

3.2.2.2.1 SiF₃Microwave data for ²⁸Si¹⁹F₃

Transition				ν [MHz]	Ref.	
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$	hyperfine $F' - F''^a$)			
State: electronic \tilde{X}^2A_1 ; vibrational zero point level						
5 \leftarrow 4	0 \leftarrow 0	4 $\frac{1}{2} \leftarrow$ 3 $\frac{1}{2}$	3 \leftarrow 2	75 071.901	99Tan	
			6 \leftarrow 5	75 075.454		
			5 \leftarrow 4	75 081.987		
			4 \leftarrow 3	75 088.185		
	0 \leftarrow 0	5 $\frac{1}{2} \leftarrow$ 4 $\frac{1}{2}$	4 \leftarrow 3	75 088.892		
			5 \leftarrow 4	75 091.953		
			7 \leftarrow 6	75 102.055		
			4 \leftarrow 3	75 068.799		
	1 \leftarrow 1	4 $\frac{1}{2} \leftarrow$ 3 $\frac{1}{2}$	5 \leftarrow 4	75 078.992		
			5 \leftarrow 4	75 095.101		
			6 \leftarrow 5	75 102.882		
			6 \leftarrow 5	75 104.138		
	-1 \leftarrow -1	4 $\frac{1}{2} \leftarrow$ 3 $\frac{1}{2}$	4 \leftarrow 3	75 062.070		
			5 \leftarrow 4	75 075.454		
			5 \leftarrow 4	75 077.607		
			6 \leftarrow 5	75 077.607		
	3 \leftarrow 3	4 $\frac{1}{2} \leftarrow$ 3 $\frac{1}{2}$	7 \leftarrow 6	75 095.752		
			4 \leftarrow 3	75 099.785		
			5 \leftarrow 4	75 105.165		
			6 \leftarrow 5	75 114.647		
	4 \leftarrow 4	4 $\frac{1}{2} \leftarrow$ 3 $\frac{1}{2}$	5 \leftarrow 4	75 082.613		
			5 $\frac{1}{2} \leftarrow$ 4 $\frac{1}{2}$	75 113.664		
			5 \leftarrow 4	90 084.981		
			4 \leftarrow 3	90 089.463		
	6 \leftarrow 5	0 \leftarrow 0	5 $\frac{1}{2} \leftarrow$ 4 $\frac{1}{2}$	6 \leftarrow 5		90 095.706
				5 \leftarrow 4		90 101.410
				5 \leftarrow 4		90 102.796
				6 \leftarrow 5		90 106.322
		0 \leftarrow 0	6 $\frac{1}{2} \leftarrow$ 5 $\frac{1}{2}$	7 \leftarrow 6		90 109.576
				8 \leftarrow 7		90 117.074
				5 \leftarrow 4		90 081.392
				5 \leftarrow 4		90 083.198
		-1 \leftarrow -1	5 $\frac{1}{2} \leftarrow$ 4 $\frac{1}{2}$	6 \leftarrow 5		90 092.440
				6 \leftarrow 5		90 109.576
				7 \leftarrow 6		90 117.840
				7 \leftarrow 6		90 118.713
		2 \leftarrow 2	5 $\frac{1}{2} \leftarrow$ 4 $\frac{1}{2}$	5 \leftarrow 4		90 079.508
				6 \leftarrow 5		90 092.440
				6 $\frac{1}{2} \leftarrow$ 5 $\frac{1}{2}$		90 112.706
				7 \leftarrow 6		90 119.124
		3 \leftarrow 3	5 $\frac{1}{2} \leftarrow$ 4 $\frac{1}{2}$	4 \leftarrow 3		90 065.592
				7 \leftarrow 6		90 091.487
				6 \leftarrow 5		90 093.937

			5 ← 4	90 097.617
		$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	5 ← 4	90 109.234
			8 ← 7	90 114.615
			6 ← 5	90 115.966
			7 ← 6	90 121.881
	4 ← 4	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	5 ← 4	90 068.426
		$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	6 ← 5	90 095.706
			6 ← 5	90 122.683
			7 ← 6	90 122.683
	5 ← 5	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	5 ← 4	90 060.109
		$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	6 ← 5	90 099.094
			7 ← 6	90 125.345
7 ← 6	0 ← 0	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	5 ← 4	105 097.271
			8 ← 7	105 102.084
			7 ← 6	105 108.102
			6 ← 5	105 114.278
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	6 ← 5	105 115.129
			7 ← 6	105 119.780
			8 ← 7	105 123.560
			9 ← 8	105 130.527
7 ← 6	-1 ← -1	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	6 ← 5	105 094.963
	1 ← 1		6 ← 5	105 096.184
			7 ← 6	105 104.240
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	7 ← 6	105 123.560
	-1 ← -1		8 ← 7	105 131.182
	1 ← 1		8 ← 7	105 131.970
	2 ← 2	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	6 ← 5	105 094.103
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	7 ← 6	105 104.634
			7 ← 6	105 125.987
			8 ← 7	105 132.498
	3 ← 3	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	5 ← 4	105 086.339
			8 ← 7	105 104.240
			7 ← 6	105 108.102
			6 ← 5	105 113.949
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	6 ← 5	105 119.780
			7 ← 6	105 127.128
			9 ← 8	105 130.098
			8 ← 7	105 131.970
	4 ← 4	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	6 ← 5	105 088.234
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	7 ← 6	105 107.636
			7 ← 6	105 133.802
			8 ← 7	105 136.480
	5 ← 5	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	6 ← 5	105 083.801
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	7 ← 6	105 110.493
			7 ← 6	105 139.062
			8 ← 7	105 139.485
	6 ← 6	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	5 ← 4	105 053.854
			8 ← 7	105 111.096
			7 ← 6	105 111.096
		$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	9 ← 8	105 128.897
			6 ← 5	105 145.982
			7 ← 6	105 145.982

$8 \leftarrow 7$	$0 \leftarrow 0$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8 \leftarrow 7$	105 157.096
			$6 \leftarrow 5$	120 108.261
			$9 \leftarrow 8$	120 113.098
			$8 \leftarrow 7$	120 118.884
			$7 \leftarrow 6$	120 125.823
			$7 \leftarrow 6$	120 125.823
			$8 \leftarrow 7$	120 131.558
			$9 \leftarrow 8$	120 135.705
			$10 \leftarrow 9$	120 142.236
			$7 \leftarrow 6$	10 106.453
$-1 \leftarrow -1$ $1 \leftarrow 1$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 6$	120 107.589
			$8 \leftarrow 7$	120 114.121
			$8 \leftarrow 7$	120 136.658
			$9 \leftarrow 8$	120 142.236
			$9 \leftarrow 8$	120 143.090
			$7 \leftarrow 6$	120 106.453
			$8 \leftarrow 7$	120 115.356
			$8 \leftarrow 7$	120 137.859
			$9 \leftarrow 8$	120 144.126
			$6 \leftarrow 5$	120 101.992
$-1 \leftarrow -1$ $2 \leftarrow 2$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$9 \leftarrow 8$	120 115.356
			$8 \leftarrow 7$	120 119.709
			$7 \leftarrow 6$	120 127.248
			$7 \leftarrow 6$	120 129.783
			$8 \leftarrow 7$	120 137.859
			$9 \leftarrow 8$	120 142.236
			$10 \leftarrow 9$	120 143.090
			$7 \leftarrow 6$	120 103.625
			$8 \leftarrow 7$	120 118.454
			$8 \leftarrow 7$	120 144.708
$3 \leftarrow 3$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$9 \leftarrow 8$	120 148.469
			$7 \leftarrow 6$	120 101.487
			$8 \leftarrow 7$	120 121.151
			$8 \leftarrow 7$	120 149.513
			$9 \leftarrow 8$	120 151.708
			$6 \leftarrow 5$	120 083.248
			$9 \leftarrow 8$	120 122.762
			$8 \leftarrow 7$	120 124.171
			$7 \leftarrow 6$	120 124.171
			$10 \leftarrow 9$	120 145.770
$4 \leftarrow 4$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$7 \leftarrow 6$	120 149.513
			$8 \leftarrow 7$	120 154.358
			$9 \leftarrow 8$	120 161.912
			$7 \leftarrow 6$	120 095.839
			$8 \leftarrow 7$	120 130.523
			$8 \leftarrow 7$	120 159.955
			$9 \leftarrow 8$	120 160.259
			$7 \leftarrow 6$	135 117.518
			$10 \leftarrow 9$	135 122.252
			$9 \leftarrow 8$	135 127.664
$5 \leftarrow 5$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	135 135.952
			$8 \leftarrow 7$	135 134.363
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$6 \leftarrow 6$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$7 \leftarrow 7$	$7\frac{1}{2} \leftarrow 6\frac{1}{2}$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$8 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
			$8 \leftarrow 7$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	
			$9 \leftarrow 8$	
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	$8 \leftarrow 7$	
			$8 \leftarrow 7$	
			$9 \leftarrow 8$	
			$7 \leftarrow 6$	
			$10 \leftarrow 9$	

