 690.63(10) ^{d)}
$6_{34} \leftarrow 5_{33}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	
		$7 \leftarrow 6$	395 535.68(10) ^{d)}
$6_{33} \leftarrow 5_{32}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$5 \leftarrow 4$	
		$6 \leftarrow 5$	396 034.05(10) ^{c,d)}
$6_{15} \leftarrow 5_{14}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	
		$6 \leftarrow 5$	396 034.05(10) ^{c,d)}
$6_{43} \leftarrow 5_{42}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	
		$6 \leftarrow 5$	397 077.70(10) ^{d)}
$6_{42} \leftarrow 5_{41}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	
		$7 \leftarrow 6$	398 470.75(10) ^{c,d)}
$17_{2,16} \leftarrow 18_{1,17}$	$17\frac{1}{2} \leftarrow 18\frac{1}{2}$	$6 \leftarrow 5$	
		$7 \leftarrow 6$	398 470.75(10) ^{c,d)}
		$6 \leftarrow 5$	
		$7 \leftarrow 6$	399 022.029(10)
		$18 \leftarrow 19$	399 025.60(10)
	$16\frac{1}{2} \leftarrow 17\frac{1}{2}$	$17 \leftarrow 18$	408 517.95(10)
$7_{44} \leftarrow 6_{43}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$16 \leftarrow 17$	408 522.19(10)
		$17 \leftarrow 18$	447 289.85(10) ^{c,d)}
		$7 \leftarrow 6$	

$7_{43} \leftarrow 6_{42}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	$447\,289.85(10)^{c,d}$	
$7_{17} \leftarrow 6_{16}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	$448\,867.53(10)^d$	
	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$6 \leftarrow 5$	$450\,136.82(10)^d$	
$7_{35} \leftarrow 6_{34}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$8 \leftarrow 7$	$450\,374.53(10)^{c,d}$	
$7_{34} \leftarrow 6_{33}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	$450\,374.53(10)^{c,d}$	
$7_{26} \leftarrow 6_{25}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	$453\,200.48(10)^d$	
$7_{25} \leftarrow 6_{24}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	$453\,200.48(10)^d$	
$7_{07} \leftarrow 6_{06}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$6 \leftarrow 5$	$455\,794.60(10)^d$	
	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$8 \leftarrow 7$	$455\,990.66(10)^d$	
$7_{26} \leftarrow 6_{25}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 6$	$457\,994.38(10)^d$	
$7_{25} \leftarrow 6_{24}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 7$	$458\,231.55(10)^d$	
$7_{35} \leftarrow 6_{34}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 6$	$460\,006.04(10)^{c,d}$	
$7_{34} \leftarrow 6_{33}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 7$	$460\,006.04(10)^{c,d}$	
$7_{16} \leftarrow 6_{15}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	$461\,847.69(10)^d$	
$7_{44} \leftarrow 6_{43}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$6 \leftarrow 5$	$462\,034.53(10)^{c,d}$	
$7_{43} \leftarrow 6_{42}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 7$	$462\,034.53(10)^{c,d}$	
$8_{08} \leftarrow 7_{07}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 6$	$520\,780.45(10)^d$	
	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$9 \leftarrow 8$	$520\,972.33(10)^d$	
$13_{2,12} \leftarrow 12_{1,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$8 \leftarrow 7$	$2\,497\,808.95(4)^d$	95Cha
$14_{2,13} \leftarrow 13_{1,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$7 \leftarrow 6$	$2\,551\,119.79(5)^d$	
$9_{36} \leftarrow 9_{27}$	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	$14 \leftarrow 13$	$2\,862\,042.59(18)^d$	
$3_{31} \leftarrow 2_{20}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$15 \leftarrow 14$	$3\,100\,255.48(3)^{c,d}$	
$3_{30} \leftarrow 2_{21}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$14 \leftarrow 13$	$3\,100\,255.48(3)^{c,d}$	
$8_{36} \leftarrow 7_{25}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$10 \leftarrow 10$	$3\,416\,970.94(4)^d$	
$16_{3,14} \leftarrow 15_{2,13}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$9 \leftarrow 9$	$3\,900\,150.30(7)^d$	
		$2 \leftarrow 1$		
		$3 \leftarrow 2$		
		$2 \leftarrow 1$		
		$3 \leftarrow 2$		
		$7 \leftarrow 6$		
		$8 \leftarrow 7$		
		$17 \leftarrow 16$		
		$16 \leftarrow 15$		

$16_{4,12} \leftarrow 16_{3,13}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	$15 \leftarrow 15$	$4\,029\,030.07(10)^d$
		$16 \leftarrow 16$	
$19_{3,17} \leftarrow 18_{2,16}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$20 \leftarrow 19$	$4\,086\,47.18(5)^d$
		$19 \leftarrow 18$	
$4_{41} \leftarrow 3_{30}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	$4\,258\,492.25(10)^{c,d}$
		$5 \leftarrow 4$	
$4_{40} \leftarrow 3_{31}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	$4\,258\,492.25(10)^{c,d}$
		$5 \leftarrow 4$	
$4_{41} \leftarrow 3_{30}$	$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	$3 \leftarrow 2$	$4\,306\,810.24(8)^{c,d}$
		$4 \leftarrow 3$	
$4_{40} \leftarrow 3_{31}$	$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	$3 \leftarrow 2$	$4\,306\,810.24(8)^{c,d}$
		$4 \leftarrow 3$	
$5_{42} \leftarrow 4_{31}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	$4\,324\,315.59(30)^{c,d}$
		$5 \leftarrow 4$	
$5_{41} \leftarrow 4_{32}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	$4\,324\,315.59(30)^{c,d}$
		$5 \leftarrow 4$	
$5_{42} \leftarrow 4_{31}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	$4\,371\,260.25(143)^{c,d}$
		$5 \leftarrow 4$	
$5_{41} \leftarrow 4_{32}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	$4\,371\,260.25(143)^{c,d}$
		$5 \leftarrow 4$	
$6_{43} \leftarrow 5_{32}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	$4\,390\,319.67(10)^{c,d}$
		$6 \leftarrow 5$	
$6_{42} \leftarrow 5_{33}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	$4\,390\,319.67(10)^{c,d}$
		$6 \leftarrow 5$	
$12_{4,9} \leftarrow 11_{3,8}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	$11 \leftarrow 10$	$4\,815\,319.69(14)^d$
		$12 \leftarrow 11$	
$18_{4,14} \leftarrow 17_{3,15}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 18$	$5\,172\,050.43(77)^d$
		$18 \leftarrow 17$	
$11_{56} \leftarrow 11_{47}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 10$	$5\,173\,898.15(16)^{c,d}$
		$11 \leftarrow 11$	
$11_{57} \leftarrow 11_{48}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 10$	$5\,173\,898.15(16)^{c,d}$
		$11 \leftarrow 11$	
$11_{57} \leftarrow 10_{46}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	$10 \leftarrow 9$	$5\,885\,277.27(38)^{c,d}$
		$11 \leftarrow 10$	
$11_{56} \leftarrow 10_{47}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	$10 \leftarrow 9$	$5\,885\,277.27(38)^{c,d}$
		$11 \leftarrow 10$	

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}$ where \mathbf{I} is the ¹H nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

^{c)} K-type doubling not resolved.

^{d)} ¹H hyperfine doubling not resolved.

Molecular parameters for ¹ H ¹⁶ O ₂				
Parameter		Value	Method	Ref.
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)				
$A - \frac{1}{2}(B + C)$	[MHz]	577 680.377(25) ^{a)}	MW	97Cha
$\frac{1}{2}(B + C)$	[MHz]	32 592.729 1(16)		
$\frac{1}{4}(B - C)$	[MHz]	462.501 8(73)		
Δ_K	[MHz]	123.572 4(35)		
Δ_{NK}	[MHz]	3.445 31(24)		
Δ_N	[MHz]	0.116 865(10)		
δ_K	[MHz]	1.977 9(75)		
δ_N	[kHz]	6.149 9(26)		
ϕ_K	[kHz]	99.14(18)		
ϕ_{KN}	[kHz]	1.060(13)		
ϕ_{NK}	[Hz]	19.36(44)		
ϕ_N	[kHz]	0.0 ^{b)}		
ϕ_K	[kHz]	0.0 ^{b)}		
ϕ_{NK}	[kHz]	0.0 ^{b)}		
ϕ_N	[kHz]	0.0 ^{b)}		
L_K	[kHz]	- 0.138 7(18)		
$(\epsilon_{aa} + \epsilon_{bb} + \epsilon_{cc})$	[MHz]	- 49 986.19(20)		
$(2\epsilon_{aa} - \epsilon_{bb} - \epsilon_{cc})$	[MHz]	- 98 729.83(28)		
$\frac{1}{2}(\epsilon_{bb} - \epsilon_{cc})$	[MHz]	- 215.841(25)		
$\frac{1}{2}(\epsilon_{ab} + \epsilon_{ba})$	[MHz]	- 194.39(18) ^{c)}		
Δ_K^s	[MHz]	23.664(21)		
$\Delta_{KN}^s + \Delta_{NK}^s$	[MHz]	0.291 1 ^{b)}		
Δ_{NK}^s	[MHz]	0.291 1(22)		
Δ_N^s	[MHz]	0.0 ^{b)}		
δ_K^s	[MHz]	0.159(12)		
δ_N^s	[MHz]	0.0 ^{b)}		
ϕ_K^s	[kHz]	- 30.39(92)		
$a_F(^1H)$	[MHz]	- 27.518(45)		
$T_{aa}(^1H)$	[MHz]	- 8.320(90)		
$(T_{bb} - T_{cc})$	[MHz]	31.49(13)		
$T_{ab}(^1H)$	[MHz]	15.4(34) ^{c)}		

^{a)} The numbers in parentheses represent 3 standard deviations of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter constrained to this value.

^{c)} The signs of ϵ_{ab} and $T_{ab}(^1H)$ are relatively correct.

References for HO₂

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3.2.3.2.11 HS₂Microwave data for ¹H³²S₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)				
$9_{09} \leftarrow 8_{08}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	141 824.148	94Yam
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	142 025.731	
$9_{19} \leftarrow 8_{18}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	141 453.887	
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	140 325.661	
$9_{18} \leftarrow 8_{17}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	143 312.745	
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	142 398.631	
$9_{28} \leftarrow 8_{27}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	143 524.816	
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	140 040.187	
$9_{27} \leftarrow 8_{26}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	143 537.000	
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	140 057.027	
$9_{37} \leftarrow 8_{36}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	144 616.787 ^{c)}	
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	138 855.331 ^{c)}	
$9_{36} \leftarrow 8_{35}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	144 616.787 ^{c)}	
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	138 855.331 ^{c)}	
$10_{0,10} \leftarrow 9_{09}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	157 585.782	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	157 785.933	
$10_{1,10} \leftarrow 9_{19}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	157 016.913	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	156 101.436	
$10_{19} \leftarrow 9_{18}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	159 096.099	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	158 394.683	
$10_{29} \leftarrow 9_{28}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	159 059.317	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	156 083.319	
$10_{28} \leftarrow 9_{27}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	159 076.465	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	156 106.186	
$10_{38} \leftarrow 9_{37}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	160 083.681 ^{c)}	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	154 956.785 ^{c)}	
$10_{37} \leftarrow 9_{36}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	160 083.681 ^{c)}	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	154 956.785 ^{c)}	
$10_{47} \leftarrow 9_{46}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	160 914.570 ^{c)}	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	154 047.397 ^{c)}	
$10_{46} \leftarrow 9_{45}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	160 914.570 ^{c)}	
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	154 047.397 ^{c)}	
$15_{0,15} \leftarrow 14_{0,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	236 349.920	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	236 536.045	
$15_{1,15} \leftarrow 14_{1,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	235 025.973	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	234 649.466	
$15_{1,14} \leftarrow 14_{1,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	238 212.048	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	238 038.257	
$15_{2,14} \leftarrow 14_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	237 166.267	

	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	235 696.887
$15_{2,13} \leftarrow 14_{2,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	237 228.381
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	235 771.857
$15_{3,13} \leftarrow 14_{3,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	237 867.582 [°]
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	234 906.675 [°]
$15_{3,12} \leftarrow 14_{3,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	237 867.582 [°]
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	234 906.675 [°]
$15_{4,12} \leftarrow 14_{4,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	238 532.480 [°]
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	234 100.608 [°]
$15_{4,11} \leftarrow 14_{4,10}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	238 532.480 [°]
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	234 100.608 [°]
$15_{5,11} \leftarrow 14_{5,10}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	239 112.270 [°]
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	233 376.872 [°]
$16_{0,16} \leftarrow 15_{0,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	252 092.065
$16_{1,16} \leftarrow 15_{1,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	250 643.925
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	250 322.274
$16_{2,15} \leftarrow 15_{2,14}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	252 837.520
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	251 543.387
$16_{2,14} \leftarrow 15_{2,13}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	252 913.477
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	251 634.025
$16_{3,14} \leftarrow 15_{3,13}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	253 486.926 [°]
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	250 813.379 [°]
$16_{3,13} \leftarrow 15_{3,12}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	253 486.926 [°]
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	250 813.379 [°]
$16_{4,13} \leftarrow 15_{4,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	250 038.201 [°]
$16_{4,12} \leftarrow 15_{4,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	250 038.201 [°]
$16_{5,12} \leftarrow 15_{5,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	249 324.765 [°]
$16_{5,12} \leftarrow 15_{5,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	249 324.765 [°]
$17_{0,17} \leftarrow 16_{0,16}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	267 830.064
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	267 992.721
$17_{1,17} \leftarrow 16_{1,16}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	266 263.175
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	265 987.330
$17_{1,16} \leftarrow 16_{1,15}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	269 952.169
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	269 812.618
$17_{2,16} \leftarrow 16_{2,15}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	268 517.494
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	267 373.536
$17_{2,15} \leftarrow 16_{2,14}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	268 609.278
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	267 481.836
$17_{3,15} \leftarrow 16_{3,14}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	269 120.025 [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	266 699.789 [°]
$17_{3,14} \leftarrow 16_{3,13}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	269 120.025 [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	266 699.789 [°]
$17_{4,14} \leftarrow 16_{4,13}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	269 706.377 [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	265 955.688 [°]
$17_{4,13} \leftarrow 16_{4,12}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	269 706.377 [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	265 955.688 [°]

$17_{5,13} \leftarrow 16_{5,12}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	270 240.419 [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$b)$	265 255.055 [°]
$17_{5,12} \leftarrow 16_{5,11}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	270 240.419 [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$b)$	265 255.055 [°]
$18_{0,18} \leftarrow 17_{0,17}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	283 563.668
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	283 671.871
$18_{1,18} \leftarrow 17_{1,17}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	281 882.906
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	281 645.597
$18_{1,17} \leftarrow 17_{1,16}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 18$	286 725.847
		$18 \leftarrow 17$	286 720.463
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	285 688.755
$18_{2,17} \leftarrow 17_{2,16}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	284 204.186
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	283 189.544
$18_{2,16} \leftarrow 17_{2,15}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	284 313.781
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	283 317.621
$18_{3,16} \leftarrow 17_{3,15}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	284 764.588 [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	283 568.391 [°]
$18_{3,15} \leftarrow 17_{3,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	284 764.588 [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	283 568.391 [°]
$18_{4,15} \leftarrow 17_{4,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	285 312.623 [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	281 854.727 [°]
$18_{4,14} \leftarrow 17_{4,13}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	285 312.623 [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	281 854.727 [°]
$18_{5,14} \leftarrow 17_{5,13}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	285 821.660 [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	281 168.623 [°]
$18_{5,13} \leftarrow 17_{5,12}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$b)$	285 821.660 [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$b)$	281 168.623 [°]
$19_{0,19} \leftarrow 18_{0,18}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 18$	298 462.549
		$18 \leftarrow 17$	298 467.892
$19_{1,18} \leftarrow 18_{1,17}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 18$	300 171.655
$4_{13} \leftarrow 4_{04}$	$4\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 5$	280 023.298
		$4 \leftarrow 4$	280 022.622
	$3\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 4$	302 145.473
		$3 \leftarrow 3$	302 147.377
$5_{14} \leftarrow 5_{05}$	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 6$	281 890.120
		$5 \leftarrow 5$	281 889.446
	$4\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 5$	300 891.487
		$4 \leftarrow 4$	300 893.288
$6_{15} \leftarrow 6_{06}$	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 7$	283 550.110
		$6 \leftarrow 6$	283 549.496
	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 6$	300 215.405
		$5 \leftarrow 5$	300 217.012
$7_{16} \leftarrow 7_{07}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 8$	285 097.324
		$7 \leftarrow 7$	285 096.729
	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 7$	299 972.179
		$6 \leftarrow 6$	299 973.651
$8_{17} \leftarrow 8_{08}$	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	$9 \leftarrow 9$	286 593.999
		$8 \leftarrow 8$	286 593.397

	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 8$	300 067.859	
		$7 \leftarrow 7$	300 069.242	
$9_{18} \leftarrow 9_{09}$	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	$9 \leftarrow 9$	300 440.775	
		$8 \leftarrow 8$	300 442.089	
$10_{19} \leftarrow 10_{0,10}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$11 \leftarrow 11$	289 592.914	
		$10 \leftarrow 10$	289 592.266	
	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	$10 \leftarrow 10$	301 049.559	
		$9 \leftarrow 9$	301 050.809	
$11_{1,10} \leftarrow 11_{0,11}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$12 \leftarrow 12$	291 146.560	
		$11 \leftarrow 11$	291 145.945	
	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$11 \leftarrow 11$	301 865.944	
$12_{1,11} \leftarrow 12_{0,12}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	$10 \leftarrow 10$	301 867.134	
		$13 \leftarrow 13$	292 759.774	
		$12 \leftarrow 12$	292 759.172	
	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$12 \leftarrow 12$	302 870.246	
$18_{1,17} \leftarrow 18_{0,18}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$11 \leftarrow 11$	302 871.427	
		$18 \leftarrow 18$	305 330.486	
		$19 \leftarrow 19$	305 324.565	
	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$20 \leftarrow 20$	306 205.052	
		$19 \leftarrow 19$	306 203.695	
$4_{22} \leftarrow 4_{13}$	$4\frac{1}{2} \leftarrow 4\frac{1}{2}$	^{b)}	844 166.878(100) ^{d)}	00Tan
$5_{23} \leftarrow 5_{14}$	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	^{b)}	845 545.066(100)	
	$4\frac{1}{2} \leftarrow 4\frac{1}{2}$	^{b)}	886 849.499(100)	
$6_{24} \leftarrow 6_{15}$	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	^{b)}	846 622.921(100)	
	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	^{b)}	884 274.619(150)	
$7_{25} \leftarrow 7_{16}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	847 398.894(100)	
	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	^{b)}	881 778.795(100)	
$8_{26} \leftarrow 8_{17}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	879 366.123(100)	
$9_{27} \leftarrow 9_{18}$	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	848 113.451(100)	
	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	877 024.620(100)	
$10_{28} \leftarrow 10_{19}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	848 093.805(100)	
	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	874 735.981(30)	
$11_{29} \leftarrow 11_{1,10}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	847 850.461(50)	
	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	872 481.896(100)	
$12_{2,10} \leftarrow 12_{1,11}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	847 401.666(100)	
	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	870 244.612(200)	
$13_{2,11} \leftarrow 13_{1,12}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	846 762.754(100)	
	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	868 009.638(30)	
$14_{2,12} \leftarrow 14_{1,13}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	845 946.963(150)	
	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	865 764.029(100)	
$15_{2,13} \leftarrow 15_{1,14}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	844 963.209(100)	
	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	863 497.593(30)	
$16_{2,14} \leftarrow 16_{1,15}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	843 814.318(100)	
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	861 202.314(100)	
$17_{2,15} \leftarrow 17_{1,16}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	842 471.428(100)	
	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	858 871.377(80)	
$18_{2,16} \leftarrow 18_{1,17}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 19$	840 059.212(150)	
		$18 \leftarrow 18$	840 064.866(150)	

	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	856 500.343(100)
$19_{2,17} \leftarrow 19_{1,18}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	^{b)}	839 918.126(100)
		^{b)}	854 085.016(150)
$5_{24} \leftarrow 5_{15}$	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	^{b)}	848 206.354(100)
$6_{25} \leftarrow 6_{16}$	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	^{b)}	850 475.623(100)
	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	^{b)}	889 542.755(100)
$7_{26} \leftarrow 7_{17}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	852 663.179(100)
	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	^{b)}	888 669.041(100)
$8_{27} \leftarrow 8_{18}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	888 096.153(150)
$9_{28} \leftarrow 9_{19}$	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	887 810.811(100)
$10_{29} \leftarrow 10_{1,10}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	858 896.481(50)
	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	887 792.611(200)
$11_{2,10} \leftarrow 11_{1,11}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	860 929.310(30)
	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	888 021.407(100)
$12_{2,11} \leftarrow 12_{1,12}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	862 969.319(100)
	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	888 477.534(150)
$13_{2,12} \leftarrow 13_{1,13}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	865 031.083(100)
	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	889 144.580(100)
$14_{2,13} \leftarrow 14_{1,14}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	867 127.046(150)
	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	890 008.047(100)
$15_{2,14} \leftarrow 15_{1,15}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	869 267.428(200)
$21_{2,20} \leftarrow 20_{1,19}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	^{b)}	331 288.548(20)
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	^{b)}	330 569.013(20)
$21_{2,19} \leftarrow 20_{1,18}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	^{b)}	331 464.881(20)
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	^{b)}	330 770.490(14)
$22_{4,19} \leftarrow 21_{4,18}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	^{b)}	347 829.805(20) ^{c)}
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	^{b)}	345 294.744(20) ^{c)}
$22_{4,18} \leftarrow 21_{4,17}$	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	347 829.805(20) ^{c)}
	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	^{b)}	345 294.744(20) ^{c)}
$23_{0,23} \leftarrow 22_{0,22}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	362 155.929(20)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	362 317.586(20)
$23_{1,23} \leftarrow 22_{1,22}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	359 964.235(20)
$23_{1,22} \leftarrow 22_{1,21}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	364 885.993(30)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	364 980.090(20)
$23_{2,22} \leftarrow 22_{2,21}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	362 686.843(20)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	362 108.822(30)
$23_{2,21} \leftarrow 22_{2,20}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	362 920.009(20)
$23_{3,21} \leftarrow 22_{3,20}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	363 098.519(30)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	361 702.445(30)
$23_{3,20} \leftarrow 22_{3,19}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	363 100.498(30)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	361 704.851(30)
$23_{4,20} \leftarrow 22_{4,19}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	363 475.734(20) ^{c)}
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	361 121.516(20) ^{c)}
$23_{4,19} \leftarrow 22_{4,18}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	363 475.734(20) ^{c)}
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	361 121.516(20) ^{c)}
$23_{5,19} \leftarrow 22_{5,18}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	363 855.304(20) ^{c)}

	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	360 516.332(20) ^{c)}
$23_{5,18} \leftarrow 22_{5,17}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	363 855.304(20) ^{c)}
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	^{b)}	360 516.332(20) ^{c)}
$24_{0,24} \leftarrow 23_{0,23}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	377 857.481(20)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	378 022.912(20)
$24_{1,24} \leftarrow 23_{1,23}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	375 573.740(30)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	375 476.293(20)
$24_{1,23} \leftarrow 23_{1,22}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	380 708.864(20)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	380 821.955(20)
$24_{2,23} \leftarrow 23_{2,22}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	378 385.946(20)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	377 866.887(20)
$24_{2,22} \leftarrow 23_{2,21}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	378 651.575(20)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	378 165.120(20)
$24_{3,22} \leftarrow 23_{3,21}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	378 778.604(30)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	377 496.403(30)
$24_{3,21} \leftarrow 23_{3,20}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	377 499.384(30)
$24_{4,21} \leftarrow 23_{4,20}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	376 936.905(20) ^{c)}
$24_{4,20} \leftarrow 23_{4,19}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	376 936.905(20) ^{c)}
$24_{5,20} \leftarrow 23_{5,19}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	379 480.567(20) ^{c)}
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	376 347.241(20) ^{c)}
$24_{5,19} \leftarrow 23_{5,18}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	^{b)}	379 480.567(20) ^{c)}
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	^{b)}	376 347.241(20) ^{c)}

^{c)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}$ where \mathbf{I} is the ¹H nuclear spin.

^{b)} ¹H hyperfine doubling not resolved.

^{c)} K-type doubling not resolved.

^{d)} The numbers in parentheses represent the authors' estimate of the experimental uncertainty, in unit of the last quoted decimal place.

Far-infrared data for ¹H³²S₂

Laser			Rotational transition		Ref.
Gas	λ [μm]	ν [GHz]	$N_{K_a K_c}$	spin	
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)					
CH ₃ OD	305.7	980.591 6	$6_{24} \leftarrow 5_{15}$	$F_2 \leftarrow F_2$	95Ash
			$8_{27} \leftarrow 7_{16}$	$F_1 \leftarrow F_1$	
CH ₃ OD	294.8	1 016.897 2	$10_{29} \leftarrow 9_{18}$	$F_1 \leftarrow F_1$	
¹³ CD ₃ OD	216.4	1 385.646 1	$30_{2,28} \leftarrow 29_{1,29}$	$F_2 \leftarrow F_2$	
CH ₂ F ₂	214.6	1 397.118 6	$30_{2,28} \leftarrow 29_{1,29}$	$F_1 \leftarrow F_1$	
CH ₃ OH	211.3	1 419.049 3	$5_{33} \leftarrow 5_{24}$	$F_1 \leftarrow F_1$	
			$5_{32} \leftarrow 5_{23}$	$F_1 \leftarrow F_1$	
¹³ CH ₃ OH	203.6	1 472.199 4	$3_{31} \leftarrow 3_{22}$	$F_2 \leftarrow F_2$	
CH ₂ DOH	183.4	1 632.666 9	$11_{39} \leftarrow 10_{28}$	$F_2 \leftarrow F_2$	
CH ₃ OH	179.7	1 668.035 0	$15_{3,12} \leftarrow 14_{2,13}$	$F_1 \leftarrow F_1$	
			$22_{4,18} \leftarrow 23_{3,21}$	$F_2 \leftarrow F_2$	
			$22_{4,19} \leftarrow 23_{3,20}$	$F_2 \leftarrow F_2$	
CH ₃ OH	164.6	1 821.335 2	$10_{47} \leftarrow 11_{38}$	$F_1 \leftarrow F_1$	

Molecular parameters for ¹ H ³² S ₂				
Parameter		Value	Method	Ref.
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)				
<i>A</i>	[MHz]	296 978.959 7(77) ^{a)}	MW	00Tan
<i>B</i>	[MHz]	7 996.367 2(26)		
<i>C</i>	[MHz]	7 776.736 5(26)		
Δ_K	[MHz]	24.331 1(20)		
Δ_{NK}	[MHz]	0.233 786(26)		
Δ_N	[kHz]	5.887 13(34)		
δ_K	[MHz]	0.131 48(131)		
δ_N	[kHz]	0.156 04(18)		
ϕ_K	[kHz]	8.32 ^{b)}		
ϕ_{KN}	[Hz]	34.45(91)		
ϕ_{NK}	[Hz]	0.243(23)		
ϕ_N	[kHz]	0.0 ^{b)}		
ϕ_K	[kHz]	0.0 ^{b)}		
ϕ_{NK}	[kHz]	0.0 ^{b)}		
ϕ_N	[kHz]	0.0 ^{b)}		
ϵ_{aa}	[MHz]	− 45 926.759(36)		
ϵ_{bb}	[MHz]	− 424.263(45)		
ϵ_{cc}	[MHz]	10.071(45)		
$\frac{1}{2} (\epsilon_{ab} + \epsilon_{ba})$	[MHz]	234.699 6(49) ^{c)}		
Δ_K^s	[MHz]	6.714 0(61)		
$\Delta_{KN}^s + \Delta_{NK}^s$	[kHz]	202.128(54)		
Δ_{NK}^s	[kHz]	− 9.738(24)		
Δ_N^s	[kHz]	0.118 5(110)		
δ_K^s	[kHz]	84.9(229)		
δ_N^s	[Hz]	68.7(72)		
$a_F(^1H)$	[MHz]	− 22.400(235)		
$T_{aa}(^1H)$	[MHz]	− 5.871(193)		
$T_{bb}(^1H)$	[MHz]	5.841(124)		
$T_{cc}(^1H)$	[MHz]	0.030(80) ^{d)}		
$T_{ab}(^1H)$	[MHz]	− 4.197(207) ^{c)}		
$r_e(H-S)$	[nm]	0.135 23(49)		
$r_e(S-S)$	[nm]	0.196 03(10)		
$\alpha_e(H-S-S)$	[deg]	101.74(187)		

^{a)} The numbers in parentheses represent 1 standard deviation of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter constrained to this value.

^{c)} The relative sign of the two parameters is correct.

^{d)} Derived parameter.

Microwave data for ²H³²S₂ (DS₂)

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)} $F' - F''$		

State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)

$10_{0,10} \leftarrow 9_{09}$	$10 \frac{1}{2} \leftarrow 9 \frac{1}{2}$	^{b)}	151 826.903	94Yam
	$9 \frac{1}{2} \leftarrow 8 \frac{1}{2}$	^{b)}	151 438.446	
$10_{1,10} \leftarrow 9_{19}$	$10 \frac{1}{2} \leftarrow 9 \frac{1}{2}$	^{b)}	150 227.867	

	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	149 908.174
$10_{19} \leftarrow 9_{18}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	153 850.872
$11_{0,11} \leftarrow 10_{0,10}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	166 986.982
$11_{1,11} \leftarrow 10_{1,10}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	165 195.304
	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	164 944.232
$11_{1,10} \leftarrow 10_{19}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	169 331.614
	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	169 270.382
$12_{0,12} \leftarrow 11_{0,11}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	182 137.793
$12_{1,12} \leftarrow 11_{1,11}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	180 166.250
$12_{1,12} \leftarrow 11_{1,11}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	184 674.152
	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	184 676.729
$14_{0,14} \leftarrow 13_{0,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	212 407.927
	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	212 568.337
$14_{1,14} \leftarrow 13_{1,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	210 110.838
	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	209 985.208
$14_{2,12} \leftarrow 13_{2,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	212 779.190
$14_{3,12} \leftarrow 13_{3,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	212 053.719
$14_{3,11} \leftarrow 13_{3,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	212 057.946
$14_{4,11} \leftarrow 13_{4,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	211 493.704 ^{c)}
$14_{4,10} \leftarrow 13_{49}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	211 493.704 ^{c)}
$14_{5,10} \leftarrow 13_{59}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	210 929.284 ^{c)}
$14_{59} \leftarrow 13_{58}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	210 929.284 ^{c)}
$16_{0,16} \leftarrow 15_{0,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	242 631.069
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	242 782.454
$16_{1,16} \leftarrow 15_{1,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	240 050.524
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	239 971.793
$16_{1,15} \leftarrow 15_{1,14}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	246 080.657
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	246 206.966
$16_{2,15} \leftarrow 15_{2,14}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	242 874.204
$16_{2,14} \leftarrow 15_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	243 792.012
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	243 400.227
$16_{3,14} \leftarrow 15_{3,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	242 635.165
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	243 748.098
$16_{3,13} \leftarrow 15_{3,12}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	243 748.098
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	242 643.424
$16_{4,13} \leftarrow 15_{4,12}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	244 063.856 ^{c)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	242 142.916 ^{c)}
$16_{4,12} \leftarrow 15_{4,11}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	244 063.856 ^{c)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	242 142.916 ^{c)}
$16_{5,12} \leftarrow 15_{5,11}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	244 415.330 ^{c)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	241 630.550 ^{c)}
$16_{5,12} \leftarrow 15_{5,11}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	244 415.330 ^{c)}
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	241 630.550 ^{c)}
$17_{0,17} \leftarrow 16_{0,16}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	257 723.113
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	257 868.959
$17_{1,16} \leftarrow 16_{1,15}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	261 426.387

	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	261 569.542
$17_{2,16} \leftarrow 16_{2,15}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	258 452.649
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	258 081.658
$17_{2,15} \leftarrow 16_{2,14}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	259 030.077
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	258 710.225
$17_{3,15} \leftarrow 16_{3,14}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	258 876.889
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	257 904.660
$17_{3,14} \leftarrow 16_{3,13}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	258 886.569
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	257 915.785
$17_{4,14} \leftarrow 16_{4,13}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	257 439.940 ^{°)}
$17_{4,13} \leftarrow 16_{4,12}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	257 439.940 ^{°)}
$17_{5,13} \leftarrow 16_{5,12}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	259 479.373 ^{°)}
$17_{5,12} \leftarrow 16_{5,11}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	259 479.373 ^{°)}
$17_{6,12} \leftarrow 16_{6,11}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	259 797.697 ^{°)}
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	256 457.701 ^{°)}
$17_{6,12} \leftarrow 16_{6,11}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	259 797.697 ^{°)}
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	256 457.701 ^{°)}
$17_{6,12} \leftarrow 16_{6,11}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	260 095.025 ^{°)}
$17_{6,11} \leftarrow 16_{6,10}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	260 095.025 ^{°)}
$18_{0,18} \leftarrow 17_{0,17}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	272 801.174
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	272 941.031
$18_{1,18} \leftarrow 17_{1,17}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	269 978.810
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	269 931.284
$18_{1,17} \leftarrow 17_{1,16}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	276 767.825
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	276 924.545
$18_{2,17} \leftarrow 17_{2,16}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	273 594.279
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	273 279.188
$18_{2,16} \leftarrow 17_{2,15}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 280.595
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	274 022.377
$18_{3,16} \leftarrow 17_{3,15}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 020.335
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	273 163.052
$18_{3,15} \leftarrow 17_{3,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 033.303
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	273 177.825
$18_{4,15} \leftarrow 17_{4,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 268.963 ^{°)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	272 722.027 ^{°)}
$18_{4,14} \leftarrow 17_{4,13}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 268.963 ^{°)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	272 722.027 ^{°)}
$18_{5,14} \leftarrow 17_{5,13}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 555.273 ^{°)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	272 254.441 ^{°)}
$18_{5,13} \leftarrow 17_{5,12}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 555.273 ^{°)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	272 254.441 ^{°)}
$18_{6,13} \leftarrow 17_{6,12}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 847.166 ^{°)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	271 777.105 ^{°)}
$18_{6,12} \leftarrow 17_{6,11}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	274 847.166 ^{°)}
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	271 777.105 ^{°)}
$18_{7,12} \leftarrow 17_{7,11}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	275 123.286 ^{°)}

	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	271 302.474 ^{c)}	
$18_{7,11} \leftarrow 17_{7,10}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	275 123.286 ^{c)}	
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	271 302.474 ^{c)}	
$19_{0,19} \leftarrow 18_{0,18}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	287 864.606	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 998.159	
$19_{1,19} \leftarrow 18_{1,18}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	284 937.352	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	284 901.479	
$19_{1,18} \leftarrow 18_{1,17}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	292 104.236	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	292 271.816	
$19_{2,18} \leftarrow 18_{2,17}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	288 735.265	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	288 467.651	
$19_{2,17} \leftarrow 18_{2,16}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	289 543.193	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	289 338.125	
$19_{3,17} \leftarrow 18_{3,16}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	289 169.813	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	288 411.964	
$19_{3,16} \leftarrow 18_{3,15}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	289 186.887	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	288 431.328	
$19_{4,16} \leftarrow 18_{4,15}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	289 385.189 ^{c)}	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 991.258 ^{c)}	
$19_{4,15} \leftarrow 18_{4,14}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	289 385.189 ^{c)}	
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 991.258 ^{c)}	
$19_{5,15} \leftarrow 18_{5,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 542.794 ^{c)}	
$19_{5,14} \leftarrow 18_{5,13}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 542.794 ^{c)}	
$19_{6,14} \leftarrow 18_{6,13}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 080.654 ^{c)}	
$19_{6,13} \leftarrow 18_{6,12}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	287 080.654 ^{c)}	
$19_{7,13} \leftarrow 18_{7,12}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	290 162.072 ^{c)}	
$19_{7,12} \leftarrow 18_{7,11}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	290 162.072 ^{c)}	
$12_{1,11} \leftarrow 12_{0,12}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	165 743.348	
$13_{1,12} \leftarrow 13_{0,13}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	163 727.360	
	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	168 374.995	
$15_{1,14} \leftarrow 15_{0,15}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	174 420.081	
$16_{1,15} \leftarrow 16_{0,16}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	173 354.084	
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	177 844.582	
$17_{1,16} \leftarrow 17_{0,17}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	177 057.393	
	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	181 545.177	
$18_{1,17} \leftarrow 18_{0,18}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	185 528.656	
$19_{1,18} \leftarrow 19_{0,19}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	^{b)}	185 263.704	
$10_{37} \leftarrow 10_{28}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	729 778.040(200) ^{d)}	00Tan
$11_{38} \leftarrow 11_{29}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	730 211.501(300)	
	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	746 534.637(100)	
$12_{39} \leftarrow 12_{2,10}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	730 547.803(100)	
	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	745 791.221(100)	
$13_{3,10} \leftarrow 13_{2,11}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	730 788.931(100)	
$14_{3,11} \leftarrow 14_{2,12}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	730 936.044(100)	
	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	^{b)}	744 345.119(200)	
$15_{3,12} \leftarrow 15_{2,13}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	730 988.545(300)	

	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	743 613.112(100)
$16_{3,13} \leftarrow 16_{2,14}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	730 944.934(100)
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	742 856.272(100)
$17_{3,14} \leftarrow 17_{2,15}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	730 801.475(100)
	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	742 061.775(100)
$18_{3,15} \leftarrow 18_{2,16}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	730 554.227(200)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	741 217.175(100)
$19_{3,16} \leftarrow 19_{2,17}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	^{b)}	730 197.876(100)
	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	740 310.535(100)
$10_{38} \leftarrow 10_{29}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	^{b)}	730 108.606(100)
	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	747 712.284(100)
$11_{39} \leftarrow 11_{2,10}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	730 693.708(100)
$12_{3,10} \leftarrow 12_{2,11}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	^{b)}	746 586.900(100)
$13_{3,11} \leftarrow 13_{2,12}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	^{b)}	746 144.835(200)
$14_{3,12} \leftarrow 14_{2,13}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	732 184.449(100)
$15_{3,13} \leftarrow 15_{2,14}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	732 626.607(100)
	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	^{b)}	745 470.805(100)
$16_{3,14} \leftarrow 16_{2,15}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	733 056.192(100)
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	^{b)}	745 231.810(100)
$17_{3,15} \leftarrow 17_{2,16}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	733 480.403(100)
	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	^{b)}	745 054.850(100)
$18_{3,16} \leftarrow 18_{2,17}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	733 906.448(100)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	^{b)}	744 938.575(100)
$19_{3,17} \leftarrow 19_{2,18}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	^{b)}	734 341.104(100)
	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	^{b)}	744 882.934(100)
$8_{35} \leftarrow 7_{26}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	851 220.492(300)
$9_{36} \leftarrow 8_{27}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	866 977.481(100)
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	884 361.519(100)
$10_{37} \leftarrow 9_{28}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	882 693.646(200)
$8_{36} \leftarrow 7_{25}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	^{b)}	869 644.950(300)
$9_{37} \leftarrow 8_{26}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	^{b)}	866 839.869(100)
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	^{b)}	884 186.910(200)
$10_{38} \leftarrow 9_{27}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	^{b)}	882 473.717(100)

^{a)} Coupling scheme: $J = N + S$; $F = J + I_1$ where I_1 is the ²H nuclear spin.

^{b)} ²H hyperfine splitting not resolved.

^{c)} K-type doubling not resolved.

^{d)} The numbers in parentheses represent the authors' estimate of the experimental uncertainty, in unit of the last quoted decimal place.