			9 ← 8	135 141.610
			10 ← 9	135 145.924
			11 ← 10	135 151.882
-1 ← -1	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		8 ← 7	135 116.528
1 ← 1			8 ← 7	135 117.518
1 ← 1			9 ← 8	135 124.182
1 ← 1	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		9 ← 8	135 145.924
-1 ← -1			10 ← 9	135 152.899
1 ← 1			10 ← 9	135 152.455
2 ← 2	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		8 ← 7	135 116.528
			9 ← 8	135 124.182
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		9 ← 8	135 148.081
			10 ← 9	135 153.743
3 ← 3	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		7 ← 6	135 114.104
			10 ← 9	135 124.920
			9 ← 8	135 129.337
			8 ← 7	135 138.189
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		8 ← 7	135 138.189
			9 ← 8	135 147.019
			10 ← 9	135 151.478
			11 ← 10	135 153.743
4 ← 4	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		8 ← 7	135 115.803
			9 ← 8	135 127.664
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		9 ← 8	135 154.346
			10 ← 9	135 158.479
5 ← 5	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		8 ← 7	135 115.207
			9 ← 8	135 130.355
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		9 ← 8	135 159.001
			10 ← 9	135 161.960
6 ← 6	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		10 ← 9	135 132.904
			9 ← 8	135 135.264
			8 ← 7	135 140.225
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		8 ← 7	135 154.346
			11 ← 10	135 159.000
			9 ← 8	135 162.416
			10 ← 9	135 168.253
7 ← 7	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		8 ← 7	135 113.595
			9 ← 8	135 139.071
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		9 ← 8	135 169.757
			10 ← 9	135 171.281
8 ← 8	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$		8 ← 7	135 112.713
			9 ← 8	135 145.924
	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		9 ← 8	135 175.062
			10 ← 9	135 177.120
15 ← 14	0 ← 0	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	225 120.912
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	14 ← 13	225 144.340
			17 ← 16	225 156.240
-1 ← -1	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$		14 ← 13	225 120.912
1 ← 1			15 ← 14	225 124.831
2 ← 2	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$		14 ← 13	225 122.257
			15 ← 14	225 125.943
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$		16 ← 15	225 158.601

		15 ← 14	225 155.289
3 ← 3	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	225 123.984
		16 ← 15	225 129.017
		14 ← 13	225 137.850
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	14 ← 13	225 148.979
		15 ← 14	225 153.960
4 ← 4	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	225 127.148
		15 ← 14	225 131.712
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 162.407
		16 ← 15	225 165.275
5 ← 5	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	225 130.781
		15 ← 14	225 136.049
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 167.656
		16 ← 15	225 170.900
6 ← 6	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	16 ← 15	225 142.351
		15 ← 14	225 145.656
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	14 ← 13	225 162.407
		16 ← 15	25 173.259
		17 ← 16	225 174.597
7 ← 7	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	225 140.570
		15 ← 14	225 147.810
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 181.400
		16 ← 15	225 183.579
8 ← 8	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	225 146.701
		15 ← 14	225 155.289
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 189.999
		16 ← 15	225 191.891
9 ← 9	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	225 148.979
		16 ← 15	225 164.714
		14 ← 13	225 182.786
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	14 ← 13	225 179.541
		15 ← 14	225 195.435
		17 ← 16	225 197.555
		16 ← 15	225 199.347
10 ← 10	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 210.101
		16 ← 15	225 212.883
11 ← 11	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	15 ← 14	225 184.490
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 221.578
		16 ← 15	225 223.541
12 ← 12	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	13 ← 12	225 170.969
		16 ← 15	225 196.153
		15 ← 14	225 200.370
		14 ← 13	225 206.794
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	14 ← 13	225 221.578
		17 ← 16	225 229.831
		15 ← 14	225 229.831
		16 ← 15	225 236.130
13 ← 13	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	225 189.999
		15 ← 14	225 211.189
	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	15 ← 14	225 245.999
		16 ← 15	225 250.194
14 ← 14	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	14 ← 13	225 200.370

16 ← 15	0 ← 0	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	14 ← 13	240 110.605
			17 ← 16	240 114.064
			16 ← 15	240 117.560
			15 ← 14	240 110.605
	1 ← 1	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	16 ← 15	240 114.064
			15 ← 14	240 112.066
			16 ← 15	240 115.381
			14 ← 13	240 114.064
	2 ← 2	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	17 ← 16	240 118.647
			15 ← 14	240 117.560
			23 ← 22	329 962.664
			22 ← 21	329 965.100
	3 ← 3	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	21 ← 20	329 967.627
			20 ← 19	329 959.814
			21 ← 20	329 987.896
			23 ← 22	329 992.742
	4 ← 4	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	24 ← 23	329 995.490
			21 ← 20	329 960.516
			22 ← 21	329 962.554
			22 ← 21	329 994.313
22 ← 21	0 ← 0	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	329 994.313
			21 ← 20	329 994.313
			21 ← 20	329 994.313
			21 ← 20	329 962.554
	1 ← 1	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 ← 21	329 964.554
			22 ← 21	329 996.830
			23 ← 22	329 998.622
			20 ← 19	329 966.058
	3 ← 3	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 ← 21	329 971.668
			21 ← 20	329 974.289
			23 ← 22	329 969.058
			22 ← 21	329 997.293
	4 ← 4	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	23 ← 22	329 999.716
			24 ← 23	330 002.252
			21 ← 20	329 971.001
			22 ← 21	329 973.255
	5 ← 5	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 ← 21	330 006.170
			22 ← 21	330 008.011
			21 ← 20	329 977.369
			22 ← 21	329 979.797
	6 ← 6	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 ← 21	330 013.200
			23 ← 22	330 014.740
			20 ← 19	329 984.544
			23 ← 22	329 988.935
	7 ← 7	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 ← 21	329 991.324
			21 ← 20	330 015.338
			22 ← 21	330 018.279
			23 ← 22	330 020.624
	7 ← 7	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	24 ← 23	330 022.681
			22 ← 21	329 997.293
			22 ← 21	30 031.903
			22 ← 21	