Molecular parameters for ²H³²S₂ (DS₂)

Parameter	Value	Method	Ref.	
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)				
$A - \frac{1}{2}(B + C)$	[MHz]	147 806.509(55) ^{a)}	MW	00Tan
$\frac{1}{2}(B + C)$	[MHz]	7 603.098 14(36)		
$\frac{1}{4}(B - C)$	[MHz]	96.089 15(34)		
D_K	[MHz]	6.785 2(43)		
D_{NK}	[MHz]	0.184 299(35)		
D_N	[kHz]	5.152 21(61)		
d_1	[kHz]	- 0.256 87(66)		
d_2	[kHz]	- 0.036 328(175)		
H_K	[kHz]	8.32 ^{b)}		
H_{KN}	[kHz]	0.034 00(88)		
H_{NK}	[Hz]	0.127(60)		
H_N	[kHz]	0.0 ^{b)}		
h_1	[kHz]	0.0 ^{b)}		
h_2	[kHz]	0.0 ^{b)}		
h_3	[kHz]	0.0 ^{b)}		
ϵ_{aa}	[MHz]	- 24 103.171(134)		
ϵ_{bb}	[MHz]	- 405.118 5(159)		
ϵ_{cc}	[MHz]	9.045 8(174)		
$\frac{1}{2}(\epsilon_{ab} + \epsilon_{ba})$	[MHz]	187.100 4(184)		
D_K^s	[MHz]	6.713 8(65)		
D_{KN}^s	[kHz]	29.85(47)		
D_{NK}^s	[kHz]	1.511(24)		
D_N^s	[Hz]	68.1(67)		
d_1^s	[Hz]	60.2(100)		
d_2^s	[Hz]	57.1(67)		

^{a)} The numbers in parentheses represent 1 standard deviation of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter constrained to this value.

References for HS₂

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3.2.3.2.12 ClO₂Microwave data for ³⁵Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)} $F' - F''$		
$2_{21} \leftarrow 2_{12}$	$2\frac{1}{2} \leftarrow 2\frac{1}{2}$	$4 \leftarrow 4$	130 449.129(25) ^{b)}	97Mül
		$2 \leftarrow 3$	130 505.006(25)	
		$3 \leftarrow 3$	130 524.656(40)	
		$4 \leftarrow 3$	130 532.405(30)	

State: electronic \tilde{X}^2A' ; vibrational (0,0,0)

		1 ← 2	130 533.056(50)
		2 ← 2	130 553.159(25)
		3 ← 2	130 572.765(20)
		2 ← 1	130 578.186(30)
39 _{4,35} ← 40 _{3,38}	39 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	41 ← 42	131 354.290(25)
		40 ← 41	131 405.999(25)
31 _{9,22} ← 32 _{8,25}	31 $\frac{1}{2}$ ← 32 $\frac{1}{2}$	30 ← 31	131 411.532(25)
		33 ← 34	131 411.532(25)
		31 ← 32	131 412.120(25)
		32 ← 33	131 412.120(25)
45 _{8,37} ← 44 _{9,36}	45 $\frac{1}{2}$ ← 44 $\frac{1}{2}$	47 ← 46	131 424.724(25)
		46 ← 45	131 427.312(25)
		45 ← 44	131 429.697(25)
		44 ← 43	131 431.841(25)
39 _{4,35} ← 40 _{3,38}	39 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	39 ← 40	131 448.181(25)
		38 ← 39	131 481.510(25)
32 _{5,28} ← 31 _{6,25}	32 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	31 ← 30	131 580.053(25)
		32 ← 31	131 580.897(25)
		33 ← 32	131 582.336(20)
		34 ← 33	131 584.384(20)
31 _{9,22} ← 32 _{8,25}	30 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	29 ← 30	132 027.819(25)
		32 ← 33	132 027.819(25)
		30 ← 31	132 028.434(25)
		31 ← 32	132 028.434(25)
2 ₂₁ ← 2 ₁₂	1 $\frac{1}{2}$ ← 1 $\frac{1}{2}$	1 ← 0	132 062.185(30)
		0 ← 1	132 096.361(25)
		2 ← 1	132 137.509(25)
		1 ← 2	132 206.358(25)
		2 ← 2	132 230.317(20)
		3 ← 2	132 239.645(25)
		2 ← 3	132 344.538(30)
26 _{8,19} ← 27 _{7,20}	26 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	28 ← 29	140 014.500(20)
		25 ← 26	140 015.171(60)
		27 ← 28	140 015.523(40)
		26 ← 27	140 015.523(40)
	25 $\frac{1}{2}$ ← 26 $\frac{1}{2}$	24 ← 25	140 678.009(20)
		27 ← 28	140 678.928(40)
		25 ← 26	140 678.928(40)
		26 ← 27	140 679.405(60)
35 _{10,25} ← 36 _{9,28}	35 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	34 ← 35	141 849.407(25)
		37 ← 38	141 849.407(25)
		35 ← 36	141 849.965(25)
		36 ← 37	141 849.965(25)
	34 $\frac{1}{2}$ ← 35 $\frac{1}{2}$	36 ← 37	142 459.596(25)
		33 ← 34	142 459.596(25)
		35 ← 36	142 460.184(25)
		34 ← 35	142 460.184(25)
22 _{4,19} ← 22 _{3,20}	22 $\frac{1}{2}$ ← 22 $\frac{1}{2}$	23 ← 23	314 780.650(80)
		22 ← 22	314 787.932(80)
		21 ← 21	314 793.233(80)
21 _{5,16} ← 21 _{4,17}	20 $\frac{1}{2}$ ← 20 $\frac{1}{2}$	22 ← 22	370 282.940(25)
		21 ← 21	370 288.470(25)
		20 ← 20	370 294.332(25)
		19 ← 19	370 300.434(25)

$58_{7,52} \leftarrow 57_{8,49}$	$57\frac{1}{2} \leftarrow 56\frac{1}{2}$	$56 \leftarrow 55$	381 048.86(40)
	$58\frac{1}{2} \leftarrow 57\frac{1}{2}$	$57 \leftarrow 56$	382 383.924(40)
		$58 \leftarrow 57$	382 394.484(40)
		$60 \leftarrow 59$	382 423.896(60)
$12_{3,10} \leftarrow 11_{29}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 10$	415 030.356(100)
$34_{13,22} \leftarrow 35_{12,23}$	$34\frac{1}{2} \leftarrow 35\frac{1}{2}$	$36 \leftarrow 37$	415 520.307(120)
		$35 \leftarrow 36$	415 522.363(200)
		$34 \leftarrow 35$	415 523.672(150)
		$33 \leftarrow 34$	415 523.672(150)
$43_{15,28} \leftarrow 44_{14,31}$	$42\frac{1}{2} \leftarrow 43\frac{1}{2}$	$41 \leftarrow 42$	415 694.336(120)
		$42 \leftarrow 43$	415 695.808(200)
		$43 \leftarrow 44$	415 696.735(150)
		$44 \leftarrow 45$	415 696.735(150)
$33_{6,27} \leftarrow 33_{5,28}$	$33\frac{1}{2} \leftarrow 33\frac{1}{2}$	$32 \leftarrow 31$	415 708.674(200)
		$32 \leftarrow 33$	415 753.595(200)
		$34 \leftarrow 35$	415 809.880(200)
		$33 \leftarrow 34$	415 809.880(200)
		$34 \leftarrow 33$	415 859.157(300)
$25_{11,14} \leftarrow 26_{10,17}$	$24\frac{1}{2} \leftarrow 25\frac{1}{2}$	$23 \leftarrow 24$	415 956.335(100)
		$24 \leftarrow 25$	415 960.173(120)
		$25 \leftarrow 26$	415 962.620(180)
		$26 \leftarrow 27$	415 963.283(180)
$34_{13,22} \leftarrow 35_{12,23}$	$33\frac{1}{2} \leftarrow 34\frac{1}{2}$	$32 \leftarrow 33$	416 490.403(120)
		$33 \leftarrow 34$	416 492.561(200)
		$34 \leftarrow 35$	416 494.122(150)
		$35 \leftarrow 36$	416 494.122(150)
$34_{3,32} \leftarrow 35_{0,35}$	$33\frac{1}{2} \leftarrow 34\frac{1}{2}$	$32 \leftarrow 33$	416 795.175(100)
		$33 \leftarrow 34$	416 840.170(120)
		$34 \leftarrow 35$	416 879.115(120)
$12_{3,10} \leftarrow 11_{29}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$13 \leftarrow 13$	417 026.236(300)
		$12 \leftarrow 12$	417 083.542(300)
		$11 \leftarrow 11$	417 138.460(300)
		$10 \leftarrow 10$	417 190.300(300)
$60_{8,53} \leftarrow 59_{9,50}$	$59\frac{1}{2} \leftarrow 58\frac{1}{2}$	$61 \leftarrow 60$	418 538.951(180)
		$60 \leftarrow 59$	418 541.528(180)
		$58 \leftarrow 57$	418 548.871(150)
$11_{83} \leftarrow 12_{76}$	$11\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 14$	419 752.545(120)
		$12 \leftarrow 12$	419 791.619(170)
		$11 \leftarrow 11$	419 797.108(170)
$11_{38} \leftarrow 11_{0,11}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$13 \leftarrow 13$	419 847.982(100)
		$11 \leftarrow 12$	419 865.670(200)
		$12 \leftarrow 12$	419 896.192(100)
		$11 \leftarrow 11$	419 931.466(100)
		$10 \leftarrow 10$	419 955.952(100)
$50_{5,46} \leftarrow 51_{2,49}$	$50\frac{1}{2} \leftarrow 51\frac{1}{2}$	$12 \leftarrow 11$	419 961.969(140)
$11_{38} \leftarrow 11_{0,11}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$51 \leftarrow 52$	419 972.040(150)
$50_{5,46} \leftarrow 51_{2,49}$	$50\frac{1}{2} \leftarrow 51\frac{1}{2}$	$11 \leftarrow 10$	419 975.856(200)
		$50 \leftarrow 51$	419 998.092(180)
$11_{38} \leftarrow 11_{0,11}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$49 \leftarrow 50$	420 018.616(180)
		$9 \leftarrow 9$	421 018.616(100)
		$10 \leftarrow 10$	421 594.420(100)
		$11 \leftarrow 11$	421 641.341(100)
		$12 \leftarrow 12$	421 681.321(100)

$11_{83} \leftarrow 12_{76}$	$10\frac{1}{2} \leftarrow 11\frac{1}{2}$	$9 \leftarrow 10$	421 752.105(100)
		$11 \leftarrow 11$	421 759.118(150)
		$12 \leftarrow 12$	421 762.708(150)
		$10 \leftarrow 11$	421 768.397(100)
		$11 \leftarrow 12$	421 779.859(120)
		$12 \leftarrow 13$	421 784.748(120)
$50_{5,46} \leftarrow 51_{2,49}$	$49\frac{1}{2} \leftarrow 50\frac{1}{2}$	$48 \leftarrow 49$	422 595.576(150)
$45_{6,39} \leftarrow 44_{7,38}$	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	$47 \leftarrow 46$	422 585.162(100)
		$46 \leftarrow 45$	422 595.576(100)
		$45 \leftarrow 44$	422 603.885(100)
		$44 \leftarrow 43$	422 619.446(100)
$59_{8,51} \leftarrow 59_{7,52}$	$58\frac{1}{2} \leftarrow 58\frac{1}{2}$	$60 \leftarrow 60$	422 859.453(100)
		$59 \leftarrow 59$	422 863.396(150)
		$58 \leftarrow 58$	422 868.228(100)
		$57 \leftarrow 57$	422 873.730(100)
	$59\frac{1}{2} \leftarrow 59\frac{1}{2}$	$58 \leftarrow 58$	423 075.720(100)
		$59 \leftarrow 59$	423 079.497(100)
$47_{16,31} \leftarrow 48_{15,34}$	$47\frac{1}{2} \leftarrow 48\frac{1}{2}$	$49 \leftarrow 50$	423 215.755(150)
		$46 \leftarrow 47$	423 217.550(120)
		$47 \leftarrow 48$	423 217.550(120)
$45_{6,39} \leftarrow 44_{7,38}$	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	$43 \leftarrow 42$	423 479.793(100)
		$44 \leftarrow 43$	423 498.769(100)
		$45 \leftarrow 44$	423 515.359(100)
		$46 \leftarrow 45$	423 529.367(100)
$42_{4,39} \leftarrow 43_{1,42}$	$41\frac{1}{2} \leftarrow 42\frac{1}{2}$	$43 \leftarrow 44$	423 553.688(150)
$47_{16,31} \leftarrow 48_{15,34}$	$46\frac{1}{2} \leftarrow 47\frac{1}{2}$	$45 \leftarrow 46$	424 060.128(150)
		$47 \leftarrow 48$	424 062.163(120)
		$48 \leftarrow 49$	424 062.163(120)
$11_{38} \leftarrow 10_{29}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	$12 \leftarrow 12$	424 314.130(100)
		$11 \leftarrow 11$	424 344.685(100)
		$13 \leftarrow 12$	424 357.678(70)
		$10 \leftarrow 10$	424 367.997(100)
		$12 \leftarrow 11$	424 375.183(70)
		$11 \leftarrow 10$	424 387.827(70)
		$10 \leftarrow 9$	424 396.562(70)
$20_{10,11} \leftarrow 21_{9,12}$	$19\frac{1}{2} \leftarrow 20\frac{1}{2}$	$18 \leftarrow 19$	424 413.095(70)
		$19 \leftarrow 20$	424 418.906(100)
		$20 \leftarrow 21$	424 422.510(90)
		$21 \leftarrow 22$	424 423.857(90)
$25_{0,25} \leftarrow 24_{1,24}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	$26 \leftarrow 26$	424 527.264(100)
		$25 \leftarrow 25$	424 554.433(100)
		$24 \leftarrow 24$	424 578.233(150)
$38_{14,25} \leftarrow 39_{13,26}$	$38\frac{1}{2} \leftarrow 39\frac{1}{2}$	$40 \leftarrow 41$	424 583.589(100)
		$39 \leftarrow 40$	424 585.296(200)
		$38 \leftarrow 39$	424 586.367(200)
		$37 \leftarrow 38$	424 586.367(200)
$29_{12,17} \leftarrow 30_{11,20}$	$29\frac{1}{2} \leftarrow 30\frac{1}{2}$	$31 \leftarrow 32$	424 597.525(100)
		$30 \leftarrow 31$	424 600.358(150)
		$29 \leftarrow 30$	424 602.132(120)
		$28 \leftarrow 29$	424 602.132(120)
$25_{0,25} \leftarrow 24_{1,24}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$25 \leftarrow 25$	424 714.905(100)
		$24 \leftarrow 24$	424 734.395(100)
		$23 \leftarrow 23$	424 751.628(100)

	$24\frac{1}{2} \leftarrow 24\frac{1}{2}$	$25 \leftarrow 25$	425 150.434(150)
$65_{8,57} \leftarrow 65_{7,58}$	$64\frac{1}{2} \leftarrow 64\frac{1}{2}$	$63 \leftarrow 63$	428 200.760(150)
		$64 \leftarrow 64$	428 207.861(150)
		$66 \leftarrow 66$	428 218.724(150)
$46_{8,39} \leftarrow 47_{5,42}$	$45\frac{1}{2} \leftarrow 46\frac{1}{2}$	$47 \leftarrow 48$	428 283.033(180)
	$46\frac{1}{2} \leftarrow 47\frac{1}{2}$	$46 \leftarrow 47$	428 294.634(150)
		$45 \leftarrow 46$	428 497.769(180)
		$46 \leftarrow 47$	428 508.392(130)
		$47 \leftarrow 48$	428 521.126(150)
		$48 \leftarrow 49$	428 536.263(180)
$43_{3,40} \leftarrow 44_{2,43}$	$43\frac{1}{2} \leftarrow 44\frac{1}{2}$	$45 \leftarrow 46$	428 766.490(120)
		$44 \leftarrow 45$	428 805.381(120)
$51_{17,34} \leftarrow 52_{16,37}$	$51\frac{1}{2} \leftarrow 52\frac{1}{2}$	$53 \leftarrow 54$	431 253.080(200)
		$52 \leftarrow 53$	431 254.162(200)
		$50 \leftarrow 51$	431 254.720(200)
		$51 \leftarrow 52$	431 254.720(200)
		$49 \leftarrow 50$	432 077.477(180)
		$51 \leftarrow 52$	432 079.194(150)
		$52 \leftarrow 53$	432 079.194(150)
$42_{15,28} \leftarrow 43_{14,29}$	$42\frac{1}{2} \leftarrow 43\frac{1}{2}$	$44 \leftarrow 45$	433 289.944(150)
		$43 \leftarrow 44$	433 291.602(250)
		$42 \leftarrow 43$	433 292.296(120)
		$41 \leftarrow 42$	433 292.296(120)
		$40 \leftarrow 41$	434 186.999(120)
		$41 \leftarrow 42$	434 188.527(180)
		$42 \leftarrow 43$	434 189.627(120)
		$43 \leftarrow 44$	434 189.627(120)
$46_{6,41} \leftarrow 46_{5,42}$	$46\frac{1}{2} \leftarrow 46\frac{1}{2}$	$48 \leftarrow 48$	520 199.285(250)
		$46 \leftarrow 46$	520 218.276(180)
		$45 \leftarrow 45$	520 224.839(200)
	$45\frac{1}{2} \leftarrow 45\frac{1}{2}$	$44 \leftarrow 44$	521 110.963(180)
		$45 \leftarrow 45$	521 121.588(180)
		$46 \leftarrow 46$	521 130.595(200)
$41_{3,38} \leftarrow 41_{2,39}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	$43 \leftarrow 43$	521 175.909(150)
		$40 \leftarrow 40$	521 228.791(180)
$37_{2,35} \leftarrow 37_{1,36}$	$37\frac{1}{2} \leftarrow 37\frac{1}{2}$	$39 \leftarrow 39$	522 414.966(130)
		$38 \leftarrow 38$	522 436.788(200)
		$37 \leftarrow 37$	522 454.523(150)
		$36 \leftarrow 36$	522 468.291(150)
$15_{3,12} \leftarrow 14_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$17 \leftarrow 16$	522 433.855(120)
		$16 \leftarrow 15$	522 436.778(130)
		$15 \leftarrow 14$	522 454.523(120)
		$14 \leftarrow 13$	522 463.489(120)
$41_{3,38} \leftarrow 41_{2,39}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	$39 \leftarrow 39$	522 622.354(170)
$15_{3,12} \leftarrow 14_{2,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$13 \leftarrow 12$	523 516.930(130)
		$14 \leftarrow 13$	523 547.349(130)
		$15 \leftarrow 14$	523 575.021(130)
		$16 \leftarrow 15$	523 598.696(180)
$37_{2,35} \leftarrow 37_{1,36}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$35 \leftarrow 35$	523 802.713(160)
		$36 \leftarrow 36$	523 824.465(150)
		$38 \leftarrow 38$	523 859.215(150)
$37_{4,33} \leftarrow 36_{5,32}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	$39 \leftarrow 39$	524 069.720(120)
		$38 \leftarrow 38$	524 089.949(120)

		37 ← 37	524 106.623(120)
		36 ← 36	524 120.004(120)
$51_{8,43} \leftarrow 51_{7,44}$	$50\frac{1}{2} \leftarrow 50\frac{1}{2}$	52 ← 52	524 228.944(200)
$31_{0,31} \leftarrow 30_{1,30}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	32 ← 31	524 591.005(150)
		31 ← 30	524 591.005(150)
		30 ← 29	524 591.005(150)
		29 ← 28	524 591.005(150)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	30 ← 29	524 594.793(180)
		31 ← 30	524 594.793(180)
		32 ← 31	524 594.793(180)
		33 ← 32	524 594.793(180)
$51_{8,43} \leftarrow 51_{7,44}$	$51\frac{1}{2} \leftarrow 51\frac{1}{2}$	50 ← 50	524 663.145(200)
$26_{3,24} \leftarrow 25_{2,23}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	51 ← 51	524 670.748(200)
$37_{4,33} \leftarrow 36_{5,32}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	27 ← 26	524 680.444(120)
		35 ← 34	524 983.011(150)
		36 ← 35	525 003.269(130)
		37 ← 36	525 021.060(150)
		38 ← 37	525 036.093(150)
$26_{3,24} \leftarrow 25_{2,23}$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	25 ← 24	525 065.633(130)
		26 ← 25	525 076.464(130)
		27 ← 26	525 090.136(130)
		28 ← 27	525 106.853(130)
$19_{11,8} \leftarrow 20_{10,11}$	$19\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 22	525 190.270(180)
		20 ← 21	525 197.619(180)
		19 ← 20	525 201.541(240)
		18 ← 19	525 202.549(240)

^{a)} Coupling scheme: $J = N + S$; $F = J + I$, where I is the ³⁵Cl nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁵Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (1,0,0)				
$24_{5,20} \leftarrow 24_{4,21}$	$23\frac{1}{2} \leftarrow 23\frac{1}{2}$	$22 \leftarrow 22$	$380\,503.553(60)^b)$	97Mül
		$23 \leftarrow 23$	$380\,505.570(60)$	
		$24 \leftarrow 24$	$380\,507.140(80)$	
		$25 \leftarrow 25$	$380\,507.981(80)$	
$20_{5,16} \leftarrow 20_{4,17}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$18 \leftarrow 18$	$381\,072.368(40)$	
		$19 \leftarrow 19$	$381\,073.465(80)$	
		$21 \leftarrow 21$	$381\,073.465(80)$	
		$20 \leftarrow 20$	$381\,073.465(80)$	
$26_{5,22} \leftarrow 26_{4,23}$	$26\frac{1}{2} \leftarrow 26\frac{1}{2}$	$27 \leftarrow 27$	$381\,568.057(40)$	
$9_{36} \leftarrow 8_{27}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	$10 \leftarrow 9$	$381\,569.469(60)$	
$26_{5,22} \leftarrow 26_{4,23}$	$26\frac{1}{2} \leftarrow 26\frac{1}{2}$	$26 \leftarrow 26$	$381\,570.551(50)$	
		$25 \leftarrow 25$	$381\,572.183(50)$	
	$25\frac{1}{2} \leftarrow 25\frac{1}{2}$	$24 \leftarrow 24$	$382\,075.872(35)$	
		$25 \leftarrow 25$	$382\,079.136(60)$	
		$27 \leftarrow 27$	$382\,083.528(40)$	

$9_{36} \leftarrow 8_{27}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 6$	382 401.127(40)
		$8 \leftarrow 7$	382 413.525(40)
$33_{6,27} \leftarrow 33_{5,28}$	$32\frac{1}{2} \leftarrow 32\frac{1}{2}$	$33 \leftarrow 33$	416 265.023(120)
		$32 \leftarrow 32$	416 275.015(200)
		$31 \leftarrow 31$	416 286.135(200)
	$33\frac{1}{2} \leftarrow 33\frac{1}{2}$	$32 \leftarrow 32$	416 368.407(120)
		$33 \leftarrow 33$	416 375.826(120)
		$35 \leftarrow 35$	416 395.687(150)
$25_{0,25} \leftarrow 24_{1,24}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$26 \leftarrow 25$	421 946.667(120)
		$25 \leftarrow 24$	421 946.667(120)
		$23 \leftarrow 22$	421 947.693(150)
	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	$24 \leftarrow 23$	421 946.667(120)
		$26 \leftarrow 25$	421 947.693(150)
		$27 \leftarrow 26$	421 948.047(180)
$11_{38} \leftarrow 10_{29}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	$13 \leftarrow 12$	423 034.506(120)
		$12 \leftarrow 11$	423 052.008(120)
		$11 \leftarrow 10$	423 064.698(150)
		$10 \leftarrow 9$	423 073.430(150)
	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	$9 \leftarrow 8$	423 881.744(120)
		$10 \leftarrow 9$	423 898.875(120)
		$11 \leftarrow 10$	423 914.519(120)
		$12 \leftarrow 11$	423 927.632(120)
$24_{2,23} \leftarrow 23_{1,22}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$23 \leftarrow 22$	431 313.237(120)
		$24 \leftarrow 23$	431 317.072(120)
		$26 \leftarrow 25$	431 327.922(120)
$31_{6,25} \leftarrow 31_{5,26}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$30 \leftarrow 30$	432 213.113(150)
		$31 \leftarrow 31$	432 219.091(150)
		$32 \leftarrow 32$	432 226.431(150)
		$33 \leftarrow 33$	432 235.098(150)
	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 30$	432 267.899(180)
		$29 \leftarrow 29$	432 276.882(180)

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁵Cl nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁵Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
$19_{1,18} \leftarrow 18_{2,17}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 18$	$313\,832.352(200)^b$	97Mül
		$18 \leftarrow 17$	$313\,837.958(150)$	
$20_{2,19} \leftarrow 19_{1,18}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 18$	$381\,013.288(70)$	
		$20 \leftarrow 19$	$381\,021.506(70)$	
		$21 \leftarrow 20$	$381\,031.970(70)$	
$27_{1,26} \leftarrow 27_{0,27}$	$27\frac{1}{2} \leftarrow 27\frac{1}{2}$	$27 \leftarrow 27$	$415\,236.807(100)$	
		$26 \leftarrow 26$	$415\,254.430(100)$	
$6_{43} \leftarrow 5_{32}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 7$	$416\,248.167(150)$	
		$5 \leftarrow 5$	$416\,262.502(120)$	

		8 ← 7	416 270.490(100)
		7 ← 6	416 278.913(100)
		5 ← 4	416 282.257(120)
		6 ← 5	416 282.257(120)
51 _{7,44} ← 50 _{8,43}	50 $\frac{1}{2}$ ← 49 $\frac{1}{2}$	49 ← 48	416 501.516(150)
		50 ← 49	416 516.690(170)
		51 ← 50	416 529.995(150)
27 _{1,26} ← 27 _{0,27}	26 $\frac{1}{2}$ ← 26 $\frac{1}{2}$	52 ← 51	416 541.159(150)
		25 ← 25	416 591.632(100)
		27 ← 27	416 646.697(100)
12 ₈₅ ← 13 ₇₆	12 $\frac{1}{2}$ ← 13 $\frac{1}{2}$	28 ← 28	416 668.522(100)
		14 ← 15	416 755.284(100)
		13 ← 14	416 768.313(100)
		12 ← 13	416 774.893(130)
30 _{3,28} ← 30 _{2,29}	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	11 ← 12	416 776.389(130)
		32 ← 32	416 948.550(100)
		31 ← 31	416 972.386(100)
		30 ← 30	416 991.543(100)
31 _{2,29} ← 31 _{1,30}	31 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	29 ← 29	417 006.350(100)
		33 ← 33	417 289.435(100)
		32 ← 32	417 317.718(100)
		31 ← 31	417 340.647(100)
		30 ← 30	417 358.465(100)
6 ₄₃ ← 5 ₃₂	5 $\frac{1}{2}$ ← 4 $\frac{1}{2}$	4 ← 3	417 435.615(100)
		5 ← 4	417 441.897(100)
		6 ← 5	417 447.512(100)
		7 ← 6	417 450.824(100)
		5 ← 5	417 462.522(100)
		6 ← 6	417 471.113(100)
26 _{11,16} ← 27 _{10,17}	26 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	28 ← 29	417 599.868(120)
30 _{3,28} ← 30 _{2,29}	29 $\frac{1}{2}$ ← 29 $\frac{1}{2}$	28 ← 28	418 211.871(150)
		29 ← 29	418 235.944(100)
		30 ← 30	418 256.922(100)
12 ₈₅ ← 13 ₇₆	11 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	10 ← 11	418 545.500(100)
26 _{11,16} ← 27 _{10,17}	25 $\frac{1}{2}$ ← 26 $\frac{1}{2}$	11 ← 12	418 558.902(150)
		26 ← 27	418 682.879(170)
31 _{2,29} ← 31 _{1,30}	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	27 ← 28	418 682.879(170)
		29 ← 29	418 745.626(100)
		30 ← 30	418 774.169(100)
		31 ← 31	418 799.058(100)
		32 ← 32	418 819.827(100)
12 _{3,10} ← 11 ₂₉	12 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	11 ← 10	419 419.606(100)
		12 ← 11	419 432.243(100)
		13 ← 12	419 447.957(100)
		14 ← 13	419 467.139(100)
	11 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	13 ← 12	419 642.732(120)
		12 ← 11	419 661.067(120)
		11 ← 10	419 681.103(120)
		10 ← 9	419 702.225(120)
34 _{3,30} ← 34 _{4,31}	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	36 ← 36	421 610.080(100)
		35 ← 35	421 619.775(100)
		34 ← 34	421 627.537(100)
		33 ← 33	421 633.463(100)

$35_{13,22} \leftarrow 36_{12,25}$	$35\frac{1}{2} \leftarrow 36\frac{1}{2}$	$37 \leftarrow 38$	422 044.215(120)
		$36 \leftarrow 37$	422 046.088(180)
		$35 \leftarrow 36$	422 047.256(150)
		$34 \leftarrow 35$	422 047.256(150)
$34_{5,30} \leftarrow 34_{4,31}$	$33\frac{1}{2} \leftarrow 33\frac{1}{2}$	$32 \leftarrow 32$	422 357.348(100)
		$33 \leftarrow 33$	422 367.359(200)
		$34 \leftarrow 34$	422 375.747(100)
		$35 \leftarrow 35$	422 382.648(120)
$35_{13,22} \leftarrow 36_{12,25}$	$34\frac{1}{2} \leftarrow 35\frac{1}{2}$	$34 \leftarrow 35$	422 970.953(200)
		$35 \leftarrow 36$	422 972.375(150)
		$36 \leftarrow 37$	422 972.375(150)
$47_{7,40} \leftarrow 47_{6,41}$	$46\frac{1}{2} \leftarrow 46\frac{1}{2}$	$48 \leftarrow 48$	423 060.541(120)
		$47 \leftarrow 47$	423 069.106(120)
	$47\frac{1}{2} \leftarrow 47\frac{1}{2}$	$46 \leftarrow 46$	423 495.888(150)
		$47 \leftarrow 47$	423 503.619(120)
		$48 \leftarrow 48$	423 513.198(150)
		$49 \leftarrow 49$	423 524.607(120)
$21_{10,11} \leftarrow 22_{9,14}$	$21\frac{1}{2} \leftarrow 22\frac{1}{2}$	$23 \leftarrow 24$	423 960.489(100)
		$22 \leftarrow 23$	423 965.435(100)
		$21 \leftarrow 22$	423 968.289(120)
		$20 \leftarrow 21$	423 968.289(120)
		$20 \leftarrow 21$	425 201.698(120)
		$21 \leftarrow 22$	425 204.894(150)
		$22 \leftarrow 23$	425 206.067(150)
$30_{12,19} \leftarrow 31_{11,20}$	$30\frac{1}{2} \leftarrow 31\frac{1}{2}$	$32 \leftarrow 33$	429 262.894(120)
		$31 \leftarrow 32$	429 265.537(150)
		$30 \leftarrow 31$	429 267.070(120)
		$29 \leftarrow 30$	429 267.070(120)
$7_{52} \leftarrow 6_{43}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$9 \leftarrow 8$	522 014.506(150)
		$8 \leftarrow 7$	522 021.366(200)
		$7 \leftarrow 6$	522 024.576(160)
		$6 \leftarrow 5$	522 024.576(160)
$31_{0,31} \leftarrow 30_{1,30}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$32 \leftarrow 31$	523 238.336(150)
		$31 \leftarrow 30$	523 238.336(150)
		$30 \leftarrow 29$	523 238.336(150)
		$29 \leftarrow 28$	523 238.336(150)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 29$	523 241.994(170)
		$31 \leftarrow 30$	523 241.994(170)
		$32 \leftarrow 31$	523 241.994(170)
		$33 \leftarrow 32$	523 241.994(170)
		$31 \leftarrow 30$	525 766.783(170)
		$32 \leftarrow 31$	525 768.819(150)

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁵Cl nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁵Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,0,1)				
$36_{6,30} \leftarrow 36_{5,31}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$35 \leftarrow 35$	380 890.710(50) ^{b)}	97Mül
		$38 \leftarrow 38$	380 922.612(40)	
$9_{55} \leftarrow 9_{46}$	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	$7 \leftarrow 7$	382 109.004(60)	
		$8 \leftarrow 8$	382 117.919(60)	
$24_{1,23} \leftarrow 23_{2,22}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$26 \leftarrow 25$	414 909.801(50)	
		$25 \leftarrow 24$	414 911.586(50)	
		$24 \leftarrow 23$	414 912.887(50)	
		$23 \leftarrow 22$	414 913.926(50)	
		$24 \leftarrow 23$	415 013.191(50)	
		$25 \leftarrow 24$	415 014.631(50)	
$23_{2,22} \leftarrow 22_{1,21}$	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	$24 \leftarrow 23$	417 089.249(150)	
		$23 \leftarrow 22$	417 094.406(120)	
		$22 \leftarrow 21$	417 100.561(150)	
		$21 \leftarrow 20$	417 107.770(180)	
		$23 \leftarrow 22$	417 221.680(150)	
		$24 \leftarrow 23$	417 227.545(150)	
$32_{6,26} \leftarrow 32_{5,27}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$25 \leftarrow 24$	417 234.641(150)	
		$33 \leftarrow 33$	419 786.595(170)	
		$32 \leftarrow 32$	419 794.767(170)	
		$31 \leftarrow 31$	419 803.990(170)	
		$30 \leftarrow 30$	419 814.017(170)	
		$26 \leftarrow 25$	422 879.203(180)	
$25_{1,25} \leftarrow 24_{0,24}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$25 \leftarrow 24$	422 879.203(180)	
		$24 \leftarrow 23$	422 879.203(180)	
		$23 \leftarrow 22$	422 880.350(180)	
		$24 \leftarrow 23$	422 886.372(150)	
		$25 \leftarrow 24$	422 887.007(150)	
		$26 \leftarrow 25$	422 887.734(150)	
$13_{3,11} \leftarrow 12_{2,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$12 \leftarrow 11$	423 237.154(120)	
		$13 \leftarrow 12$	423 250.983(180)	
		$14 \leftarrow 13$	423 268.465(180)	
		$15 \leftarrow 14$	423 289.959(120)	
		$14 \leftarrow 13$	423 365.222(120)	
		$13 \leftarrow 12$	423 384.920(150)	
$7_{44} \leftarrow 6_{33}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$12 \leftarrow 11$	423 407.033(180)	
		$8 \leftarrow 7$	423 983.078(150)	
		$6 \leftarrow 5$	423 985.719(120)	
		$7 \leftarrow 6$	423 985.719(120)	
		$6 \leftarrow 5$	425 080.676(140)	
		$7 \leftarrow 6$	425 085.331(120)	
$26_{2,24} \leftarrow 25_{3,23}$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	$8 \leftarrow 7$	425 087.921(140)	
		$28 \leftarrow 27$	425 290.144(150)	
		$27 \leftarrow 26$	425 301.987(120)	
		$26 \leftarrow 25$	425 311.493(120)	
		$25 \leftarrow 24$	425 318.930(150)	
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	425 733.504(180)	

27 ← 26

425 742.452(180)

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁵Cl nuclear spin.^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.Microwave data for ³⁵Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
$10_{74} \leftarrow 11_{65}$	$9\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 11$	$382\,387.948(60)^b$	97Mül
$32_{5,28} \leftarrow 32_{4,29}$	$32\frac{1}{2} \leftarrow 32\frac{1}{2}$	$34 \leftarrow 34$	$417\,573.370(120)$	
		$33 \leftarrow 33$	$417\,581.045(120)$	
		$32 \leftarrow 32$	$417\,587.134(150)$	
		$31 \leftarrow 31$	$417\,591.693(120)$	
$35_{5,29} \leftarrow 35_{5,30}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 30$	$418\,223.517(130)$	
		$31 \leftarrow 31$	$418\,231.398(130)$	
		$33 \leftarrow 33$	$418\,243.465(130)$	
		$36 \leftarrow 36$	$420\,422.578(150)$	
		$35 \leftarrow 35$	$420\,432.079(180)$	
		$34 \leftarrow 34$	$420\,433.147(180)$	
		$33 \leftarrow 33$	$420\,455.639(120)$	
		$35 \leftarrow 35$	$420\,669.478(150)$	
$25_{0,25} \leftarrow 24_{1,24}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$36 \leftarrow 36$	$420\,679.645(130)$	
		$26 \leftarrow 25$	$422\,473.414(100)$	
		$25 \leftarrow 24$	$422\,473.414(100)$	
		$24 \leftarrow 24$	$422\,473.414(100)$	
		$23 \leftarrow 22$	$422\,474.311(150)$	
		$27 \leftarrow 26$	$422\,474.311(150)$	
$31_{2,29} \leftarrow 31_{1,30}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$32 \leftarrow 32$	$422\,644.371(200)$	
		$31 \leftarrow 31$	$422\,667.520(100)$	
		$30 \leftarrow 30$	$422\,685.443(150)$	
$30_{3,28} \leftarrow 30_{2,29}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$32 \leftarrow 32$	$423\,314.046(100)$	
		$31 \leftarrow 31$	$423\,337.967(100)$	
		$30 \leftarrow 30$	$423\,357.162(100)$	
		$29 \leftarrow 29$	$423\,371.983(100)$	
$6_{43} \leftarrow 5_{32}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$8 \leftarrow 7$	$423\,420.398(150)$	
		$5 \leftarrow 4$	$423\,432.152(120)$	
		$6 \leftarrow 5$	$423\,432.152(120)$	
$31_{2,29} \leftarrow 31_{1,30}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$29 \leftarrow 29$	$424\,086.016(100)$	
		$30 \leftarrow 30$	$424\,114.878(100)$	
		$31 \leftarrow 31$	$424\,140.083(100)$	
		$32 \leftarrow 32$	$424\,161.010(100)$	
		$4 \leftarrow 3$	$424\,571.969(100)$	
$30_{3,28} \leftarrow 30_{2,29}$	$29\frac{1}{2} \leftarrow 29\frac{1}{2}$	$30 \leftarrow 30$	$424\,624.724(150)$	

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁵Cl nuclear spin.^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Molecular parameters for ³⁵ Cl ¹⁶ O ₂				
Parameter		Value	Method	Ref.
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)				
<i>A</i>	[MHz]	52 081.249 14(188) ^{a)}	MW	97Mül
<i>B</i>	[MHz]	9 952.604 85(40)		
<i>C</i>	[MHz]	8 334.219 47(35)		
<i>D</i> _K	[kHz]	2 051.844 9(268)		
<i>D</i> _{NK}	[kHz]	− 112.637 7(50)		
<i>D</i> _N	[kHz]	8.517 293(300)		
<i>d</i> ₁	[kHz]	− 2.304 514(43)		
<i>d</i> ₂	[kHz]	− 0.138 794 6(257)		
<i>H</i> _K	[kHz]	0.272 10(32)		
<i>H</i> _{KN}	[Hz]	− 18.538(40)		
<i>H</i> _{NK}	[Hz]	− 0.294 35(189)		
<i>H</i> _N	[Hz]	0.012 730(52)		
<i>h</i> ₁	[Hz]	0.007 200 7(175)		
<i>h</i> ₂	[Hz]	0.961 4(168)×10 ^{−3}		
<i>h</i> ₃	[Hz]	0.490 1(51)×10 ^{−3}		
<i>L</i> _K	[Hz]	− 0.515 7(123)×10 ^{−1}		
<i>L</i> _{KKN}	[Hz]	0.472 2(81)×10 ^{−2}		
<i>L</i> _{NK}	[Hz]	0.116 1(165)×10 ^{−3}		
<i>ε</i> _{aa}	[MHz]	− 1 388.279 3(126)		
<i>ε</i> _{bb}	[MHz]	− 216.929 3(58)		
<i>ε</i> _{cc}	[MHz]	4.602 2(54)		
<i>D</i> _K ^s	[kHz]	− 0.683(151)		
<i>D</i> _{KN} ^s	[kHz]	− 3.454 (140)		
<i>D</i> _{NK} ^s	[kHz]	− 1.529(115)		
<i>D</i> _N ^s	[kHz]	− 0.122 8(58)		
<i>d</i> ₁ ^s	[kHz]	− 0.093 66(67)		
<i>d</i> ₂ ^s	[kHz]	− 0.022 88(37)		
<i>a</i> _F (³⁵ Cl)	[MHz]	46.146 9(129)		
<i>T</i> _{aa} (³⁵ Cl)	[MHz]	− 77.678 6(168)		
<i>T</i> _{bb} (³⁵ Cl)	[MHz]	− 83.117 3(124)		
<i>χ</i> _{aa} (³⁵ Cl)	[MHz]	− 51.842(45)		
<i>χ</i> _{bb} (³⁵ Cl)	[MHz]	2.646(35)		
<i>C</i> _{aa} (³⁵ Cl)	[kHz]	45.50(334)		
<i>C</i> _{bb} (³⁵ Cl)	[kHz]	8.80(107)		
<i>C</i> _{cc} (³⁵ Cl)	[kHz]	7.93(97)		
<i>r</i> (Cl–O)	[nm]	0.146 987 3(22)		
<i>α</i> (O–Cl–O)	[deg]	117.396 9(18)		
State: electronic \tilde{X}^2A' ; vibrational (1,0,0)				
<i>A</i>	[MHz]	52 027.322 4(43) ^{a)}	MW	97Mül
<i>B</i>	[MHz]	9 892.581 85(80)		
<i>C</i>	[MHz]	8 280.752 37(76)		
<i>D</i> _K	[kHz]	2 074.316(176)		
<i>D</i> _{NK}	[kHz]	− 105.303 3(95)		
<i>D</i> _N	[kHz]	8.467 51(100)		
<i>d</i> ₁	[kHz]	− 2.301 409(205)		
<i>d</i> ₂	[kHz]	− 0.157 660(142)		
<i>H</i> _K	[kHz]	0.272 10(32)		
<i>H</i> _{KN}	[Hz]	− 18.538(40)		
<i>H</i> _{NK}	[Hz]	− 0.294 35(189)		
<i>H</i> _N	[Hz]	0.012 730(52)		
<i>h</i> ₁	[Hz]	0.007 200 7(175)		

h_2	[Hz]	$0.961\,4(168)\times 10^{-3}$		
h_3	[Hz]	$0.490\,1(51)\times 10^{-3}$		
L_K	[Hz]	$-0.515\,7\times 10^{-1\,b)}$		
L_{KKN}	[Hz]	$0.472\,2\times 10^{-2\,b)}$		
L_{NK}	[Hz]	$0.116\,1\times 10^{-3\,b)}$		
\mathcal{E}_{aa}	[MHz]	$-1\,397.647(48)$		
\mathcal{E}_{bb}	[MHz]	$-220.842\,4(154)$		
\mathcal{E}_{cc}	[MHz]	$4.747\,0(151)$		
D_K^s	[kHz]	$-4.783(201)$		
D_{KN}^s	[kHz]	$-3.454\,^b)$		
D_{NK}^s	[kHz]	$-1.529\,^b)$		
D_N^s	[kHz]	$-0.122\,8\,^b)$		
d_1^s	[kHz]	$-0.062\,5(98)$		
d_2^s	[kHz]	$-0.034\,58(72)$		
$a_f(^{35}\text{Cl})$	[MHz]	$46.080(68)$		
$T_{aa}(^{35}\text{Cl})$	[MHz]	$-77.109\,6(768)$		
$T_{bb}(^{35}\text{Cl})$	[MHz]	$-82.397(43)$		
$\chi_{aa}(^{35}\text{Cl})$	[MHz]	$-51.622(174)$		
$\chi_{bb}(^{35}\text{Cl})$	[MHz]	$2.766(98)$		
$C_{bb}(^{35}\text{Cl})$	[kHz]	$45.50\,^b)$		
$C_{cc}(^{35}\text{Cl})$	[kHz]	$8.80\,^b)$		
$C_{\alpha}(^{35}\text{Cl})$	[kHz]	$7.93\,^b)$		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
A	[MHz]	$53\,079.415\,40(331)\,^a)$	MW	97Mül
B	[MHz]	$9\,943.466\,26(66)$		
C	[MHz]	$8\,310.179\,75(62)$		
D_K	[kHz]	$2\,274.560(65)$		
D_{NK}	[kHz]	$-117.453\,6(80)$		
D_N	[kHz]	$8.473\,78(74)$		
d_1	[kHz]	$-2.312\,843(167)$		
d_2	[kHz]	$-0.164\,231(79)$		
H_K	[kHz]	$0.333\,67(69)$		
H_{KN}	[Hz]	$-21.502(108)$		
H_{NK}	[Hz]	$-0.294\,00(403)$		
H_N	[Hz]	$0.012\,166(232)$		
h_1	[Hz]	$0.007\,52(133)$		
h_2	[Hz]	$0.911(94)\times 10^{-3}$		
h_3	[Hz]	$0.642\,2(245)\times 10^{-3}$		
L_K	[Hz]	$-0.515\,7\times 10^{-1\,b)}$		
L_{KKN}	[Hz]	$0.472\,2\times 10^{-2\,b)}$		
L_{NK}	[Hz]	$0.116\,1\times 10^{-3\,b)}$		
\mathcal{E}_{aa}	[MHz]	$-1\,375.4690(253)$		
\mathcal{E}_{bb}	[MHz]	$-217.310\,7(105)$		
\mathcal{E}_{cc}	[MHz]	$4.649\,0(98)$		
D_K^s	[kHz]	$-11.558(306)$		
D_{KN}^s	[kHz]	$-3.454\,^b)$		
D_{NK}^s	[kHz]	$-1.529\,^b)$		
D_N^s	[kHz]	$-0.122\,8\,^b)$		
d_1^s	[kHz]	$-0.091\,53(95)$		
d_2^s	[kHz]	$-0.020\,29(83)$		
$a_f(^{35}\text{Cl})$	[MHz]	$46.226\,9(156)$		
$T_{aa}(^{35}\text{Cl})$	[MHz]	$-77.612\,1(168)$		
$T_{bb}(^{35}\text{Cl})$	[MHz]	$-83.303(43)$		

$\chi_{aa}({}^{35}\text{Cl})$	[MHz]	– 51.862(45)		
$\chi_{bb}({}^{35}\text{Cl})$	[MHz]	2.604(29)		
$C_{aa}({}^{35}\text{Cl})$	[kHz]	45.50 ^{b)}		
$C_{bb}({}^{35}\text{Cl})$	[kHz]	8.80 ^{b)}		
$C_{cc}({}^{35}\text{Cl})$	[kHz]	7.93 ^{b)}		
State: electronic \tilde{X}^2A' ; vibrational (0,0,1)				
A	[MHz]	51 599.903 4(58) ^{a)}	MW	97Mül
B	[MHz]	9 898.016 93(116)		
C	[MHz]	8 291.348 73(117)		
D_K	[kHz]	2 049.165(134)		
D_{NK}	[kHz]	– 122.426 8(157)		
D_N	[kHz]	8.660 55(100)		
d_1	[kHz]	– 2.333 01(50)		
d_2	[kHz]	– 0.125 18(26)		
H_K	[kHz]	0.272 10(32)		
H_{KN}	[Hz]	– 18.538(40)		
H_{NK}	[Hz]	– 0.294 35(189)		
H_N	[Hz]	0.012 730(52)		
h_1	[Hz]	0.007 200 7(175)		
h_2	[Hz]	0.961 4(168)×10 ^{–3}		
h_3	[Hz]	0.490 1(51)×10 ^{–3}		
L_K	[Hz]	– 0.515 7×10 ^{–1b)}		
L_{KKN}	[Hz]	0.472 2×10 ^{–2b)}		
L_{NK}	[Hz]	0.116 1×10 ^{–3b)}		
ϵ_{aa}	[MHz]	– 1 414.362(54)		
ϵ_{bb}	[MHz]	– 219.755 7(176)		
ϵ_{cc}	[MHz]	4.744 1(198)		
D_K^s	[kHz]	1.647(177)		
D_{KN}^s	[kHz]	– 3.454 ^{b)}		
D_{NK}^s	[kHz]	– 1.529 ^{b)}		
D_N^s	[kHz]	– 0.122 8 ^{b)}		
d_1^s	[kHz]	– 0.070 6(95)		
d_2^s	[kHz]	– 0.022 88 ^{b)}		
$a_F({}^{35}\text{Cl})$	[MHz]	45.637(43)		
$T_{aa}({}^{35}\text{Cl})$	[MHz]	– 77.003(63)		
$T_{bb}({}^{35}\text{Cl})$	[MHz]	– 82.281(29)		
$\chi_{aa}({}^{35}\text{Cl})$	[MHz]	– 51.693(158)		
$\chi_{bb}({}^{35}\text{Cl})$	[MHz]	2.202(205)		
$C_{aa}({}^{35}\text{Cl})$	[kHz]	45.50 ^{b)}		
$C_{bb}({}^{35}\text{Cl})$	[kHz]	8.80 ^{b)}		
$C_{cc}({}^{35}\text{Cl})$	[kHz]	7.93 ^{b)}		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
A	[MHz]	54 117.908 9(91) ^{a)}	MW	97Mül
B	[MHz]	9 934.119 66(178)		
C	[MHz]	8 286.033 44(170)		
D_K	[kHz]	2 529.531(158)		
D_{NK}	[kHz]	– 122.576 5(154)		
D_N	[kHz]	8.430 68(203)		
d_1	[kHz]	– 2.321 19(33)		
d_2	[kHz]	– 0.190 721(163)		
H_K	[kHz]	0.395 24(126)		
H_{KN}	[Hz]	– 24.466(200)		
H_{NK}	[Hz]	– 0.293 65(712)		
H_N	[Hz]	0.011 602(446)		

h_1	[Hz]	0.007 853(246)
h_2	[Hz]	0.861(188)×10 ⁻³
h_3	[Hz]	0.794 3(490)×10 ⁻³
L_K	[Hz]	- 0.515 7×10 ^{-1^b}
L_{KKN}	[Hz]	0.472 2×10 ^{-2^b}
L_{NK}	[Hz]	0.116 1×10 ^{-3^b}
\mathcal{E}_{aa}	[MHz]	- 1 359.071(68)
\mathcal{E}_{bb}	[MHz]	- 217.712 1(256)
\mathcal{E}_{cc}	[MHz]	4.706 8(242)
D_K^s	[kHz]	- 22.433(534)
D_{KN}^s	[kHz]	- 3.454 ^b
D_{NK}^s	[kHz]	- 1.529 ^b
D_N^s	[kHz]	- 0.122 8 ^b
d_1^s	[kHz]	- 0.089 4(95)
d_2^s	[kHz]	- 0.017 70(154)
$a_F(^{35}\text{Cl})$	[MHz]	46.307(176)
$T_{aa}(^{35}\text{Cl})$	[MHz]	- 77.546(59)
$T_{bb}(^{35}\text{Cl})$	[MHz]	- 82.946 0(186)
$\chi_{aa}(^{35}\text{Cl})$	[MHz]	- 51.882(88)
$\chi_{bb}(^{35}\text{Cl})$	[MHz]	2.563(44)
$C_{aa}(^{35}\text{Cl})$	[kHz]	45.50 ^b
$C_{bb}(^{35}\text{Cl})$	[kHz]	8.80 ^b
$C_{cc}(^{35}\text{Cl})$	[kHz]	7.93 ^b

^a) The numbers in parentheses represent 1 standard deviation of the least-squares fit, in units of the last quoted decimal place.

^b) Parameter constrained to this value.

Microwave data for ³⁷Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)				
$44_{8,37} \leftarrow 43_{9,34}$	$43 \frac{1}{2} \leftarrow 42 \frac{1}{2}$	$42 \leftarrow 41$	$131\,015.912(25)^b$	97Mül
		$43 \leftarrow 42$	$131\,017.260(30)$	
		$44 \leftarrow 43$	$131\,018.667(30)$	
		$45 \leftarrow 44$	$131\,020.068(25)$	
		$44 \leftarrow 43$	$131\,280.240(30)$	
$21_{7,14} \leftarrow 22_{6,17}$	$44 \frac{1}{2} \leftarrow 43 \frac{1}{2}$	$44 \leftarrow 43$	$131\,280.240(30)$	
		$23 \leftarrow 24$	$131\,611.215(20)$	
	$20 \frac{1}{2} \leftarrow 21 \frac{1}{2}$	$20 \leftarrow 21$	$131\,612.618(20)$	
		$22 \leftarrow 23$	$131\,612.618(20)$	
		$21 \leftarrow 22$	$131\,613.107(40)$	
		$19 \leftarrow 20$	$132\,316.049(30)$	
		$20 \leftarrow 21$	$132\,317.494(100)$	
		$21 \leftarrow 22$	$132\,318.052(50)$	
		$22 \leftarrow 23$	$132\,318.052(50)$	
		$11 \leftarrow 10$	$139\,438.296(20)$	
$9_{09} \leftarrow 8_{18}$	$9 \frac{1}{2} \leftarrow 8 \frac{1}{2}$	$10 \leftarrow 9$	$139\,449.132(20)$	
		$9 \leftarrow 8$	$139\,456.531(20)$	
		$8 \leftarrow 7$	$139\,461.578(20)$	
		$7 \leftarrow 6$	$139\,558.951(20)$	
		$8 \leftarrow 7$	$139\,569.366(20)$	

		9 ← 8	139 581.038(20)
		10 ← 9	139 592.857(20)
35 _{6,29} ← 34 _{7,28}	34 $\frac{1}{2}$ ← 33 $\frac{1}{2}$	33 ← 32	140 736.208(25)
		34 ← 33	140 741.683(25)
		35 ← 34	140 746.753(30)
		36 ← 35	140 751.353(25)
	35 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	36 ← 35	140 776.865(25)
		35 ← 34	140 781.521(25)
		34 ← 33	140 785.512(25)
6 ₂₅ ← 6 ₁₆	6 $\frac{1}{2}$ ← 6 $\frac{1}{2}$	8 ← 8	142 027.566(20)
		7 ← 7	142 063.336(20)
		6 ← 6	142 087.361(20)
		5 ← 5	142 102.704(20)
16 _{6,11} ← 17 _{5,12}	16 $\frac{1}{2}$ ← 17 $\frac{1}{2}$	18 ← 19	142 179.408(20)
		17 ← 18	142 181.855(30)
		15 ← 16	142 182.833(20)
		16 ← 17	142 182.833(20)
27 _{5,22} ← 27 _{4,23}	27 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	29 ← 29	314 524.463(170)
31 _{3,28} ← 31 _{2,29}	31 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	33 ← 33	314 518.517(120)
		30 ← 30	314 581.592(100)
15 _{5,10} ← 15 _{4,11}	15 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	14 ← 14	370 116.725(40)
		17 ← 17	370 117.201(50)
		15 ← 15	370 117.876 (30)
		16 ← 16	370 117.876 (30)
16 _{5,12} ← 16 _{4,13}	16 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	18 ← 18	370 580.690 (20)
		17 ← 17	370 582.085 (30)
		15 ← 15	370 582.085 (30)
		16 ← 16	370 582.623 (60)
31 _{2,29} ← 31 _{1,30}	31 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	31 ← 32	415 139.896(170)
		31 ← 31	415 198.957(200)
		30 ← 30	415 213.267(200)
41 _{15,26} ← 42 _{14,36}	41 $\frac{1}{2}$ ← 42 $\frac{1}{2}$	43 ← 44	415 226.049(150)
		42 ← 43	415 227.374(200)
		41 ← 42	415 228.154(120)
		40 ← 41	415 228.154(120)
34 _{3,32} ← 35 _{0,35}	34 $\frac{1}{2}$ ← 35 $\frac{1}{2}$	36 ← 37	416 004.043(180)
		35 ← 36	416 041.318(250)
		33 ← 34	416 093.997(200)
41 _{15,26} ← 42 _{14,36}	40 $\frac{1}{2}$ ← 41 $\frac{1}{2}$	39 ← 40	416 120.674(180)
		40 ← 41	416 121.903(250)
		41 ← 42	416 122.865(150)
		42 ← 43	416 122.865(150)
31 _{2,29} ← 31 _{1,30}	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	30 ← 29	416 503.707(200)
		29 ← 29	416 555.414(120)
		30 ← 30	416 577.816(120)
		31 ← 31	416 597.487(150)
		32 ← 32	416 614.103(120)
19 _{10,9} ← 20 _{9,12}	19 $\frac{1}{2}$ ← 20 $\frac{1}{2}$	21 ← 22	417 195 485(100)
		20 ← 21	417 200.599(100)
		19 ← 20	417 203.389(180)
		18 ← 19	417 204.150(180)
11 ₃₈ ← 10 ₂₉	11 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	12 ← 12	418 083.727(100)
		11 ← 11	418 108.883(100)

		10 ← 10	418 128.088(130)
$7_{43} \leftarrow 6_{34}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	8 ← 8	418 238.346(120)
		7 ← 7	418 248.692(100)
		6 ← 6	418 255.013(150)
$19_{10,9} \leftarrow 20_{9,12}$	$18\frac{1}{2} \leftarrow 19\frac{1}{2}$	17 ← 18	418 563.001(100)
		18 ← 19	418 568.280(100)
		19 ← 20	418 571.760(150)
		20 ← 21	418 573.206(150)
$34_{3,32} \leftarrow 35_{0,35}$	$33\frac{1}{2} \leftarrow 34\frac{1}{2}$	32 ← 33	418 663.128(170)
$10_{83} \leftarrow 11_{74}$	$10\frac{1}{2} \leftarrow 11\frac{1}{2}$	11 ← 12	418 669.711(100)
		10 ← 11	418 677.617(150)
		9 ← 10	418 679.485(150)
$34_{3,32} \leftarrow 35_{0,35}$	$33\frac{1}{2} \leftarrow 34\frac{1}{2}$	33 ← 34	418 699.564(200)
		34 ← 35	418 731.218(170)
		35 ← 36	418 758.253(170)
$11_{38} \leftarrow 10_{29}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	10 ← 10	419 010.332(100)
$7_{43} \leftarrow 6_{34}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	11 ← 11	419 016.927(100)
		5 ← 4	419 318.323(100)
		6 ← 5	419 323.028(100)
		7 ← 6	419 327.304(120)
		8 ← 7	419 329.995(120)
		5 ← 5	419 339.770(100)
		6 ← 6	419 345.767(100)
		7 ← 7	419 349.691(100)
$36_{7,30} \leftarrow 37_{4,33}$	$36\frac{1}{2} \leftarrow 37\frac{1}{2}$	35 ← 36	420 677.543(150)
		36 ← 37	420 686.968(150)
	$35\frac{1}{2} \leftarrow 36\frac{1}{2}$	37 ← 38	420 690.995(240)
	$36\frac{1}{2} \leftarrow 37\frac{1}{2}$	37 ← 38	420 698.154(150)
	$35\frac{1}{2} \leftarrow 36\frac{1}{2}$	36 ← 37	420 701.613(150)
	$36\frac{1}{2} \leftarrow 37\frac{1}{2}$	38 ← 39	420 711.301(150)
	$35\frac{1}{2} \leftarrow 36\frac{1}{2}$	35 ← 36	420 713.562(150)
		34 ← 35	420 726.670(180)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	43 ← 43	420 775.407(100)
$29_{3,26} \leftarrow 28_{4,25}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	30 ← 29	420 769.645(100)
		29 ← 28	420 783.028(100)
		28 ← 27	420 793.845(120)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	42 ← 42	420 796.378(120)
$32_{13,20} \leftarrow 33_{12,11}$	$32\frac{1}{2} \leftarrow 33\frac{1}{2}$	41 ← 41	420 813.673(100)
		34 ← 35	420 815.910(150)
		33 ← 34	420 817.809(150)
		32 ← 33	420 819.077(120)
		31 ← 32	420 819.077(120)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	40 ← 40	420 827.523(100)
$10_{83} \leftarrow 11_{74}$	$9\frac{1}{2} \leftarrow 10\frac{1}{2}$	9 ← 10	420 834.863(100)
		10 ← 11	420 846.771(100)
		11 ← 12	420 852.313(100)
$29_{3,26} \leftarrow 28_{4,25}$	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	27 ← 26	421 447.262(120)
		28 ← 27	421 463.522(120)
		29 ← 28	421 478.049(120)
		30 ← 29	421 490.587(120)
$7_{43} \leftarrow 6_{34}$	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	7 ← 7	421 808.359(150)
$32_{13,20} \leftarrow 33_{12,11}$	$31\frac{1}{2} \leftarrow 32\frac{1}{2}$	30 ← 31	421 831.171(100)

		31 ← 32	421 833.288(150)
		32 ← 33	421 834.884(120)
		33 ← 34	421 834.884(120)
$7_{43} \leftarrow 6_{34}$	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	6 ← 6	421 850.033(150)
		5 ← 5	421 883.876(120)
$55_{8,47} \leftarrow 54_{9,46}$	$55\frac{1}{2} \leftarrow 54\frac{1}{2}$	57 ← 56	422 107.082(200)
		56 ← 55	422 112.666(120)
		55 ← 54	422 116.498(120)
		54 ← 53	422 118.732(120)
$41_{4,37} \leftarrow 41_{3,38}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	39 ← 39	422 344.931(100)
		40 ← 40	422 366.083(100)
		41 ← 41	422 384.577(100)
		42 ← 42	422 400.089(100)
$55_{8,47} \leftarrow 54_{9,46}$	$54\frac{1}{2} \leftarrow 53\frac{1}{2}$	53 ← 52	422 717.293(100)
		54 ← 53	422 726.973(100)
		55 ← 54	422 735.431(100)
		56 ← 55	422 742.762(100)
$25_{0,25} \leftarrow 24_{1,24}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	26 ← 26	422 813.264(100)
		25 ← 25	422 834.780(100)
		24 ← 24	422 853.709(100)
	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	25 ← 25	422 969.074(100)
		24 ← 24	422 984.383(100)
$23_{11,12} \leftarrow 24_{10,15}$	$23\frac{1}{2} \leftarrow 24\frac{1}{2}$	23 ← 23	422 997.801(100)
		25 ← 26	424 941.341(100)
		24 ← 25	424 945.054(120)
		23 ← 24	424 947.392(150)
		22 ← 23	424 947.392(150)
$42_{4,39} \leftarrow 43_{1,42}$	$42\frac{1}{2} \leftarrow 43\frac{1}{2}$	43 ← 44	425 813.666(200)
		42 ← 43	425 838.430(200)
		41 ← 42	425 857.926(200)
	$41\frac{1}{2} \leftarrow 42\frac{1}{2}$	40 ← 41	428 407.983(200)
		41 ← 42	428 438.512(150)
		42 ← 43	428 464.662(150)
$35_{2,33} \leftarrow 36_{1,36}$	$35\frac{1}{2} \leftarrow 36\frac{1}{2}$	34 ← 35	428 546.561(130)
$60_{8,53} \leftarrow 59_{9,50}$	$59\frac{1}{2} \leftarrow 58\frac{1}{2}$	61 ← 60	428 665.039(200)
		60 ← 59	428 668.577(200)
		58 ← 57	428 678.271(200)
	$60\frac{1}{2} \leftarrow 59\frac{1}{2}$	59 ← 58	429 327.390(200)
		61 ← 60	429 334.802(150)
		62 ← 61	429 340.063(200)
$59_{7,52} \leftarrow 59_{6,53}$	$59\frac{1}{2} \leftarrow 59\frac{1}{2}$	61 ← 61	430 721.231(200)
		60 ← 60	430 734.362(200)
		59 ← 59	430 745.113(200)
$43_{7,36} \leftarrow 43_{6,37}$	$42\frac{1}{2} \leftarrow 42\frac{1}{2}$	44 ← 44	431 194.537(150)
		43 ← 43	431 202.289(100)
		42 ← 42	431 211.355(120)
		41 ← 41	431 221.609(100)
$53_{6,47} \leftarrow 53_{5,48}$	$52\frac{1}{2} \leftarrow 52\frac{1}{2}$	52 ← 52	431 611.822(100)
		53 ← 53	431 626.361(100)
		54 ← 54	431 638.481(150)
$59_{7,52} \leftarrow 59_{6,53}$	$58\frac{1}{2} \leftarrow 58\frac{1}{2}$	57 ← 57	432 090.405(100)
		58 ← 58	432 103.681(100)
$40_{15,26} \leftarrow 41_{14,27}$	$40\frac{1}{2} \leftarrow 41\frac{1}{2}$	42 ← 43	432 666.072(150)

$55_{8,47} \leftarrow 55_{7,48}$	$55\frac{1}{2} \leftarrow 55\frac{1}{2}$	$54 \leftarrow 54$	434 101.508(100)
		$55 \leftarrow 55$	434 106.938(100)
		$56 \leftarrow 56$	434 113.493(100)
		$57 \leftarrow 57$	434 121.329(150)
$8_{54} \leftarrow 7_{43}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$6 \leftarrow 5$	520 478.841(120)
		$7 \leftarrow 6$	520 483.094(120)
		$8 \leftarrow 7$	520 486.485(180)
		$9 \leftarrow 8$	520 488.479(180)
		$6 \leftarrow 6$	520 495.737(150)
$34_{7,28} \leftarrow 34_{6,29}$	$34\frac{1}{2} \leftarrow 34\frac{1}{2}$	$33 \leftarrow 33$	520 518.704(250)
$31_{14,17} \leftarrow 32_{13,20}$	$30\frac{1}{2} \leftarrow 31\frac{1}{2}$	$36 \leftarrow 36$	520 520.598(200)
		$29 \leftarrow 30$	520 567.881(200)
		$30 \leftarrow 31$	520 570.258(200)
		$31 \leftarrow 32$	520 572.279(160)
		$32 \leftarrow 33$	520 572.279(160)
$34_{7,28} \leftarrow 34_{6,29}$	$33\frac{1}{2} \leftarrow 33\frac{1}{2}$	$35 \leftarrow 35$	520 899.484(200)
		$34 \leftarrow 34$	520 900.488(250)
		$33 \leftarrow 33$	520 901.379(250)
		$32 \leftarrow 32$	520 902.296(200)
$31_{7,24} \leftarrow 31_{6,25}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$30 \leftarrow 30$	521 556.631(180)
		$31 \leftarrow 31$	521 558.585(180)
		$32 \leftarrow 32$	521 560.654(170)
		$33 \leftarrow 33$	521 562.865(150)
	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$32 \leftarrow 32$	521 919.188(200)
		$31 \leftarrow 31$	521 921.461(180)
		$30 \leftarrow 30$	521 923.635(170)
$31_{0,31} \leftarrow 30_{1,30}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$29 \leftarrow 29$	521 926.008(180)
		$32 \leftarrow 31$	522 399.790(150)
		$31 \leftarrow 30$	522 399.790(150)
		$30 \leftarrow 29$	522 399.790(150)
		$29 \leftarrow 28$	522 399.790(150)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 29$	522 403.650(180)
		$31 \leftarrow 30$	522 403.650(180)
		$32 \leftarrow 31$	522 403.650(180)
		$33 \leftarrow 32$	522 403.650(180)
$30_{2,29} \leftarrow 29_{1,28}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	$31 \leftarrow 30$	524 010.188(200)
		$30 \leftarrow 29$	524 011.206(200)
		$29 \leftarrow 28$	524 012.504(180)
		$28 \leftarrow 27$	524 014.056(170)
	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$29 \leftarrow 28$	524 031.123(200)
		$30 \leftarrow 29$	524 032.225(200)
		$31 \leftarrow 30$	524 033.546(180)
		$32 \leftarrow 31$	524 035.089(170)
$32_{7,26} \leftarrow 32_{6,27}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$33 \leftarrow 33$	524 046.625(200)
		$32 \leftarrow 32$	524 047.748(240)
		$31 \leftarrow 31$	524 048.963(300)
		$30 \leftarrow 30$	524 049.595(240)
$46_{7,40} \leftarrow 46_{6,41}$	$46\frac{1}{2} \leftarrow 46\frac{1}{2}$	$48 \leftarrow 48$	524 458.015(180)
		$47 \leftarrow 47$	524 461.239(200)
		$46 \leftarrow 46$	524 463.994(200)
		$45 \leftarrow 45$	524 466.119(250)
$37_{2,35} \leftarrow 37_{1,36}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$35 \leftarrow 35$	525 070.838(150)
		$38 \leftarrow 38$	525 116.513(150)

$22_{12,11} \leftarrow 23_{11,12}$	$21\frac{1}{2} \leftarrow 22\frac{1}{2}$	$20 \leftarrow 21$	525 601.780(200)
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^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁷Cl nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁷Cl¹⁶O,

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (1,0,0)				
$30_{5,26} \leftarrow 30_{4,27}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$29 \leftarrow 29$	382 332.805(100) ^{b)}	97Mül
		$28 \leftarrow 28$	382 943.599(50)	
		$29 \leftarrow 29$	382 949.522(40)	
		$30 \leftarrow 30$	382 954.604(40)	
$31_{2,29} \leftarrow 31_{1,30}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$31 \leftarrow 31$	382 958.744(40)	
		$30 \leftarrow 30$	415 286.679(200)	
		$31 \leftarrow 31$	415 306.391(200)	
		$11 \leftarrow 10$	416 780.614(170)	
$11_{38} \leftarrow 10_{29}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 9$	416 787.921(150)	
		$9 \leftarrow 8$	417 417.638(150)	
$7_{43} \leftarrow 6_{34}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 7$	417 423.619(170)	
		$10 \leftarrow 9$	417 615.269(170)	
$11_{38} \leftarrow 10_{29}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	$11 \leftarrow 10$	417 629.003(140)	
		$12 \leftarrow 11$	417 640.778(170)	
		$5 \leftarrow 4$	418 480.418(200)	
		$6 \leftarrow 5$	418 485.019(200)	
$7_{43} \leftarrow 6_{34}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	418 489.294(150)	
		$8 \leftarrow 7$	418 491.952(150)	
		$26 \leftarrow 25$	420 260.007(150)	
		$25 \leftarrow 24$	420 260.007(150)	
$25_{0,25} \leftarrow 24_{1,24}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$24 \leftarrow 23$	420 260.007(150)	
		$23 \leftarrow 22$	420 260.780(300)	
		$24 \leftarrow 23$	420 260.780(300)	
		$26 \leftarrow 25$	420 261.945(180)	
$36_{5,32} \leftarrow 36_{4,33}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$27 \leftarrow 26$	420 261.945(180)	
		$37 \leftarrow 37$	424 823.668(200)	
		$36 \leftarrow 36$	424 831.702(150)	
		$35 \leftarrow 35$	424 838.102(180)	
$29_{6,23} \leftarrow 29_{5,24}$	$29\frac{1}{2} \leftarrow 29\frac{1}{2}$	$29 \leftarrow 29$	426 083.242(200)	
		$30 \leftarrow 30$	426 088.354(200)	
		$31 \leftarrow 31$	426 094.216(200)	
		$28 \leftarrow 28$	426 228.754(150)	
$25_{1,24} \leftarrow 24_{2,23}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$27 \leftarrow 27$	426 234.826(150)	
		$23 \leftarrow 22$	432 199.684(180)	
		$24 \leftarrow 23$	432 199.684(180)	
		$25 \leftarrow 24$	432 199.684(180)	
		$26 \leftarrow 25$	432 199.684(180)	

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁷Cl nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁷Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
$45_{5,40} \leftarrow 45_{4,41}$	$44 \frac{1}{2} \leftarrow 44 \frac{1}{2}$	$46 \leftarrow 46$	$382\,864.293(45)^b$	97Mül
$27_{1,26} \leftarrow 27_{0,27}$	$27 \frac{1}{2} \leftarrow 27 \frac{1}{2}$	$29 \leftarrow 29$	$415\,222.980(100)$	
$11_{83} \leftarrow 12_{76}$	$11 \frac{1}{2} \leftarrow 12 \frac{1}{2}$	$28 \leftarrow 28$	$415\,247.253(100)$	
		$27 \leftarrow 27$	$415\,266.168(100)$	
		$26 \leftarrow 26$	$415\,280.671(100)$	
		$13 \leftarrow 14$	$415\,295.788(200)$	
		$12 \leftarrow 13$	$415\,308.774(200)$	
		$11 \leftarrow 12$	$415\,315.199(200)$	
$34_{3,30} \leftarrow 34_{4,31}$	$34 \frac{1}{2} \leftarrow 34 \frac{1}{2}$	$10 \leftarrow 11$	$415\,316.953(200)$	
		$36 \leftarrow 36$	$415\,371.012(100)$	
		$35 \leftarrow 35$	$415\,379.708(100)$	
		$34 \leftarrow 34$	$415\,386.715(100)$	
		$33 \leftarrow 33$	$415\,392.196(100)$	
		$33 \frac{1}{2} \leftarrow 33 \frac{1}{2}$	$416\,145.148(120)$	
		$33 \leftarrow 33$	$416\,153.980(120)$	
		$34 \leftarrow 34$	$416\,161.630(150)$	
		$35 \leftarrow 35$	$416\,167.937(120)$	
		$27_{1,26} \leftarrow 27_{0,27}$	$26 \frac{1}{2} \leftarrow 26 \frac{1}{2}$	$27 \leftarrow 27$
$30_{3,28} \leftarrow 30_{2,29}$	$30 \frac{1}{2} \leftarrow 30 \frac{1}{2}$	$28 \leftarrow 28$	$416\,659.799(100)$	
		$32 \leftarrow 32$	$416\,909.856(120)$	
		$31 \leftarrow 31$	$416\,929.321(100)$	
		$30 \leftarrow 30$	$416\,945.104(100)$	
		$29 \leftarrow 29$	$416\,957.534(100)$	
		$10 \frac{1}{2} \leftarrow 11 \frac{1}{2}$	$10 \leftarrow 11$	$417\,289.435(200)$
$30_{3,28} \leftarrow 30_{2,29}$	$29 \frac{1}{2} \leftarrow 29 \frac{1}{2}$	$11 \leftarrow 12$	$417\,289.435(150)$	
		$12 \leftarrow 13$	$417\,289.435(200)$	
		$28 \leftarrow 28$	$418\,159.504(100)$	
		$29 \leftarrow 29$	$418\,179.168(100)$	
		$30 \leftarrow 30$	$418\,196.435(100)$	
		$18 \leftarrow 19$	$418\,869.599(100)$	
$20_{10,11} \leftarrow 21_{9,12}$	$19 \frac{1}{2} \leftarrow 20 \frac{1}{2}$	$19 \leftarrow 20$	$418\,874.277(100)$	
		$20 \leftarrow 21$	$418\,877.238(200)$	
		$12 \leftarrow 12$	$419\,089.613(300)$	
		$11 \leftarrow 11$	$419\,119.731(200)$	
$45_{7,38} \leftarrow 45_{6,39}$	$44 \frac{1}{2} \leftarrow 44 \frac{1}{2}$	$10 \leftarrow 10$	$419\,141.055(150)$	
		$46 \leftarrow 46$	$419\,398.331(120)$	
		$45 \leftarrow 45$	$419\,405.904(120)$	
		$44 \leftarrow 44$	$419\,414.725(120)$	
		$43 \leftarrow 43$	$419\,424.659(120)$	
		$45 \frac{1}{2} \leftarrow 45 \frac{1}{2}$	$419\,817.976(100)$	
		$45 \leftarrow 45$	$419\,824.732(100)$	
		$46 \leftarrow 46$	$419\,832.994(100)$	
$39_{5,34} \leftarrow 38_{6,33}$	$39 \frac{1}{2} \leftarrow 38 \frac{1}{2}$	$47 \leftarrow 47$	$419\,842.824(120)$	
		$41 \leftarrow 40$	$420\,472.926(120)$	
		$40 \leftarrow 39$	$420\,490.717(140)$	
		$39 \leftarrow 38$	$420\,505.603(120)$	

$31_{2,29} \leftarrow 31_{1,30}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$38 \leftarrow 37$	420 517.757(120)
		$33 \leftarrow 33$	420 581.179(100)
		$32 \leftarrow 32$	420 603.676(100)
		$31 \leftarrow 31$	420 621.958(100)
$11_{38} \leftarrow 11_{0,11}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$30 \leftarrow 30$	420 636.358(100)
		$9 \leftarrow 9$	420 727.940(200)
		$29 \leftarrow 29$	421 990.807(100)
		$30 \leftarrow 30$	422 013.424(100)
$31_{2,29} \leftarrow 31_{1,30}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$31 \leftarrow 31$	422 033.264(100)
		$32 \leftarrow 32$	422 050.067(100)
		$13 \leftarrow 12$	422 613.381(100)
		$12 \leftarrow 11$	422 628.492(100)
$11_{38} \leftarrow 10_{29}$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	$11 \leftarrow 10$	422 639.548(100)
		$10 \leftarrow 9$	422 647.374(100)
		$43 \leftarrow 43$	423 375.524(100)
		$42 \leftarrow 42$	423 396.659(100)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	$41 \leftarrow 41$	423 414.083(100)
		$9 \leftarrow 8$	423 442.632(100)
		$10 \leftarrow 9$	423 457.195(100)
		$11 \leftarrow 10$	423 470.873(100)
$11_{38} \leftarrow 10_{29}$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	$12 \leftarrow 11$	423 482.542(100)
		$32 \leftarrow 32$	423 811.447(100)
		$30 \leftarrow 30$	423 816.254(120)
		$31 \leftarrow 31$	423 817.857(120)
$31_{6,25} \leftarrow 31_{5,26}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	$31 \leftarrow 31$	423 821.806(100)
		$30 \leftarrow 30$	423 825.125(100)
		$32 \leftarrow 32$	423 828.450(100)
		$29 \leftarrow 29$	423 833.138(100)
$7_{43} \leftarrow 6_{34}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$33 \leftarrow 33$	423 836.242(100)
		$8 \leftarrow 8$	424 888.707(120)
		$7 \leftarrow 7$	424 898.986(120)
		$6 \leftarrow 6$	424 905.338(120)
$41_{4,37} \leftarrow 41_{3,38}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$9 \leftarrow 8$	424 913.853(100)
		$8 \leftarrow 7$	424 919.856(100)
		$7 \leftarrow 6$	424 922.413(100)
		$6 \leftarrow 5$	424 922.413(100)
$15_{96} \leftarrow 16_{89}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	$39 \leftarrow 39$	424 959.837(100)
		$40 \leftarrow 40$	424 981.193(100)
		$41 \leftarrow 41$	424 999.804(100)
		$42 \leftarrow 42$	425 015.406(100)
$7_{43} \leftarrow 6_{34}$	$15\frac{1}{2} \leftarrow 16\frac{1}{2}$	$16 \leftarrow 17$	425 881.655(120)
		$15 \leftarrow 16$	425 885.596(180)
		$5 \leftarrow 4$	425 959.213(100)
		$6 \leftarrow 5$	425 963.922(100)
$31_{0,31} \leftarrow 30_{1,30}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	425 968.194(100)
		$8 \leftarrow 7$	425 970.885(100)
		$5 \leftarrow 5$	425 980.759(150)
		$6 \leftarrow 6$	425 986.688(150)
$31_{0,31} \leftarrow 30_{1,30}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$7 \leftarrow 7$	425 990.624(150)
		$32 \leftarrow 31$	521 044.519(180)
		$31 \leftarrow 30$	521 044.519(180)
		$30 \leftarrow 29$	521 044.519(180)

	29 ← 28	521 044.519(180)
31 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	30 ← 29	521 048.143(250)
	31 ← 30	521 048.143(250)
	32 ← 31	521 048.143(250)
	33 ← 32	521 048.143(250)

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁷Cl nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁷Cl¹⁶O₂