		23 ← 22	330 033.296
8 ← 8	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 004.824
		22 ← 21	330 008.011
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	23 ← 22	330 044.906
9 ← 9	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	20 ← 19	330 015.338
		23 ← 22	330 022.004
		22 ← 21	330 024.250
		21 ← 20	330 028.314
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	21 ← 20	330 048.961
		22 ← 21	330 053.138
		23 ← 22	330 055.470
		24 ← 23	330 056.689
10 ← 10	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 030.178
		22 ← 21	330 034.467
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 21	330 071.589
		23 ← 22	330 072.600
11 ← 11	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 044.906
		22 ← 21	330 049.865
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 21	330 087.910
		23 ← 22	330 088.810
12 ← 12	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	20 ← 19	330 058.683
		23 ← 22	330 068.494
		22 ← 21	330 070.659
		21 ← 20	330 076.992
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	21 ← 20	330 095.042
		22 ← 21	330 101.772
		23 ← 22	330 104.304
		24 ← 23	330 104.304
13 ← 13	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 078.888
		22 ← 21	330 085.820
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 21	330 125.113
		23 ← 22	330 125.894
14 ← 14	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	22 ← 21	330 105.101
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 21	330 145.972
		23 ← 22	330 146.764
15 ← 15	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	20 ← 19	330 114.418
		22 ← 21	330 131.130
		21 ← 20	330 141.986
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	21 ← 20	330 152.252
		22 ← 21	330 163.745
		24 ← 23	330 165.751
		23 ← 22	330 167.113
16 ← 16	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 140.342
		22 ← 21	330 149.674
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 21	330 192.148
17 ← 17	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 163.745
	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	22 ← 21	330 217.179
18 ← 18	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	20 ← 19	330 182.719
19 ← 19	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	21 ← 20	330 214.657
		22 ← 21	330 229.929

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_T$ where $\mathbf{I}_T = \mathbf{I}_1 + \mathbf{I}_2 + \mathbf{I}_3$, $I_T = 3/2$ for $K = 3n$ and $I_T = 1/2$ for $K \neq 3n$.

Molecular parameters for ²⁸Si¹⁹F₃

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
<i>B</i>	[MHz] 7 509.082 99(92) ^{a)}	MW	99Tan
<i>D_N</i>	[kHz] 9.966(11)		
<i>D_{NK}</i>	[kHz] – 17.112 1(56)		
<i>D_K</i>	[kHz] 5.5 ^{b)}		
<i>H_N</i>	[Hz] 0.165(36)		
<i>H_{NK}</i>	[Hz] – 0.180 6(70)		
<i>H_{KN}</i>	[Hz] 0.228(12)		
<i>Φ_N</i>	[mHz] – 0.127(35)		
<i>ε_{bb}</i>	[MHz] 36.022 4(69)		
<i>ε_{cc}</i>	[MHz] 4.810(22)		
<i>a_F</i> (¹⁹ F)	[MHz] 386.83(24)		
<i>T_{cc}</i>	[MHz] 115.390(46)		
<i> T_{aa} – T_{bb} </i>	[MHz] 117.7(20)		

^{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 in the least-squares fit.Reference for SiF₃99Tan Tanimoto, M., Saito, S. : J. Chem. Phys. **111** (1999) 9242.**3.2.2.2.2 MgCH₃**Microwave data for ²⁴Mg¹²C¹H₃

Transition			ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level				
8 \leftarrow 7	0 \leftarrow 0	7 $\frac{1}{2} \leftarrow$ 6 $\frac{1}{2}$	176 057.910	95And
		8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	176 105.925	
		7 $\frac{1}{2} \leftarrow$ 6 $\frac{1}{2}$	176 049.174	
		8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	176 097.680	
	3 \leftarrow 3	7 $\frac{1}{2} \leftarrow$ 6 $\frac{1}{2}$	175 977.587	
		8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	176 031.979	
		8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	198 054.852	
		9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$	198 102.570	
9 \leftarrow 8	0 \leftarrow 0	8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	198 044.839	
		9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$	198 093.293	
		8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	198 015.083	
		9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$	198 065.274	
	2 \leftarrow 2	8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	198 015.083	
		9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$	198 065.274	
		8 $\frac{1}{2} \leftarrow$ 7 $\frac{1}{2}$	197 965.515	
		9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$	198 018.532	
10 \leftarrow 9	0 \leftarrow 0	9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$	220 046.787	
		10 $\frac{1}{2} \leftarrow$ 9 $\frac{1}{2}$	220 094.521	
		9 $\frac{1}{2} \leftarrow$ 8 $\frac{1}{2}$		
		10 $\frac{1}{2} \leftarrow$ 9 $\frac{1}{2}$		

11 \leftarrow 10	1 \leftarrow 1	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	220 035.861
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	20 084.067
	2 \leftarrow 2	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	220 002.975
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	220 052.717
	3 \leftarrow 3	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	219 948.434
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	220 000.516
	0 \leftarrow 0	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	242 033.375
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	242 081.100
	1 \leftarrow 1	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	242 021.442
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	242 069.622
12 \leftarrow 11	2 \leftarrow 2	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	241 985.636
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	242 034.995
	3 \leftarrow 3	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	241 925.986
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	241 977.252
	0 \leftarrow 0	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	264 014.139
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	264 061.904
	1 \leftarrow 1	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	264 001.216
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	264 049.339
	2 \leftarrow 2	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	263 962.308
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	264 011.449
13 \leftarrow 12	3 \leftarrow 3	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	263 897.575
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	263 948.305
	6 \leftarrow 6	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	263 549.293
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	263 608.908
	0 \leftarrow 0	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	286 988.561
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	286 036.286
	1 \leftarrow 1	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	285 974.577
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	286 022.612
	2 \leftarrow 2	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	285 932.552
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	285 981.481
14 \leftarrow 13	3 \leftarrow 3	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	285 862.739
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	285 912.969
	6 \leftarrow 6	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	285 486.871
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	285 544.657
	0 \leftarrow 0	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	307 955.979
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	308 003.763
	1 \leftarrow 1	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	307 940.967
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	307 988.958
	2 \leftarrow 2	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	307 895.924
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	307 944.755
15 \leftarrow 14	3 \leftarrow 3	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	307 821.020
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	307 870.833
	6 \leftarrow 6	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	307 417.569
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	307 473.707
	0 \leftarrow 0	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	329 916.150
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	329 963.700

	1 \leftarrow 1	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	329 900.237
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	329 948.006
	2 \leftarrow 2	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	329 851.877
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	329 900.237
	3 \leftarrow 3	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	329 771.844
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	329 821.332
	6 \leftarrow 6	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	329 340.502
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	329 395.699
	16 \leftarrow 15	0 \leftarrow 0	351 868.284
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	351 915.945
	1 \leftarrow 1	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	351 851.149
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	351 899.004
	2 \leftarrow 2	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	351 799.967
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	351 848.382
	3 \leftarrow 3	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	351 714.629
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	351 763.901
	6 \leftarrow 6	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	351 255.581
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	351 309.819
	17 \leftarrow 16	0 \leftarrow 0	373 811.845
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	373 859.504
	1 \leftarrow 1	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	373 793.747
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	373 841.499
	2 \leftarrow 2	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	373 739.382
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	373 787.731
	3 \leftarrow 3	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	373 648.900
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	373 698.039
	6 \leftarrow 6	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	373 162.155
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	373 215.569

^a) Proton hyperfine splittings not resolved.

Molecular parameters for ²⁴Mg¹²C¹H₃

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
B	[MHz]	11 007.957 4(30) ^{a)}	MW
D_N	[kHz]	22.129 0(38)	95And
D_{NK}	[kHz]	535.04(38)	
H_{NK}	[Hz]	7.91 (58)	
H_{KN}	[Hz]	60.9(82)	
$(\epsilon_{bb} + \epsilon_{cc})/2$	[MHz]	47.732(47)	
D_{NK}^s	[kHz]	- 11.7(61)	

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

Reference for MgCH₃95And Anderson, M.A., Ziurys, L.M. : Astrophys. J. **452** (1995) L157.**3.2.2.2.3 CaCH₃**Microwave data for ⁴⁰Ca¹²C¹H₃

Transition				ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$	hyperfine $F' - F''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level					
$3 \leftarrow 2$	$0 \leftarrow 0$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$1 \leftarrow 0$	45 369.479(15) ^{b)}	99Nam
			$2 \leftarrow 1$	45 369.479(15) ^{c)}	
			$3 \leftarrow 2$	45 369.408(15)	
			$4 \leftarrow 3$	45 369.036(15)	
$0 \leftarrow 0$	$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	$3 \leftarrow 2$	45 424.258(15) ^{c)}		
		$4 \leftarrow 3$	45 424.258(15) ^{c)}		
		$2 \leftarrow 1$	45 424.398(15)		
		$5 \leftarrow 4$	45 424.398(15)		
$1 \leftarrow 1$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$2 \leftarrow 1$	45 361.311(15) ^{c)}		
		$3 \leftarrow 2$	45 361.311(15) ^{c)}		
		$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	45 422.909(15) ^{c)}		
		$4 \leftarrow 3$	45 422.909(15) ^{c)}		
$5 \leftarrow 4$	$0 \leftarrow 0$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	75 630.118(15) ^{c)}	
			$5 \leftarrow 4$	75 630.118(15) ^{c)}	
			$3 \leftarrow 2$	75 630.039(15) ^{c)}	
			$6 \leftarrow 5$	75 630.039(15) ^{c)}	
			$3 \leftarrow 3$	75 628.888(15)	
			$4 \leftarrow 4$	75 628.565(15)	
			$5 \leftarrow 5$	75 628.174(15)	
		$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$4 \leftarrow 3$	75 685.494(15) ^{c)}	
			$5 \leftarrow 4$	75 685.494(15) ^{c)}	
			$6 \leftarrow 5$	75 685.494(15) ^{c)}	
			$7 \leftarrow 6$	75 685.494(15) ^{c)}	
			$4 \leftarrow 4$	75 686.726(15)	
			$5 \leftarrow 5$	75 686.992(15)	
			$6 \leftarrow 6$	75 687.322(15)	

$1 \leftarrow 1$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$4 \leftarrow 3$	75 622.804(15) ^γ
		$5 \leftarrow 4$	75 622.804(15) ^γ
	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	$5 \leftarrow 4$	75 680.393(15) ^γ
		$6 \leftarrow 5$	75 680.393(15) ^γ

^a) Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_T$ where $\mathbf{I}_T = \mathbf{I}_1 + \mathbf{I}_2 + \mathbf{I}_3$, $I_T = 3/2$ for $K = 3n$ and $I_T = 1/2$ for $K \neq 3n$.

^b) Authors' estimate of experimental uncertainty in units of the last quoted decimal place.

^γ) Unresolved hyperfine components.

Microwave data for ⁴⁰Ca¹²C¹H₃ (cont)

Transition			ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level				
$9 \leftarrow 8$	$0 \leftarrow 0$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	136 134.771	96And
		$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	136 190.263	
	$1 \leftarrow 1$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	136 123.776	
		$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	136 179.868	
	$3 \leftarrow 3$	$8\frac{1}{2} \leftarrow 7\frac{1}{2}$	136 035.223	
$9\frac{1}{2} \leftarrow 8\frac{1}{2}$		136 096.261		
$10 \leftarrow 9$	$0 \leftarrow 0$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	151 255.895	
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	151 311.441	
	$1 \leftarrow 1$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	151 243.696	
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	151 299.737	
	$2 \leftarrow 2$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	151 207.182	
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	151 264.677	
	$3 \leftarrow 3$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	151 146.345	
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	151 206.355	
	$4 \leftarrow 4$	$9\frac{1}{2} \leftarrow 8\frac{1}{2}$	151 061.394	
		$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	151 124.886	
$11 \leftarrow 10$	$0 \leftarrow 0$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	166 374.430	
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	166 429.967	
	$1 \leftarrow 1$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	166 361.058	
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	166 417.121	
	$2 \leftarrow 2$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	166 321.199	
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	166 378.387	
	$3 \leftarrow 3$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	166 254.726	
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	166 314.066	
	$4 \leftarrow 4$	$10\frac{1}{2} \leftarrow 9\frac{1}{2}$	166 161 895	
		$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	166 223.973	
$12 \leftarrow 11$	$0 \leftarrow 0$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	181 490.198	
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	181 545.732	
	$1 \leftarrow 1$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	181 475.706	
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	181 531.633	
	$2 \leftarrow 2$	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	181 432.377	
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	181 489.273	

13 \leftarrow 12	3 \leftarrow 3	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	181 360.246
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	181 418.863
	4 \leftarrow 4	$11\frac{1}{2} \leftarrow 10\frac{1}{2}$	181 259.443
		$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	181 320.503
	0 \leftarrow 0	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	196 602.876
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	196 658.390
	1 \leftarrow 1	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	196 587.270
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	196 643.105
	2 \leftarrow 2	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	196 540.470
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	196 597.197
14 \leftarrow 13	3 \leftarrow 3	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	196 462.654
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	196 520.796
	4 \leftarrow 4	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	196 353.816
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	196 414.093
	0 \leftarrow 0	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	211 712.242
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	211 767.751
	1 \leftarrow 1	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	211 695.498
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	211 751.257
	2 \leftarrow 2	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	211 645.220
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	211 701.834
15 \leftarrow 14	3 \leftarrow 3	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	211 561.691
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	211 619.482
	4 \leftarrow 4	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	211 444 896
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	211 504.492
	0 \leftarrow 0	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	226 817.913
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	226 873.542
	1 \leftarrow 1	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	226 800.091
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	226 855.896
	2 \leftarrow 2	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	226 746.399
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	226 802.830
16 \leftarrow 15	3 \leftarrow 3	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	226 657.142
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	226 714.670
	4 \leftarrow 4	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	226 532.408
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	226 591.454
	0 \leftarrow 0	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	241 919.970
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	241 975.537
	1 \leftarrow 1	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	241 900.984
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	241 956.640
	2 \leftarrow 2	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	241 843.807
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	241 900.102
17 \leftarrow 16	3 \leftarrow 3	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	241 748.825
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	241 806.098
	4 \leftarrow 4	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	241 616.144
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	241 674.694
	0 \leftarrow 0	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	257 017.864
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	257 073.408

	1 \leftarrow 1	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 997.672
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	257 053.380
	2 \leftarrow 2	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 937.152
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	256 993.359
	3 \leftarrow 3	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 836.427
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	256 893.474
	4 \leftarrow 4	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 695.922
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	256 753.945
	5 \leftarrow 5	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 515.308
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	256 575.011
	6 \leftarrow 6	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 295.624
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	256 357.220
18 \leftarrow 17	7 \leftarrow 7	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	256 037.004
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	256 100.960
	8 \leftarrow 8	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	255 740.330
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	255 806.615
	0 \leftarrow 0	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	272 111.423
		$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	272 167.003
	1 \leftarrow 1	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	272 090.073
		$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	272 145 758
	2 \leftarrow 2	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	272 026.150
		$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	272 082.215
	3 \leftarrow 3	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	271 919.729
		$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	271 976.603
19 \leftarrow 18	4 \leftarrow 4	$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	271 771.090
		$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	271 829.024
	0 \leftarrow 0	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	287 200.368
		$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	287 255.895
	1 \leftarrow 1	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	287 177.891
		$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	287 233.567
	2 \leftarrow 2	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	287 110.527
		$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	287 166.624
	3 \leftarrow 3	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	286 998.445
		$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	287 055.270
	4 \leftarrow 4	$18\frac{1}{2} \leftarrow 17\frac{1}{2}$	286 841.800
		$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	286 899.571
20 \leftarrow 19	0 \leftarrow 0	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	302 284.453
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	302 339.986
	1 \leftarrow 1	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	302 260.915
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	302 316.566
	2 \leftarrow 2	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	302 190.129
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	302 246.160
	3 \leftarrow 3	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	302 072.457
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	302 129.004
	4 \leftarrow 4	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	301 907.834
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	301 965.367