Transition			ν [MHz]	Ref.	
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}			
		$F' - F''$			
State: electronic \tilde{X}^2A' ; vibrational (0,0,1)					
$31_{4,28} \leftarrow 31_{3,29}$	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	$31 \leftarrow 31$	$382\,747.118(60)^b$	97Mül	
		$30 \leftarrow 30$	$382\,756.335(50)$		
$25_{1,25} \leftarrow 24_{0,24}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	$26 \leftarrow 25$	$421\,074.715(120)$		
		$25 \leftarrow 24$	$421\,074.715(120)$		
		$23 \leftarrow 22$	$421\,075.730(200)$		
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	$24 \leftarrow 23$		$421\,081.574(150)$
			$25 \leftarrow 24$		$421\,081.574(200)$
		$26 \leftarrow 25$	$421\,082.974(150)$		
		$27 \leftarrow 26$	$421\,082.974(200)$		

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁷Cl nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ³⁷Cl¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
$45_{5,40} \leftarrow 45_{4,41}$	$45 \frac{1}{2} \leftarrow 45 \frac{1}{2}$	$47 \leftarrow 47$	$382\,485.771(60)^b$	97Mül
$12_{3,10} \leftarrow 11_{29}$	$12 \frac{1}{2} \leftarrow 11 \frac{1}{2}$	$11 \leftarrow 10$	$415\,816.072(200)$	
		$14 \leftarrow 13$	$415\,856.500(200)$	
	$11 \frac{1}{2} \leftarrow 10 \frac{1}{2}$	$13 \leftarrow 12$	$416\,011.048(180)$	
		$12 \leftarrow 11$	$416\,026.720(250)$	
		$11 \leftarrow 10$	$416\,043.587(250)$	
$33_{6,27} \leftarrow 33_{5,28}$	$32 \frac{1}{2} \leftarrow 32 \frac{1}{2}$	$34 \leftarrow 34$	$418\,384.184(200)$	
		$33 \leftarrow 33$	$418\,891.679(300)$	
		$32 \leftarrow 32$	$418\,534.542(200)$	
$25_{0,25} \leftarrow 24_{1,24}$	$24 \frac{1}{2} \leftarrow 23 \frac{1}{2}$	$26 \leftarrow 25$	$420\,074.078(180)$	
		$25 \leftarrow 24$	$420\,074.078(180)$	
		$24 \leftarrow 23$	$420\,074.078(180)$	
	$25 \frac{1}{2} \leftarrow 24 \frac{1}{2}$	$24 \leftarrow 23$	$420\,074.078(180)$	
$30_{3,28} \leftarrow 30_{2,29}$	$29 \frac{1}{2} \leftarrow 29 \frac{1}{2}$	$28 \leftarrow 28$	$424\,454.103(100)$	
		$29 \leftarrow 29$	$424\,473.813(100)$	
		$30 \leftarrow 30$	$424\,491.111(100)$	
		$31 \leftarrow 31$	$424\,505.656(100)$	

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ³⁷Cl nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Molecular parameters for ³⁷Cl¹⁶O₂

Parameter		Value	Method	Ref.
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)				
A	[MHz]	50 736.864 27(195) ^{a)}	MW	97Mül
B	[MHz]	9 953.122 85(33)		
C	[MHz]	8 299.39(30)		
D_K	[kHz]	1 947.267 1(358)		
D_{NK}	[kHz]	– 108.122 1(44)		
D_N	[kHz]	8.459 287(291)		
d_1	[kHz]	– 2.329 175(68)		
d_2	[kHz]	– 0.142 540 8(389)		
H_K	[kHz]	0.252 10(34)		
H_{KN}	[Hz]	– 17.421(39)		
H_{NK}	[Hz]	– 0.300 87(199)		
H_N	[Hz]	0.012 757(60)		
h_1	[Hz]	0.007 172 7(330)		
h_2	[Hz]	1.008 0(260)×10 ^{–3}		
h_3	[Hz]	0.496 9(64)×10 ^{–3}		
L_K	[Hz]	– 0.488 7(122)×10 ^{–1}		
L_{KKN}	[Hz]	0.472 2×10 ^{–2} ^{b)}		
L_{NK}	[Hz]	0.116 1×10 ^{–3} ^{b)}		
ε_{aa}	[MHz]	– 1 352.448 6(180)		
ε_{bb}	[MHz]	– 216.935.0(73)		
ε_{cc}	[MHz]	4.541 0(69)		
D_K^s	[kHz]	– 0.683 ^{b)}		
D_{KN}^s	[kHz]	– 3.454 ^{b)}		
D_{NK}^s	[kHz]	– 1.529 ^{b)}		
D_N^s	[kHz]	– 0.122 8 ^{b)}		
d_1^s	[kHz]	– 0.093 66 ^{b)}		
d_2^s	[kHz]	– 0.022 88 ^{b)}		
$a_{\text{F}}(^{37}\text{Cl})$	[MHz]	38.413 2(226)		
$T_{aa}(^{37}\text{Cl})$	[MHz]	– 64.696 5(271)		
$T_{bb}(^{37}\text{Cl})$	[MHz]	– 69.186 3(384)		
$\chi_{aa}(^{37}\text{Cl})$	[MHz]	– 40.897(45)		
$\chi_{bb}(^{37}\text{Cl})$	[MHz]	2.194(55)		
$C_{aa}(^{37}\text{Cl})$	[kHz]	36.90(271)		
$C_{bb}(^{37}\text{Cl})$	[kHz]	7.33(89)		
$C_{cc}(^{37}\text{Cl})$	[kHz]	6.60(80)		
State: electronic \tilde{X}^2A' ; vibrational (1,0,0)				
A	[MHz]	50 673.617 5(73) ^{a)}	MW	97Mül
B	[MHz]	9 893.686 15(112)		
C	[MHz]	8 246.647 52(102)		

D_K	[kHz]	1 966.146(289)		
D_{NK}	[kHz]	– 100.686 2(139)		
D_N	[kHz]	8.409 51(950)		
d_1	[kHz]	– 2.326 070(211)		
d_2	[kHz]	– 0.161 652(158)		
H_K	[kHz]	0.252 10 ^b		
H_{KN}	[Hz]	– 17.421 ^b		
H_{NK}	[Hz]	– 0.300 87 ^b		
H_N	[Hz]	0.012 757 ^b		
h_1	[Hz]	0.007 172 7 ^b		
h_2	[Hz]	1.008 0×10 ^{–3 b}		
h_3	[Hz]	0.496 9×10 ^{–3 b}		
L_K	[Hz]	– 0.515 7×10 ^{–1 b}		
L_{KKN}	[Hz]	0.472 2×10 ^{–2 b}		
L_{NK}	[Hz]	0.116 1×10 ^{–3 b}		
\mathcal{E}_{aa}	[MHz]	– 1 361.774(99)		
\mathcal{E}_{bb}	[MHz]	– 220.715 0(345)		
\mathcal{E}_{cc}	[MHz]	4.744 6(340)		
D_K^s	[kHz]	– 4.783 ^b		
D_{KN}^s	[kHz]	– 3.454 ^b		
D_{NK}^s	[kHz]	– 1.529 ^b		
D_N^s	[kHz]	– 0.122 8 ^b		
d_1^s	[kHz]	– 0.062 5 ^b		
d_2^s	[kHz]	– 0.034 58 ^b		
$a_r(^{37}\text{Cl})$	[MHz]	38.357 2(604)		
$T_{aa}(^{37}\text{Cl})$	[MHz]	– 64 223 5(677)		
$T_{bb}(^{37}\text{Cl})$	[MHz]	– 68.586 8(712)		
$\chi_{aa}(^{37}\text{Cl})$	[MHz]	– 40.724(160)		
$\chi_{bb}(^{37}\text{Cl})$	[MHz]	1.914(160)		
$C_{aa}(^{37}\text{Cl})$	[kHz]	36.90 ^b		
$C_{bb}(^{37}\text{Cl})$	[kHz]	7.33 ^b		
$C_{cc}(^{37}\text{Cl})$	[kHz]	6.60 ^b		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
A	[MHz]	51 706.880 96(368) ^{a)}	MW	97Mül
B	[MHz]	9 943.957 23(63)		
C	[MHz]	8 275.063 68(62)		
D_K	[kHz]	2 157.645(102)		
D_{NK}	[kHz]	– 112.729 0(80)		
D_N	[kHz]	8.415 78(74)		
d_1	[kHz]	– 2.337 161(181)		
d_2	[kHz]	– 0.168 406(85)		
H_K	[kHz]	0.575 50(81)		
H_{KN}	[Hz]	– 20.385(107)		
H_{NK}	[Hz]	– 0.300 52(408)		
H_N	[Hz]	0.012 193(234)		
h_1	[Hz]	0.007 499(136)		
h_2	[Hz]	0.958(98)×10 ^{–3}		
h_3	[Hz]	0.649 0(253)×10 ^{–3}		
L_K	[Hz]	– 0.515 7×10 ^{–1 b}		
L_{KKN}	[Hz]	0.472 2×10 ^{–2 b}		
L_{NK}	[Hz]	0.116 1×10 ^{–3 b}		
\mathcal{E}_{aa}	[MHz]	– 1 339.871 9(284)		
\mathcal{E}_{bb}	[MHz]	– 217.292 7(113)		
\mathcal{E}_{cc}	[MHz]	4.626 6(107)		

D_K^s	[kHz]	– 11.558 ^{b)}		
D_{KN}^s	[kHz]	– 3.454 ^{b)}		
D_{NK}^s	[kHz]	– 1.529 ^{b)}		
D_N^s	[kHz]	– 0.122 8 ^{b)}		
d_1^s	[kHz]	– 0.091 53 ^{b)}		
d_2^s	[kHz]	– 0.020 29 ^{b)}		
$a_F(^{37}\text{Cl})$	[MHz]	38.479 8(237)		
$T_{aa}(^{37}\text{Cl})$	[MHz]	– 64.641 1(289)		
$T_{bb}(^{37}\text{Cl})$	[MHz]	– 69.115 3(149)		
$\chi_{aa}(^{37}\text{Cl})$	[MHz]	– 40.913(132)		
$\chi_{bb}(^{37}\text{Cl})$	[MHz]	2.162(118)		
$C_{aa}(^{37}\text{Cl})$	[kHz]	36.90 ^{b)}		
$C_{bb}(^{37}\text{Cl})$	[kHz]	7.33 ^{b)}		
$C_{cc}(^{37}\text{Cl})$	[kHz]	6.60 ^{b)}		
State: electronic \tilde{X}^2A' ; vibrational (0,0,1)				
A	[MHz]	50 278.402 8(140) ^{a)}	MW	97Mül
B	[MHz]	9 943.957 23(277)		
C	[MHz]	8 256.864 57(282)		
D_K	[kHz]	1 944.587 (136)		
D_{NK}	[kHz]	– 117.558 8(362)		
D_N	[kHz]	8.603 10(263)		
d_1	[kHz]	– 2.357 05(32)		
d_2	[kHz]	– 0.126 00(43)		
H_K	[kHz]	0.252 10 ^{b)}		
H_{KN}	[Hz]	– 17.421 ^{b)}		
H_{NK}	[Hz]	– 0.300 87 ^{b)}		
H_N	[Hz]	0.012 757 ^{b)}		
h_1	[Hz]	0.007 172 7 ^{b)}		
h_2	[Hz]	1.008 0×10 ^{–3} ^{b)}		
h_3	[Hz]	0.496 9×10 ^{–3} ^{b)}		
L_K	[Hz]	– 0.515 7×10 ^{–1} ^{b)}		
L_{KKN}	[Hz]	0.472 2×10 ^{–2} ^{b)}		
L_{NK}	[Hz]	0.116 1×10 ^{–3} ^{b)}		
\mathcal{E}_{aa}	[MHz]	– 1 377.475(73)		
\mathcal{E}_{bb}	[MHz]	– 219.675 5(265)		
\mathcal{E}_{cc}	[MHz]	4.720 4(266)		
D_K^s	[kHz]	1.647 ^{b)}		
D_{KN}^s	[kHz]	– 3.454 ^{b)}		
D_{NK}^s	[kHz]	– 1.529 ^{b)}		
D_N^s	[kHz]	– 0.122 8 ^{b)}		
d_1^s	[kHz]	– 0.070 6 ^{b)}		
d_2^s	[kHz]	– 0.022 88 ^{b)}		
$a_F(^{37}\text{Cl})$	[MHz]	37.989 2(764)		
$T_{aa}(^{37}\text{Cl})$	[MHz]	– 64.133 5(577)		
$T_{bb}(^{37}\text{Cl})$	[MHz]	– 68.490 3(667)		
$\chi_{aa}(^{37}\text{Cl})$	[MHz]	– 41.014(153)		
$\chi_{bb}(^{37}\text{Cl})$	[MHz]	1.961(98)		
$C_{aa}(^{37}\text{Cl})$	[kHz]	36.90 ^{b)}		
$C_{bb}(^{37}\text{Cl})$	[kHz]	7.33 ^{b)}		
$C_{cc}(^{37}\text{Cl})$	[kHz]	6.60 ^{b)}		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
A	[MHz]	52 716.802 1(94) ^{a)}	MW	97Mül
B	[MHz]	9 934.585 39(193)		
C	[MHz]	8 250.886 75(187)		

D_K	[kHz]	2 398.712(274)
D_{NK}	[kHz]	– 117.642 9(159)
D_N	[kHz]	8.372 68(204)
d_1	[kHz]	– 2.345 17(23)
d_2	[kHz]	– 0.195 325(167)
H_K	[kHz]	0.367 20(150)
H_{KN}	[Hz]	– 23.349(204)
H_{NK}	[Hz]	– 0.300 17(739)
H_N	[Hz]	0.011 629(456)
h_1	[Hz]	0.007 825(266)
h_2	[Hz]	0.908(190)×10 ^{–3}
h_3	[Hz]	0.801 1(494)×10 ^{–3}
L_K	[Hz]	– 0.515 7×10 ^{–1} ^{b)}
L_{KKN}	[Hz]	0.472 2×10 ^{–2} ^{b)}
L_{NK}	[Hz]	0.116 1×10 ^{–3} ^{b)}
\mathcal{E}_{aa}	[MHz]	– 1 327.295 2(475)
\mathcal{E}_{bb}	[MHz]	– 217.670 4(258)
\mathcal{E}_{cc}	[MHz]	4.723 2(245)
D_K^s	[kHz]	– 22.433 ^{b)}
D_{KN}^s	[kHz]	– 3.454 ^{b)}
D_{NK}^s	[kHz]	– 1.529 ^{b)}
D_N^s	[kHz]	– 0.122 8 ^{b)}
d_1^s	[kHz]	– 0.089 4 ^{b)}
d_2^s	[kHz]	– 0.017 70 ^{b)}
$a_r(^{37}\text{Cl})$	[MHz]	38.564 4(269)
$T_{aa}(^{37}\text{Cl})$	[MHz]	– 64.585 7(338)
$T_{bb}(^{37}\text{Cl})$	[MHz]	– 69.044 4(247)
$\chi_{aa}(^{37}\text{Cl})$	[MHz]	– 40.929(153)
$\chi_{bb}(^{37}\text{Cl})$	[MHz]	2.129(71)
$C_{aa}(^{37}\text{Cl})$	[kHz]	36.90 ^{b)}
$C_{bb}(^{37}\text{Cl})$	[kHz]	7.33 ^{b)}
$C_{cc}(^{37}\text{Cl})$	[kHz]	6.60 ^{b)}

^{a)} The numbers in parentheses represent 1 standard deviation of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter constrained to this value.

Reference for ClO₂

97Mül Müller, H.S.P., Sørensen, G.O., Birk, M., Friedl, R.R. :
J. Mol. Spectrosc. **186** (1997) 177.

3.2.3.2.13 BrO₂Microwave data for ⁷⁹Br¹⁶O₂

Transition			ν [MHz]	Ref.		
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}				
		$F' - F''$				
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)						
$6_{16} \leftarrow 5_{05}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$7 \leftarrow 6$	90 823.075(25) ^{b)}	97Mü2		
		$6 \leftarrow 5$	90 900.642(25)			
		$5 \leftarrow 4$	90 980.649(25)			
		$4 \leftarrow 3$	91 034.139(25)			
		$5 \leftarrow 4$	90 889.377(30)			
	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	90 968.723(25)			
		$7 \leftarrow 6$	90 999.403(30)			
		$8 \leftarrow 7$	91 114.376(25)			
		$32_{1,32} \leftarrow 31_{0,31}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$		$33 \leftarrow 32$	412 180.861(50)
					$30 \leftarrow 29$	412 181.777(50)
$31 \leftarrow 30$	412 185.509(50)					
$32 \leftarrow 31$	412 195.178(50)					
$32 \leftarrow 31$	412 218.064(50)					
$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	$31 \leftarrow 30$		412 226.562(50)			
	$33 \leftarrow 32$		412 232.856(50)			
	$34 \leftarrow 33$		412 234.909(50)			
	$35_{1,34} \leftarrow 35_{0,35}$		$35\frac{1}{2} \leftarrow 35\frac{1}{2}$		$35 \leftarrow 35$	427 391.941(50)
					$37 \leftarrow 37$	427 446.191(50)
$34 \leftarrow 34$		427 699.218(50)				
$34\frac{1}{2} \leftarrow 34\frac{1}{2}$		$34 \leftarrow 34$			430 183.046(70)	
		$33 \leftarrow 33$			430 219.087(80)	
		$36 \leftarrow 36$	430 469.335(50)			
		$7_{07} \leftarrow 6_{16}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$		$9 \leftarrow 8$	88 670.197(35)
					$7 \leftarrow 6$	88 727 601(35)
$8 \leftarrow 7$					88 730.498(30)	
$6 \leftarrow 5$					88 740.486(30)	
$5 \leftarrow 4$	88 762.854(30)					
$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$		88 773.997(30)			
	$7 \leftarrow 6$		88 796.796(30)			
	$8 \leftarrow 7$		88 820.383(30)			
	$31_{0,31} \leftarrow 30_{1,30}$		$30\frac{1}{2} \leftarrow 29\frac{1}{2}$		$32 \leftarrow 31$	399 517.044(50)
					$29 \leftarrow 28$	399 518.020(50)
$30 \leftarrow 29$		399 521.301(50)				
$31 \leftarrow 30$		399 533.338(50)				
$31 \leftarrow 30$		399 552.206(50)				
$31\frac{1}{2} \leftarrow 30\frac{1}{2}$		$30 \leftarrow 29$	399 562.974(50)			
		$32 \leftarrow 31$	399 568.983(50)			
		$33 \leftarrow 32$	399 571.202(50)			
		$33_{0,33} \leftarrow 32_{1,32}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$		$34 \leftarrow 33$	424 842.859(50)
					$31 \leftarrow 30$	424 843.738(50)
$32 \leftarrow 31$	424 848.018(50)					
$33 \leftarrow 32$	424 855.471(50)					
$33 \leftarrow 32$	424 881.905(50)					
$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	$32 \leftarrow 31$		424 888.236(50)			
	$34 \leftarrow 33$		424 894.948(50)			

$13_{2,11} \leftarrow 12_{1,12}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$35 \leftarrow 34$	424 896.892(50)
		$15 \leftarrow 14$	405 362.609(50)
$2_{21} \leftarrow 1_{10}$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$13 \leftarrow 12$	405 942.784(50)
		$12 \leftarrow 11$	406 301.585(50)
		$3 \leftarrow 2$	89 459.681(35)
		$4 \leftarrow 3$	89 489.183(35)
$32_{2,31} \leftarrow 31_{1,30}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$2 \leftarrow 2$	90 955.568(35)
		$3 \leftarrow 2$	91 193.518(40)
		$33 \leftarrow 32$	424 972.174(50)
		$32 \leftarrow 31$	424 975.695(50)
		$31 \leftarrow 30$	424 978.438(50)
		$30 \leftarrow 29$	424 980.104(50)
		$31 \leftarrow 30$	425 018.895(50)
		$32 \leftarrow 31$	425 023.219(50)
		$33 \leftarrow 32$	425 026.126(50)
		$34 \leftarrow 33$	425 029.298(50)
$26_{2,25} \leftarrow 26_{1,26}$	$25\frac{1}{2} \leftarrow 25\frac{1}{2}$	$24 \leftarrow 24$	314 993.793(35)
		$25 \leftarrow 25$	315 005.473(35)
		$27 \leftarrow 27$	315 313.999(35)
		$34 \leftarrow 34$	414 608.008(70)
$34_{2,33} \leftarrow 34_{1,34}$	$34\frac{1}{2} \leftarrow 34\frac{1}{2}$	$35 \leftarrow 35$	414 650.213(50)
		$36 \leftarrow 36$	414 668.914(50)
		$33 \leftarrow 33$	414 921.284(50)
		$33 \leftarrow 33$	417 409.103(50)
		$32 \leftarrow 32$	417 438.361(50)
		$32 \leftarrow 31$	412 309.645(50)
		$31 \leftarrow 30$	412 313.463(50)
		$30 \leftarrow 29$	412 316.414(50)
		$29 \leftarrow 28$	412 318.231(50)
		$30 \leftarrow 29$	412 355.926(50)
$15_{3,12} \leftarrow 14_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$31 \leftarrow 30$	412 360.541(50)
		$32 \leftarrow 31$	412 363.678(50)
		$33 \leftarrow 32$	412 366.928(50)
		$17 \leftarrow 16$	416 333.837(50)
		$16 \leftarrow 15$	426 485.526(70)
		$15 \leftarrow 14$	416 711.478(50)
		$14 \leftarrow 13$	416 994.719(50)
		$13 \leftarrow 12$	420 349.572(50)
		$14 \leftarrow 13$	420 507.380(50)
		$15 \leftarrow 14$	420 753.428(70)
$22_{3,20} \leftarrow 21_{2,19}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	$16 \leftarrow 15$	421 105.134(100)
		$23 \leftarrow 22$	315 514.600(35)
		$22 \leftarrow 21$	315 644.623(35)
		$21 \leftarrow 20$	315 566.459(35)
		$20 \leftarrow 19$	315 580.374(35)
		$21 \leftarrow 20$	315 701.240(35)
		$22 \leftarrow 21$	315 729.281(35)
		$23 \leftarrow 22$	315 751.137(35)
		$24 \leftarrow 23$	315 766.361(35)
		$31 \leftarrow 30$	412 715.280(50)
$30_{3,28} \leftarrow 29_{2,27}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	$30 \leftarrow 29$	412 723.615(50)
		$29 \leftarrow 28$	412 729.829(50)
		$28 \leftarrow 27$	412 733.751(50)

	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$29 \leftarrow 28$	412 761.963(50)
		$30 \leftarrow 29$	412 770.468(50)
		$31 \leftarrow 30$	412 776.765(50)
		$32 \leftarrow 31$	412 781.124(50)
$39_{3,36} \leftarrow 39_{2,37}$	$39\frac{1}{2} \leftarrow 39\frac{1}{2}$	$41 \leftarrow 41$	424 057.975(50)
		$40 \leftarrow 40$	424 097.057(50)
		$39 \leftarrow 39$	424 151.656(50)
		$38 \leftarrow 38$	424 221.694(50)
$28_{3,26} \leftarrow 28_{2,27}$	$27\frac{1}{2} \leftarrow 27\frac{1}{2}$	$29 \leftarrow 29$	313 622.839(50)
$7_{34} \leftarrow 7_{25}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$6 \leftarrow 6$	94 191.388(25)
		$7 \leftarrow 7$	94 230.690(25)
		$8 \leftarrow 8$	94 272.879(20)
		$9 \leftarrow 9$	94 316.475(20)
	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 8$	95 105.289(25)
		$7 \leftarrow 7$	95 174.499(25)
		$6 \leftarrow 6$	95 234.259(30)
		$5 \leftarrow 4$	95 285.060(25)
$36_{3,34} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$37 \leftarrow 37$	413 908.257(50)
		$35 \leftarrow 35$	414 033.632(50)
	$35\frac{1}{2} \leftarrow 35\frac{1}{2}$	$34 \leftarrow 34$	416 538.357(50)
		$35 \leftarrow 35$	416 569.898(50)
$46_{7,40} \leftarrow 46_{6,41}$	$47\frac{1}{2} \leftarrow 47\frac{1}{2}$	$48 \leftarrow 48$	416 569.898(50)
$36_{3,34} \leftarrow 36_{2,35}$	$35\frac{1}{2} \leftarrow 35\frac{1}{2}$	$36 \leftarrow 36$	416 623.604(50)
		$37 \leftarrow 37$	416 703.884(50)
$31_{2,29} \leftarrow 30_{3,28}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$32 \leftarrow 31$	425 158.668(50)
		$31 \leftarrow 30$	425 165.920(50)
		$30 \leftarrow 29$	425 171.337(50)
		$29 \leftarrow 28$	425 174.774(50)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 29$	425 196.199(50)
		$31 \leftarrow 30$	425 203.615(50)
		$32 \leftarrow 31$	425 209.060(50)
		$33 \leftarrow 32$	425 212.813(50)
$21_{3,16} \leftarrow 20_{2,19}$	$21\frac{1}{2} \leftarrow 21\frac{1}{2}$	$23 \leftarrow 23$	418 986.740(50)
		$22 \leftarrow 22$	419 086.474(50)
		$21 \leftarrow 21$	419 241.426(50)
		$20 \leftarrow 20$	419 443.649(50)
$28_{4,25} \leftarrow 27_{3,24}$	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	$29 \leftarrow 28$	405 072.764(50)
		$28 \leftarrow 27$	405 098.217950
		$27 \leftarrow 26$	405 116.883(50)
		$26 \leftarrow 25$	405 128.970(50)
	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	$27 \leftarrow 26$	405 272.749(50)
		$28 \leftarrow 27$	405 297.048(50)
		$29 \leftarrow 28$	405 315.839(50)
		$30 \leftarrow 29$	405 328.733(50)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	$43 \leftarrow 43$	419 193.397(50)
		$42 \leftarrow 42$	419 228.730(50)
		$41 \leftarrow 41$	419 281.016(50)
		$40 \leftarrow 40$	419 349.044(50)
	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	$39 \leftarrow 99$	421 776.699(50)
		$40 \leftarrow 40$	421 810.280(50)
		$41 \leftarrow 41$	421 863.337(50)
		$42 \leftarrow 42$	421 937.360(50)
$38_{4,35} \leftarrow 38_{3,36}$	$38\frac{1}{2} \leftarrow 38\frac{1}{2}$	$40 \leftarrow 40$	411 134.505(50)

		39 ← 39	411 174.332(50)
		38 ← 38	411 230.270(50)
		37 ← 37	411 302.067(50)
	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	37 ← 37	413 789.777(50)
		38 ← 38	413 845.792(50)
		39 ← 39	413 925.373(50)
23 _{3,20} ← 22 _{4,19}	23 $\frac{1}{2}$ ← 22 $\frac{1}{2}$	25 ← 24	314 265.514(35)
		24 ← 23	314 287.473(35)
		23 ← 22	314 317.790(35)
		22 ← 21	314 354.734(40)
	22 $\frac{1}{2}$ ← 21 $\frac{1}{2}$	21 ← 20	314 909.460(35)
		22 ← 21	314 930.033(35)
		23 ← 22	314 960.133(35)
		24 ← 23	315 000.722(35)
29 _{3,26} ← 28 _{4,25}	29 $\frac{1}{2}$ ← 28 $\frac{1}{2}$	28 ← 27	410 507.334(50)
		29 ← 28	410 512.191(50)
		30 ← 29	410 515.458(50)
		31 ← 30	410 517.345(50)
	28 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	30 ← 29	410 588.141(50)
		29 ← 28	410 593.425(50)
		28 ← 27	410 597.447(50)
		27 ← 26	410 600.035(50)
9 _{3,4} ← 8 _{4,5}	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	9 ← 9	316 707.654(40)
		10 ← 10	316 713.345(60)
		8 ← 8	316 717.878(60)
		11 ← 10	316 747.985(35)
		10 ← 9	316 748.657(35)
		9 ← 8	316 762.512(35)
		8 ← 7	316 785.046(35)
	8 $\frac{1}{2}$ ← 7 $\frac{1}{2}$	8 ← 7	318 619.512(40)
		7 ← 6	318 620.868(40)
		9 ← 8	318 631.072(40)
		10 ← 9	318 661.232(40)
15 _{3,10} ← 14 _{4,11}	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	17 ← 16	405 391.209(50)
		16 ← 15	405 397.400(50)
		15 ← 14	405 413.618(50)
		14 ← 13	405 437.247(50)
	14 $\frac{1}{2}$ ← 13 $\frac{1}{2}$	13 ← 12	406 875.488(50)
		14 ← 13	406 881.800(50)
		15 ← 14	406 897.248(50)
		16 ← 15	406 924.457(50)
16 _{3,12} ← 15 _{4,11}	16 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	15 ← 14	408 115.320(50)
		16 ← 15	408 139.990(30)
		17 ← 16	408 164.001(50)
		18 ← 17	408 186.605(50)
	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	17 ← 16	408 802.099(50)
		16 ← 15	408 857.409(50)
		15 ← 14	408 900.665(50)
		14 ← 13	408 933.293(50)
18 _{3,14} ← 17 _{4,13}	18 $\frac{1}{2}$ ← 17 $\frac{1}{2}$	17 ← 16	424 799.464(50)
		18 ← 17	424 875.349(50)
		19 ← 18	424 937.359(50)
		20 ← 19	424 982.761(50)
	17 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	19 ← 18	424 996.694(50)

		18 ← 17	424 087.804(50)
		17 ← 16	425 156.961(50)
		16 ← 15	425 206.566(50)
43 _{5,38} ← 43 _{4,39}	43 $\frac{1}{2}$ ← 43 $\frac{1}{2}$	45 ← 45	411 298.196(50)
		44 ← 44	411 332.260(50)
		43 ← 43	411 383.457(50)
		42 ← 42	411 450.545(50)
	42 $\frac{1}{2}$ ← 42 $\frac{1}{2}$	41 ← 41	413 870.197(70)
		42 ← 42	413 903.863(50)
40 _{5,36} ← 40 _{4,37}	40 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	44 ← 44	414 028.371(50)
		42 ← 42	406 243.473(50)
		41 ← 41	406 279.371(50)
		40 ← 40	406 332.577(50)
		39 ← 39	406 401.880(50)
	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	38 ← 38	408 809.846(30)
		39 ← 39	408 844.195(50)
13 ₆₇ ← 12 ₅₈	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	40 ← 40	408 898.369(50)
		14 ← 13	416 204.845(70)
		15 ← 14	416 206.066(70)
		13 ← 12	416 212.635(50)
		12 ← 11	416 226.983(50)
	12 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	12 ← 11	417 894.781(70)
		11 ← 10	417 896.664(70)
		13 ← 12	417 901.033(50)
		14 ← 13	417 918.134(50)
6 ₆₁ ← 5 ₅₀	6 $\frac{1}{2}$ ← 5 $\frac{1}{2}$	7 ← 7	313 939.875(60)
		8 ← 7	313 983.935(35)
		7 ← 6	313 985.513(35)
		6 ← 5	313 990.516(35)
		5 ← 4	314 005.964(35)
		6 ← 6	314 100.759(50)
		5 ← 5	314 204.936(80)
	5 $\frac{1}{2}$ ← 4 $\frac{1}{2}$	6 ← 6	316 043.947(40)
		5 ← 5	316 231.612(40)
		5 ← 4	316 325.339(40)
		4 ← 3	316 327.484(40)
		6 ← 5	316 332.012(50)
		7 ← 6	316 337.083(50)
		4 ← 4	316 347.164(70)
14 ₆₉ ← 13 ₅₈	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	13 ← 12	431 947.992(50)
		14 ← 13	431 950.413(50)
		12 ← 11	431 951.811(50)
		15 ← 14	431 961.222(50)
44 _{6,39} ← 44 _{5,40}	44 $\frac{1}{2}$ ← 44 $\frac{1}{2}$	46 ← 46	425 700.449(50)
		45 ← 45	425 732.818(50)
		44 ← 44	425 781.537(50)
		43 ← 43	425 845.428(50)
10 ₇₄ ← 9 ₆₃	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	12 ← 11	413 741.225(70)
		11 ← 10	413 741.225(70)
		10 ← 9	413 753.703(50)
		9 ← 8	413 775.146(50)
	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	9 ← 8	415 873.285(70)
		8 ← 7	415 874.149(70)
		10 ← 9	415 883.827(50)

		11 ← 10	415 908.765(50)
$26_{7,20} \leftarrow 25_{6,19}$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	28 ← 27	626 159.843(80)
$49_{7,42} \leftarrow 49_{6,43}$	$49\frac{1}{2} \leftarrow 49\frac{1}{2}$	51 ← 51	410 610.970(50)
		49 ← 49	410 697.666(50)
		48 ← 48	410 766.089(50)
	$48\frac{1}{2} \leftarrow 48\frac{1}{2}$	48 ← 48	413 380.635(100)
		50 ← 50	413 506.212(70)
$38_{7,32} \leftarrow 38_{6,33}$	$38\frac{1}{2} \leftarrow 38\frac{1}{2}$	40 ← 40	315 277.398(35)
		39 ← 39	315 306.654(35)
		38 ← 38	315 351.577(35)
		37 ← 37	315 410.933(35)
$46_{7,40} \leftarrow 46_{6,41}$	$46\frac{1}{2} \leftarrow 46\frac{1}{2}$	47 ← 47	416 600.993(50)
		46 ← 46	416 647.644(50)
		45 ← 45	416 709.100(50)
	$45\frac{1}{2} \leftarrow 45\frac{1}{2}$	44 ← 44	419 058.824(50)
		45 ← 45	419 090.143(50)
		46 ← 46	419 138.250(50)
		47 ← 47	419 204.262(50)
$11_{7,4} \leftarrow 12_{6,7}$	$10\frac{1}{2} \leftarrow 11\frac{1}{2}$	10 ← 11	93 023.551(25)
		9 ← 10	93 024.279(25)
$23_{6,17} \leftarrow 22_{6,17}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	25 ← 24	90 166.280(35)
		24 ← 23	90 186.371(35)
		23 ← 22	90 207.840(35)
		22 ← 21	90 230.128(35)
$8_{8,1} \leftarrow 7_{7,0}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	10 ← 9	425 420.824(80)
		9 ← 8	425 421.624(80)
		8 ← 7	425 524.277(50)
		7 ← 6	425 433.663(50)
$53_{8,45} \leftarrow 53_{7,46}$	$53\frac{1}{2} \leftarrow 53\frac{1}{2}$	55 ← 55	418 994.540(50)
		54 ← 54	419 029.726(50)
		53 ← 53	419 082.556(50)
		52 ← 52	419 151.964(50)
$40_{8,33} \leftarrow 40_{7,34}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	42 ← 42	317 299.200(40)
		41 ← 41	317 318.990(40)
		40 ← 40	317 350.068(40)
		39 ← 39	317 391.558(40)
$48_{8,41} \leftarrow 48_{7,42}$	$48\frac{1}{2} \leftarrow 48\frac{1}{2}$	50 ← 50	405 975.674(50)
		49 ← 49	406 004.301(50)
		48 ← 48	406 047.801(50)
		47 ← 47	406 105.231(50)
	$47\frac{1}{2} \leftarrow 47\frac{1}{2}$	46 ← 46	408 365.575(50)
		47 ← 47	408 396.024(50)
		49 ← 49	408 504.110(50)
$35_{7,28} \leftarrow 34_{8,27}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	37 ← 36	316 648.766(35)
		36 ← 35	316 700.992(35)
		35 ← 34	316 774.535(100)
		34 ← 33	316 867.710(40)
$57_{9,48} \leftarrow 57_{8,49}$	$56\frac{1}{2} \leftarrow 56\frac{1}{2}$	55 ← 55	425 964.832(50)
		58 ← 58	426 132.544(70)
$52_{9,44} \leftarrow 52_{8,45}$	$52\frac{1}{2} \leftarrow 52\frac{1}{2}$	54 ← 54	421 389.684(100)
		53 ← 53	421 415.397(150)
$16_{10,7} \leftarrow 15_{9,6}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	626 441.253(80)
		14 ← 13	626 441.253(80)

		17 ← 16	626 464.550(80)
61 _{10,51} ← 61 _{9,52}	60 $\frac{1}{2}$ ← 60 $\frac{1}{2}$	60 ← 60	424 933.508(80)
45 _{9,36} ← 44 _{10,35}	45 $\frac{1}{2}$ ← 44 $\frac{1}{2}$	46 ← 45	409 121.152(50)
		45 ← 44	409 188.956(50)
		44 ← 43	409 274.784(50)
	44 $\frac{1}{2}$ ← 43 $\frac{1}{2}$	43 ← 42	411 102.678(100)
		46 ← 45	411 307.067(100)
13 _{11,2} ← 13 _{10,3}	13 $\frac{1}{2}$ ← 13 $\frac{1}{2}$	14 ← 14	430 211.660(70)
		15 ← 15	430 212.844(70)
		13 ← 13	430 241.795(50)
15 _{11,4} ← 15 _{10,5}	15 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	16 ← 16	430 246.684(150)
		17 ← 17	430 247.307(150)
17 _{11,6} ← 17 _{10,7}	17 $\frac{1}{2}$ ← 17 $\frac{1}{2}$	16 ← 16	430 202.148(120)
29 _{11,18} ← 29 _{10,19}	29 $\frac{1}{2}$ ← 29 $\frac{1}{2}$	30 ← 30	425 121.416(50)
		29 ← 29	425 123.344(80)
		31 ← 30	425 124.306(80)
		28 ← 28	425 129.754(50)
31 _{11,20} ← 31 _{10,21}	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	31 ← 31	424 385.525(50)
		30 ← 30	424 385.525(50)
		29 ← 29	424 389.167(50)
		32 ← 32	424 389.167(50)
33 _{11,22} ← 33 _{10,23}	33 $\frac{1}{2}$ ← 33 $\frac{1}{2}$	33 ← 33	420 516.997(70)
		32 ← 32	420 518.031(150)
		34 ← 34	420 518.563(120)
		35 ← 35	420 522.840(50)
	32 $\frac{1}{2}$ ← 32 $\frac{1}{2}$	33 ← 33	421 685.589(100)
		34 ← 34	421 685.589(100)
		32 ← 32	421 687.217(70)
		31 ← 31	421 691.309(50)
35 _{11,24} ← 35 _{10,25}	35 $\frac{1}{2}$ ← 35 $\frac{1}{2}$	34 ← 34	417 260.253(50)
		35 ← 35	417 262.090(50)
		36 ← 36	417 265.577(50)
		37 ← 37	417 270.816(50)
	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	36 ← 36	418 299.725(80)
		35 ← 35	418 301.860(50)
		34 ← 34	418 305.599(50)
		33 ← 33	418 310.792(50)
37 _{11,26} ← 37 _{10,27}	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	36 ← 36	413 106.788(50)
		37 ← 37	413 111.856(50)
		38 ← 38	413 117.654(50)
		39 ← 39	413 124.151(50)
	36 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	38 ← 38	414 008.520(50)
		37 ← 37	414 014.027(50)
		36 ← 36	414 020.054(50)
		35 ← 35	414 026.515(50)
39 _{11,28} ← 39 _{10,29}	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	38 ← 38	407 700.819(50)
		39 ← 39	407 709.733(100)
40 _{11,30} ← 40 _{10,31}	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	41 ← 41	407 709.733(100)
39 _{11,28} ← 39 _{10,29}	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	40 ← 40	407 718.749(50)
		41 ← 41	407 727.078(50)
	38 $\frac{1}{2}$ ← 38 $\frac{1}{2}$	40 ← 40	408 442.854(50)
		39 ← 39	408 452.617(50)