21 \leftarrow 20	0 \leftarrow 0	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	317 363.515
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	317 419.105
	1 \leftarrow 1	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	317 338.719
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	317 394.394
	2 \leftarrow 2	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	317 264.647
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	317 320.595
	3 \leftarrow 3	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	317 141.173
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	317 197.760
	4 \leftarrow 4	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	316 968.762
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	317 026.112
22 \leftarrow 21	0 \leftarrow 0	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	332 437.195
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	332 492.692
	1 \leftarrow 1	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	332 411.257
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	332 466.914
	2 \leftarrow 2	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	332 333.884
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	332 389.757
	3 \leftarrow 3	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	332 204.787
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	332 261.277
	4 \leftarrow 4	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	332 024.681
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	332 081.671
23 \leftarrow 22	0 \leftarrow 0	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	347 505.237
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	347 560.689
	1 \leftarrow 1	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	347 478.222
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	347 533.849
	2 \leftarrow 2	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	347 397.342
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	347 453.263
	3 \leftarrow 3	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	347 262.808
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	347 319.142
	4 \leftarrow 4	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	347 074.876
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	347 131.843
24 \leftarrow 23	0 \leftarrow 0	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	362 567.375
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	362 622.898
	1 \leftarrow 1	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	362 539.341
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	362 594.970
	2 \leftarrow 2	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	362 455.089
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	362 511.011
	3 \leftarrow 3	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	362 315.044
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	362 371.294
	4 \leftarrow 4	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	362 119.237
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	362 176.137
25 \leftarrow 24	0 \leftarrow 0	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	377 623.547
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	377 678.931
	1 \leftarrow 1	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	377 594.247
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	377 649.917
	2 \leftarrow 2	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	377 506.867
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	377 562.234

$3 \leftarrow 3$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	377 361.197
	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	377 417.357
$4 \leftarrow 4$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	377 157.650
	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	377 214.433

^{a)} Proton hyperfine splittings not resolved.

Molecular parameters for ⁴⁰Ca¹²C¹H₃

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
A	[GHz]	163.336 2 ^{a)}	OPT
B	[MHz]	7 566.308 37(12) ^{b)}	MW, MODR
D_N	[kHz]	10.627 46(18)	89Br
D_{NK}	[kHz]	598.273(29)	96And, 99Nam
D_K	[MHz]	2.10 ^{a)}	
H_{NK}	[Hz]	12.153 (32)	
H_{KN}	[kHz]	0.105 20(39)	
\mathcal{E}_{aa}	[MHz]	6.702(49)	
$(\mathcal{E}_{bb} + \mathcal{E}_{cc})/2$	[MHz]	55.573 0(27)	
D_N^s	[Hz]	− 30.5(66)	
D_{NK}^s	[kHz]	0.71(62)	
$a_F(^1H)$	[MHz]	− 1.965(11)	
T_{aa}	[MHz]	2.180(18)	
μ	[D]	2.62(3)	OPT Stark
			96Mar

^{a)} Parameter constrained to this value in the least-squares fit.

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

References for CaCH₃

89Bra	Brazier, C.R., Bernath, P.F. : J. Chem. Phys. 91 (1989) 4548.
96And	Anderson, M.A., Ziurys, L.M. : Astrophys. J. 460 (1996) L77.
96Mar	Marr, A.J., Grieman, F.J., Steimle, T.C. : J. Chem. Phys. 105 (1996) 3930.
99Nam	Namiki, K.C., Steimle, T.C. : J. Chem. Phys. 110 (1999) 11309.

3.2.2.2.4 SrCH₃

Microwave data for ⁸⁶Sr¹²C¹H₃

Transition			ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level				
14 \leftarrow 13	0 \leftarrow 0	13 $\frac{1}{2} \leftarrow$ 12 $\frac{1}{2}$	162 574.916	96And
		14 $\frac{1}{2} \leftarrow$ 13 $\frac{1}{2}$	162 698.516	
	1 \leftarrow 1	13 $\frac{1}{2} \leftarrow$ 12 $\frac{1}{2}$	162 561.150	
		14 $\frac{1}{2} \leftarrow$ 13 $\frac{1}{2}$	162 685.311	
	2 \leftarrow 2	13 $\frac{1}{2} \leftarrow$ 12 $\frac{1}{2}$	162 519.846	
		14 $\frac{1}{2} \leftarrow$ 13 $\frac{1}{2}$	162 645.765	

	$3 \leftarrow 3$	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	162 451.455
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	162 579.869
$15 \leftarrow 14$	$0 \leftarrow 0$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	174 180.532
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	174 304.253
	$1 \leftarrow 1$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	174 165.937
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	174 290.008
	$2 \leftarrow 2$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	174 122.085
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	174 247.539
	$3 \leftarrow 3$	$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	174 049.075
		$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	174 176.759
$16 \leftarrow 15$	$0 \leftarrow 0$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	185 783.873
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	185 907.553
	$1 \leftarrow 1$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	185 768.343
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	185 892.457
	$2 \leftarrow 2$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	185 721.728
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	185 847.017
	$3 \leftarrow 3$	$15\frac{1}{2} \leftarrow 14\frac{1}{2}$	185 644.205
		$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	185 771.399
$17 \leftarrow 16$	$0 \leftarrow 0$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	197 384.600
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	197 508.424
	$1 \leftarrow 1$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	197 368.284
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	197 492.270
	$2 \leftarrow 2$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	197 318.967
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	197 444.006
	$3 \leftarrow 3$	$16\frac{1}{2} \leftarrow 15\frac{1}{2}$	197 236.915
		$17\frac{1}{2} \leftarrow 16\frac{1}{2}$	197 363.800
$20 \leftarrow 19$	$0 \leftarrow 0$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	232 171.043
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	232 294.669
	$1 \leftarrow 1$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	232 151.886
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	232 275.810
	$2 \leftarrow 2$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	232 094.404
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	232 219.087
	$3 \leftarrow 3$	$19\frac{1}{2} \leftarrow 18\frac{1}{2}$	231 998.614
		$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	232 124.554
$21 \leftarrow 20$	$0 \leftarrow 0$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	243 760.546
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	243 884.295
	$1 \leftarrow 1$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	243 740.423
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	243 864.579
	$2 \leftarrow 2$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	243 680.153
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	243 804.785
	$3 \leftarrow 3$	$20\frac{1}{2} \leftarrow 19\frac{1}{2}$	243 579.890
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	243 705.636
$22 \leftarrow 21$	$0 \leftarrow 0$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	255 346.715
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	255 470.509
	$1 \leftarrow 1$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	255 325.692
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	255 449.660