		38 ← 38	408 461.597(50)
		37 ← 37	408 469.850(50)
12 _{11,2} ← 12 _{10,3}	12 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	12 ← 12	430 184.890(50)
		11 ← 11	430 248.468(80)
14 _{11,4} ← 14 _{10,5}	14 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	15 ← 15	430 244.326(80)
		16 ← 16	430 245.203(80)
16 _{11,6} ← 16 _{10,7}	16 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	17 ← 17	430 216.829(80)
		18 ← 18	430 216.829(80)
		16 ← 16	430 236.743(50)
20 _{11,10} ← 20 _{10,11}	19 $\frac{1}{2}$ ← 19 $\frac{1}{2}$	21 ← 21	431 911.506(50)
24 _{11,14} ← 24 _{10,15}	23 $\frac{1}{2}$ ← 23 $\frac{1}{2}$	25 ← 25	430 221.946(50)
		23 ← 23	430 200.118(80)
		22 ← 22	430 201.384(120)
		24 ← 24	430 206.619(50)
28 _{11,18} ← 28 _{10,19}	28 $\frac{1}{2}$ ← 28 $\frac{1}{2}$	29 ← 29	425 967.663(50)
		30 ← 30	425 970.358(50)
		28 ← 28	425 970.358(50)
		27 ← 27	425 978.324(50)
30 _{11,20} ← 30 _{10,21}	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	31 ← 31	424 178.682(70)
		30 ← 30	424 179.845(70)
		32 ← 32	424 181.851(50)
		29 ← 29	424 184.858(50)
	29 $\frac{1}{2}$ ← 29 $\frac{1}{2}$	29 ← 29	425 538.545(120)
		30 ← 30	425 539.428(120)
		28 ← 28	425 541.577(50)
		31 ← 31	425 544.383(50)
32 _{11,22} ← 32 _{10,23}	32 $\frac{1}{2}$ ← 32 $\frac{1}{2}$	32 ← 32	421 919.980(120)
		33 ← 33	421 919.980(120)
		31 ← 31	421 922.102(50)
		34 ← 34	421 924.070(50)
34 _{11,24} ← 34 _{10,25}	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	33 ← 33	419 114.639(50)
		34 ← 34	419 114.639(50)
		35 ← 35	419 116.873(50)
		36 ← 36	419 121 419(50)
	33 $\frac{1}{2}$ ← 33 $\frac{1}{2}$	35 ← 35	420 227.653(50)
		34 ← 34	420 227.653(50)
		33 ← 33	420 230.184(50)
		32 ← 32	420 234.627(50)
36 _{11,26} ← 36 _{10,27}	36 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	35 ← 35	415 692.290(50)
		36 ← 36	415 694.865(50)
		37 ← 37	415 698.801(50)
		38 ← 38	415 704.272(50)
	35 $\frac{1}{2}$ ← 35 $\frac{1}{2}$	37 ← 37	416 688.776(50)
		36 ← 36	416 691.366(50)
		35 ← 35	416 695.343(50)
		34 ← 34	416 700.544(50)
38 _{11,28} ← 38 _{10,29}	38 $\frac{1}{2}$ ← 38 $\frac{1}{2}$	37 ← 37	411 607.149(50)
		38 ← 38	411 614.886(50)
	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	39 ← 39	412 501.879(50)
		38 ← 38	412 506.639(50)
		37 ← 37	412 512.079(50)
		36 ← 36	412 518.023(50)
40 _{11,30} ← 40 _{10,31}	40 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	39 ← 39	406 933.337(50)

		40 ← 40	406 937.524(50)
	$39\frac{1}{2} \leftarrow 39\frac{1}{2}$	40 ← 40	407 715.899(50)
		39 ← 39	407 722.186(50)
		38 ← 38	407 728.428(50)
$56_{11,46} \leftarrow 56_{10,47}$	$55\frac{1}{2} \leftarrow 55\frac{1}{2}$	54 ← 54	414 684.774(100)
		55 ← 55	414 716.340(150)
		57 ← 57	414 797.401(100)
$49_{10,39} \leftarrow 48_{11,38}$	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	47 ← 46	419 509.286(70)
		48 ← 47	419 541.135(50)
		49 ← 48	419 592.569(50)
		50 ← 49	419 664.843(100)
$52_{12,41} \leftarrow 52_{11,42}$	$51\frac{1}{2} \leftarrow 51\frac{1}{2}$	52 ← 52	424 105.501(50)
		50 ← 50	424 113.852(50)
$58_{12,47} \leftarrow 58_{11,48}$	$58\frac{1}{2} \leftarrow 58\frac{1}{2}$	60 ← 60	425 812.661(100)
		59 ← 59	425 818.778(100)
$49_{11,38} \leftarrow 48_{12,37}$	$49\frac{1}{2} \leftarrow 48\frac{1}{2}$	50 ← 49	314 964.761(40)
		49 ← 48	315 004.017(35)
		48 ← 47	315 051.507(50)
	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	48 ← 47	315 297.543(50)
		49 ← 48	315 323.775(50)
		50 ← 49	315 357.078(35)
$53_{11,42} \leftarrow 52_{12,41}$	$52\frac{1}{2} \leftarrow 51\frac{1}{2}$	54 ← 53	427 836.713(70)
$30_{14,17} \leftarrow 31_{13,18}$	$30\frac{1}{2} \leftarrow 31\frac{1}{2}$	31 ← 32	93 323.071(20)
		32 ← 33	93 324.545(20)
		30 ← 31	93 331.051(20)
		29 ← 30	93 347.722(25)
	$29\frac{1}{2} \leftarrow 30\frac{1}{2}$	29 ← 30	95 244.016(20)
		28 ← 29	95 245.266(20)
		30 ← 31	95 251.978(20)
		31 ← 32	95 269.960(20)
$43_{13,30} \leftarrow 42_{14,29}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	41 ← 40	94 788.554(25)
		42 ← 41	94 792.571(20)
		44 ← 43	94 792.571(20)
		43 ← 42	94 793.949(20)
	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	45 ← 44	95 824.534(20)
		42 ← 41	95 828.350(20)
		44 ← 43	95 828.678(20)
		43 ← 42	95 829.911(15)

^a) Coupling scheme: $J = N + S$; $F = J + I_1$ where I_1 is the ⁷⁹Br nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ⁷⁹Br¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
$32_{1,32} \leftarrow 31_{0,31}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$31 \leftarrow 30$	411 262.474(50) ^{b)}	97Mü2
		$32 \leftarrow 31$	411 271.314(50)	
		$32 \leftarrow 31$	411 295.888(50)	
		$31 \leftarrow 30$	411 303.569(50)	
	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	$33 \leftarrow 32$	411 310.139(50)	
		$34 \leftarrow 33$	411 312.177(50)	
		$33 \leftarrow 32$	423 927.960(50)	
		$32 \leftarrow 31$	423 933.540(50)	
$33_{0,33} \leftarrow 32_{1,32}$	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	$34 \leftarrow 33$	423 940.531(50)	
		$35 \leftarrow 34$	423 942.440(50)	
		$33 \leftarrow 32$	424 241.371(50)	
		$32 \leftarrow 31$	424 244.923(50)	
$32_{2,31} \leftarrow 31_{1,30}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$31 \leftarrow 30$	424 247.686(50)	
		$30 \leftarrow 29$	424 249.361(50)	
		$35 \leftarrow 35$	406 582.374(50)	
		$34 \leftarrow 34$	406 656.001(50)	
$35_{2,33} \leftarrow 35_{1,34}$	$35\frac{1}{2} \leftarrow 35\frac{1}{2}$	$33 \leftarrow 33$	409 146.978(70)	
		$34 \leftarrow 34$	409 179.881(50)	
		$35 \leftarrow 35$	409 236.269(80)	
		$36 \leftarrow 36$	409 320.004(50)	
$31_{1,30} \leftarrow 30_{2,29}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$32 \leftarrow 31$	411 609.607(50)	
		$31 \leftarrow 30$	411 613.454(50)	
		$30 \leftarrow 29$	411 616.423(50)	
		$29 \leftarrow 28$	411 618.244(50)	
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 29$	411 656.446(50)	
		$31 \leftarrow 30$	411 661.061(50)	
		$32 \leftarrow 31$	411 664.240(50)	
		$33 \leftarrow 32$	411 667.522(50)	
$30_{3,28} \leftarrow 29_{2,27}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	$31 \leftarrow 30$	412 263.651(150)	
		$30 \leftarrow 29$	412 272.063(70)	
		$29 \leftarrow 28$	412 278.347(80)	
		$28 \leftarrow 27$	412 282.316(80)	
	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$30 \leftarrow 29$	412 320.808(50)	
		$31 \leftarrow 30$	412 327.205(50)	
		$32 \leftarrow 31$	412 331.630(50)	
		$35 \leftarrow 25$	405 809.678(50)	
$37_{3,34} \leftarrow 37_{2,35}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$36 \leftarrow 36$	405 845.577(50)	
		$37 \leftarrow 37$	405 903.723(50)	
		$38 \leftarrow 38$	405 986.366(50)	
		$27 \leftarrow 27$	315 109.405(35)	
$28_{3,26} \leftarrow 28_{2,27}$	$28\frac{1}{2} \leftarrow 28\frac{1}{2}$	$38 \leftarrow 38$	419 514.363(50)	
$36_{3,34} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$37 \leftarrow 37$	419 572.196(50)	
		$36 \leftarrow 36$	419 627.600(70)	
		$35 \leftarrow 35$	419 698.895(80)	
		$32 \leftarrow 31$	424 642.671(50)	
$31_{2,29} \leftarrow 30_{3,28}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$31 \leftarrow 30$	424 649.956(50)	

		30 ← 29	424 655.390(50)
		29 ← 28	424 658.828(50)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	30 ← 29	424 680.430(50)
		31 ← 30	424 687.878(50)
		32 ← 31	424 693.339(50)
		33 ← 32	424 697.099(50)
$28_{4,25} \leftarrow 27_{3,24}$	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	29 ← 28	405 430.667(50)
		28 ← 27	405 457.539(50)
		27 ← 26	405 477.233(50)
		26 ← 25	405 490.015(50)
	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	27 ← 26	405 653.179(50)
		28 ← 27	405 678.741(50)
		29 ← 28	405 698.518(50)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	30 ← 29	405 712.072950
		42 ← 42	424 274.964(50)
$38_{4,35} \leftarrow 38_{3,36}$	$37\frac{1}{2} \leftarrow 37\frac{1}{2}$	40 ← 40	424 396.358(50)
		36 ← 36	419 072.398(50)
		37 ← 37	419 107.103(50)
		38 ← 38	419 163.695(50)
		39 ← 39	419 243.733(50)
$29_{3,26} \leftarrow 28_{4,25}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	28 ← 27	409 894.535(70)
		29 ← 28	409 898.663(70)
		30 ← 29	409 901.381(100)
		31 ← 30	409 902.775(100)
	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	30 ← 29	409 989.019(70)
		29 ← 28	409 993.464(70)
		28 ← 27	409 996.913(70)
		27 ← 26	409 999.083(70)
$16_{5,12} \leftarrow 15_{4,11}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	15 ← 14	412 612.362(50)
		16 ← 15	412 651.043(50)
		17 ← 16	412 684.368(50)
		18 ← 17	412 711.587(50)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	17 ← 16	413 321.801(50)
		16 ← 15	413 374.980(50)
		15 ← 14	413 416.768(50)
		14 ← 13	413 448.233(70)
$15_{5,10} \leftarrow 14_{4,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	17 ← 16	409 474.742(50)
		16 ← 15	409 480.347(50)
		15 ← 14	409 495.844(50)
		14 ← 13	409 518.571(50)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	410 925.231(50)
		14 ← 13	410 930.875(50)
		16 ← 15	410 972.326(50)
$43_{5,38} \leftarrow 43_{4,39}$	$42\frac{1}{2} \leftarrow 42\frac{1}{2}$	43 ← 43	418 341.073(50)
$40_{5,36} \leftarrow 40_{4,37}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	39 ← 39	411 286.727(50)
$12_{67} \leftarrow 11_{56}$	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	14 ← 13	406 943.248(70)
		12 ← 11	406 951.316(50)
		11 ← 10	406 967.580(50)
	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	11 ← 10	408 681.034(50)
		10 ← 9	408 682.933(50)
		12 ← 11	408 688.290(50)
		13 ← 12	408 707.840(50)
$13_{67} \leftarrow 12_{58}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	14 ← 13	421 450.248(70)

		15 ← 14	421 451.433(70)
		13 ← 12	421 458.050(70)
		12 ← 11	421 472.506(70)
42 _{6,37} ← 42 _{5,38}	41 $\frac{1}{2}$ ← 41 $\frac{1}{2}$	40 ← 40	405 892.795(50)
		42 ← 42	405 979.137(50)
		43 ← 43	406 051.655(50)
10 ₇₄ ← 9 ₆₃	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	12 ← 11	420 028.022(80)
		11 ← 10	420 028.483(80)
		10 ← 9	420 040.732(50)
		9 ← 8	420 062.247(50)
9 ₇₂ ← 8 ₆₃	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	9 ← 8	405 402.444(50)
		8 ← 7	405 423.877(50)
	8 $\frac{1}{2}$ ← 7 $\frac{1}{2}$	8 ← 7	407 565.611(70)
		7 ← 6	407 566.776(80)
		9 ← 8	407 575.973(50)
		10 ← 9	407 599.960(50)
11 ₈₃ ← 11 ₇₄	11 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	11 ← 11	315 434.207(35)
15 ₈₇ ← 15 ₇₈	14 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	15 ← 15	316 794.672(40)
		16 ← 16	316 825.738(35)
17 ₈₉ ← 17 _{7,10}	16 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	15 ← 15	315 764.755(40)
19 _{8,11} ← 19 _{7,12}	18 $\frac{1}{2}$ ← 18 $\frac{1}{2}$	17 ← 17	314 348.529(50)
53 _{8,45} ← 53 _{7,46}	53 $\frac{1}{2}$ ← 53 $\frac{1}{2}$	54 ← 54	420 090.010(70)
8 ₈₁ ← 8 ₇₂	8 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	8 ← 8	315 321.958(50)
10 ₈₃ ← 10 ₇₄	10 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	11 ← 11	315 408.087(40)
		12 ← 12	315 409.008(40)
14 ₈₇ ← 14 ₇₈	14 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	15 ← 15	315 046.629(50)
		16 ← 16	315 047.625(50)
16 ₈₉ ← 16 _{7,10}	15 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	16 ← 16	316 328.777(70)
20 _{8,13} ← 20 _{7,14}	19 $\frac{1}{2}$ ← 19 $\frac{1}{2}$	19 ← 19	313 527.105(50)
		20 ← 20	313 530.508(60)
		18 ← 18	313 530.508(60)
16 _{10,7} ← 15 ₉₆	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	15 ← 14	398 894.294(50)
22 _{10,13} ← 22 _{9,14}	21 $\frac{1}{2}$ ← 21 $\frac{1}{2}$	21 ← 21	398 897.286(50)
		20 ← 20	398 880.818(50)
		23 ← 23	398 902.249(50)
37 _{11,26} ← 37 _{10,27}	36 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	37 ← 37	424 707.450(50)
		36 ← 36	424 713.136(50)
39 _{11,28} ← 39 _{10,29}	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	38 ← 38	418 595.702(80)
		39 ← 39	418 603.983(50)
		40 ← 40	418 612.101(50)
		41 ← 41	418 619.922(50)
	38 $\frac{1}{2}$ ← 38 $\frac{1}{2}$	40 ← 40	419 325.190(50)
		39 ← 39	419 334.252(50)
		38 ← 38	419 342.662(50)
36 _{11,26} ← 36 _{10,27}	36 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	35 ← 35	426 291.026(50)
		36 ← 36	426 293.181(80)
		37 ← 37	426 296.824(50)
		38 ← 38	426 301.940(50)
40 _{11,30} ← 40 _{10,31}	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	41 ← 41	418 383.958(70)
		40 ← 40	418 390.184(50)
		39 ← 39	418 396.290(50)
		38 ← 38	418 402.277(50)

$44_{11,34} \leftarrow 44_{10,35}$	$44 \frac{1}{2} \leftarrow 44 \frac{1}{2}$	$43 \leftarrow 43$	407 195.912(70)
		$44 \leftarrow 44$	407 211.343(100)
		$45 \leftarrow 45$	407 224.520(70)
		$46 \leftarrow 46$	407 235.658(70)
	$43 \frac{1}{2} \leftarrow 43 \frac{1}{2}$	$45 \leftarrow 45$	407 849.217(70)
		$44 \leftarrow 44$	407 856.221(70)
		$43 \leftarrow 43$	407 862.417(70)
		$42 \leftarrow 42$	407 868.217(70)
$54_{11,44} \leftarrow 54_{10,45}$	$53 \frac{1}{2} \leftarrow 53 \frac{1}{2}$	$52 \leftarrow 52$	408 909.455(100)
		$54 \leftarrow 54$	408 927.738(70)
		$55 \leftarrow 55$	408 946.819(70)

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ⁷⁹Br nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ⁷⁹Br¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		

State: electronic \tilde{X}^2A' ; vibrational (0,2,0)

$32_{1,32} \leftarrow 31_{0,31}$	$31 \frac{1}{2} \leftarrow 30 \frac{1}{2}$	$33 \leftarrow 32$	410 332.784(80) ^{b)}	97Mü2
		$30 \leftarrow 29$	410 334.037(80)	
		$31 \leftarrow 30$	410 338.064(70)	
		$32 \leftarrow 31$	410 346.067(80)	
	$32 \frac{1}{2} \leftarrow 31 \frac{1}{2}$	$32 \leftarrow 31$	410 372.425(70)	
		$31 \leftarrow 30$	410 379.163(70)	
$31_{1,30} \leftarrow 30_{2,29}$	$30 \frac{1}{2} \leftarrow 29 \frac{1}{2}$	$32 \leftarrow 31$	410 912.646(50)	
		$31 \leftarrow 30$	410 916.491(50)	
		$30 \leftarrow 29$	410 919.490(50)	
		$29 \leftarrow 28$	410 921.402(50)	
	$31 \frac{1}{2} \leftarrow 30 \frac{1}{2}$	$30 \leftarrow 29$	410 960.028(50)	
		$31 \leftarrow 30$	410 964.683(70)	
		$32 \leftarrow 31$	410 967.900(50)	
		$33 \leftarrow 32$	410 971.163(100)	
$30_{3,28} \leftarrow 29_{2,27}$	$30 \frac{1}{2} \leftarrow 29 \frac{1}{2}$	$30 \leftarrow 29$	411 882.925(70)	
		$31 \leftarrow 30$	411 889.322(70)	
		$32 \leftarrow 31$	411 893.835(70)	
		$29 \leftarrow 28$	411 838.563(100)	
	$29 \frac{1}{2} \leftarrow 28 \frac{1}{2}$	$28 \leftarrow 27$	411 842.594(100)	
		$29 \leftarrow 28$	405 877.564(50)	
$28_{4,25} \leftarrow 27_{3,24}$	$27 \frac{1}{2} \leftarrow 26 \frac{1}{2}$	$26 \leftarrow 25$	405 940.408(50)	
		$28 \leftarrow 27$	406 152.696(50)	
		$29 \leftarrow 28$	406 173.556(50)	
		$30 \leftarrow 29$	406 187.841(50)	
$29_{3,26} \leftarrow 28_{4,25}$	$28 \frac{1}{2} \leftarrow 27 \frac{1}{2}$	$30 \leftarrow 29$	409 348.528(50)	
		$29 \leftarrow 28$	409 352.083(50)	
		$28 \leftarrow 27$	409 354.853(50)	
		$27 \leftarrow 26$	409 356.550(50)	
	$29 \frac{1}{2} \leftarrow 28 \frac{1}{2}$	$28 \leftarrow 27$	409 238.185(120)	
		$29 \leftarrow 28$	409 241.491(70)	
		$30 \leftarrow 29$	409 243.563(80)	

		31 ← 30	409 244.651(80)
$9_{72} \leftarrow 8_{63}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	9 ← 8	411 959.183(60)
		8 ← 7	411 980.636(60)
$19_{10,9} \leftarrow 19_{9,10}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	20 ← 20	408 034.957(70)
		21 ← 21	408 036.010(70)
		19 ← 19	408 046.746(50)
		18 ← 18	408 069.367(70)
$21_{10,11} \leftarrow 21_{9,12}$	$21\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 22	407 375.201(80)
		23 ← 23	407 376.671(80)
		21 ← 21	407 383.827(80)
		20 ← 20	407 401.446(100)
	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	20 ← 20	409 140.589(70)
		19 ← 19	409 141.845(70)
		22 ← 22	409 167.671(50)
$23_{10,13} \leftarrow 23_{9,14}$	$23\frac{1}{2} \leftarrow 23\frac{1}{2}$	24 ← 24	406 425.596(80)
		25 ← 25	406 427.560(50)
		23 ← 23	406 431.537(50)
		22 ← 22	406 444.489(50)
	$22\frac{1}{2} \leftarrow 22\frac{1}{2}$	22 ← 22	408 019.875(50)
		21 ← 21	408 021.686(50)
		23 ← 23	408 025.469(70)
$25_{10,15} \leftarrow 25_{9,16}$	$25\frac{1}{2} \leftarrow 25\frac{1}{2}$	24 ← 24	408 039.508(70)
		27 ← 27	405 124.910(70)
		25 ← 25	405 125.986(70)
		24 ← 24	405 135.290(50)
	$24\frac{1}{2} \leftarrow 24\frac{1}{2}$	24 ← 24	406 562.954(50)
		23 ← 23	406 565.441(70)
		25 ← 25	406 566.302(70)
		26 ← 26	406 576.129(50)
$14_{10,5} \leftarrow 14_{9,6}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 13	411 341.665(100)
		12 ← 12	411 341.665(100)
		14 ← 14	411 363.716(100)
$16_{10,7} \leftarrow 16_{9,8}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	16 ← 16	408 607.360(50)
		15 ← 15	408 640.556(80)
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	15 ← 15	410 904.754(70)
		14 ← 14	407 738.185(80)
$20_{10,11} \leftarrow 20_{9,12}$	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 21	407 739.374(80)
		20 ← 20	407 748.266(70)
	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	19 ← 19	409 596.989(70)
		18 ← 18	409 598.030(70)
		20 ← 20	409 606.581(70)
$22_{10,13} \leftarrow 22_{9,14}$	$21\frac{1}{2} \leftarrow 21\frac{1}{2}$	21 ← 21	408 618.300(50)
		20 ← 20	408 619.764(50)
		22 ← 22	408 625.149(50)
		23 ← 23	408 641.414(80)
$24_{10,15} \leftarrow 24_{9,16}$	$24\frac{1}{2} \leftarrow 24\frac{1}{2}$	25 ← 25	405 827.041(70)
		26 ← 26	405 828.724(100)
		24 ← 24	405 831.420(70)
	$23\frac{1}{2} \leftarrow 23\frac{1}{2}$	23 ← 23	407 341.196(70)
		22 ← 22	407 343.360(70)
		24 ← 24	407 345.557(70)

^a) Coupling scheme: $J = N + S$; $F = J + I_1$ where I_1 is the ⁷⁹Br nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Molecular parameters for ⁷⁹Br¹⁶O₂

Parameter		Value	Method	Ref.
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)				
<i>A</i>	[MHz]	28 024.518 21(108) ^{a)}	MW	97Mü2
<i>B</i>	[MHz]	8 233.172 826(246)		
<i>C</i>	[MHz]	6 345.433 279(257)		
<i>D</i> _K	[kHz]	714.378 4(225)		
<i>D</i> _{NK}	[kHz]	− 70.691 69(303)		
<i>D</i> _N	[kHz]	7.135 185(192)		
<i>d</i> ₁	[kHz]	− 2.637 561(103)		
<i>d</i> ₂	[kHz]	− 0.156 557(51)		
<i>H</i> _K	[kHz]	0.061 037(182)		
<i>H</i> _{KN}	[Hz]	− 5.923 6(201)		
<i>H</i> _{NK}	[Hz]	− 0.339 92(168)		
<i>H</i> _N	[Hz]	0.017 449(48)		
<i>h</i> ₁	[Hz]	0.009 295(76)		
<i>h</i> ₂	[Hz]	0.966(53)×10 ^{−3}		
<i>h</i> ₃	[Hz]	0.936 5(109)×10 ^{−3}		
<i>L</i> _K	[Hz]	− 0.702 30(510)×10 ^{−2}		
<i>L</i> _{KKN}	[Hz]	0.874 0(81)×10 ^{−3}		
<i>L</i> _{NK}	[Hz]	0.156(88)×10 ^{−4}		
<i>l</i> ₁	[Hz]	− 0.443(167)×10 ^{−7}		
<i>l</i> ₂	[Hz]	0.45(125)×10 ^{−8}		
<i>l</i> ₃	[Hz]	− 0.73(59)×10 ^{−8}		
<i>l</i> ₄	[Hz]	− 0.469(138)×10 ^{−8}		
<i>ε</i> _{aa}	[MHz]	− 2 352.219 2(157)		
<i>ε</i> _{bb}	[MHz]	− 565.664 4(56)		
<i>ε</i> _{cc}	[MHz]	52.574 1(60)		
<i>D</i> _K ^s	[kHz]	− 17.205(191)		
<i>D</i> _{KN} ^s	[kHz]	− 0.305(34)		
<i>D</i> _{NK} ^s	[kHz]	− 0.624 5(275)		
<i>D</i> _N ^s	[kHz]	− 0.372 46(269)		
<i>d</i> ₁ ^s	[kHz]	− 0.343 27(204)		
<i>d</i> ₂ ^s	[kHz]	− 0.115 08(108)		
<i>H</i> _K ^s	[Hz]	3.76(60)		
<i>h</i> ₁ ^s	[Hz]	0.212(95)×10 ^{−3}		
<i>h</i> ₂ ^s	[Hz]	0.142(72)×10 ^{−3}		
<i>h</i> ₃ ^s	[Hz]	− 0.748(154)×10 ^{−4}		
<i>a</i> _F (⁷⁹ Br)	[MHz]	88.950(30)		
<i>a</i> _F (⁷⁹ Br) _I	[kHz]	0.126 2(260)		
<i>a</i> _F (⁷⁹ Br) _K	[kHz]	− 2.706(276)		
<i>T</i> _{aa} (⁷⁹ Br)	[MHz]	− 373.336(47)		
<i>T</i> _{aa} (⁷⁹ Br) _J	[kHz]	− 0.211(91)		
<i>T</i> _{aa} (⁷⁹ Br) _K	[kHz]	2.88(42)		

$T_{bb}({}^{79}\text{Br})$	[MHz]	– 408.234(31)		
$T_{bb}({}^{79}\text{Br})_I$	[kHz]	0.595(50)		
$T_{bb}({}^{79}\text{Br})_K$	[kHz]	– 24.63(122)		
$\chi_{aa}({}^{79}\text{Br})$	[MHz]	356.221(65)		
$\chi_{bb}({}^{79}\text{Br})$	[MHz]	22.118(40)		
$C_{aa}({}^{79}\text{Br})$	[kHz]	160.12(267)		
$C_{bb}({}^{79}\text{Br})$	[kHz]	41.58(172)		
$C_{cc}({}^{79}\text{Br})$	[kHz]	31.65(178)		
$r_0(\text{Br–O})$	[nm]	0.164 91(30)		
$\alpha_0(\text{O–Br–O})$	[deg]	114.44(50)		
μ	[Debye]	2.81(20)		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
A	[MHz]	28 517.613 61(366) ^{a)}	MW	97Mü2
B	[MHz]	8 228.248 72(124)		
C	[MHz]	6 329.510 21(140)		
D_K	[kHz]	782.146(66)		
D_{NK}	[kHz]	– 73.160 6(58)		
D_N	[kHz]	7.091 52(171)		
d_1	[kHz]	– 2.645 332(280)		
d_2	[kHz]	– 0.186 316(111)		
H_K	[kHz]	0.073 397(385)		
H_{KN}	[Hz]	– 6.746 6(457)		
H_{NK}	[Hz]	– 0.356 11(215)		
H_N	[Hz]	0.017 739(781)		
h_1	[Hz]	0.009 165(126)		
h_2	[Hz]	1.090(82)×10 ^{–3}		
h_3	[Hz]	1.158 3(172)×10 ^{–3}		
L_K	[Hz]	– 0.702 30×10 ^{–2 b)}		
L_{KKN}	[Hz]	0.874 0×10 ^{–3 b)}		
L_{NK}	[Hz]	0.156×10 ^{–4 b)}		
l_1	[Hz]	– 0.443×10 ^{–7 b)}		
l_2	[Hz]	0.45×10 ^{–8 b)}		
l_3	[Hz]	– 0.73×10 ^{–8 b)}		
l_4	[Hz]	– 0.469×10 ^{–8 b)}		
\mathcal{E}_{aa}	[MHz]	– 2 306.671 2(411)		
\mathcal{E}_{bb}	[MHz]	– 564.312 5(230)		
\mathcal{E}_{cc}	[MHz]	53.067 8(196)		
D_K^s	[kHz]	– 33.665(416)		
D_{KN}^s	[kHz]	0.256(194)		
D_{NK}^s	[kHz]	– 0.017 5(1633)		
D_N^s	[kHz]	– 0.390 76(777)		
d_1^s	[kHz]	– 0.342 09(307)		
d_2^s	[kHz]	– 0.107 33(144)		
H_K^s	[Hz]	3.76 ^{b)}		
h_1^s	[Hz]	0.212×10 ^{–3 b)}		
h_2^s	[Hz]	0.142×10 ^{–3 b)}		
h_3^s	[Hz]	– 0.748×10 ^{–4 b)}		
$a_F({}^{79}\text{Br})$	[MHz]	89.329(124)		
$a_F({}^{79}\text{Br})_I$	[kHz]	0.126 2 ^{b)}		
$a_F({}^{79}\text{Br})_K$	[kHz]	– 2.706 ^{b)}		
$T_{aa}({}^{79}\text{Br})$	[MHz]	– 373.431(91)		
$T_{aa}({}^{79}\text{Br})_I$	[kHz]	– 0.211 ^{b)}		
$T_{aa}({}^{79}\text{Br})_K$	[kHz]	2.88 ^{b)}		

$T_{bb}({}^{79}\text{Br})$	[MHz]	– 407.716(141)		
$T_{bb}({}^{79}\text{Br})_I$	[kHz]	0.595 ^{b)}		
$T_{bb}({}^{79}\text{Br})_K$	[kHz]	– 24.63 ^{b)}		
$\chi_{aa}({}^{79}\text{Br})$	[MHz]	356.575(200)		
$\chi_{bb}({}^{79}\text{Br})$	[MHz]	22.474(130)		
$C_{aa}({}^{79}\text{Br})$	[kHz]	160.12 ^{b)}		
$C_{bb}({}^{79}\text{Br})$	[kHz]	41.58 ^{b)}		
$C_{cc}({}^{79}\text{Br})$	[kHz]	31.65 ^{b)}		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
A	[MHz]	29 030.213 1(109) ^{a)}	MW	97Mü2
B	[MHz]	8 223.106 67(289)		
C	[MHz]	6 313.535 55(281)		
D_K	[kHz]	856.833(139)		
D_{NK}	[kHz]	– 75.794 7(58)		
D_N	[kHz]	7.074 85(341)		
d_1	[kHz]	– 2.653 10(530)		
d_2	[kHz]	– 0.216 075(198)		
H_K	[kHz]	0.085 757(703)		
H_{KN}	[Hz]	– 5.939 10(844)		
H_{NK}	[Hz]	– 0.372 30(316)		
H_N	[Hz]	0.018 03 (156)		
h_1	[Hz]	0.009 035(216)		
h_2	[Hz]	1.214(137)×10 ^{–3}		
h_3	[Hz]	1.380 1(287)×10 ^{–3}		
L_K	[Hz]	– 0.702 30×10 ^{–2} ^{b)}		
L_{KKN}	[Hz]	0.874 0×10 ^{–3} ^{b)}		
L_{NK}	[Hz]	0.156×10 ^{–4} ^{b)}		
l_1	[Hz]	– 0.443×10 ^{–7} ^{b)}		
l_2	[Hz]	0.45×10 ^{–8} ^{b)}		
l_3	[Hz]	– 0.73×10 ^{–8} ^{b)}		
l_4	[Hz]	– 0.469×10 ^{–8} ^{b)}		
\mathcal{E}_{aa}	[MHz]	– 2 254.216(108)		
\mathcal{E}_{bb}	[MHz]	– 562.917(79)		
\mathcal{E}_{cc}	[MHz]	53.606 0(444)		
D_K^s	[kHz]	– 50.125(764)		
D_{KN}^s	[kHz]	0.817(382)		
D_{NK}^s	[kHz]	– 0.589(323)		
D_N^s	[kHz]	– 0.409 1(148)		
d_1^s	[kHz]	– 0.340 91(460)		
d_2^s	[kHz]	– 0.099 58(219)		
H_K^s	[Hz]	3.76 ^{b)}		
h_1^s	[Hz]	0.212×10 ^{–3} ^{b)}		
h_2^s	[Hz]	0.142×10 ^{–3} ^{b)}		
h_3^s	[Hz]	– 0.748×10 ^{–4} ^{b)}		

^{a)} The numbers in parentheses represent 2 standard deviations of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter constrained to this value.

Microwave data for ⁸¹Br¹⁶O₂

Transition			ν [MHz]	Ref.		
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}				
		$F' - F''$				
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)						
$6_{16} \leftarrow 5_{05}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$7 \leftarrow 6$	90 518.404(30) ^{b)}	97Mü2		
		$6 \leftarrow 5$	90 585.328(25)			
		$5 \leftarrow 4$	90 669.776(25)			
		$4 \leftarrow 3$	90 733.126(25)			
		$5 \leftarrow 4$	90 568.973(20)			
		$6 \leftarrow 5$	90 646.743(25)			
		$7 \leftarrow 6$	90 669.776(25)			
		$8 \leftarrow 7$	90 809.411(25)			
		$32_{1,32} \leftarrow 31_{0,31}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$		$33 \leftarrow 32$	411 513.974(60)
					$30 \leftarrow 29$	411 514.942(50)
$31 \leftarrow 30$	411 518.712(60)					
$32 \leftarrow 31$	411 528.556(50)					
$32 \leftarrow 31$	411 550.548(50)					
$31 \leftarrow 30$	411 559.161(50)					
$33 \leftarrow 32$	411 565.780(50)					
$34 \leftarrow 33$	411 568.140(50)					
$35_{1,34} \leftarrow 35_{0,35}$	$35\frac{1}{2} \leftarrow 35\frac{1}{2}$			$35 \leftarrow 35$	426 841.254(50)	
				$36 \leftarrow 36$	426 881.426(50)	
		$37 \leftarrow 37$	426 903.106(50)			
		$34 \leftarrow 34$	427 174.491(50)			
		$34 \leftarrow 34$	429 626.125(50)			
		$33 \leftarrow 33$	429 660.048(70)			
		$36 \leftarrow 36$	429 933.960(50)			
		$35 \leftarrow 35$	429 948.567(70)			
		$7_{07} \leftarrow 6_{16}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$9 \leftarrow 8$	88 694.843(35)	
				$7 \leftarrow 6$	88 755.612(35)	
$8 \leftarrow 7$	88 766.477(25)					
$6 \leftarrow 5$	88 766.477(25)					
$5 \leftarrow 4$	88 780.966(30)					
$6 \leftarrow 5$	88 793.898(30)					
$7 \leftarrow 6$	88 818.487(35)					
$8 \leftarrow 7$	88 836.260(30)					
$31_{0,31} \leftarrow 30_{1,30}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$			$32 \leftarrow 31$	398 870.569(60)	
				$29 \leftarrow 28$	398 871.558(50)	
		$30 \leftarrow 29$	398 874.891(60)			
		$31 \leftarrow 30$	398 886.961(50)			
		$31 \leftarrow 30$	398 905.176(50)			
		$30 \leftarrow 29$	398 915.945(50)			
		$32 \leftarrow 31$	398 922.258(50)			
		$33 \leftarrow 32$	398 924.789(50)			
		$33_{0,33} \leftarrow 32_{1,32}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	$34 \leftarrow 33$	424 155.651(60)	
				$31 \leftarrow 30$	424 156.575(60)	
$32 \leftarrow 31$	424 160.877(50)					
$33 \leftarrow 32$	424 168.604(50)					
$33 \leftarrow 32$	424 193.976(50)					
$32 \leftarrow 31$	424 200.534(50)					

		34 ← 33	424 207.530(50)
		35 ← 34	424 209.745(50)
49 _{0,49} ← 48 _{1,48}	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	50 ← 49	626 154.701(80)
		47 ← 46	626 154.701(80)
		49 ← 48	626 157.020(80)
		48 ← 47	626 174.887(80)
	49 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	48 ← 47	626 185.716(80)
		49 ← 48	626 204.185(80)
		50 ← 49	626 206.947(120)
		51 ← 50	626 208.052(120)
2 ₂₁ ← 1 ₁₀	2 $\frac{1}{2}$ ← 1 $\frac{1}{2}$	3 ← 2	89 860.912(35)
		4 ← 3	89 888.478(35)
	1 $\frac{1}{2}$ ← $\frac{1}{2}$	2 ← 2	90 310.681(30)
		3 ← 2	90 550.750(30)
32 _{2,31} ← 31 _{1,30}	31 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	33 ← 32	424 283.455(50)
		32 ← 31	424 286.881(50)
		31 ← 30	424 289.731(50)
		30 ← 29	424 291.737(50)
	32 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	31 ← 30	424 329.762(50)
		32 ← 31	424 334.074(50)
		33 ← 32	424 337.151(50)
		34 ← 33	424 340.981(50)
48 _{2,47} ← 47 _{1,46}	47 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	48 ← 47	626 252.640(150)
		47 ← 46	626 253.080(250)
		49 ← 48	626 253.640(100)
		46 ← 45	626 253.640(100)
	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	47 ← 46	626 299.351(120)
		49 ← 48	626 299.351(120)
		50 ← 49	626 304.764(80)
37 _{2,35} ← 37 _{1,36}	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	39 ← 39	426 324.011(50)
		38 ← 38	426 393.271(50)
		37 ← 37	426 448.389(50)
13 _{2,11} ← 12 _{1,12}	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	15 ← 14	405 675.283(50)
		14 ← 13	405 788.551(70)
		13 ← 12	406 325.869(50)
		12 ← 11	406 681.132(50)
	12 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	11 ← 10	410 542.900(150)
		12 ← 11	410 763.506(120)
		13 ← 12	411 089.913(50)
26 _{2,25} ← 26 _{1,26}	25 $\frac{1}{2}$ ← 25 $\frac{1}{2}$	26 ← 26	314 541.015(80)
		24 ← 24	314 626.037(35)
		25 ← 25	314 644.023(35)
		27 ← 27	314 974.036(35)
34 _{2,33} ← 34 _{1,34}	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	34 ← 34	414 078.432(80)
		35 ← 35	414 126.874(50)
		36 ← 36	414 146.911(50)
		33 ← 33	414 417.793(50)
	33 $\frac{1}{2}$ ← 33 $\frac{1}{2}$	33 ← 33	416 873.557(70)
		32 ← 32	416 900.313(50)
		35 ← 35	417 179.964(70)
		34 ← 34	417 202.017(70)
31 _{1,30} ← 30 _{2,29}	30 $\frac{1}{2}$ ← 29 $\frac{1}{2}$	32 ← 31	411 641.651(50)
		31 ← 30	411 645.372(50)