	$2 \leftarrow 2$	$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	255 262.713
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	255 387.242
		$21\frac{1}{2} \leftarrow 20\frac{1}{2}$	255 157.933
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	255 283.502
$23 \leftarrow 22$	$0 \leftarrow 0$	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	266 929.508
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	267 053.251
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	266 907.614
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	267 031.513
	$2 \leftarrow 2$	$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	266 841.947
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	266 966.441
		$22\frac{1}{2} \leftarrow 21\frac{1}{2}$	266 732.577
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	266 858.000
$24 \leftarrow 23$	$0 \leftarrow 0$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	278 508.718
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	278 632.568
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	278 485.974
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	278 609.869
	$2 \leftarrow 2$	$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	278 417.572
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	278 54.973
		$23\frac{1}{2} \leftarrow 22\frac{1}{2}$	278 303.763
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	278 429.043
$25 \leftarrow 24$	$0 \leftarrow 0$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	290 084.298
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	290 208.082
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	290 060.608
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	290 184.657
	$2 \leftarrow 2$	$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	289 989.531
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	290 113.925
		$24\frac{1}{2} \leftarrow 23\frac{1}{2}$	289 871.244
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	289 996.409
$26 \leftarrow 25$	$0 \leftarrow 0$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	301 656.052
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	301 779.741
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	301 631.350
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	301 755.310
	$2 \leftarrow 2$	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	301 557.608
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	301 681.979
		$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	301 434.956
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	301 559.946
$27 \leftarrow 26$	$0 \leftarrow 0$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	313 223.659
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	313 347.400
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	313 198.122
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	313 322.093
	$2 \leftarrow 2$	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	313 121.748
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	313 246.073
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	312 994.576
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	313 119.551
$28 \leftarrow 27$	$0 \leftarrow 0$	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	324 787.082
		$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	324 911.012

	1 ← 1	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	324 760.727
		$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	324 884.654
	2 ← 2	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	324 681.687
		$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	324 805.960
29 ← 28	3 ← 3	$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	324 550.137
		$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	324 675.016
	0 ← 0	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	336 346.270
		$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	336 470.102
30 ← 29	1 ← 1	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	336 319.044
		$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	336 442.949
	2 ← 2	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	336 237.328
		$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	336 361.607
	3 ← 3	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	336 101.378
		$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	336 226.216
	0 ← 0	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	347 900.874
		$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	348 024.763
	1 ← 1	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	347 872.824
		$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	347 996.771
	2 ← 2	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	347 788.547
		$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	347 912.715
31 ← 30	3 ← 3	$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	347 648.267
		$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	347 773.001
	0 ← 0	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	359 451.046
		$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	359 574.813
	1 ← 1	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	359 421.920
		$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	359 546.003
	2 ← 2	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	359 335.213
		$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	359 459.155
	3 ← 3	$30\frac{1}{2} \leftarrow 29\frac{1}{2}$	359 190.541
		$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	359 315.069
32 ← 31	0 ← 0	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	370 996.223
		$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	371 120.133
	1 ← 1	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	370 966.297
		$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	371 090.271
	2 ← 2	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	370 876.934
		$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	371 001.132
	3 ← 3	$31\frac{1}{2} \leftarrow 30\frac{1}{2}$	370 727.996
		$32\frac{1}{2} \leftarrow 31\frac{1}{2}$	370 852.658

^a) Proton hyperfine splittings not resolved.

Molecular parameters for ⁸⁶Sr¹²C¹H₃

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
<i>B</i>	[MHz] 5 810.976 7(15) ^{a)}	MW	96And
<i>D_N</i>	[kHz] 6.442 2(11)		
<i>D_{NK}</i>	[kHz] 483.23(32)		
<i>D_K</i>	[MHz] 2.00 ^{b)}		
<i>H_{NK}</i>	[Hz] 8.68 (22)		
<i>H_{KN}</i>	[Hz] 58.0 ^{b)}		
(<i>ε_{bb}</i> + <i>ε_{cc}</i>)/2	[MHz] 123.482(92)		
<i>D_{NK}^s</i>	[MHz] – 0.119(20)		
<i>D_N^s</i>	[kHz] 0.333(89)		

^{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 in the least-squares fit.

Reference for SrCH₃
 96And Anderson, M.A., Robinson, J.S., Ziurys, L.M. : Chem. Phys. Letts. **257** (1996) 471.

3.2.2.2.5 BaCH₃

Microwave data for ¹³⁶Ba¹²C¹H₃

Transition			ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level				
46 \leftarrow 45	0 \leftarrow 0	45 $\frac{1}{2} \leftarrow$ 44 $\frac{1}{2}$	478 042.890	98Xin
		46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	478 169.939	
	1 \leftarrow 1	45 $\frac{1}{2} \leftarrow$ 44 $\frac{1}{2}$	477 992.088	
		46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	478 119.165	
	2 \leftarrow 2	45 $\frac{1}{2} \leftarrow$ 44 $\frac{1}{2}$	477 839.857	
		46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	477 966.974	
47 \leftarrow 46	3 \leftarrow 3	45 $\frac{1}{2} \leftarrow$ 44 $\frac{1}{2}$	477 586.462	
		46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	477 713.694	
	0 \leftarrow 0	46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	488 346.933	
		47 $\frac{1}{2} \leftarrow$ 46 $\frac{1}{2}$	488 474.084	
	1 \leftarrow 1	46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	488 295.209	
		47 $\frac{1}{2} \leftarrow$ 46 $\frac{1}{2}$	488 422.386	
48 \leftarrow 47	2 \leftarrow 2	46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	488 140.212	
		47 $\frac{1}{2} \leftarrow$ 46 $\frac{1}{2}$	488 267.543	
	3 \leftarrow 3	46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	487 882.302	
		47 $\frac{1}{2} \leftarrow$ 46 $\frac{1}{2}$	488 009.692	
	0 \leftarrow 0	47 $\frac{1}{2} \leftarrow$ 46 $\frac{1}{2}$	498 645.221	
		48 $\frac{1}{2} \leftarrow$ 47 $\frac{1}{2}$	498 772.457	
1 \leftarrow 1	47 $\frac{1}{2} \leftarrow$ 46 $\frac{1}{2}$	498 592.650		
	48 $\frac{1}{2} \leftarrow$ 47 $\frac{1}{2}$	498 719.844		

49 ← 48	2 ← 2	47 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	498 434.849
		48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	498 562.236
	3 ← 3	47 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	498 172.470
		48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	498 299.914
	0 ← 0	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	508 937.524
		49 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	509 064.929
	1 ← 1	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	508 884.001
		49 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	509 011.474
	2 ← 2	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	508 723.679
		49 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	508 851.165
	3 ← 3	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	508 456.836
		49 $\frac{1}{2}$ ← 48 $\frac{1}{2}$	508 584.423

^{a)} Proton hyperfine splittings not resolved.

Molecular parameters for ¹³⁶Ba¹²C¹H₃

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
B [MHz]	5 218.480 5(48) ^{a)}	MW	98Xin
D_N [kHz]	5.120 8(11)		
D_{NK} [kHz]	598.14(99)		
H_{NK} [Hz]	10.89 (22)		
H_{KN} [kHz]	0.107(25)		
$(\epsilon_{bb} + \epsilon_{cc})/2$ [MHz]	124.27(63)		
ϵ_{aa} [MHz]	32.0 ^{b)}		
D_{NK}^s [MHz]	−0.017(11)		
D_N^s [kHz]	0.434(95)		

^{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 in the least-squares fit.