		30 ← 29	411 648.432(50)
		29 ← 28	411 650.638(50)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	30 ← 29	412 687.557(50)
		31 ← 30	411 692.163(50)
		32 ← 31	411 695.495(50)
		33 ← 32	411 699.426(50)
$15_{3,12} \leftarrow 14_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	17 ← 16	416 333.837(50)
		16 ← 15	426 485.526(70)
		15 ← 14	416 711.478(50)
		14 ← 13	416 994.719(50)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	420 349.572(50)
		14 ← 13	420 507.380(50)
		15 ← 14	420 753.428(70)
		16 ← 15	421 105.134(100)
$7_{34} \leftarrow 7_{25}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	6 ← 6	93 095.346(25)
		7 ← 7	93 137.790(25)
		8 ← 8	93 183.346(25)
		9 ← 9	93 230.555(20)
	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	8 ← 8	93 993.598(20)
		7 ← 7	94 067.837(25)
		6 ← 6	94 132.692(25)
		5 ← 4	94 188.288(25)
$39_{3,36} \leftarrow 39_{2,37}$	$39\frac{1}{2} \leftarrow 39\frac{1}{2}$	41 ← 41	423 935.181(50)
		40 ← 40	423 982.102(50)
		39 ← 39	424 040.372(50)
		38 ← 38	424 110.541(50)
$36_{3,34} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	38 ← 38	413 518.399(50)
		37 ← 37	413 587.397(50)
		36 ← 36	413 644.937(100)
		35 ← 35	413 714.418(70)
	$35\frac{1}{2} \leftarrow 35\frac{1}{2}$	34 ← 34	416 190.320(50)
		36 ← 36	416 285.271(50)
		37 ← 37	416 365.078(50)
$21_{5,16} \leftarrow 20_{2,19}$	$21\frac{1}{2} \leftarrow 21\frac{1}{2}$	20 ← 20	418 889.931(50)
$31_{2,29} \leftarrow 30_{3,28}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	32 ← 31	424 473.295(50)
		31 ← 30	424 480.608(50)
		30 ← 29	424 486.394(50)
		29 ← 28	424 490.520(50)
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	30 ← 29	424 511.089(50)
		31 ← 30	424 518.568(50)
		32 ← 31	424 524.458(50)
		33 ← 32	424 528.990(50)
$47_{2,45} \leftarrow 46_{3,44}$	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	48 ← 47	626 367.503(80)
		47 ← 46	626 370.633(80)
		46 ← 45	626 373.059(100)
		45 ← 44	626 374.770(100)
	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	46 ← 45	626 413.861(80)
		47 ← 46	626 417.267(80)
		48 ← 47	626 419.923(100)
		49 ← 48	626 422.158(100)
$52_{12,41} \leftarrow 52_{11,42}$	$51\frac{1}{2} \leftarrow 51\frac{1}{2}$	51 ← 51	419 370.415(50)
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	43 ← 43	419 370.415(50)
		42 ← 42	419 412.754(50)

		41 ← 41	419 468.528(50)
		40 ← 40	419 536.852(50)
	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	40 ← 40	421 977.592(50)
$38_{4,35} \leftarrow 38_{3,36}$	$38\frac{1}{2} \leftarrow 38\frac{1}{2}$	40 ← 40	411 033.538(50)
		39 ← 39	411 081.323(50)
		38 ← 38	411 141.017(50)
		37 ← 37	411 212.957(50)
	$37\frac{1}{2} \leftarrow 37\frac{1}{2}$	36 ← 36	413 639.055(50)
		37 ← 37	413 680.514(50)
$23_{3,20} \leftarrow 22_{4,19}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	39 ← 39	413 820.932(50)
		25 ← 24	315 096.885(30)
		24 ← 23	315 121.151(35)
		23 ← 22	315 151.570(35)
		22 ← 21	315 186.787(35)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	21 ← 20	315 709.849(35)
		22 ← 21	315 732.461(35)
		23 ← 22	315 762.765(35)
$29_{3,26} \leftarrow 28_{4,25}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	24 ← 23	315 801.844(35)
		28 ← 27	410 077.918(50)
		29 ← 28	410 083.353(50)
		30 ← 29	410 087.343(50)
		31 ← 30	410 090.087(50)
	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	30 ← 29	410 149.011(50)
		29 ← 28	410 154.855(50)
		28 ← 27	410 159.594(50)
		27 ← 26	410 163.070(50)
$9_{54} \leftarrow 8_{45}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	11 ← 10	314 912.996(35)
		10 ← 9	314 916.420(35)
		9 ← 8	314 931.574(35)
		8 ← 7	314 954.471(35)
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	7 ← 6	316 773.622(35)
		8 ← 7	316 775.456(40)
		9 ← 8	316 788.537(35)
		7 ← 7	316 796.236(70)
		10 ← 9	316 817.705(35)
$15_{5,10} \leftarrow 14_{4,11}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	405 094.389(50)
		14 ← 13	405 103.196(50)
		15 ← 14	405 121.333(50)
		16 ← 15	405 151.582(50)
$16_{5,12} \leftarrow 15_{4,11}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	15 ← 14	405 695.490(50)
		16 ← 15	405 774.412(30)
		17 ← 16	405 839.241(50)
		18 ← 17	405 885.694(50)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	17 ← 16	406 524.964(50)
		16 ← 15	406 572.966(50)
		15 ← 14	406 611.069(50)
		14 ← 13	406 465.642(50)
$40_{5,36} \leftarrow 40_{4,37}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	41 ← 41	406 465.642(50)
$43_{5,38} \leftarrow 43_{4,39}$	$43\frac{1}{2} \leftarrow 43\frac{1}{2}$	45 ← 45	411 905.845(50)
		44 ← 44	411 946.537(50)
		43 ← 43	412 001.045(50)
		42 ← 42	412 068.295(50)
	$42\frac{1}{2} \leftarrow 42\frac{1}{2}$	41 ← 41	414 457.971(70)

		42 ← 42	414 498.155(50)
		43 ← 43	414 554.094(50)
		44 ← 44	414 626.886(50)
40 _{3,36} ← 40 _{4,37}	40 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	42 ← 42	406 422.718(50)
		40 ← 40	406 522.585(50)
		39 ← 39	406 592.222(50)
	39 $\frac{1}{2}$ ← 39 $\frac{1}{2}$	39 ← 39	409 015.194(30)
		40 ← 40	409 073.258(50)
		41 ← 41	409 149.675(50)
25 _{4,21} ← 24 _{5,20}	24 $\frac{1}{2}$ ← 23 $\frac{1}{2}$	23 ← 22	314 347.512(40)
		24 ← 23	314 400.485(35)
		25 ← 24	314 470.548(40)
		26 ← 25	314 559.633(35)
29 _{4,25} ← 28 _{5,24}	28 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	26 ← 25	405 221.724(50)
		27 ← 26	405 239.151(50)
		28 ← 27	405 262.509(50)
		29 ← 28	405 292.455(50)
6 ₆₁ ← 5 ₅₀	5 $\frac{1}{2}$ ← 4 $\frac{1}{2}$	6 ← 6	313 851.031(60)
		5 ← 5	314 013.064(50)
		4 ← 4	314 114.209(50)
		5 ← 4	314 124.240(30)
		4 ← 3	314 124.780(30)
		6 ← 5	314 130.078(35)
		7 ← 6	314 133.706(35)
13 ₆₇ ← 12 ₅₈	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	14 ← 13	413 940.974(70)
		15 ← 14	413 941.834(70)
		13 ← 12	413 949.820(50)
		12 ← 11	413 963.148(50)
	12 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	12 ← 11	415 618.952(50)
		11 ← 10	415 618.952(50)
		13 ← 12	415 625.965(50)
		14 ← 13	415 642.280(50)
17 _{11,6} ← 17 _{10,7}	17 $\frac{1}{2}$ ← 17 $\frac{1}{2}$	16 ← 16	426 143.707(50)
44 _{6,39} ← 44 _{5,40}	44 $\frac{1}{2}$ ← 44 $\frac{1}{2}$	46 ← 46	426 143.707(50)
		45 ← 45	426 182.568(50)
		44 ← 44	426 234.516(50)
		43 ← 43	426 298.796(50)
10 ₇₄ ← 9 ₆₃	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	12 ← 11	411 127.410(50)
		11 ← 10	411 130.755(50)
		10 ← 9	411 143.599(50)
		9 ← 8	411 163.866(50)
	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	9 ← 8	413 244.751(70)
		8 ← 7	413 246.648(70)
		10 ← 9	413 258.377(50)
		11 ← 10	413 282.340(50)
11 ₇₄ ← 10 ₆₅	11 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	13 ← 12	425 758.646(50)
		12 ← 11	425 761.634(50)
		11 ← 10	425 773.825(50)
		10 ← 9	425 793.042(50)
	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	9 ← 8	427 788.572(50)
49 _{7,42} ← 49 _{6,43}	49 $\frac{1}{2}$ ← 49 $\frac{1}{2}$	51 ← 51	412 719.929(50)
		49 ← 49	412 815.532(50)
		48 ← 48	412 883.517(50)

$38_{7,32} \leftarrow 38_{6,33}$	$38\frac{1}{2} \leftarrow 38\frac{1}{2}$	40 \leftarrow 40	315 431.291(35)
		39 \leftarrow 39	315 467.106(35)
		38 \leftarrow 38	315 515.936(35)
		37 \leftarrow 37	315 576.708(35)
$46_{7,40} \leftarrow 46_{6,41}$	$37\frac{1}{2} \leftarrow 37\frac{1}{2}$	36 \leftarrow 36	317 528.986(40)
		39 \leftarrow 39	317 685.716(40)
	$46\frac{1}{2} \leftarrow 46\frac{1}{2}$	48 \leftarrow 48	417 343.110(50)
		47 \leftarrow 47	417 380.146(50)
		46 \leftarrow 46	417 430.030(50)
		45 \leftarrow 45	417 491.943(50)
		44 \leftarrow 44	419 819.817(50)
		45 \leftarrow 45	419 857.289(50)
		46 \leftarrow 46	419 908.968(50)
		47 \leftarrow 47	419 975.741(50)
$8_{81} \leftarrow 7_{70}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	8 \leftarrow 8	424 496.198(50)
		6 \leftarrow 6	424 768.691(120)
		7 \leftarrow 6	424 778.132(70)
		6 \leftarrow 5	424 778.132(70)
		8 \leftarrow 7	424 781.668(50)
		9 \leftarrow 8	424 783.849(50)
		22 \leftarrow 21	626 382.014(150)
		21 \leftarrow 20	626 382.559(150)
		23 \leftarrow 22	626 384.606(100)
		20 \leftarrow 19	626 385.868(120)
$53_{8,45} \leftarrow 53_{7,46}$	$52\frac{1}{2} \leftarrow 52\frac{1}{2}$	53 \leftarrow 53	425 077.965(70)
		54 \leftarrow 54	425 150.477(70)
		53 \leftarrow 53	419 082.556(50)
		52 \leftarrow 52	419 151.964(50)
		42 \leftarrow 42	316 672.437(35)
$40_{8,33} \leftarrow 40_{7,34}$	$40\frac{1}{2} \leftarrow 40\frac{1}{2}$	41 \leftarrow 41	316 697.339(35)
		40 \leftarrow 40	316 731.823(35)
		39 \leftarrow 39	316 775.034(150)
		38 \leftarrow 38	318 404.994(40)
		39 \leftarrow 39	318 430.430(40)
	$39\frac{1}{2} \leftarrow 39\frac{1}{2}$	40 \leftarrow 40	318 466.234(40)
		40 \leftarrow 40	318 513.180(40)
		49 \leftarrow 49	406 980.998(50)
		48 \leftarrow 48	407 027.776(50)
		47 \leftarrow 47	407 085.989(50)
$48_{8,41} \leftarrow 48_{7,42}$	$48\frac{1}{2} \leftarrow 48\frac{1}{2}$	46 \leftarrow 46	409 333.400(50)
		47 \leftarrow 47	409 369.728(50)
		49 \leftarrow 49	409 482.373(50)
		24 \leftarrow 23	90 212.232(35)
		25 \leftarrow 24	90 218.752(35)
	$47\frac{1}{2} \leftarrow 47\frac{1}{2}$	26 \leftarrow 25	90 222.668(35)
		27 \leftarrow 26	90 223.930(35)
		32 \leftarrow 32	317 007.183(35)
		33 \leftarrow 33	317 031.783(35)
		34 \leftarrow 34	317 053.561(35)
$26_{7,20} \leftarrow 25_{8,17}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	35 \leftarrow 35	317 072.169(35)
		50 \leftarrow 50	424 819.769(50)
		52 \leftarrow 52	424 903.232(50)
		53 \leftarrow 53	424 962.649(50)
$33_{9,24} \leftarrow 33_{8,25}$	$33\frac{1}{2} \leftarrow 33\frac{1}{2}$		
$52_{9,44} \leftarrow 52_{8,45}$	$51\frac{1}{2} \leftarrow 51\frac{1}{2}$		

$41_{8,33} \leftarrow 40_{9,32}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	$43 \leftarrow 42$	407 219.946(50)
		$42 \leftarrow 41$	407 282.275(50)
		$41 \leftarrow 40$	407 362.692(50)
		$40 \leftarrow 39$	407 459.702(50)
	$40 \frac{1}{2} \leftarrow 39 \frac{1}{2}$	$39 \leftarrow 38$	409 338.634(50)
		$40 \leftarrow 39$	409 401.351(50)
		$41 \leftarrow 40$	409 483.796(50)
$61_{10,51} \leftarrow 61_{9,52}$	$61 \frac{1}{2} \leftarrow 61 \frac{1}{2}$	$62 \leftarrow 62$	427 837.785(70)
		$61 \leftarrow 61$	427 897.281(50)
		$60 \leftarrow 60$	427 971.080(50)
	$60 \frac{1}{2} \leftarrow 60 \frac{1}{2}$	$59 \leftarrow 59$	431 037.653(50)
		$60 \leftarrow 60$	431 082.477(50)
		$62 \leftarrow 62$	431 220.173(50)
$54_{10,45} \leftarrow 54_{9,46}$	$54 \frac{1}{2} \leftarrow 54 \frac{1}{2}$	$56 \leftarrow 56$	413 713.265(120)
$45_{9,36} \leftarrow 44_{10,35}$	$45 \frac{1}{2} \leftarrow 44 \frac{1}{2}$	$46 \leftarrow 45$	418 565.580(70)
		$45 \leftarrow 44$	418 639.948(50)
		$44 \leftarrow 43$	418 729.548(50)
	$44 \frac{1}{2} \leftarrow 43 \frac{1}{2}$	$43 \leftarrow 42$	420 600.495(120)
$11_{11,0} \leftarrow 11_{10,1}$	$11 \frac{1}{2} \leftarrow 11 \frac{1}{2}$	$13 \leftarrow 13$	426 018.914(50)
		$12 \leftarrow 12$	426 025.524(50)
		$11 \leftarrow 11$	426 067.994(50)
		$10 \leftarrow 10$	426 137.691(50)
	$10 \frac{1}{2} \leftarrow 10 \frac{1}{2}$	$9 \leftarrow 9$	429 627.819(50)
$13_{11,2} \leftarrow 13_{10,3}$	$13 \frac{1}{2} \leftarrow 13 \frac{1}{2}$	$15 \leftarrow 15$	426 164.648(200)
		$14 \leftarrow 14$	426 170.528(50)
		$13 \leftarrow 13$	426 202.238(50)
		$12 \leftarrow 12$	426 254.294(50)
$15_{11,4} \leftarrow 15_{10,5}$	$15 \frac{1}{2} \leftarrow 15 \frac{1}{2}$	$17 \leftarrow 17$	426 193.477(70)
		$16 \leftarrow 16$	426 198.399(50)
		$15 \leftarrow 15$	426 222.557(50)
		$14 \leftarrow 14$	426 262.522(50)
$17_{11,6} \leftarrow 17_{10,7}$	$17 \frac{1}{2} \leftarrow 17 \frac{1}{2}$	$19 \leftarrow 19$	426 090.052(50)
		$18 \leftarrow 18$	426 093.807(50)
		$17 \leftarrow 17$	426 112.468(50)
$12_{11,2} \leftarrow 12_{10,3}$	$12 \frac{1}{2} \leftarrow 12 \frac{1}{2}$	$13 \leftarrow 13$	426 112.468(50)
$19_{11,8} \leftarrow 19_{10,9}$	$19 \frac{1}{2} \leftarrow 19 \frac{1}{2}$	$21 \leftarrow 21$	425 831.261(50)
		$20 \leftarrow 20$	425 833.950(50)
		$19 \leftarrow 19$	425 848.456(50)
		$18 \leftarrow 18$	425 873.024(50)
$21_{11,10} \leftarrow 21_{10,11}$	$21 \frac{1}{2} \leftarrow 21 \frac{1}{2}$	$23 \leftarrow 23$	425 387.288(70)
		$22 \leftarrow 22$	425 388.963(70)
		$21 \leftarrow 21$	425 400.126(50)
		$20 \leftarrow 20$	425 419.543(50)
$23_{11,12} \leftarrow 23_{10,13}$	$23 \frac{1}{2} \leftarrow 23 \frac{1}{2}$	$25 \leftarrow 25$	424 721.689(80)
		$24 \leftarrow 24$	424 722.600(80)
		$23 \leftarrow 23$	424 730.955(50)
		$22 \leftarrow 22$	424 745.927(50)
$25_{11,14} \leftarrow 25_{10,15}$	$24 \frac{1}{2} \leftarrow 24 \frac{1}{2}$	$24 \leftarrow 24$	425 483.584(50)
		$23 \leftarrow 23$	425 483.584(50)
		$25 \leftarrow 25$	425 489.479(50)
		$26 \leftarrow 26$	425 502.033(50)
$27_{11,16} \leftarrow 27_{10,17}$	$26 \frac{1}{2} \leftarrow 26 \frac{1}{2}$	$26 \leftarrow 26$	424 086.925(70)

		25 ← 25	424 087.949(70)
		27 ← 27	424 090.735(50)
		28 ← 28	424 099.765(50)
29 _{11,18} ← 29 _{10,19}	29 $\frac{1}{2}$ ← 29 $\frac{1}{2}$	30 ← 30	420 913.056(50)
		29 ← 29	420 915.060(80)
		31 ← 30	420 915.060(80)
		28 ← 28	420 920.618(50)
31 _{11,20} ← 31 _{10,21}	31 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	32 ← 32	418 827.641(50)
		31 ← 31	418 827.641(50)
		30 ← 30	418 830.589(50)
		33 ← 33	418 830.589(50)
	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	31 ← 31	420 106.674(50)
		30 ← 30	420 106.674(50)
		32 ← 32	420 109.694(50)
		29 ← 29	420 109.694(50)
33 _{11,22} ← 33 _{10,23}	33 $\frac{1}{2}$ ← 33 $\frac{1}{2}$	33 ← 33	416 180.995(70)
		32 ← 32	416 180.995(70)
		34 ← 34	416 182.731(50)
		35 ← 35	416 186.808(50)
	32 $\frac{1}{2}$ ← 32 $\frac{1}{2}$	34 ← 34	417 333.316(50)
		33 ← 33	417 333.316(50)
		32 ← 32	417 335.441(50)
		31 ← 31	417 339.470(50)
35 _{11,24} ← 35 _{10,25}	35 $\frac{1}{2}$ ← 35 $\frac{1}{2}$	34 ← 34	412 824.621(50)
		35 ← 35	412 827.292(50)
		36 ← 36	412 831.286(50)
		37 ← 37	412 836.688(50)
	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	36 ← 36	413 847.449(50)
		34 ← 34	413 854.707(50)
		33 ← 33	413 860.059(50)
37 _{11,26} ← 37 _{10,27}	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	36 ← 36	408 529.191(50)
		37 ← 37	408 535.231(50)
		38 ← 38	408 541.789(50)
		39 ← 39	408 548.874(50)
	36 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	38 ← 38	409 411.931(50)
		37 ← 37	409 418.402(50)
		36 ← 36	409 425.229(50)
		35 ← 35	409 432.309(50)
12 _{11,2} ← 12 _{10,3}	12 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	14 ← 14	426 105.697(50)
		12 ← 12	426 148.618(50)
		11 ← 11	426 208.611(50)
14 _{11,4} ← 14 _{10,5}	14 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	16 ← 16	426 194.503(50)
		15 ← 15	426 199.862(50)
		14 ← 14	426 227.485(50)
		13 ← 13	426 272.993(50)
16 _{11,6} ← 16 _{10,7}	16 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	18 ← 18	426 159.618(50)
		17 ← 17	426 163.888(100)
		16 ← 16	426 185.125(50)
		15 ← 15	426 220.401(50)
18 _{11,8} ← 18 _{10,9}	18 $\frac{1}{2}$ ← 18 $\frac{1}{2}$	20 ← 20	425 981.786(50)
		19 ← 19	425 985.001(50)
		18 ← 18	426 001.467(50)
		17 ← 17	426 029.148(50)

$20_{11,10} \leftarrow 20_{10,11}$	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 \leftarrow 22	425 634.549(50)
		21 \leftarrow 21	425 636.728(50)
		20 \leftarrow 20	425 649.477(50)
		19 \leftarrow 19	425 671.304(50)
$22_{11,12} \leftarrow 22_{10,13}$	$22\frac{1}{2} \leftarrow 22\frac{1}{2}$	24 \leftarrow 24	425 084.660(70)
		23 \leftarrow 23	425 085.893(70)
		22 \leftarrow 22	425 095.622(50)
		21 \leftarrow 21	425 112.847(50)
$24_{11,14} \leftarrow 24_{10,15}$	$24\frac{1}{2} \leftarrow 24\frac{1}{2}$	26 \leftarrow 26	424 292.868(120)
		25 \leftarrow 25	424 292.868(120)
		24 \leftarrow 24	424 300.063(70)
		23 \leftarrow 23	424 313.253(50)
	$23\frac{1}{2} \leftarrow 23\frac{1}{2}$	22 \leftarrow 22	426 064.914(70)
		23 \leftarrow 23	426 065.914(70)
		24 \leftarrow 24	426 072.199(50)
		25 \leftarrow 25	426 086.690(50)
$28_{11,18} \leftarrow 28_{10,19}$	$28\frac{1}{2} \leftarrow 28\frac{1}{2}$	29 \leftarrow 29	421 782.468(50)
		30 \leftarrow 30	421 784.030(50)
		28 \leftarrow 28	421 785.453(50)
		27 \leftarrow 27	421 792.435(50)
$30_{11,20} \leftarrow 30_{10,21}$	$30\frac{1}{2} \leftarrow 30\frac{1}{2}$	31 \leftarrow 31	419 946.199(70)
		30 \leftarrow 30	419 947.278(80)
		32 \leftarrow 32	419 948.684(70)
		29 \leftarrow 29	419 951.540(50)
	$29\frac{1}{2} \leftarrow 29\frac{1}{2}$	29 \leftarrow 29	421 289.551(70)
		30 \leftarrow 30	421 290.650(70)
		28 \leftarrow 28	421 292.270(50)
		31 \leftarrow 31	421 295.953(50)
$32_{11,22} \leftarrow 32_{10,23}$	$32\frac{1}{2} \leftarrow 32\frac{1}{2}$	32 \leftarrow 32	417 628.131(70)
		33 \leftarrow 33	417 628.902(100)
		31 \leftarrow 31	417 629.876(70)
		34 \leftarrow 34	417 632.348(50)
	$31\frac{1}{2} \leftarrow 31\frac{1}{2}$	32 \leftarrow 32	418 846.893(70)
		31 \leftarrow 31	418 847.809(100)
		33 \leftarrow 33	418 848.762(70)
		30 \leftarrow 30	418 851.235(50)
$34_{11,24} \leftarrow 34_{10,25}$	$34\frac{1}{2} \leftarrow 34\frac{1}{2}$	33 \leftarrow 33	414 750.619(100)
		34 \leftarrow 34	414 751.482(100)
		35 \leftarrow 35	414 753.996(50)
		36 \leftarrow 36	414 758.489(50)
$36_{11,26} \leftarrow 36_{10,27}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	35 \leftarrow 35	411 244.916(50)
		36 \leftarrow 36	411 248.316(50)
		37 \leftarrow 37	411 252.825(50)
		36 \leftarrow 36	412 230.324(60)
$38_{11,28} \leftarrow 38_{10,29}$	$38\frac{1}{2} \leftarrow 38\frac{1}{2}$	37 \leftarrow 37	407 037.024(50)
		38 \leftarrow 38	407 057.098(50)
		39 \leftarrow 39	407 074.896(50)
		40 \leftarrow 40	407 090.409(50)
	$37\frac{1}{2} \leftarrow 37\frac{1}{2}$	39 \leftarrow 39	407 952.513(50)
		38 \leftarrow 38	407 957.946(50)
		37 \leftarrow 37	407 963.971(50)
		36 \leftarrow 36	407 970.437(50)
$56_{11,46} \leftarrow 56_{10,47}$	$55\frac{1}{2} \leftarrow 55\frac{1}{2}$	54 \leftarrow 54	414 084.672(100)

		55 ← 55	414 122.222(150)
		57 ← 57	414 211.520(120)
22 _{11,12} ← 23 _{10,13}	21 $\frac{1}{2}$ ← 22 $\frac{1}{2}$	20 ← 21	88 859.812(30)
		21 ← 22	88 861.625(30)
		23 ← 24	88 900.412(40)
47 _{12,35} ← 47 _{11,36}	47 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	46 ← 46	424 427.763(50)
		47 ← 47	424 449.970(50)
		48 ← 48	424 469.262(50)
	46 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	48 ← 48	424 741.986(50)
		47 ← 47	424 762.777(50)
		45 ← 45	424 794.984(50)
49 _{12,37} ← 49 _{11,38}	48 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	50 ← 50	411 097.165(50)
		48 ← 48	411 152.176(50)
		47 ← 47	411 172.189(70)
	49 $\frac{1}{2}$ ← 49 $\frac{1}{2}$	48 ← 48	411 098.737(50)
		50 ← 50	411 160.997(50)
		51 ← 51	411 184.164(50)
52 _{12,41} ← 52 _{11,42}	52 $\frac{1}{2}$ ← 52 $\frac{1}{2}$	51 ← 51	418 715.680(50)
		52 ← 52	418 718.969(50)
		53 ← 53	418 722.517(50)
		54 ← 54	418 726.264(50)
	51 $\frac{1}{2}$ ← 51 $\frac{1}{2}$	53 ← 53	419 363.169(50)
		50 ← 50	419 374.525(50)
54 _{12,43} ← 54 _{11,44}	53 $\frac{1}{2}$ ← 53 $\frac{1}{2}$	54 ← 54	417 414.457(70)
		53 ← 53	417 414.457(70)
		55 ← 55	417 415.887(70)
		52 ← 52	417 415.887(70)
56 _{12,45} ← 56 _{11,46}	55 $\frac{1}{2}$ ← 55 $\frac{1}{2}$	55 ← 55	418 857.983(50)
		56 ← 56	418 859.665(50)
		54 ← 54	418 859.665(50)
		57 ← 57	418 864.978(50)
58 _{12,47} ← 58 _{11,48}	57 $\frac{1}{2}$ ← 57 $\frac{1}{2}$	56 ← 56	424 507.226(50)
		58 ← 58	424 549.464(50)
		59 ← 59	424 574.219(50)
27 _{13,14} ← 28 _{12,17}	27 $\frac{1}{2}$ ← 28 $\frac{1}{2}$	29 ← 30	93 022.396(20)
		27 ← 28	93 033.400(20)
		26 ← 27	93 051.369(20)
	26 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	25 ← 26	94 992.497(20)
		26 ← 27	94 993.759(20)
		27 ← 28	95 003.956(20)
		28 ← 29	95 023.971(20)
30 _{14,17} ← 31 _{13,18}	30 $\frac{1}{2}$ ← 31 $\frac{1}{2}$	32 ← 33	88 302.114(20)
		31 ← 32	88 302.677(20)
		30 ← 31	88 311.211(20)
		29 ← 30	88 327.043(20)
	29 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	28 ← 29	90 201.802(35)
		29 ← 30	90 202.669(35)
		30 ← 31	90 211.278(50)
		31 ← 32	90 228.270(35)

^a) Coupling scheme: $J = N + S$; $F = J + I_1$ where I_1 is the ⁸¹Br nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ⁸¹Br¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)} $F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
$32_{1,32} \leftarrow 31_{0,31}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$32 \leftarrow 31$	410 606.877(50) ^{b)}	97Mü2
	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	$32 \leftarrow 31$	410 630.480(50)	
$33_{1,32} \leftarrow 33_{0,33}$	$33\frac{1}{2} \leftarrow 33\frac{1}{2}$	$31 \leftarrow 30$	410 638.328(50)	
		$34 \leftarrow 33$	410 647.510(50)	
$35_{2,33} \leftarrow 35_{1,34}$	$35\frac{1}{2} \leftarrow 35\frac{1}{2}$	$32 \leftarrow 32$	407 382.187(80)	
		$37 \leftarrow 37$	406 146.773(50)	
		$36 \leftarrow 36$	406 216.435(50)	
		$35 \leftarrow 35$	406 276.809(70)	
		$34 \leftarrow 34$	406 349.589(50)	
		$34 \leftarrow 34$	408 851.100(50)	
	$34\frac{1}{2} \leftarrow 34\frac{1}{2}$	$35 \leftarrow 35$	408 910.815(50)	
		$36 \leftarrow 36$	408 994.211(50)	
$31_{1,30} \leftarrow 30_{2,29}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$32 \leftarrow 31$	410 943.070(50)	
		$31 \leftarrow 30$	410 946.822(50)	
		$30 \leftarrow 29$	410 949.896(50)	
		$29 \leftarrow 28$	410 952.111(50)	
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 29$	410 989.489(50)	
		$31 \leftarrow 30$	410 994.131(50)	
		$32 \leftarrow 31$	410 997.488(50)	
		$33 \leftarrow 32$	411 001.460(50)	
$22_{3,20} \leftarrow 21_{2,19}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	$22 \leftarrow 21$	314 933.417(35)	
		$21 \leftarrow 20$	315 095.728(30)	
$30_{3,28} \leftarrow 29_{2,27}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	$31 \leftarrow 30$	411 575.223(50)	
		$30 \leftarrow 29$	411 583.560(50)	
		$29 \leftarrow 28$	411 590.206(50)	
		$28 \leftarrow 27$	411 595.008(50)	
	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$31 \leftarrow 30$	411 638.319(50)	
		$15 \leftarrow 14$	418 629.276(50)	
$15_{3,12} \leftarrow 14_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$14 \leftarrow 13$	418 915.175(70)	
		$35 \leftarrow 25$	405 724.208(50)	
$37_{3,34} \leftarrow 37_{2,35}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$36 \leftarrow 36$	405 767.328(50)	
		$37 \leftarrow 37$	405 829.617(70)	
		$38 \leftarrow 38$	405 913.103(50)	
		$38 \leftarrow 38$	419 169.175(50)	
$36_{3,34} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 36\frac{1}{2}$	$37 \leftarrow 37$	419 238.929(50)	
		$36 \leftarrow 36$	419 296.888(50)	
$31_{2,29} \leftarrow 30_{3,28}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$32 \leftarrow 31$	423 959.133(50)	
		$31 \leftarrow 30$	423 966.468(50)	
		$30 \leftarrow 29$	423 972.290(50)	
		$29 \leftarrow 28$	423 976.440(50)	
	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$30 \leftarrow 29$	423 997.202(50)	
		$31 \leftarrow 30$	424 004.722(50)	
		$32 \leftarrow 31$	424 010.612(50)	
		$33 \leftarrow 32$	424 015.164(50)	
$41_{4,37} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 41\frac{1}{2}$	$43 \leftarrow 43$	424 421.358(50)	

		42 ← 42	424 446.992(50)
		40 ← 40	424 589.187(50)
38 _{4,35} ← 38 _{3,36}	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	36 ← 36	418 949.700(50)
		37 ← 37	418 991.525(50)
		38 ← 38	419 051.842(50)
		39 ← 39	419 132.962(50)
29 _{3,26} ← 28 _{4,25}	29 $\frac{1}{2}$ ← 28 $\frac{1}{2}$	28 ← 27	409 494.158(50)
		29 ← 28	409 498.936(50)
		30 ← 29	409 502.379(50)
		31 ← 30	409 504.688(50)
	28 $\frac{1}{2}$ ← 27 $\frac{1}{2}$	30 ← 29	409 577.880(50)
		29 ← 28	409 582.994(50)
		27 ← 26	409 590.162(50)
16 _{5,12} ← 15 _{4,11}	16 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	15 ← 14	410 283.028(70)
		16 ← 15	410 321.910(70)
		17 ← 16	410 357.577(50)
		18 ← 17	410 389.213(80)
	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	17 ← 16	410 962.856(50)
		16 ← 15	411 019.879(50)
		15 ← 14	411 066.436(50)
		14 ← 13	411 103.671(70)
15 _{5,10} ← 14 _{4,11}	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	17 ← 16	407 653.643(50)
		16 ← 15	407 662.278(50)
		15 ← 14	407 679.193(50)
	14 $\frac{1}{2}$ ← 13 $\frac{1}{2}$	13 ← 12	409 101.450(70)
		14 ← 13	409 110.337(50)
		15 ← 14	409 127.306(50)
		16 ← 15	409 154.511(50)
43 _{5,38} ← 43 _{4,39}	43 $\frac{1}{2}$ ← 43 $\frac{1}{2}$	43 ← 43	416 402.709(70)
	42 $\frac{1}{2}$ ← 42 $\frac{1}{2}$	41 ← 41	418 870.065(50)
		42 ← 42	418 910.530(50)
		44 ← 44	419 040.762(50)
40 _{5,36} ← 40 _{4,37}	40 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	40 ← 40	411 407.400(50)
		39 ← 39	411 477.616(50)
12 _{6,7} ← 11 _{5,6}	11 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	10 ← 9	406 368.963(50)
		11 ← 10	406 368.963(50)
		12 ← 11	406 377.185(50)
		13 ← 12	406 395.777(50)
13 _{6,7} ← 12 _{5,8}	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	14 ← 13	419 141.441(70)
		15 ← 14	419 142.300(70)
		14 ← 13	419 150.340(50)
45 _{6,39} ← 45 _{5,40}	44 $\frac{1}{2}$ ← 44 $\frac{1}{2}$	43 ← 43	405 805.020(50)
		44 ← 44	405 847.337(50)
		46 ← 46	405 981.138(70)
42 _{6,37} ← 42 _{5,38}	41 $\frac{1}{2}$ ← 41 $\frac{1}{2}$	40 ← 40	406 417.020(50)
		42 ← 42	406 473.387(100)
		43 ← 43	406 546.753(50)
10 _{7,4} ← 9 _{6,3}	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	12 ← 11	417 361.752(80)
		11 ← 10	417 365.083(80)
		10 ← 9	417 377.940(50)
		9 ← 8	417 398.277(50)
	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	8 ← 7	419 439.178(50)
		9 ← 8	419 441.065(70)

		10 ← 9	419 452.834(50)
		11 ← 10	419 476.892(50)
46 _{7,40} ← 46 _{6,41}	45 $\frac{1}{2}$ ← 45 $\frac{1}{2}$	44 ← 44	424 805.020(70)
		47 ← 47	424 805.020(70)
13 ₈₅ ← 13 ₇₆	12 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	13 ← 13	314 543.178(40)
10 ₈₃ ← 10 ₇₄	9 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	8 ← 8	313 305.568(40)
48 _{8,41} ← 48 _{7,42}	48 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	50 ← 50	410 803.866(80)
		49 ← 49	410 838.338(50)
		48 ← 48	410 884.997(50)
31 _{11,20} ← 31 _{10,21}	30 $\frac{1}{2}$ ← 30 $\frac{1}{2}$	30 ← 30	430 470.739(50)
		31 ← 31	430 470.739(50)
35 _{11,24} ← 35 _{10,25}	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	36 ← 36	424 353.451(50)
		35 ← 35	424 356.104(50)
		34 ← 34	424 360.055(50)
		33 ← 33	424 365.204(50)
37 _{11,26} ← 37 _{10,27}	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	36 ← 36	419 178.446(50)
		37 ← 37	419 183.944(50)
		38 ← 38	419 190.062(50)
		39 ← 39	419 196.789(50)
	36 $\frac{1}{2}$ ← 36 $\frac{1}{2}$	37 ← 37	420 049.334(50)
39 _{11,28} ← 39 _{10,29}	38 $\frac{1}{2}$ ← 38 $\frac{1}{2}$	36 ← 36	420 055.665(50)
		39 ← 39	414 469.239(80)
41 _{11,30} ← 41 _{10,31}	41 $\frac{1}{2}$ ← 41 $\frac{1}{2}$	38 ← 38	414 478.824(70)
		40 ← 40	406 473.920(50)
		42 ← 42	406 502.580(50)
		43 ← 43	406 514.581(50)
	41 $\frac{1}{2}$ ← 41 $\frac{1}{2}$	41 ← 41	406 996.858(50)
		40 ← 40	407 010.920(50)
		39 ← 39	407 022.983(50)
34 _{11,24} ← 34 _{10,25}	34 $\frac{1}{2}$ ← 34 $\frac{1}{2}$	35 ← 35	425 217.840(70)
		36 ← 36	425 222.071(50)
	33 $\frac{1}{2}$ ← 33 $\frac{1}{2}$	35 ← 35	426 287.755(80)
		34 ← 34	426 288.580(80)
38 _{11,28} ← 38 _{10,29}	37 $\frac{1}{2}$ ← 37 $\frac{1}{2}$	32 ← 32	426 295.407(50)
		38 ← 38	418 516.013(50)
		37 ← 37	418 521.851(50)
		36 ← 36	418 528.041(50)
40 _{11,30} ← 40 _{10,31}	40 $\frac{1}{2}$ ← 40 $\frac{1}{2}$	39 ← 39	412 938.167(70)
		40 ← 40	412 942.835(70)
		41 ← 41	412 947.657(70)
		42 ← 42	412 953.150(70)
42 _{11,32} ← 42 _{10,33}	42 $\frac{1}{2}$ ← 42 $\frac{1}{2}$	41 ← 41	407 756.544(70)
		42 ← 42	407 761.931(70)
		43 ← 43	407 767.398(70)
		44 ← 44	407 773.078(70)
		43 ← 43	408 418.330(50)
		42 ← 42	408 426.035(50)
		41 ← 41	408 433.300(50)
54 _{11,44} ← 54 _{10,45}	54 $\frac{1}{2}$ ← 54 $\frac{1}{2}$	54 ← 54	405 733.078(70)
		53 ← 53	405 754.564(70)
49 _{12,37} ← 49 _{11,38}	49 $\frac{1}{2}$ ← 49 $\frac{1}{2}$	49 ← 49	424 505.253(50)
		48 ← 48	424 542.953(100)

$51_{12,39} \leftarrow 51_{11,40}$	$50\frac{1}{2} \leftarrow 50\frac{1}{2}$	$51 \leftarrow 51$	424 547.440(70)
		$47 \leftarrow 47$	424 561.623(50)
		$52 \leftarrow 52$	406 660.616(50)
		$51 \leftarrow 51$	406 669.492(50)
		$50 \leftarrow 50$	406 731.170(70)
		$49 \leftarrow 49$	406 756.220(70)

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_1$ where \mathbf{I}_1 is the ⁸¹Br nuclear spin.

^{b)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Microwave data for ⁸¹Br¹⁶O₂

Transition			ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$	Hyperfine ^{a)}		
		$F' - F''$		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
$32_{1,32} \leftarrow 31_{0,31}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	$33 \leftarrow 32$	409 670.227(70) ^{b)}	97Mü2
		$30 \leftarrow 29$	409 671.465(70)	
		$31 \leftarrow 30$	409 675.619(50)	
		$32 \leftarrow 31$	409 683.898(50)	
		$32 \leftarrow 31$	409 709.149(50)	
		$31 \leftarrow 30$	409 716.183(50)	
		$33 \leftarrow 32$	409 723.360(50)	
		$34 \leftarrow 33$	409 725.625(50)	
		$32 \leftarrow 31$	410 247.540(80)	
		$31 \leftarrow 30$	410 251.332(80)	
$31_{1,30} \leftarrow 30_{2,29}$	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	$30 \leftarrow 29$	410 254.372(80)	
		$29 \leftarrow 28$	410 256.652(100)	
		$30 \leftarrow 29$	410 294.579(120)	
		$31 \leftarrow 30$	410 299.275(80)	
		$32 \leftarrow 31$	410 302.610(80)	
		$33 \leftarrow 32$	410 306.622(100)	
		$30 \leftarrow 29$	411 191.783(50)	
		$31 \leftarrow 30$	411 198.625(50)	
		$32 \leftarrow 31$	411 204.045(50)	
		$28 \leftarrow 27$	405 011.262(50)	
$28_{4,25} \leftarrow 27_{3,24}$	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	$29 \leftarrow 28$	405 032.744(70)	
		$30 \leftarrow 29$	405 049.153(50)	
		$11 \leftarrow 10$	314 203.781(120)	
		$28 \leftarrow 27$	408 870.485(70)	
$29_{3,26} \leftarrow 28_{4,25}$	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	$29 \leftarrow 28$	408 874.491(70)	
		$30 \leftarrow 29$	408 877.272(70)	
		$31 \leftarrow 30$	408 879.043(70)	
		$30 \leftarrow 29$	408 968.882(70)	
		$27 \leftarrow 26$	408 979.093(50)	
		$14 \leftarrow 13$	411 913.087(100)	
		$15 \leftarrow 14$	424 550.691(100)	
		$14 \leftarrow 13$	424 551.568(100)	
		$13 \leftarrow 12$	424 559.698(60)	
		$12 \leftarrow 11$	424 573.122(100)	
$10_{74} \leftarrow 9_{63}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	$10 \leftarrow 9$	425 886.700(100)	
		$11 \leftarrow 10$	425 910.720(70)	

$9_{72} \leftarrow 8_{63}$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	$11 \leftarrow 10$	409 959.183(80)
		$10 \leftarrow 9$	409 959.183(120)
		$9 \leftarrow 8$	409 959.183(70)
		$8 \leftarrow 7$	409 959.183(70)
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 6$	411 348.426(150)
		$9 \leftarrow 8$	411 361.438(70)
$23_{8,15} \leftarrow 23_{7,16}$	$22\frac{1}{2} \leftarrow 22\frac{1}{2}$	$24 \leftarrow 24$	314 206.530(120)
$20_{8,13} \leftarrow 20_{7,14}$	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$19 \leftarrow 19$	316 799.156(50)
$17_{10,7} \leftarrow 17_{98}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	$15 \leftarrow 15$	406 779.162(50)
		$16 \leftarrow 16$	406 782.555(50)
		$17 \leftarrow 17$	406 798.818(50)
		$18 \leftarrow 18$	406 830.149(50)
$19_{10,9} \leftarrow 19_{9,10}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$17 \leftarrow 17$	406 119.721(70)
		$19 \leftarrow 19$	406 134.145(50)
		$20 \leftarrow 20$	406 157.889(50)
$21_{10,11} \leftarrow 21_{9,12}$	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$19 \leftarrow 19$	405 248.191(80)
		$20 \leftarrow 20$	405 249.240(80)
		$21 \leftarrow 21$	405 258.157(70)
		$22 \leftarrow 22$	405 276.064(70)
$18_{10,9} \leftarrow 18_{9,10}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$16 \leftarrow 16$	406 472.416(70)
		$17 \leftarrow 17$	406 475.198(70)
		$19 \leftarrow 19$	406 516.623(50)
$20_{10,11} \leftarrow 20_{9,12}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$20 \leftarrow 20$	405 726.308(50)
		$21 \leftarrow 21$	405 747.046(50)

^a) Coupling scheme: $J = N + S$; $F = J + I_1$ where I_1 is the ⁸¹Br nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Molecular parameters for ⁸¹Br¹⁶O₂

Parameter	Value	Method	Ref.	
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)				
A	[MHz]	27 824.890 96(113) ^{a)}	MW	97Mü2
B	[MHz]	8 233.254 666(229)		
C	[MHz]	6 335.136 755(270)		
D_K	[kHz]	704.385 5(231)		
D_{NK}	[kHz]	− 69.980 26(298)		
D_N	[kHz]	7.125 027(185)		
d_1	[kHz]	− 2.642 166(103)		
d_2	[kHz]	− 0.156 820(51)		
H_K	[kHz]	0.059 767(184)		
H_{KN}	[Hz]	− 5.778 0(173)		

H_{NK}	[Hz]	– 0.342 10(172)		
H_{N}	[Hz]	0.017 449(48)		
h_1	[Hz]	0.009 295(76)		
h_2	[Hz]	0.966(53)×10 ^{–3}		
h_3	[Hz]	0.936 5(109)×10 ^{–3}		
L_{K}	[Hz]	– 0.702 30(510)×10 ^{–2}		
L_{KKN}	[Hz]	0.874 0(81)×10 ^{–3}		
L_{NK}	[Hz]	0.156(88)×10 ^{–4}		
l_1	[Hz]	– 0.443(167)×10 ^{–7}		
l_2	[Hz]	0.45(125)×10 ^{–8}		
l_3	[Hz]	– 0.73(59)×10 ^{–8}		
l_4	[Hz]	– 0.469(138)×10 ^{–8}		
ε_{aa}	[MHz]	– 2 335.506 1(159)		
ε_{bb}	[MHz]	– 565.6642 8(49)		
ε_{cc}	[MHz]	52.485 8(55)		
D_{K}^{S}	[kHz]	– 16.791(177)		
D_{KN}^{S}	[kHz]	– 0.305(34)		
D_{NK}^{S}	[kHz]	– 0.624 5(275)		
D_{N}^{S}	[kHz]	– 0.372 46(269)		
d_1^{S}	[kHz]	– 0.343 27(204)		
d_2^{S}	[kHz]	– 0.115 08(108)		
H_{K}^{S}	[Hz]	3.76(60)		
h_1^{S}	[Hz]	0.212(95)×10 ^{–3}		
h_2^{S}	[Hz]	0.142(72)×10 ^{–3}		
h_3^{S}	[Hz]	– 0.748(154)×10 ^{–4}		
$a_{\text{F}}(^{81}\text{Br})$	[MHz]	95.900(32)		
$a_{\text{F}}(^{81}\text{Br})_{\text{J}}$	[kHz]	0.136 0(280)		
$a_{\text{F}}(^{81}\text{Br})_{\text{K}}$	[kHz]	– 2.916(298)		
$T_{aa}(^{81}\text{Br})$	[MHz]	– 402.452(48)		
$T_{aa}(^{81}\text{Br})_{\text{J}}$	[kHz]	– 0.277(98)		
$T_{aa}(^{81}\text{Br})_{\text{K}}$	[kHz]	3.11(45)		
$T_{bb}(^{81}\text{Br})$	[MHz]	– 454.605(32)		
$T_{bb}(^{81}\text{Br})_{\text{J}}$	[kHz]	0.641(107)		
$T_{bb}(^{81}\text{Br})_{\text{K}}$	[kHz]	– 26.55(131)		
$\chi_{aa}(^{81}\text{Br})$	[MHz]	297.587(65)		
$\chi_{bb}(^{81}\text{Br})$	[MHz]	18.445(112)		
$C_{aa}(^{81}\text{Br})$	[kHz]	167.52(283)		
$C_{bb}(^{81}\text{Br})$	[kHz]	42.32(192)		
$C_{cc}(^{81}\text{Br})$	[kHz]	31.89(198)		
State: electronic \tilde{X}^2A' ; vibrational (0,1,0)				
A	[MHz]	28 313.867 76(385) ^{a)}	MW	97Mü2
B	[MHz]	8 228.307 96(125)		
C	[MHz]	6 319.252 59(140)		
D_{K}	[kHz]	771.161(66)		
D_{NK}	[kHz]	– 72.418 2(50)		
D_{N}	[kHz]	7.081 36(171)		
d_1	[kHz]	– 2.649 937(280)		
d_2	[kHz]	– 0.186 579(111)		
H_{K}	[kHz]	0.073 397(385)		
H_{KN}	[Hz]	– 6.601(45)		
H_{NK}	[Hz]	– 0.358 29(218)		
H_{N}	[Hz]	0.017 739(781)		
h_1	[Hz]	0.009 165(126)		

h_2	[Hz]	$1.090(82) \times 10^{-3}$		
h_3	[Hz]	$1.158\,3(172) \times 10^{-3}$		
L_K	[Hz]	$-0.702\,30 \times 10^{-2\,b)}$		
L_{KKN}	[Hz]	$0.874\,0 \times 10^{-3\,b)}$		
L_{NK}	[Hz]	$0.156 \times 10^{-4\,b)}$		
l_1	[Hz]	$-0.443 \times 10^{-7\,b)}$		
l_2	[Hz]	$0.45 \times 10^{-8\,b)}$		
l_3	[Hz]	$-0.73 \times 10^{-8\,b)}$		
l_4	[Hz]	$-0.469 \times 10^{-8\,b)}$		
\mathcal{E}_{aa}	[MHz]	$-2\,290.372(43)$		
\mathcal{E}_{bb}	[MHz]	$-564.307\,8(230)$		
\mathcal{E}_{cc}	[MHz]	$52.984\,7(187)$		
D_K^s	[kHz]	$-33.251(410)$		
D_{KN}^s	[kHz]	$0.256(194)$		
D_{NK}^s	[kHz]	$-0.017\,5(1633)$		
D_N^s	[kHz]	$-0.390\,76(777)$		
d_1^s	[kHz]	$-0.342\,09(307)$		
d_2^s	[kHz]	$-0.107\,33(144)$		
H_K^s	[Hz]	$3.76^b)$		
h_1^s	[Hz]	$0.212 \times 10^{-3\,b)}$		
h_2^s	[Hz]	$0.142 \times 10^{-3\,b)}$		
h_3^s	[Hz]	$-0.748 \times 10^{-4\,b)}$		
$a_F(^{79}\text{Br})$	[MHz]	$96.308(134)$		
$a_F(^{79}\text{Br})_I$	[kHz]	$0.136\,0(280)$		
$a_F(^{79}\text{Br})_K$	[kHz]	$-2.916(298)$		
$T_{aa}(^{79}\text{Br})$	[MHz]	$-402.554(97)$		
$T_{aa}(^{79}\text{Br})_I$	[kHz]	$-0.277(98)$		
$T_{aa}(^{79}\text{Br})_K$	[kHz]	$3.11(45)$		
$T_{bb}(^{79}\text{Br})$	[MHz]	$-439.488(66)$		
$T_{bb}(^{79}\text{Br})_I$	[kHz]	$0.641(107)$		
$T_{bb}(^{79}\text{Br})_K$	[kHz]	$-26.55(131)$		
$\chi_{aa}(^{79}\text{Br})$	[MHz]	$297.883(171)$		
$\chi_{bb}(^{79}\text{Br})$	[MHz]	$18.743(118)$		
$C_{aa}(^{79}\text{Br})$	[kHz]	$167.52(283)$		
$C_{bb}(^{79}\text{Br})$	[kHz]	$42.32(192)$		
$C_{cc}(^{79}\text{Br})$	[kHz]	$31.89(198)$		
State: electronic \tilde{X}^2A' ; vibrational (0,2,0)				
A	[MHz]	$28\,822.120\,2(91)^a)$	MW	97Mü2
B	[MHz]	$8\,223.145\,29(294)$		
C	[MHz]	$6\,303.317\,86(284)$		
D_K	[kHz]	$844.574(135)$		
D_{NK}	[kHz]	$-75.021\,3(125)$		
D_N	[kHz]	$7.037\,69(340)$		
d_1	[kHz]	$-2.657\,708(530)$		
d_2	[kHz]	$-0.217\,311(253)$		
H_K	[kHz]	$0.072\,13(39)$		
H_{KN}	[Hz]	$-7.424(41)$		
H_{NK}	[Hz]	$-0.374\,48(316)$		
H_N	[Hz]	$0.018\,03\,(156)$		
h_1	[Hz]	$0.009\,035(216)$		
h_2	[Hz]	$1.214(137) \times 10^{-3}$		
h_3	[Hz]	$1.380\,1(287) \times 10^{-3}$		
L_K	[Hz]	$-0.702\,30 \times 10^{-2\,b)}$		

L_{KKN}	[Hz]	$0.874\,0 \times 10^{-3\,b}$
L_{NK}	[Hz]	$0.156 \times 10^{-4\,b}$
l_1	[Hz]	$-0.443 \times 10^{-7\,b}$
l_2	[Hz]	$0.45 \times 10^{-8\,b}$
l_3	[Hz]	$-0.73 \times 10^{-8\,b}$
l_4	[Hz]	$-0.469 \times 10^{-8\,b}$
\mathcal{E}_{aa}	[MHz]	$-2\,238.213(107)$
\mathcal{E}_{bb}	[MHz]	$-562.907(72)$
\mathcal{E}_{cc}	[MHz]	$53.528\,1(444)$
D_K^s	[kHz]	$-49.711(760)$
D_{KN}^s	[kHz]	$0.817(382)$
D_{NK}^s	[kHz]	$-0.589(323)$
D_N^s	[kHz]	$-0.409\,1(148)$
d_1^s	[kHz]	$-0.340\,91(460)$
d_2^s	[kHz]	$-0.099\,58(219)$
H_K^s	[Hz]	3.76^b
h_1^s	[Hz]	$0.212 \times 10^{-3\,b}$
h_2^s	[Hz]	$0.142 \times 10^{-3\,b}$
h_3^s	[Hz]	$-0.748 \times 10^{-4\,b}$

^a) The numbers in parentheses represent 2 standard deviations of the least-squares fit, in units of the last quoted decimal place.

^b) Parameter constrained to this value.

Reference for BrO₂

97Mül Müller, H.S.P., Miller, C.E., Cohen, E.A. : J.Chem.Phys **107**(1997)8292.

3.2.3.2.14 FS₂

Microwave data for ¹⁹F³²S₂

Transition			ν [MHz]	Ref.
rotational	fine structure $J' \leftarrow J''$	Hyperfine ^a)		
$N' - N''$		$F' - F''$		

State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)

$14_{1,13} \leftarrow 13_{1,12}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	$128\,019.860(20)^b$	96Tan
		$14 \leftarrow 13$	$128\,016.952(20)$	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	$127\,970.716(20)$	
		$15 \leftarrow 14$	$127\,973.029(20)$	
$14_{2,13} \leftarrow 13_{2,12}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 12$	$123\,801.077(20)$	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	$124\,127.469(20)$	
		$15 \leftarrow 14$	$124\,128.788(20)$	
$14_{2,12} \leftarrow 13_{2,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$14 \leftarrow 13$	$130\,119.323(20)$	
		$14 \leftarrow 13$	$130\,120.230(80)$	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	$130\,021.291(20)$	
		$15 \leftarrow 14$	$130\,020.501(20)$	
$14_{3,12} \leftarrow 13_{3,11}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$14 \leftarrow 13$	$126\,118.909(20)$	
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 13$	$126\,132.281(20)$	
		$15 \leftarrow 14$	$126\,133.838(20)$	
$14_{3,11} \leftarrow 13_{3,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	$14 \leftarrow 13$	$127\,381.951(20)$	

		14 ← 13	127 383.257(20)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	127 324.422(50)
		15 ← 14	127 323.249(20)
$14_{4,11} \leftarrow 13_{4,10}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	14 ← 13	126 163.165(50)
		14 ← 13	126 162.760(20)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	126 170.625(20)
		15 ← 14	126 171.004(20)
$14_{4,10} \leftarrow 13_{4,9}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	126 274.348(20) [∘]
		15 ← 14	126 274.348(20) [∘]
$15_{0,15} \leftarrow 14_{0,14}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	15 ← 14	127 639.735(20)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	127 645.835(20)
		16 ← 15	127 647.757(20)
$15_{1,15} \leftarrow 14_{1,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	126 904.692(20)
		16 ← 15	126 905.709(20)
$15_{1,14} \leftarrow 14_{1,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	136 606.507(20)
		15 ← 14	136 603.383(20)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	136 567.218(20)
$15_{2,14} \leftarrow 14_{2,13}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	132 757.640(20)
		15 ← 14	132 755.214(20)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	16 ← 15	132 773.233(20)
$15_{2,13} \leftarrow 14_{2,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	139 555.387(20) [∘]
		15 ← 14	139 555.387(20) [∘]
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	139 453.782(20)
		16 ← 15	139 453.280(20)
$15_{3,13} \leftarrow 14_{3,12}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	15 ← 14	135 103.851(20)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	135 102.735(20)
		16 ← 15	135 103.851(20)
$15_{3,12} \leftarrow 14_{3,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	136 775.775(20)
		16 ← 15	136 774.366(20)
$15_{4,12} \leftarrow 14_{4,11}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	135 249.022(20) [∘]
		15 ← 14	135 249.022(20) [∘]
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	135 316.274(20) [∘]
		16 ← 15	135 316.274(20) [∘]
$15_{4,11} \leftarrow 14_{4,10}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	135 381.359(20) [∘]
		15 ← 14	135 381.359(20) [∘]
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	136 093.721(50)
$15_{5,11} \leftarrow 14_{5,10}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	135 021.868(50)
		15 ← 14	135 021.257(50)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	135 025.328(50)
$15_{5,10} \leftarrow 14_{5,9}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	135 026.604(20)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	135 030.080(20)
		16 ← 15	135 030.645(20)
$16_{0,16} \leftarrow 15_{0,15}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	135 772.267(20)
		16 ← 15	135 770.761(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	16 ← 15	135 776.360(20)
		17 ← 16	135 778.055(20)
$16_{1,16} \leftarrow 15_{1,15}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	135 186.241(20)
		16 ← 15	135 185.481(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	16 ← 15	135 183.499(20)
		17 ← 16	135 184.485(20)

$16_{1,15} \leftarrow 15_{1,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	145 076.599(20)
		$16 \leftarrow 15$	145 073.046(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	145 047.218(20)
$16_{2,15} \leftarrow 15_{2,14}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$17 \leftarrow 16$	145 049.978(20)
		$15 \leftarrow 14$	141 389.365(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	141 387.687(20)
$16_{2,14} \leftarrow 15_{2,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$16 \leftarrow 15$	141 376.892(20)
		$17 \leftarrow 16$	141 378.176(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$15 \leftarrow 14$	148 817.039(20) [°]
$16_{3,14} \leftarrow 15_{3,13}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$16 \leftarrow 15$	148 817.039(20) [°]
		$16 \leftarrow 15$	148 917.791(20) [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	148 917.791(20) [°]
$16_{3,13} \leftarrow 15_{3,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 14$	144 018.120(20) [°]
		$16 \leftarrow 15$	144 018.120(20) [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	144 073.264(20) [°]
$16_{4,13} \leftarrow 15_{4,12}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$17 \leftarrow 16$	144 073.264(20) [°]
		$16 \leftarrow 15$	145 676.013(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	146 303.775(20)
$16_{4,12} \leftarrow 15_{4,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$17 \leftarrow 16$	143 038.757(50)
		$15 \leftarrow 14$	144 548.964(20) [°]
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	144 548.964(20) [°]
$16_{5,12} \leftarrow 15_{5,11}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$16 \leftarrow 15$	143 501.543(20)
		$15 \leftarrow 14$	144 089.958(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	144 089.489(20)
$16_{5,11} \leftarrow 15_{5,10}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$16 \leftarrow 15$	144 087.513(20)
		$17 \leftarrow 16$	144 088.007(80)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	144 096.239(20)
$17_{0,17} \leftarrow 16_{0,16}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	144 096.648(20)
		$16 \leftarrow 15$	143 911.294(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	143 914.812(20)
$17_{1,17} \leftarrow 16_{1,16}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$18 \leftarrow 17$	143 916.293(20)
		$16 \leftarrow 15$	143 449.479(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	143 448.888(80)
$17_{1,16} \leftarrow 16_{1,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	143 447.095(20)
		$18 \leftarrow 17$	143 448.017(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$16 \leftarrow 15$	153 435.121(20)
$17_{2,16} \leftarrow 16_{2,15}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	149 960.724(20)
		$17 \leftarrow 16$	149 955.266(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	149 941.996(20)
$17_{2,15} \leftarrow 16_{2,14}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$18 \leftarrow 17$	149 943.266(20)
		$16 \leftarrow 15$	158 196.463(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	158 196.010(20)
$17_{3,15} \leftarrow 16_{3,14}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	158 101.944(20) [°]
		$18 \leftarrow 17$	158 101.944(20) [°]
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$16 \leftarrow 15$	154 306.451(20)
$17_{3,14} \leftarrow 16_{3,13}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	153 024.965(50)
		$18 \leftarrow 17$	153 306.451(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	155 905.232(20)
$17_{4,13} \leftarrow 16_{4,12}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$18 \leftarrow 17$	155 903.460(20)
		$16 \leftarrow 15$	153 752.853(20)

		17 ← 16	153 753.304(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	18 ← 17	153 776.391(20)
$17_{5,13} \leftarrow 16_{5,12}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	153 165.080(50) [°]
		18 ← 17	153 165.080(50) [°]
$18_{0,18} \leftarrow 17_{0,17}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	152 059.643(20)
$18_{1,18} \leftarrow 17_{1,17}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	151 699.712(20)
		18 ← 17	151 699.054(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	151 698.595(20)
$18_{1,17} \leftarrow 17_{1,16}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	161 692.753(20)
		18 ← 17	161 689.404(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	161 681.189(20)
$18_{2,17} \leftarrow 17_{2,16}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	19 ← 18	161 684.132(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	17 ← 16	158 487.569(20)
		18 ← 17	158 467.514(20)
$18_{2,17} \leftarrow 17_{2,16}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	19 ← 18	158 468.811(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	17 ← 16	167 383.777(20)
		18 ← 17	167 295.404(20)
$18_{3,15} \leftarrow 17_{3,14}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	19 ← 18	167 295.968(20)
		17 ← 16	165 610.232(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	165 611.021(20)
		18 ← 17	165 560.674(20)
$18_{4,15} \leftarrow 17_{4,14}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	19 ← 18	165 558.983(20)
		17 ← 16	162 539.769(20) [°]
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	162 539.769(20) [°]
$18_{4,14} \leftarrow 17_{4,13}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	19 ← 18	162 539.769(20)
		17 ← 16	162 998.102(20)
$18_{5,13} \leftarrow 17_{5,12}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	18 ← 17	162 998.723(20)
		17 ← 16	162 282.646(20) [°]
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	162 282.646(20) [°]
		18 ← 17	162 292.446(20) [°]
$19_{0,19} \leftarrow 18_{0,18}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	19 ← 18	162 292.446(20) [°]
		18 ← 17	160 217.013(20)
	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	160 216.112(20)
		19 ← 18	160 219.119(20)
$19_{1,19} \leftarrow 18_{1,18}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	20 ← 19	160 220.285(20)
		18 ← 17	159 939.006(20)
	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	159 938.359(20) [°]
		19 ← 18	159 937.494(20)
$19_{1,18} \leftarrow 18_{1,17}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	20 ← 19	159 938.359(20) [°]
		18 ← 17	169 867.082(20)
	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	169 863.816(20)
		19 ← 18	169 862.336(50)
$19_{2,18} \leftarrow 18_{2,17}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	20 ← 19	169 865.269(20)
		19 ← 18	166 954.536(20)
$19_{2,17} \leftarrow 18_{2,16}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	20 ← 19	166 955.779(20)
		18 ← 17	176 469.753(80)
	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	176 468.741(20)
		19 ← 18	176 389.050(50)
$19_{3,17} \leftarrow 18_{3,16}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	20 ← 19	176 389.926(20)
		18 ← 17	170 806.361(20)

$19_{3,16} \leftarrow 18_{3,15}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 18$	170 804.141(20)
		$18 \leftarrow 17$	175 354.048(20)
$19_{4,16} \leftarrow 18_{4,15}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 18$	175 355.528(20)
		$20 \leftarrow 19$	175 250.037(50)
$19_{4,15} \leftarrow 18_{4,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$18 \leftarrow 17$	171 631.315(20) [°]
		$19 \leftarrow 18$	171 631.315(20) [°]
$19_{5,15} \leftarrow 18_{5,14}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$18 \leftarrow 17$	172 284.527(50)
		$19 \leftarrow 18$	172 257.840(20)
$19_{5,14} \leftarrow 18_{5,13}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$20 \leftarrow 19$	172 257.251(20)
		$18 \leftarrow 17$	171 357.600(20) [°]
$20_{0,20} \leftarrow 19_{0,19}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 18$	171 357.600(20) [°]
		$19 \leftarrow 18$	171 403.722(20) [°]
$20_{1,19} \leftarrow 19_{1,18}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$20 \leftarrow 19$	171 403.722(20) [°]
		$18 \leftarrow 17$	171 398.436(20) [°]
$20_{2,19} \leftarrow 19_{2,18}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 18$	171 398.436(20) [°]
		$19 \leftarrow 18$	168 382.423(50)
$20_{2,18} \leftarrow 19_{2,17}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$20 \leftarrow 19$	168 381.668(20)
		$21 \leftarrow 20$	168 384.937(20)
$20_{3,18} \leftarrow 19_{3,17}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 18$	177 978.533(20)
		$20 \leftarrow 19$	177 978.950(20)
$20_{3,17} \leftarrow 19_{3,16}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$21 \leftarrow 20$	177 981.748(20)
		$20 \leftarrow 19$	175 404.550(20)
$20_{4,16} \leftarrow 19_{4,15}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$21 \leftarrow 20$	175 405.814(20)
		$20 \leftarrow 19$	185 373.772(20)
$20_{5,16} \leftarrow 19_{5,15}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$21 \leftarrow 20$	185 374.896(20)
		$19 \leftarrow 18$	179 714.548(20)
$15_{0,15} \leftarrow 14_{1,14}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$20 \leftarrow 19$	179 713.333(20)
		$20 \leftarrow 19$	179 694.968(20)
$16_{0,16} \leftarrow 15_{1,15}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$21 \leftarrow 20$	179 695.626(20)
		$19 \leftarrow 18$	185 069.793(20)
$17_{0,17} \leftarrow 16_{1,16}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$20 \leftarrow 19$	185 071.293(20)
		$20 \leftarrow 19$	184 953.370(20)
$18_{0,18} \leftarrow 17_{1,17}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$21 \leftarrow 20$	184 951.869(20)
		$20 \leftarrow 19$	181 610.521(20)
$15_{0,15} \leftarrow 14_{1,14}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	$21 \leftarrow 20$	181 609.733(20)
		$19 \leftarrow 18$	180 468.262(20)
$16_{0,16} \leftarrow 15_{1,15}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	$21 \leftarrow 20$	180 818.483(20)
		$14 \leftarrow 13$	124 360.927(20)
$17_{0,17} \leftarrow 16_{1,16}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	$15 \leftarrow 14$	124 362.906(20)
		$15 \leftarrow 14$	124 334.111(20)
$18_{0,18} \leftarrow 17_{1,17}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	$16 \leftarrow 15$	124 332.208(20)
		$15 \leftarrow 14$	133 225.716(20)
$19_{0,19} \leftarrow 18_{1,18}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 15$	133 227.015(20)
		$16 \leftarrow 15$	133 205.787(20)
$20_{0,20} \leftarrow 19_{1,19}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 16$	133 204.568(20)
		$16 \leftarrow 15$	141 950.772(20)
$21_{0,21} \leftarrow 20_{1,20}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 16$	141 951.537(20)
		$17 \leftarrow 16$	141 937.087(20)
$22_{0,22} \leftarrow 21_{1,21}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	$18 \leftarrow 17$	141 936.390(20)
		$17 \leftarrow 16$	150 560.920(20)

		18 ← 17	150 561.322(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	150 552.461(20)
		19 ← 18	150 552.105(20)
$19_{0,19} \leftarrow 18_{1,18}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	159 078.348(20) ^o
		19 ← 18	159 078.348(20) ^o
	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	159 073.827(20) ^o
		20 ← 19	159 073.827(20) ^o
$20_{0,20} \leftarrow 19_{1,19}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	167 521.709(20) ^o
		20 ← 19	167 521.709(20) ^o
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	20 ← 19	167 520.338(20) ^o
		21 ← 21	167 520.338(20) ^o
$14_{1,14} \leftarrow 13_{0,13}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	13 ← 12	122 796.169(20)
		14 ← 13	122 790.302(20)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	15 ← 14	122 837.385(20)
$15_{1,15} \leftarrow 14_{0,14}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	15 ← 14	130 183.475(20)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	130 216.393(20)
		16 ← 15	130 221.278(20)
$16_{1,16} \leftarrow 15_{0,15}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	137 732.768(20)
		16 ← 15	137 729.254(20)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	16 ← 15	137 754.073(20)
		17 ← 16	137 757.980(20)
$17_{1,17} \leftarrow 16_{0,16}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	16 ← 15	145 409.972(20)
		17 ← 16	145 407.277(20)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	145 424.807(20)
		18 ← 17	145 427.943(20)
$18_{1,18} \leftarrow 17_{0,17}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	153 198.368(20)
		18 ← 17	153 196.303(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	153 207.739(20)
		19 ← 18	153 210.240(20)
$19_{1,19} \leftarrow 18_{0,18}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	161 077.741(20)
		19 ← 18	161 076.139(20)
$20_{1,20} \leftarrow 19_{0,19}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	169 030.088(20)
		20 ← 19	169 028.868(50)
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	21 ← 20	169 033.566(20)
$21_{1,21} \leftarrow 20_{0,20}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	21 ← 20	177 039.064(50)
$17_{1,17} \leftarrow 16_{2,15}$	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	17 ← 16	141 214.353(20)
		18 ← 17	141 225.219(20)
	$18\frac{1}{2} \leftarrow 11\frac{1}{2}$	18 ← 17	141 019.652(20)
		19 ← 18	141 009.979(20)
$19_{1,19} \leftarrow 18_{2,17}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	152 593.836(20)
		19 ← 18	152 602.842(20)
	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	152 414.480(20)
		20 ← 19	152 406.429(20)
$20_{1,20} \leftarrow 19_{2,18}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	19 ← 18	163 598.298(20)
	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	18 ← 17	163 438.904(20)
		19 ← 18	163 432.365(20)
$21_{1,21} \leftarrow 20_{2,19}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	20 ← 19	174 224.144(20)
	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	174 086.649(20)
		22 ← 21	174 081.496(20)
$8_{27} \leftarrow 7_{16}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	8 ← 7	125 495.408(80)

		9 ← 8	125 513.949(20)
9 ₂₈ ← 8 ₁₇	8 $\frac{1}{2}$ ← 7 $\frac{1}{2}$	8 ← 7	133 314.312(20)
	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	9 ← 8	133 202.150(20)
		10 ← 9	133 211.635(20)
10 ₂₉ ← 9 ₁₈	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	9 ← 8	139 005.984(20)
		10 ← 9	138 977.963(20)
	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	10 ← 9	139 040.485(20)
11 _{2,10} ← 10 ₁₉	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	10 ← 9	144 374.638(20)
		11 ← 10	143 347.163(20)
	11 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	11 ← 10	144 499.008(20)
12 _{2,11} ← 11 _{1,10}	11 $\frac{1}{2}$ ← 10 $\frac{1}{2}$	11 ← 10	149 446.023(20)
		12 ← 11	149 420.264(20)
	12 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	12 ← 11	149 700.104(20)
		13 ← 12	149 720.421(20)
13 _{2,12} ← 12 _{1,11}	12 $\frac{1}{2}$ ← 11 $\frac{1}{2}$	12 ← 11	155 025.895(20)
		13 ← 12	155 021.403(20)
	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	13 ← 12	154 703.385(20)
		14 ← 13	154 723.213(20)
14 _{2,13} ← 13 _{1,12}	13 $\frac{1}{2}$ ← 12 $\frac{1}{2}$	13 ← 12	159 508.763(20)
		14 ← 13	159 487.745(20)
	14 $\frac{1}{2}$ ← 13 $\frac{1}{2}$	14 ← 13	159 570.950(20)
15 _{2,14} ← 14 _{1,13}	14 $\frac{1}{2}$ ← 13 $\frac{1}{2}$	14 ← 13	164 246.609(20)
		15 ← 14	164 225.954(20)
	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	15 ← 14	164 372.151(20)
		16 ← 15	164 390.249(20)
16 _{2,15} ← 15 _{1,14}	15 $\frac{1}{2}$ ← 14 $\frac{1}{2}$	15 ← 14	169 029.437(20)
		16 ← 15	169 010.295(20)
	16 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	16 ← 15	169 181.866(20)
		17 ← 16	169 198.705(20)
17 _{2,16} ← 16 _{1,15}	16 $\frac{1}{2}$ ← 15 $\frac{1}{2}$	16 ← 15	173 913.511(20)
		17 ← 16	173 896.517(20)
	17 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	17 ← 16	174 076.614(20)
		18 ← 17	174 091.973(20)
18 _{2,17} ← 17 _{1,16}	17 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	17 ← 16	178 965.999(20)
		18 ← 17	178 950.367(20)
	18 $\frac{1}{2}$ ← 17 $\frac{1}{2}$	18 ← 17	179 129.076(20)
		19 ← 18	179 142.925(20)
6 ₂₄ ← 5 ₁₅	6 $\frac{1}{2}$ ← 5 $\frac{1}{2}$	6 ← 5	126 756.439(20)
		7 ← 6	126 721.402(20)
7 ₂₅ ← 6 ₁₆	6 $\frac{1}{2}$ ← 5 $\frac{1}{2}$	6 ← 5	139 745.194(20)
		7 ← 6	139 797.239(20)
8 ₂₆ ← 7 ₁₇	7 $\frac{1}{2}$ ← 6 $\frac{1}{2}$	7 ← 6	152 955.315(80)
		8 ← 7	153 009.381(20)
9 ₂₇ ← 8 ₁₈	9 $\frac{1}{2}$ ← 8 $\frac{1}{2}$	10 ← 9	166 290.134(20)
10 ₂₉ ← 9 ₁₉	10 $\frac{1}{2}$ ← 9 $\frac{1}{2}$	11 ← 10	181 449.825(20)
4 ₃₂ ← 3 ₂₁	3 $\frac{1}{2}$ ← 2 $\frac{1}{2}$	3 ← 2	146 535.439(80)
		4 ← 3	146 540.590(50)
	4 $\frac{1}{2}$ ← 3 $\frac{1}{2}$	4 ← 3	145 891.690(20)
		5 ← 4	145 886.508(20)
5 ₃₃ ← 4 ₂₂	4 $\frac{1}{2}$ ← 3 $\frac{1}{2}$	4 ← 3	155 348.145(20)

$6_{34} \leftarrow 5_{23}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	164 032.817(20) ^o
		$6 \leftarrow 5$	164 032.817(20) ^o
	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$7 \leftarrow 6$	163 494.129(20)
$7_{35} \leftarrow 6_{24}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	172 525.123(50)
		$7 \leftarrow 6$	172 521.742(50)
	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 6$	172 155.211(50)
		$8 \leftarrow 7$	172 158.382(20)
$8_{36} \leftarrow 7_{25}$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 7$	180 744.618(20)
	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$9 \leftarrow 8$	180 432.349(50)
$4_{31} \leftarrow 3_{22}$	$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	$4 \leftarrow 3$	146 648.553(80)
	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	145 989.459(20)
		$5 \leftarrow 4$	145 982.600(20)
$5_{32} \leftarrow 4_{23}$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$5 \leftarrow 4$	155 670.461(20)
	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$6 \leftarrow 5$	155 068.062(20)
$6_{33} \leftarrow 5_{24}$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	164 764.089(20)
	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	164 225.954(80)
		$7 \leftarrow 6$	164 219.692(20)
$7_{34} \leftarrow 6_{25}$	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$6 \leftarrow 5$	173 985.303(20)
	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 6$	173 479.571(20)
		$8 \leftarrow 7$	173 473.209(50)
$8_{35} \leftarrow 7_{26}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	182 876.521(20)
		$9 \leftarrow 8$	182 869.873(20)
$19_{1,18} \leftarrow 19_{0,19}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 19$	127 003.914(80)
	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	125 956.741(20)
		$20 \leftarrow 20$	125 921.409(20)
$20_{1,19} \leftarrow 20_{0,20}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	136 561.233(20)
		$20 \leftarrow 20$	136 597.827(20)
	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$20 \leftarrow 20$	135 551.866(50)
		$21 \leftarrow 21$	135 518.240(20)
$17_{2,16} \leftarrow 17_{1,17}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 17$	126 692.440(20)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$18 \leftarrow 18$	125 818.574(20)
$18_{2,17} \leftarrow 18_{1,18}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$17 \leftarrow 17$	133 449.626(20)
		$18 \leftarrow 18$	133 479.617(20)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$18 \leftarrow 18$	132 616.096(20)
		$19 \leftarrow 19$	132 588.755(20)
$19_{2,12} \leftarrow 19_{1,19}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$19 \leftarrow 19$	140 484.707(20)
	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	140 513.891(20)
		$20 \leftarrow 20$	139 588.755(50)
$20_{2,19} \leftarrow 20_{1,20}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	147 738.084(20)
		$20 \leftarrow 20$	147 766.478(20)
	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$20 \leftarrow 20$	146 869.417(50)
		$21 \leftarrow 21$	146 843.060(20)
$15_{3,13} \leftarrow 15_{2,14}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	$14 \leftarrow 14$	121 307.141(20)
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	$16 \leftarrow 16$	120 984.976(20)
$16_{3,14} \leftarrow 16_{2,15}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	$15 \leftarrow 15$	123 935.966(20)
	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	$16 \leftarrow 16$	123 693.070(20)
		$17 \leftarrow 17$	123 697.990(20)
$17_{3,15} \leftarrow 17_{2,16}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	$17 \leftarrow 17$	128 330.370(20)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$17 \leftarrow 17$	126 775.152(50)

$18_{3,16} \leftarrow 18_{2,17}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$18 \leftarrow 18$	126 761.640(20)
		$17 \leftarrow 17$	130 927.056(20)
$19_{3,17} \leftarrow 19_{2,18}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$18 \leftarrow 18$	130 945.875(20)
		$18 \leftarrow 18$	130 255.937(20)
	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$18 \leftarrow 18$	134 759.347(20)
		$19 \leftarrow 19$	134 777.315(20)
$20_{3,18} \leftarrow 20_{2,19}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	134 141.013(20)
		$20 \leftarrow 20$	134 125.864(20)
	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	139 051.117(20)
		$20 \leftarrow 20$	139 069.233(20)
$6_{42} \leftarrow 6_{33}$	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$21 \leftarrow 21$	139 415.666(20)
		$5 \leftarrow 5$	154 752.942(20)
	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	$8 \leftarrow 8$	153 981.284(50)
		$8 \leftarrow 8$	154 444.013(20)
$7_{43} \leftarrow 7_{34}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 8$	154 196.345(20)
$8_{44} \leftarrow 8_{35}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$9 \leftarrow 9$	154 199.161(20)
$9_{45} \leftarrow 9_{36}$	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	$9 \leftarrow 9$	153 679.120(20)
		$9 \leftarrow 9$	153 856.684(20)
	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	$10 \leftarrow 10$	153 087.093(20)
		$11 \leftarrow 11$	153 106.610(20)
$10_{46} \leftarrow 10_{37}$	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	$12 \leftarrow 12$	153 108.101(20)
$11_{47} \leftarrow 11_{38}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$11 \leftarrow 11$	152 736.083(50)
		$12 \leftarrow 12$	152 734.360(20)
	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$12 \leftarrow 12$	152 478.760(20)
		$13 \leftarrow 13$	152 481.214(50)
$12_{48} \leftarrow 12_{39}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$12 \leftarrow 12$	151 866.671(20)
		$13 \leftarrow 13$	151 863.409(20)
	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 13$	151 661.471(20)
		$14 \leftarrow 14$	151 664.727(20)
$13_{49} \leftarrow 13_{3,10}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	$13 \leftarrow 13$	150 729.612(20)
		$14 \leftarrow 14$	150 611.235(50)
	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 14$	149 300.791(20)
		$15 \leftarrow 15$	149 294.564(50)
$14_{4,10} \leftarrow 14_{3,11}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	$15 \leftarrow 15$	149 929.248(20)
		$16 \leftarrow 16$	149 920.741(20)
	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	$15 \leftarrow 15$	148 190.060(20)
		$16 \leftarrow 16$	148 167.516(20)
$15_{4,11} \leftarrow 15_{3,12}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	$16 \leftarrow 16$	147 125.485(20)
		$17 \leftarrow 17$	147 130.589(20)
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 17$	144 909.288(20)
		$17 \leftarrow 17$	144 995.945(20)
$16_{4,12} \leftarrow 16_{3,13}$	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	$17 \leftarrow 17$	142 308.677(20)
		$18 \leftarrow 18$	142 296.949(20)
	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	$18 \leftarrow 18$	142 407.643(20)
		$19 \leftarrow 19$	142 416.669(20)
$17_{4,13} \leftarrow 17_{3,14}$	$16\frac{1}{2} \leftarrow 16\frac{1}{2}$	$18 \leftarrow 18$	139 239.208(20)
		$19 \leftarrow 19$	139 226.777(20)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 19$	139 413.882(20)
		$20 \leftarrow 20$	139 423.932(20)
$18_{4,14} \leftarrow 18_{3,15}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$19 \leftarrow 19$	135 745.728(20)
		$19 \leftarrow 19$	
	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$		
$19_{4,15} \leftarrow 19_{3,16}$	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$		
	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$		
$20_{4,16} \leftarrow 20_{3,17}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$		