Microwave data for ¹³⁷Ba¹²C¹H₃

Transition				ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$	hyperfine $F' - F''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level					
46 \leftarrow 45	0 \leftarrow 0	45 $\frac{1}{2} \leftarrow$ 44 $\frac{1}{2}$	44 \leftarrow 43	477 703.787	98Xin
			47 \leftarrow 46	477 709.007	
			46 \leftarrow 45	477 713.7 ^{b)}	
			45 \leftarrow 44	477 719.8 ^{b)}	
			45 \leftarrow 44	477 814.834	
	0 \leftarrow 0	46 $\frac{1}{2} \leftarrow$ 45 $\frac{1}{2}$	46 \leftarrow 45	477 819.836	
			47 \leftarrow 46	477 825.351	
			48 \leftarrow 47	477 830.686	
			44 \leftarrow 43	477 653.073	
			47 \leftarrow 46	477 658.377	
	1 \leftarrow 1	45 $\frac{1}{2} \leftarrow$ 44 $\frac{1}{2}$	46 \leftarrow 45	477 663.779	
			45 \leftarrow 44	477 668.793	

47 ← 46	1 ← 1	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	477 764.201
			46 ← 45	477 769.178
			47 ← 46	477 774.590
			48 ← 47	477 779.935
	2 ← 2	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	44 ← 43	477 500.973
			47 ← 46	477 506.289
			46 ← 45	477 511.901
			45 ← 44	477 516.798
	2 ← 2	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	477 612.1 ^{b)}
			46 ← 45	477 617.124
			47 ← 46	477 622.666
			48 ← 47	477 628.147
	3 ← 3	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	44 ← 43	477 247.980
			47 ← 46	477 253.302
			46 ← 45	477 258.829
			45 ← 44	477 263.820
	3 ← 3	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	477 360.0 ^{b)}
			46 ← 45	477 364.0 ^{b)}
			47 ← 46	477 370.050
			48 ← 47	477 375.1 ^{b)}
	0 ← 0	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	488 000.523
			48 ← 47	488 005.681
			47 ← 46	488 009.7 ^{b)}
			46 ← 45	488 015.560
48 ← 47	0 ← 0	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	46 ← 45	488 112.354
			47 ← 46	488 116.924
			48 ← 47	488 122.406
			49 ← 48	488 127.565
	1 ← 1	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	487 948.899
			48 ← 47	487 954.042
			47 ← 46	487 959.530
			46 ← 45	487 963.944
	1 ← 1	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	46 ← 45	488 060.741
			47 ← 46	488 065.394
			48 ← 47	488 070.711
			49 ← 48	488 075.957
	2 ← 2	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	487 794.086
			48 ← 47	487 799.345
			47 ← 46	487 804.655
			46 ← 45	487 809.232
	2 ← 2	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	46 ← 45	487 906.064
			47 ← 46	487 910.572
			48 ← 47	487 916.035
			49 ← 48	487 921.240
	3 ← 3	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	45 ← 44	487 536.526
			48 ← 47	487 541.711
			47 ← 46	487 547.051
			46 ← 45	487 551.746
	3 ← 3	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	46 ← 45	487 649.6 ^{b)}
			47 ← 46	487 653.1 ^{b)}
			48 ← 47	487 658.720
			49 ← 48	487 663.793
	0 ← 0	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	46 ← 45	498 291.514

		49 ← 48	498 295.6 ^{b)}
		48 ← 47	498 301.689
		47 ← 46	498 305.971
0 ← 0	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	47 ← 46	498 404.159
		48 ← 47	498 408.473
		49 ← 48	498 413.679
		50 ← 49	498 418.713
1 ← 1	47 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	46 ← 45	498 238.942
		49 ← 48	498 243.950
		48 ← 47	498 249.125
		47 ← 46	498 253.473
1 ← 1	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	47 ← 46	498 351.633
		48 ← 47	498 355.890
		49 ← 48	498 361.131
		50 ← 49	498 366.201
2 ← 2	47 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	46 ← 45	498 081.528
		49 ← 48	498 086.546
		48 ← 47	498 091.660
		47 ← 46	498 095.987
2 ← 2	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	47 ← 46	498 194.130
		48 ← 47	498 198.511
		49 ← 48	498 203.724
		50 ← 49	498 208.741
3 ← 3	47 $\frac{1}{2}$ ← 46 $\frac{1}{2}$	46 ← 45	497 819.458
		49 ← 48	497 824.554
		48 ← 47	497 829.666
		47 ← 46	497 834.0 ^{b)}
3 ← 3	48 $\frac{1}{2}$ ← 47 $\frac{1}{2}$	47 ← 46	497 932.097
		48 ← 47	497 936.495
		49 ← 48	497 941.643
		50 ← 49	497 946.849

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}$. $I = 3/2$ for ^{137}Ba .

^{b)} Line blended with other lines.

Molecular parameters for $^{137}\text{Ba } ^{12}\text{C}^1\text{H}_3$

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
B	[MHz] 5 214.764(12) ^{a)}	MW	98Xin
D_N	[kHz] 5.114 1(27)		
D_{NK}	[kHz] 595.9 (27)		
D_K	[kHz] 0.0 ^{b)}		
H_{NK}	[Hz] 10.54(61)		
H_{KN}	[kHz] 0.110(36)		
\mathcal{E}_{bb}	[MHz] 124.16(11)		
\mathcal{E}_{aa}	[MHz] 32.0 ^{b)}		
D_{NK}^s	[MHz] − 0.007(16)		
D_N^s	[kHz] 0.427(17)		
$a_F(^{137}\text{Ba})$	[MHz] 1 998.9(85)		
$eQq_0(^{137}\text{Ba})$	[MHz] 157.2(19)		

^{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 in the least-squares fit.

Microwave data for ¹³⁸Ba ¹²C¹H₃

Transition			ν [MHz]	Ref.	
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$ ^{a)}			
State: electronic \tilde{X}^2A_1 ; vibrational zero point level					
13 \leftarrow 12	0 \leftarrow 0	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	135 382.563	98Xin	
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	135 506.749		
	1 \leftarrow 1	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	135 366.753		
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	135 491.516		
	2 \leftarrow 2	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	135 319.511		
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	135 445.842		
	3 \leftarrow 3	$12\frac{1}{2} \leftarrow 11\frac{1}{2}$	135 240.898		
		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	135 369.825		
	14 \leftarrow 13	0 \leftarrow 0	$13\frac{1}{2} \leftarrow 12\frac{1}{2}$		145 793.562
			$14\frac{1}{2} \leftarrow 13\frac{1}{2}$		145 917.862
1 \leftarrow 1		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	145 776.620		
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	145 901.463		
2 \leftarrow 2		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	145 726.028		
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	145 852.069		
3 \leftarrow 3		$13\frac{1}{2} \leftarrow 12\frac{1}{2}$	145 641.725		
		$14\frac{1}{2} \leftarrow 13\frac{1}{2}$	145 770.037		
26 \leftarrow 25		0 \leftarrow 0	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	270 556.833	
			$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	270 681.827	
	1 \leftarrow 1	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	270 526.473		
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	270 651.548		
	2 \leftarrow 2	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	270 435.387		
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	270 560.779		
	3 \leftarrow 3	$25\frac{1}{2} \leftarrow 24\frac{1}{2}$	270 283.765		
		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	270 409.726		
	27 \leftarrow 26	0 \leftarrow 0	$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	280 935.961	
			$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	281 061.031	
1 \leftarrow 1		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	280 904.520		
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	281 029.662		
2 \leftarrow 2		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	280 810.168		
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	280 935.572		
3 \leftarrow 3		$26\frac{1}{2} \leftarrow 25\frac{1}{2}$	280 652.957		
		$27\frac{1}{2} \leftarrow 26\frac{1}{2}$	280 778.987		
35 \leftarrow 34		0 \leftarrow 0	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	363 839.282	
			$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	363 964.994	
	1 \leftarrow 1	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	363 799.311		
		$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	363 925.039		
	2 \leftarrow 2	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	363 679.487		
		$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	363 805.389		
	3 \leftarrow 3	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	363 480.110		