	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$20 \leftarrow 20$	136 071.018(20)
		$21 \leftarrow 21$	136 081.789(20)
$21_{4,17} \leftarrow 21_{3,18}$	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$20 \leftarrow 20$	133 885.392(20)
	$21\frac{1}{2} \leftarrow 21\frac{1}{2}$	$21 \leftarrow 21$	133 732.955(20)
		$21 \leftarrow 21$	132 464.189(20)
		$22 \leftarrow 22$	132 475.327(20)
$4_{41} \leftarrow 4_{32}$	$4\frac{1}{2} \leftarrow 4\frac{1}{2}$	$4 \leftarrow 4$	153 982.371(80)
		$5 \leftarrow 5$	153 966.965(50)
$5_{42} \leftarrow 5_{33}$	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	$5 \leftarrow 5$	154 034.841(50)
		$6 \leftarrow 6$	154 024.095(80)
$6_{43} \leftarrow 6_{34}$	$5\frac{1}{2} \leftarrow 5\frac{1}{2}$	$5 \leftarrow 5$	154 780.362(20)
	$6\frac{1}{2} \leftarrow 6\frac{1}{2}$	$7 \leftarrow 7$	154 048.431(20)
$7_{44} \leftarrow 7_{35}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 7$	154 051.607(20)
		$8 \leftarrow 8$	154 045.635(50)
$8_{45} \leftarrow 8_{36}$	$7\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 8$	154 023.314(20)
		$9 \leftarrow 9$	154 018.687(50)
$9_{46} \leftarrow 9_{37}$	$8\frac{1}{2} \leftarrow 8\frac{1}{2}$	$8 \leftarrow 8$	154 488.142(50)
	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	$10 \leftarrow 10$	153 970.349(20)
$10_{47} \leftarrow 10_{38}$	$9\frac{1}{2} \leftarrow 9\frac{1}{2}$	$9 \leftarrow 9$	154 391.034(50)
		$10 \leftarrow 10$	154 394.606(20)
	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 10$	153 903.365(20)
		$11 \leftarrow 11$	153 900.275(20)
$11_{48} \leftarrow 11_{39}$	$10\frac{1}{2} \leftarrow 10\frac{1}{2}$	$10 \leftarrow 10$	154 304.207(20)
		$11 \leftarrow 11$	154 307.135(20)
	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$12 \leftarrow 12$	153 773.979(20)
$12_{49} \leftarrow 12_{3,10}$	$11\frac{1}{2} \leftarrow 11\frac{1}{2}$	$11 \leftarrow 11$	154 240.384(20)
		$12 \leftarrow 12$	154 243.210(50)
	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	$12 \leftarrow 12$	154 361.725(20)
		$13 \leftarrow 13$	154 380.231(20)
$13_{4,10} \leftarrow 13_{3,11}$	$12\frac{1}{2} \leftarrow 12\frac{1}{2}$	$12 \leftarrow 12$	154 218.118(20)
		$13 \leftarrow 13$	154 220.655(20)
	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	$14 \leftarrow 14$	154 016.940(20)
$14_{4,11} \leftarrow 14_{3,12}$	$13\frac{1}{2} \leftarrow 13\frac{1}{2}$	$13 \leftarrow 13$	154 261.888(20)
		$14 \leftarrow 14$	154 264.487(20)
	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	$14 \leftarrow 14$	154 054.843(20)
		$15 \leftarrow 15$	154 054.036(20)
$15_{4,12} \leftarrow 15_{3,13}$	$14\frac{1}{2} \leftarrow 14\frac{1}{2}$	$14 \leftarrow 14$	154 406.741(20)
		$15 \leftarrow 15$	154 409.517(20)
	$15\frac{1}{2} \leftarrow 15\frac{1}{2}$	$15 \leftarrow 15$	154 268.448(20)
		$16 \leftarrow 16$	154 266.406(50)
	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$18 \leftarrow 18$	154 504.523(20)
$18_{4,15} \leftarrow 18_{3,16}$	$17\frac{1}{2} \leftarrow 17\frac{1}{2}$	$17 \leftarrow 17$	155 272.265(20)
		$18 \leftarrow 18$	155 273.167(20)
	$18\frac{1}{2} \leftarrow 18\frac{1}{2}$	$18 \leftarrow 18$	155 148.091(20)
		$19 \leftarrow 19$	155 143.963(20)
$19_{4,16} \leftarrow 19_{3,17}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	155 944.265(20)
		$20 \leftarrow 20$	155 939.911(20)
$20_{4,17} \leftarrow 20_{3,18}$	$19\frac{1}{2} \leftarrow 19\frac{1}{2}$	$19 \leftarrow 19$	157 071.839(50)
		$20 \leftarrow 20$	157 076.272(20)
	$20\frac{1}{2} \leftarrow 20\frac{1}{2}$	$20 \leftarrow 20$	156 971.551(20)

		21 ← 21	156 966.734(20)
21 _{4,18} ← 21 _{3,19}	20 $\frac{1}{2}$ ← 20 $\frac{1}{2}$	20 ← 20	158 002.538(50)
		21 ← 21	158 012.329(20)
	21 $\frac{1}{2}$ ← 21 $\frac{1}{2}$	21 ← 21	158 271.706(20)
17 _{3,15} ← 16 _{3,14}	16 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	16 ← 16	155 877.623(80)
		17 ← 17	155 839.976(20)
17 _{4,14} ← 16 _{4,13}	16 $\frac{1}{2}$ ← 16 $\frac{1}{2}$	17 ← 17	156 443.127(50)
20 _{3,15} ← 21 _{3,18}	20 $\frac{1}{2}$ ← 20 $\frac{1}{2}$	20 ← 20	130 720.098(80)
		21 ← 21	133 907.459(20)

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}$ where \mathbf{I} is the ¹⁹F nuclear spin.

^b) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

^c) ¹⁹F hyperfine structure not resolved.

Molecular parameters for ¹⁹F³²S₂

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)			
A [MHz]	26 563.815 7(29) ^a)	MW	96Tan
B [MHz]	4 864.680 61(51)		
C [MHz]	4 103.894 70(45)		
A_K [MHz]	0.475 36(13)		
A_{NK} [kHz]	− 28.245 4(51)		
A_N [kHz]	2.596 10(72)		
δ_K^s [kHz]	11.581(14)		
δ_N^s [kHz]	0.650 38(24)		
ϵ_{aa} [MHz]	− 742.179(59)		
ϵ_{bb} [MHz]	− 148.293 0(60)		
ϵ_{cc} [MHz]	2.696 6(67)		
$\frac{1}{2} \epsilon_{ab} + \epsilon_{ba} $ ^b) [MHz]	260.563 8(23)		
Δ_K^s [kHz]	20.1(27)		
Δ_{NK}^s [kHz]	− 0.21(14)		
Δ_N^s [kHz]	0.147(11)		
δ_N^s [kHz]	0.070 9(61)		
$a_F(^{19}\text{F})$ [MHz]	44.17(11)		
$T_{aa}(^{19}\text{F})$ [MHz]	− 75.14(21)		
$T_{bb}(^{19}\text{F})$ [MHz]	− 74.50(11)		
$ T_{ab}(^{19}\text{F}) $ ^b) [MHz]	16.605(74)		
μ_a / μ_b	1.7		
μ_{tot} [D]	1.13	Theor	94Zhu

^a) The numbers in parentheses represent 3 standard deviations of the least-squares fit, in units of the last quoted decimal place.

^b) The relative sign of these two parameters was determined to be the same.

References for FS₂

- 94Zhu Zhuo, Q., Clouthier, D.J., Goddard, J.D. : J. Chem. Phys **100**(1994)2924.
 96Tan Tang, J., Saito, S. : J. Chem. Phys **104**(1996)7437.

3.2.3.2.15 ClS₂Microwave data for ³⁵Cl³²S₂

Transition		ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$		
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)			
$36_{0,36} \leftarrow 35_{0,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 452.705(30) ^{a)}	94Fuj
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 453.831(30)	
$36_{1,36} \leftarrow 35_{1,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 446.719(30)	
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 447.667(30)	
$36_{0,36} \leftarrow 35_{1,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 426.980(30)	
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 426.980(30)	
$36_{1,36} \leftarrow 35_{0,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 472.556(30)	
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 474.732(30)	
$37_{0,37} \leftarrow 36_{0,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 332.939(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 334.175(30)	
$37_{1,37} \leftarrow 36_{1,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 328.295(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 329.359(30)	
$37_{0,37} \leftarrow 36_{1,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 313.143(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 313.528(30)	
$37_{1,37} \leftarrow 36_{0,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 350.029(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 212.734(30)	
$38_{0,38} \leftarrow 37_{0,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 212.734(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 213.946(30)	
$38_{1,38} \leftarrow 37_{1,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 209.201(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 210.138(30)	
$38_{0,38} \leftarrow 37_{1,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 197.656(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 198.050(30)	
$38_{1,38} \leftarrow 37_{0,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 224.292(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 226.128(30)	
$39_{0,39} \leftarrow 38_{0,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 092.282(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	193 093.501(30)	
$39_{1,39} \leftarrow 38_{1,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 089.435(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	193 090.572(30)	
$39_{0,39} \leftarrow 38_{1,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 080.642(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	193 081.324(30)	
$39_{1,39} \leftarrow 38_{0,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 101.004(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	193 102.696(30)	
$40_{0,40} \leftarrow 39_{0,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 971.071(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 972.267(30)	
$40_{1,40} \leftarrow 39_{1,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 969.046(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 970.101(30)	
$40_{0,40} \leftarrow 39_{1,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 962.107(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 963.056(30)	
$40_{1,40} \leftarrow 39_{0,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 977.731(30)	

	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 979.526(30)
$41_{0,41} \leftarrow 40_{0,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 849.477(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	202 850.707(30)
$41_{1,41} \leftarrow 40_{1,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 847.861(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	202 849.010(30)
$41_{0,41} \leftarrow 40_{1,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 842.784(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	202 843.660(30)
$41_{1,41} \leftarrow 40_{0,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 854.562(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	202 856.063(30)
$35_{1,34} \leftarrow 34_{1,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	178 669.665(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 672.155(30)
$35_{2,34} \leftarrow 34_{2,33}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 445.626(30)
$35_{1,34} \leftarrow 34_{2,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	177 570.639(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	177 545.692(30)
$35_{2,34} \leftarrow 34_{1,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	179 547.299(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	179 572.147(30)
$36_{1,35} \leftarrow 35_{1,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	183 522.640(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 524.780(30)
$36_{2,35} \leftarrow 35_{2,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	183 343.714(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 341.671(30)
$36_{1,35} \leftarrow 35_{2,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	182 645.224(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	182 624.857(30)
$36_{2,35} \leftarrow 35_{1,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	184 221.095(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	184 241.695(30)
$37_{1,36} \leftarrow 36_{1,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	188 379.679(30)
$37_{2,36} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	188 235.700(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 234.082(30)
$37_{1,36} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	187 681.161(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	187 664.555(30)
$37_{2,36} \leftarrow 36_{1,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	188 934.208(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 950.846(30)
$38_{1,37} \leftarrow 37_{1,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	193 239.886(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 241.583(30)
$38_{2,37} \leftarrow 37_{2,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	193 124.521(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 123.224(30)
$38_{1,37} \leftarrow 37_{2,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	192 685.377(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	192 671.875(30)
$38_{2,37} \leftarrow 37_{1,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	193 679.118(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 692.777(30)
$39_{1,38} \leftarrow 38_{1,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	198 102.703(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	198 104.023(30)
$39_{2,38} \leftarrow 38_{2,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	198 010.545(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	198 009.531(30)
$39_{1,38} \leftarrow 38_{2,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	197 663.734(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 652.784(30)
$39_{2,38} \leftarrow 38_{1,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	198 449.624(30)

	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	198 460.772(30)
$40_{1,39} \leftarrow 39_{1,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	202 967.718(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 968.793(30)
$40_{2,39} \leftarrow 39_{2,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	202 894.311(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 893.491(30)
$40_{1,39} \leftarrow 39_{2,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	202 620.791(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	202 612.176(30)
$40_{2,39} \leftarrow 39_{1,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	203 241.113(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	203 250.194(30)
$33_{2,31} \leftarrow 32_{2,30}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	175 167.285(30)
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	175 167.285(30)
$34_{2,32} \leftarrow 33_{2,31}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	179 962.983(30)
$35_{2,33} \leftarrow 34_{2,32}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	184 734.781(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	184 740.137(30)
$36_{2,34} \leftarrow 35_{2,33}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	189 499.242(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	189 506.366(30)
$37_{2,35} \leftarrow 36_{2,34}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	194 260.054(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	194 267.793(30)
$38_{2,36} \leftarrow 37_{2,35}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	199 022.048(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	199 029.966(30)
$39_{2,37} \leftarrow 38_{2,36}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	203 788.780(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	203 796.655(30)
$32_{3,29} \leftarrow 31_{3,28}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	174 194.521(30)
	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	174 126.860(30)
$33_{3,30} \leftarrow 32_{3,29}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	179 514.233(30)
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	179 453.259(30)
$34_{3,31} \leftarrow 33_{3,30}$	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	184 775.842(30)
	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	184 724.060(30)
$35_{3,32} \leftarrow 34_{3,31}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	189 951.650(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	189 936.863(30)
$36_{3,33} \leftarrow 35_{3,32}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	195 196.796(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	195 089.918(30)
$37_{3,34} \leftarrow 36_{3,33}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	200 205.857(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	200 182.039(30)
$38_{3,35} \leftarrow 37_{3,34}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	205 238.495(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	205 213.579(30)
$33_{3,31} \leftarrow 32_{3,30}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	172 795.636(30)
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	172 777.033(30)
$34_{3,32} \leftarrow 33_{3,31}$	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	177 819.261(30)
$35_{3,33} \leftarrow 34_{3,32}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	182 826.094(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	182 810.731(30)
$36_{3,34} \leftarrow 35_{3,33}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	187 817.033(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	187 803.064(30)
$37_{3,35} \leftarrow 36_{3,34}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	192 793.022(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	192 780.733(30)
$38_{3,36} \leftarrow 37_{3,35}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	197 755.422(30)

	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	197 744.409(30)
$39_{3,37} \leftarrow 38_{3,36}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	202 705.112(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	202 695.521(30)
$32_{4,28} \leftarrow 31_{4,27}$	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	172 877.789(30)
	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	172 779.687(30)
$33_{4,29} \leftarrow 32_{4,28}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	178 581.802(30)
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	178 481.424(30)
$34_{4,30} \leftarrow 33_{4,29}$	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	184 282.050(30)
	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	184 180.769(30)
$35_{4,31} \leftarrow 34_{4,30}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	189 969.324(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	189 868.154(30)
$36_{4,32} \leftarrow 35_{4,31}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	195 634.136(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	195 534.452(30)
$37_{4,33} \leftarrow 36_{4,32}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	201 267.954(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	201 171.125(30)
$38_{4,34} \leftarrow 37_{4,33}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	206 863.825(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	206 770.663(30)
$20_{8,13} \leftarrow 19_{7,12}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	340 771.059(30)
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	339 877.233(30)
$20_{8,12} \leftarrow 19_{7,13}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	340 771.059(30)
	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	339 877.233(30)
$21_{8,14} \leftarrow 20_{7,13}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	346 014.793(30)
	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	345 150.597(30)
$21_{8,13} \leftarrow 20_{7,12}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	346 014.793(30)
	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	345 150.597(30)
$22_{8,15} \leftarrow 21_{7,14}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	351 254.321(30)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	350 417.977(30)
$22_{8,14} \leftarrow 21_{7,13}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	351 254.321(30)
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	350 417.977(30)
$23_{8,16} \leftarrow 22_{7,15}$	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	356 489.050(30)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	355 679.144(30)
$23_{8,15} \leftarrow 22_{7,16}$	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	356 489.050(30)
	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	355 679.144(30)
$24_{8,17} \leftarrow 23_{7,16}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	361 718.133(30)
	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	360 933.382(30)
$24_{8,16} \leftarrow 23_{7,17}$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	361 718.133(30)
	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	360 933.382(30)
$25_{8,18} \leftarrow 24_{7,17}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	366 940.753(30)
	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	366 179.764(30)
$25_{8,17} \leftarrow 24_{7,18}$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	366 940.753(30)
	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	366 179.764(30)
$26_{8,19} \leftarrow 25_{7,18}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	372 156.296(30)
	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	371 417.760(30)
$26_{8,18} \leftarrow 25_{7,19}$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	372 156.296(30)
	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	371 417.760(30)
$27_{8,20} \leftarrow 26_{7,19}$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	377 363.355(30)

	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	376 646.738(30)
$27_{8,19} \leftarrow 26_{7,20}$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	377 363.355(30)
	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	376 646.738(30)
$14_{95} \leftarrow 13_{86}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	340 461.547(30)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	339 285.927(30)
$14_{96} \leftarrow 13_{85}$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	340 461.547(30)
	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	339 285.927(30)
$15_{96} \leftarrow 14_{87}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	345 724.673(30)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	344 585.879(30)
$15_{97} \leftarrow 14_{86}$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	345 724.673(30)
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	344 585.879(30)
$16_{97} \leftarrow 15_{88}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	350 986.971(30)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	349 884.341(30)
$16_{98} \leftarrow 15_{87}$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	350 986.971(30)
	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	349 884.341(30)
$17_{98} \leftarrow 16_{89}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	356 248.469(30)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	355 180.974(30)
$17_{99} \leftarrow 16_{88}$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	356 248.469(30)
	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	355 180.974(30)
$18_{99} \leftarrow 17_{8,10}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	360 475.455(30)
$18_{9,10} \leftarrow 17_{89}$	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	360 475.455(30)
$19_{9,10} \leftarrow 18_{8,11}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	365 767.322(30)
$19_{9,11} \leftarrow 18_{8,10}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	365 767.322(30)
$21_{9,12} \leftarrow 20_{8,13}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	377 281.293(30)
	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	376 341.333(30)
$21_{9,13} \leftarrow 20_{8,12}$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	377 281.293(30)
	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	376 341.333(30)

^a) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Molecular parameters for ³⁵Cl³²S₂

Parameter		Value	Method	Ref.
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)				
A	[MHz]	18 319.802(27) ^{a)}	MW	94Fuj
B	[MHz]	2 827.549 9(42)		
C	[MHz]	2 445.932 9(26)		
A_K	[MHz]	0.271 27(15)		
A_{NK}	[kHz]	− 17.986(16)		
A_N	[kHz]	1.150 6(11)		
δ_K	[kHz]	4.543(58)		
δ_N	[kHz]	0.255 23(54)		
\mathcal{E}_{aa}	[MHz]	− 1 329.1(12)		
\mathcal{E}_{bb}	[MHz]	− 121.29(32)		
\mathcal{E}_{cc}	[MHz]	1.73(30)		
$\frac{1}{2} \mathcal{E}_{ab} + \mathcal{E}_{ba} $	[MHz]	17.9(56)		
Δ_K^s	[kHz]	23.7(51)		
$\Delta_{NK}^s + \Delta_{KN}^s$	[kHz]	− 2.31(89)		

Δ_N^s	[kHz]	0.133(81)
δ_N^s	[kHz]	0.068(14)
$r_s(\text{S-S})$	[nm]	0.190 6(7)
$r_s(\text{S-Cl})$	[nm]	0.207 1(5)
$\alpha_s(\text{S-S-Cl})$	[deg]	110.3(4)

^{a)} The numbers in parentheses represent 3 standard deviations of the least-squares fit, in units of the last quoted decimal place.

Microwave data for ³⁷Cl³²S₂

Transition		ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$		
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)			
$36_{0,36} \leftarrow 35_{0,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	173 930.609(30) ^{a)}	94Fuj
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	173 931.965 (30)	
$36_{1,36} \leftarrow 35_{1,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	173 923.237 (30)	
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	173 924.299 (30)	
$36_{0,36} \leftarrow 35_{1,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	173 899.025(30)	
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	173 899.025(30)	
$36_{1,36} \leftarrow 35_{0,35}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	173 955.004(30)	
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	173 957.374(30)	
$37_{0,37} \leftarrow 36_{0,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 687.093(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	178 688.347(30)	
$37_{1,37} \leftarrow 36_{1,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 681.486(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	178 682.513(30)	
$37_{0,37} \leftarrow 36_{1,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 662.861(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	178 662.861(30)	
$37_{1,37} \leftarrow 36_{0,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 705.838(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	178 708.059(30)	
$38_{0,38} \leftarrow 37_{0,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 443.181(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	183 444.409(30)	
$38_{1,38} \leftarrow 37_{1,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 438.853(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	183 439.925(30)	
$38_{0,38} \leftarrow 37_{1,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 424.472(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	183 424.829(30)	
$38_{1,38} \leftarrow 37_{0,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 457.618(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	183 459.502(30)	
$39_{0,39} \leftarrow 38_{0,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 198.983(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	188 200.077(30)	
$39_{1,39} \leftarrow 38_{1,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 195.581(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	188 196.589(30)	
$39_{0,39} \leftarrow 38_{1,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 184.389(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	188 185.100(30)	
$39_{1,39} \leftarrow 38_{0,38}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 210.200(30)	
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	188 211.669(30)	
$40_{0,40} \leftarrow 39_{0,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	192 954.178(30)	

	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	192 955.346(30)
$40_{1,40} \leftarrow 39_{1,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	192 951.585(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	192 952.615(30)
$40_{0,40} \leftarrow 39_{1,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	192 943.075(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	192 943.823(30)
$40_{1,40} \leftarrow 39_{0,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	192 962.656(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	192 964.234(30)
$41_{0,41} \leftarrow 40_{0,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 708.961(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	197 710.098(30)
$41_{1,41} \leftarrow 40_{1,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 706.926(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	197 708.062(30)
$41_{0,41} \leftarrow 40_{1,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 700.368(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	197 701.253(30)
$41_{1,41} \leftarrow 40_{0,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 715.447(30)
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	197 717.022(30)
$35_{1,34} \leftarrow 34_{1,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	174 165.356(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	174 168.123(30)
$35_{2,34} \leftarrow 34_{2,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	173 912.183(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	173 909.447(30)
$35_{1,34} \leftarrow 34_{2,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	172 872.454(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	172 843.325(30)
$35_{2,34} \leftarrow 34_{1,33}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	175 204.934(30)
	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	175 234.099(30)
$36_{1,35} \leftarrow 35_{1,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 892.215(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 894.634(30)
$36_{2,35} \leftarrow 35_{2,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	178 686.188(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	178 683.851(30)
$36_{1,35} \leftarrow 35_{2,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	177 852.482(30)
	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	177 828.560(30)
$36_{2,35} \leftarrow 35_{1,34}$	$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	179 725.749(30)
$37_{1,36} \leftarrow 36_{1,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 623.284(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 625.304(30)
$37_{2,36} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	183 456.214(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	183 454.336(30)
$37_{1,36} \leftarrow 36_{2,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	182 789.671(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	182 770.027(30)
$37_{2,36} \leftarrow 36_{1,35}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	184 289.862(30)
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	184 309.759(30)
$38_{1,37} \leftarrow 37_{1,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 357.906(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 359.601(30)
$38_{2,37} \leftarrow 37_{2,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 222.922(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 221.398(30)
$38_{1,37} \leftarrow 37_{2,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	187 691.308(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	187 675.341(30)
$38_{2,37} \leftarrow 37_{1,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	188 889.508(30)
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	188 905.851(30)

$39_{1,38} \leftarrow 38_{1,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 095.367(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	193 096.836(30)
$39_{2,38} \leftarrow 38_{2,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	192 986.732(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	192 985.516(30)
$39_{1,38} \leftarrow 38_{2,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	192 563.734(30)
	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	192 550.755(30)
$39_{2,38} \leftarrow 38_{1,37}$	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	193 518.358(30)
$40_{1,39} \leftarrow 39_{1,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 835.208(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 836.486(30)
$40_{2,39} \leftarrow 39_{2,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 748.087(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 747.023(30)
$40_{1,39} \leftarrow 39_{2,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	197 412.212(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	197 401.604(30)
$40_{2,39} \leftarrow 39_{1,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	198 171.028(30)
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	198 181.859(30)

^a) The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

Molecular parameters for $^{37}\text{Cl}^{32}\text{S}_2$

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)			
A [MHz]	18 191.9(10) ^a)	MW	94Fuj
B [MHz]	2 747.932(28)		
C [MHz]	2 383.921 8(46)		
Δ_K [MHz]	0.271 27 ^b)		
Δ_{NK} [kHz]	− 18.04(36)		
Δ_N [kHz]	1.103 1(61)		
δ_K^s [kHz]	4.543 ^b)		
δ_N^s [kHz]	0.242 7(36)		
\mathcal{E}_{aa} [MHz]	− 1 318(47)		
\mathcal{E}_{bb} [MHz]	− 117.96(75)		
\mathcal{E}_{cc} [MHz]	1.84(33)		
$\frac{1}{2} \mathcal{E}_{ab} + \mathcal{E}_{ba} $ [MHz]	17.9 ^b)		
Δ_K^s [kHz]	23.7 ^b)		
$\Delta_{NK}^s + \Delta_{KN}^s$ [kHz]	− 4.8(78)		
Δ_N^s [kHz]	0.104(73)		
δ_N^s [kHz]	0.068 ^b)		

^a) The numbers in parentheses represent 3 standard deviations of the least-squares fit, in units of the last quoted decimal place.

^b) Parameter constrained to the value for the ^{35}Cl species.

Reference for ClS₂

94Fuj Fujitake, M., Hirota, E. : Can. J. Phys **72** (1994) 1043.

3.2.3.2.16 CaSHMicrowave data for $^{40}\text{Ca}^{32}\text{S}^1\text{H}$

Transition		ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$		
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)			
$34_{0,34} \leftarrow 33_{0,33}$	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	286 342.996(30) ^{a)}	96Tal
	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	286 384.555(30)	
$34_{1,34} \leftarrow 33_{1,33}$	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	285 219.830(30)	
	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	285 259.946(30)	
$34_{1,33} \leftarrow 33_{1,32}$	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	287 581.648(30)	
$37_{0,37} \leftarrow 36_{0,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	311 503.998(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	311 541.875(30)	
$37_{1,37} \leftarrow 36_{1,36}$	$36\frac{1}{2} \leftarrow 35\frac{1}{2}$	310 291.749(30)	
	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	310 331.748(30)	
$37_{1,36} \leftarrow 36_{1,35}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	312 857.640(30)	
$38_{0,38} \leftarrow 37_{0,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	319 877.155(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	319 921.673(30)	
$38_{1,38} \leftarrow 37_{1,37}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	318 643.624(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	318 683.628(30)	
$38_{1,37} \leftarrow 37_{1,36}$	$37\frac{1}{2} \leftarrow 36\frac{1}{2}$	321 229.801(30)	
	$38\frac{1}{2} \leftarrow 37\frac{1}{2}$	321 273.643(30)	
$40_{0,40} \leftarrow 39_{0,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	336 630.005(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 671.461(30)	
$40_{1,40} \leftarrow 39_{1,39}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	335 339.241(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	335 379.247(30)	
$40_{1,39} \leftarrow 39_{1,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	338 058.737(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	338 102.382(30)	
$40_{2,39} \leftarrow 39_{2,38}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	336 626.708(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 668.704(30)	
$40_{2,38} \leftarrow 39_{2,37}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	336 752.506(30)	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 795.022(30)	
$40_{4,37} \leftarrow 39_{4,36}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	336 316.368(30) ^{b)}	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 358.849(30) ^{b)}	
$40_{4,36} \leftarrow 39_{4,35}$	$39\frac{1}{2} \leftarrow 38\frac{1}{2}$	336 316.368(30) ^{b)}	
	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 358.849(30) ^{b)}	
$41_{0,41} \leftarrow 40_{0,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	344 999.963(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	345 041.352(30)	
$41_{1,41} \leftarrow 40_{1,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	343 682.746(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	343 722.617(30)	
$41_{1,40} \leftarrow 40_{1,39}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	346 468.606(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	346 512.318(30)	
$41_{2,40} \leftarrow 40_{2,39}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	345 002.344(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	345 044.232(30)	
$41_{2,39} \leftarrow 40_{2,38}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	345 137.609(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	345 180.103(30)	

$41_{3,39} \leftarrow 40_{3,38}$	$40 \frac{1}{2} \leftarrow 39 \frac{1}{2}$	344 895.480(30)
	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	344 937.793(30)
$41_{4,38} \leftarrow 40_{4,37}$	$40 \frac{1}{2} \leftarrow 39 \frac{1}{2}$	344 685.988(30) ^{b)}
	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	344 728.462(30) ^{b)}
$41_{4,37} \leftarrow 40_{4,36}$	$40 \frac{1}{2} \leftarrow 39 \frac{1}{2}$	344 685.988(30) ^{b)}
	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	344 728.462(30) ^{b)}
$42_{0,42} \leftarrow 41_{0,41}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	353 366.485(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	353 407.826(30)
$42_{1,42} \leftarrow 41_{1,41}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	352 023.071(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	352 063.080(30)
$42_{1,41} \leftarrow 41_{1,40}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	354 875.465(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	354 919.148(30)
$42_{2,41} \leftarrow 41_{2,40}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	353 374.917(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	353 416.841(30)
$42_{2,40} \leftarrow 41_{2,39}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	353 520.258(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	353 562.815(30)
$42_{3,40} \leftarrow 41_{3,39}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	353 267.445(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	353 309.745(30)
$42_{3,39} \leftarrow 41_{3,38}$	$41 \frac{1}{2} \leftarrow 40 \frac{1}{2}$	353 268.801(30)
	$42 \frac{1}{2} \leftarrow 41 \frac{1}{2}$	353 311.134(30)

^{a)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place. ^{b)} *K*-type doubling not resolved.

Molecular parameters for $^{40}\text{Ca}^{32}\text{S}^1\text{H}$

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A'' ; vibrational (0,0,0)			
<i>A</i> [MHz]	290 606.5(396) ^{a)}	MW	96Tal
<i>B</i> [MHz]	4 253.685(2)		
<i>C</i> [MHz]	4 184.952(2)		
<i>D_K</i> [MHz]	26.5 ^{b)}		
<i>D_{NK}</i> [kHz]	361.3(3)		
<i>D_N</i> [kHz]	2.986 8(3)		
<i>d₁</i> [kHz]	− 0.052 75(33)		
<i>d₂</i> [kHz]	− 0.008 02(6)		
<i>H_{KN}</i> [kHz]	0.143 3(40)		
<i>H_{NK}</i> [kHz]	0.001 84(7)		
<i>ε_{aa}</i> [MHz]	− 14.4(31)		
<i>ε_{bb}</i> [MHz]	45.632(43)		
<i>ε_{cc}</i> [MHz]	38.229(37)		
$\frac{1}{2} \epsilon_{ab} + \epsilon_{ba} $ [MHz]	3.38(12)		
<i>r₀</i> (Ca–S) [nm]	0.256 4(2)		
<i>r₀</i> (S–H) [nm]	0.135 7(17)		
<i>α₀</i> (Ca–S–H) [deg]	91.0(18)		
<i>μ_a</i> [D]	5.36(4)	Opt Stark	94Scu

^{a)} The numbers in parentheses represent 1 standard deviation of the least-squares fit, in units of the last quoted decimal place. ^{b)} Parameter fixed to value from optical work [93Jar].

Microwave data for $^{40}\text{Ca}^{32}\text{S}^2\text{H}$ (CaSD)

Transition		ν [MHz]	Ref.
rotational $N' - N''$	fine structure $J' - J''$		
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)			
$20_{0,20} \leftarrow 19_{0,19}$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	164 510.497(30) ^{a)}	96Tal
$21_{0,21} \leftarrow 20_{0,20}$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	172 754.480 (30)	
$33_{0,33} \leftarrow 32_{0,32}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	270 899.365(30)	
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	270 939.030(30)	
$33_{1,33} \leftarrow 32_{1,32}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	269 209.977(30)	
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	269 248.735 (30)	
$33_{1,32} \leftarrow 32_{1,31}$	$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	273 231.568(30)	
	$33\frac{1}{2} \leftarrow 32\frac{1}{2}$	273 274.282(30)	
$41_{0,41} \leftarrow 40_{0,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 000.193(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	336 039.174(30)	
$41_{1,41} \leftarrow 40_{1,40}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	334 134.744(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	334 173.119(30)	
$41_{1,40} \leftarrow 40_{1,39}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	339 096.808(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	339 139.184(30)	
$41_{2,40} \leftarrow 40_{2,39}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	336 617.848(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	336 658.596(30)	
$41_{2,39} \leftarrow 40_{2,38}$	$40\frac{1}{2} \leftarrow 39\frac{1}{2}$	337 467.717(30)	
	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	337 510.432(30)	
$42_{0,42} \leftarrow 41_{0,41}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	344 114.373(30)	
$42_{1,42} \leftarrow 41_{1,41}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	342 235.740(30)	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	342 274.260(30)	
$42_{1,41} \leftarrow 41_{1,40}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	347 313.504(30)	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	347 355.760(30)	
$42_{2,41} \leftarrow 41_{2,40}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	344 781.105(30)	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	344 821.626(30)	
$42_{2,40} \leftarrow 41_{2,39}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	345 691.797(30)	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	345 734.504(30)	
$42_{3,40} \leftarrow 41_{3,39}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	344 942.945(30)	
$42_{3,39} \leftarrow 41_{3,38}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	344 932.714(30)	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	344 974.316(30)	
$42_{5,38} \leftarrow 41_{5,37}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	344 408.492(30) ^{b)}	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	344 450.152(30) ^{b)}	
$42_{5,37} \leftarrow 41_{5,36}$	$41\frac{1}{2} \leftarrow 40\frac{1}{2}$	344 408.492(30) ^{b)}	
	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	344 450.152(30) ^{b)}	
$43_{0,43} \leftarrow 42_{0,42}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	352 223.003(30)	
	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	352 261.796(30)	
$43_{1,43} \leftarrow 42_{1,42}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	350 371.874(30)	
$43_{1,42} \leftarrow 42_{1,41}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	355 526.135(30)	
	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	355 568.396(30)	
$43_{2,42} \leftarrow 42_{2,41}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	352 981.361(30)	
$43_{2,41} \leftarrow 42_{2,40}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	353 914.754(30)	

	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	353 957.565(30)
$43_{3,41} \leftarrow 42_{3,39}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	353 117.320(30)
$43_{3,40} \leftarrow 42_{3,38}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	353 111.050(30)
	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	353 152.542(30)
$43_{5,39} \leftarrow 42_{5,38}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	352 569.168(30) ^{b)}
	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	352 610.814(30) ^{b)}
$43_{5,38} \leftarrow 42_{5,37}$	$42\frac{1}{2} \leftarrow 41\frac{1}{2}$	352 569.168(30) ^{b)}
	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	352 610.814(30) ^{b)}
$44_{0,44} \leftarrow 43_{0,43}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	360 326.171(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	360 364.818(30)
$44_{1,44} \leftarrow 43_{1,43}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	358 427.662(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	358 466.012(30)
$44_{1,43} \leftarrow 43_{1,42}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	363 734.696(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	363 776.889(30)
$44_{2,43} \leftarrow 43_{2,42}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	361 096.860(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	361 137.447(30)
$44_{2,42} \leftarrow 43_{2,41}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	362 136.815(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	362 179.742(30)
$44_{3,42} \leftarrow 43_{3,41}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	361 247.520(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	361 289.050(30)
$44_{3,41} \leftarrow 43_{3,40}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	361 286.873(30)
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	361 328.374(30)
$44_{5,40} \leftarrow 43_{5,39}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	360 727.032(30) ^{b)}
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	360 768.600(30) ^{b)}
$44_{5,39} \leftarrow 43_{5,38}$	$43\frac{1}{2} \leftarrow 42\frac{1}{2}$	360 727.032(30) ^{b)}
	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	360 768.600(30) ^{b)}
$45_{1,44} \leftarrow 44_{1,43}$	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	371 981.272(30)
$45_{2,43} \leftarrow 44_{2,42}$	$44\frac{1}{2} \leftarrow 43\frac{1}{2}$	370 357.811(30)
	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	370 400.935(30)
$46_{1,45} \leftarrow 45_{1,44}$	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	380 138.808(30)
$46_{2,44} \leftarrow 45_{2,43}$	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	378 577.704(30)
	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	378 618.327(30)

^{a)} The figures in parentheses are the authors' estimates of experimental uncertainty, in units of the last quoted decimal place.

^{b)} *K*-type doubling not resolved.

Molecular parameters for $^{40}\text{Ca}^{32}\text{S}^2\text{H}$ (CaSD)

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A' ; vibrational (0,0,0)			
<i>A</i>	[MHz]	149 520.3(37) ^{a)}	96Tal
<i>B</i>	[MHz]	4 179.669(2)	
<i>C</i>	[MHz]	4 056.61(2)	
<i>D_K</i>	[MHz]	10.6 ^{b)}	
<i>D_{NK}</i>	[kHz]	328.4(5)	
<i>D_N</i>	[kHz]	2.913 9(2)	
<i>d₁</i>	[kHz]	−0.097 2(2)	
<i>d₂</i>	[kHz]	−0.024 1(5)	

H_{KN}	[kHz]	0.110(20)
H_{NK}	[kHz]	0.002 09(13)
L_{NK}	[Hz]	– 0.015(6)
\mathcal{E}_{aa}	[MHz]	– 6.1(24)
\mathcal{E}_{bb}	[MHz]	45.146(75)
\mathcal{E}_{cc}	[MHz]	37.228(63)
$\frac{1}{2} \mathcal{E}_{ab} + \mathcal{E}_{ba} $	[MHz]	4.586(41)
D_N^s	[kHz]	– 0.053(12)

^{a)} The numbers in parentheses represent 1 standard deviation of the least-squares fit, in units of the last quoted decimal place.

^{b)} Parameter fixed to value from *ab initio* calculation [96Tal].

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3.2.3.2.17 YC_2

Molecular parameter for $^{39}\text{Y}^{12}\text{C}_2$

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational (0,0,0)			
μ [D]	6.38(3) ^{a)}	Opt Stark	01Bou

^{a)} The number in parentheses represents 1 standard deviation of the least-squares fit, in units of the last quoted decimal place.

Reference for YC_2

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