		$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	363 606.279
	4 \leftarrow 4	$34\frac{1}{2} \leftarrow 33\frac{1}{2}$	363 201.571
		$35\frac{1}{2} \leftarrow 34\frac{1}{2}$	363 328.129
	5 \leftarrow 5	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	362 844.574
		$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	362 971.553
	6 \leftarrow 6	$28\frac{1}{2} \leftarrow 27\frac{1}{2}$	362 409.712
		$29\frac{1}{2} \leftarrow 28\frac{1}{2}$	362 537.355
46 \leftarrow 45	0 \leftarrow 0	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	477 370.060
		$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	477 496.921
	1 \leftarrow 1	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	477 319.391
		$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	477 446.279
	2 \leftarrow 2	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	477 167.531
		$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	477 294.471
	3 \leftarrow 3	$45\frac{1}{2} \leftarrow 44\frac{1}{2}$	476 914.803
		$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	477 041.870
47 \leftarrow 46	0 \leftarrow 0	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	487 659.696
		$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	487 786.666
	1 \leftarrow 1	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	487 608.126
		$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	487 735.118
	2 \leftarrow 2	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	487 453.538
		$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	487 580.585
	3 \leftarrow 3	$46\frac{1}{2} \leftarrow 45\frac{1}{2}$	487 196.274
		$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	487 323.439
48 \leftarrow 47	0 \leftarrow 0	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	497 943.561
		$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	498 070.679
	1 \leftarrow 1	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	497 891.100
		$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	498 018.229
	2 \leftarrow 2	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	497 733.819
		$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	497 861.010
	3 \leftarrow 3	$47\frac{1}{2} \leftarrow 46\frac{1}{2}$	497 472.093
		$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	497 599.366
49 \leftarrow 48	0 \leftarrow 0	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	508 221.578
		$49\frac{1}{2} \leftarrow 48\frac{1}{2}$	508 348.805
	1 \leftarrow 1	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	508 168.220
		$49\frac{1}{2} \leftarrow 48\frac{1}{2}$	508 295.469
	2 \leftarrow 2	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	508 008.285
		$49\frac{1}{2} \leftarrow 48\frac{1}{2}$	508 135.594
	3 \leftarrow 3	$48\frac{1}{2} \leftarrow 47\frac{1}{2}$	507 742.170
		$49\frac{1}{2} \leftarrow 48\frac{1}{2}$	507 869.530

^a) Proton hyperfine splittings not resolved.

Molecular parameters for $^{138}\text{Ba}^{12}\text{C}^1\text{H}_3$

Parameter	Value	Method	Ref.
State: electronic \tilde{X}^2A_1 ; vibrational zero point level			
B	[MHz] 5 211.140 40(86) ^{a)}	MW	98Xin
D_N	[kHz] 5.122 19(70)		
D_{NK}	[kHz] 599.60(16)		
H_N	[Hz] 0.002 32(16)		
H_{NK}	[Hz] 12.18(13)		
H_{KN}	[kHz] 0.103 9(19)		
I_{NNK}	[mHz] 0.192(29)		
$(\varepsilon_{bb} + \varepsilon_{cc})/2$	[MHz] 124.026(35)		
ε_{aa}	[MHz] 33.0 (23)		
D_{NK}^s	[MHz] -0.019 2(35)		
D_N^s	[kHz] 0.444 8(81)		

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

Reference for BaCH_3 98Xin Xin, J., Robinson, J.S., Apponi, A.J., Ziurys, L.M. : J. Chem. Phys. **108** (1998) 2703.**3.2.2.2.6 CaOCH_3** Microwave data for $^{40}\text{Ca}^{16}\text{O}^{12}\text{C}^1\text{H}_3$

Transition				ν [MHz]	Ref.
rotational $N' - N''$	rotational $K' - K''$	fine structure $J' - J''$	hyperfine $F' - F''$ ^{a)}		
State: electronic \tilde{X}^2A_1 ; vibrational zero point level					
$3 \leftarrow 2$	$0 \leftarrow 0$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$2 \leftarrow 1$	20 901.076(15) ^{b)}	98Nam
			$4 \leftarrow 3$	20 900.904(15)	
			$1 \leftarrow 1$	20 900.729(15)	
			$2 \leftarrow 2$	20 900.516(15)	
			$1 \leftarrow 2$	20 900.173(15)	
			$2 \leftarrow 2$	20 899.631(15)	
		$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	γ)	20 913.308(15)	
			$4 \leftarrow 4$	20 913.884(15)	
	$1 \leftarrow 1$	$2\frac{1}{2} \leftarrow 1\frac{1}{2}$	$2 \leftarrow 1$	20 914.300(15)	
			γ)	20 899.457(15)	
			γ)	20 913.437(15)	
			γ)	20 913.437(15)	
		$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	γ)	27 869.904(15)	
			$2 \leftarrow 2$	27 869.202(15)	
			γ)	27 882.256(15)	
			γ)	27 868.767(15)	
$4 \leftarrow 3$	$0 \leftarrow 0$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	$3 \leftarrow 3$	27 868.388(15)	
			$3 \leftarrow 3$	27 868.200(15)	
			γ)	27 882.026(15)	
		$3\frac{1}{2} \leftarrow 2\frac{1}{2}$	γ)	27 882.442(15)	
			$4 \leftarrow 4$	34 838.748(15)	
			γ)	34 838.226(15)	
	$1 \leftarrow 1$	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	γ)	34 851.147(15)	
			γ)		
		$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	γ)		
			γ)		

$1 \leftarrow 1$	$4\frac{1}{2} \leftarrow 3\frac{1}{2}$	^{d)}	34 837.708(15)
		$3 \leftarrow 3$	34 837.218(15)
	$5\frac{1}{2} \leftarrow 4\frac{1}{2}$	^{d)}	34 850.657(15)
	$6\frac{1}{2} \leftarrow 5\frac{1}{2}$	$3 \leftarrow 3$	34 851.090(15)

^{a)} Coupling scheme: $\mathbf{J} = \mathbf{N} + \mathbf{S}$; $\mathbf{F} = \mathbf{J} + \mathbf{I}_r$ where $\mathbf{I}_r = \mathbf{I}_1 + \mathbf{I}_2 + \mathbf{I}_3$, $I_r = 3/2$ for $K = 3n$ and $I_r = 1/2$ for $K \neq 3n$.

^{b)} Authors' estimate of experimental uncertainty in units of the last quoted decimal place.

^{c)} Observed line is a blend of four allowed $\Delta F = +1$ hyperfine transitions.

^{d)} Observed line is a blend of two allowed $\Delta F = +1$ hyperfine transitions.

^{e)} Observed line is a blend of three allowed $\Delta F = 0$ hyperfine transitions.

Molecular parameters for $^{40}\text{Ca}^{16}\text{O}^{12}\text{C}^1\text{H}_3$

Parameter	Value	Method	Ref.	
State: electronic \tilde{X}^2A_1 ; vibrational zero point level				
A	[GHz]	163.336 ^{a)}	OPT	89Bra
B	[MHz]	3 845.534(199) ^{b)}	MODR	98Nam
D_N	[kHz]	0.806(59)		
D_{NK}	[kHz]	70.69(114)		
\mathcal{E}_{bb}	[MHz]	12.450 5(106)		
$a_{\text{r}}(\text{H})$	[MHz]	− 0.421(27)		
T_{aa}	[MHz]	1.070(45)		
$ T_{bb} - T_{cc} $	[MHz]	0.292(47)		
μ	[D]	1.58(5)	OPT Stark	98Nam

^{a)} Parameter constrained to this value in the least-squares fit.

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

References for CaOCH₃

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