Table A.1. Line identification and associated parameters from our 31.0-50.3 GHz observations presented in this work.

Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3\,k_B\,W}{8\,\pi^3\,\nu_{rest}\,S_{ul}\,\mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$ a	31093.03	31093.03(0)	20.4	52.80	509(170)	20.926	14.5(0.0)	A.1a	1
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$ b	31093.42	31093.42(0)	20.4	52.80	339(113)	20.521	14.5(0.0)	A.1a	1
$H^{13}CCCCCN$	J=12→11	31120.03	31119.94(23)	9.7	12.00	761(0)	23.622	13.5(2.2)	A.1a	1
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$ a	31151.11	31150.84(23)	48.3	53.00	169(0)	19.816	14.0(2.2)	A.1a	2
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$ b	31160.98	31161.29(19)	48.4	53.00	337(84)	20.508	16.3(2.4)	A.1a	3
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{13}{2}\rightarrow\frac{11}{2}$ a	31241.77	31241.77(0)	40.1	11.30	1421(84)	24.063	14.5(0.0)	A.1b	1
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{13}{2}\rightarrow\frac{11}{2}$ b	31242.33	31242.33(0)	40.1	13.20	1254(84)	23.782	14.5(0.0)	A.1b	1
NaCN	$J_{K,k}=2_{0,2}\rightarrow1_{0,1}$	31262.33	31262.36(23)	2.3	2.00	751(0)	23.966	14.5(2.2)	A.1b	1
MgC_6H	$N_J=27_{\frac{53}{2}}\rightarrow26_{\frac{51}{2}}$	31305.40	31305.41(13)	20.9	26.50	332(0)	23.094	14.5(0.0)	A.1b	1
MgC_6H	$N_J=27_{\frac{55}{2}}\rightarrow26_{\frac{53}{2}}$	31307.36	31307.36(10)	20.9	27.50	332(83)	23.056	14.5(0.0)	A.1b	2
HC_9N	J=54→53	31375.44	31375.45(23)	41.4	54.00	1568(0)	22.466	13.9(2.2)	A.1b	1
HC_9N	v_{19}^e J=54→53	31407.07	31406.86(23)	113.5	54.00	411(0)	21.127	13.2(2.2)	A.1b	2
HC_9N	v_{19}^f J=54→53	31422.87	31422.82(11)	113.6	54.00	246(82)	20.614	13.9(1.1)	A.1b	3
HC_7N	J=28→27	31583.71	31583.69(0)	22.0	28.00	10352(81)	25.156	13.9(0.0)	A.2a	1
HC_7N	v_{15}^e J=28→27	31623.21	31623.31(23)	111.2	28.00	483(0)	22.090	12.7(2.2)	A.2a	2
$HC^{13}CCCCN$	J=12→11	31624.34	31624.36(23)	9.9	12.00	644(0)	23.440	14.6(2.2)	A.2a	1
$HCCCC^{13}CN$	J=12→11	31636.13	31636.04(0)	9.9	12.00	966(80)	23.844	12.8(0.3)	A.2a	1
HC_7N	v_{15}^f J=28→27	31643.34	31643.18(3)	111.2	28.00	241(80)	21.395	13.6(1.3)	A.2a	3
SiC_6	J=26→25	31784.66	31782.93(10)	20.6	26.00	238(79)	20.383	14.4(0.0)	A.2b	1
C_4H	v_7 $N_J=3_{\frac{7}{2}}\rightarrow2_{\frac{5}{2}}$ a	31786.25	31785.94(3)	247.1	5.60	873(79)	25.947	14.3(0.4)	A.2b	1
C_4H	v_7 $N_J=3_{\frac{7}{2}}\rightarrow2_{\frac{5}{2}}$ b	31830.35	31830.32(3)	247.1	5.60	790(79)	25.846	15.5(0.4)	A.2b	2
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{23}{2}\rightarrow\frac{21}{2}$ a	31881.86	31881.81(1)	9.3	22.60	2752(79)	23.757	13.3(0.1)	A.2b	1
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{23}{2}\rightarrow\frac{21}{2}$ b	31885.54	31885.53(2)	9.3	22.60	2672(79)	23.728	13.8(0.1)	A.2b	2
$HCC^{13}CCCN$	J=12→11	31918.69	31918.64(2)	10.0	12.00	1019(78)	23.888	13.4(0.3)	A.2b	1
$HCCC^{13}CCN$	J=12→11	31922.57	31922.55(1)	10.0	12.00	783(78)	23.625	14.3(0.3)	A.2b	1
HC_5N	J=12→11	31951.78	31951.75(0)	10.0	12.00	43975(0)	27.652	13.8(0.0)	A.3a	1
HC_9N	J=55→54	31956.44	31956.45(1)	42.9	55.00	1249(78)	22.202	14.2(0.2)	A.3a	4
C_6H	v_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{23}{2}\rightarrow\frac{21}{2}$	31967.06	31967.45(22)	75.9	11.00	312(0)	22.297	17.3(0.9)	A.3a	3
HC_9N	v_{19}^e J=55→54	31988.66	31988.63(23)	115.1	55.00	234(0)	20.524	13.8(2.1)	A.3a	5
HC_5N	v_{11}^e J=12→11	32004.59	32004.59(0)	163.5	11.90	233(0)	22.419	14.5(0.0)	A.3a	2
HC_9N	v_{19}^f J=55→54	32004.75	32004.75(0)	115.1	55.00	233(0)	20.522	14.5(0.0)	A.3a	6
HC_5N	v_{11}^f J=12→11	32032.49	32032.71(7)	163.5	11.90	388(78)	22.927	15.1(0.9)	A.3a	3
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{23}{2}\rightarrow\frac{21}{2}$ a	32095.24	32095.24(1)	31.7	23.00	1850(0)	23.336	13.9(0.1)	A.3a	4
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{23}{2}\rightarrow\frac{21}{2}$ b	32125.56	32125.56(0)	31.8	23.00	1998(0)	23.412	14.2(0.1)	A.3a	5
l-HC_4N	$N_J=7_7\rightarrow6_6$	32233.42	32233.42(0)	7.1	6.86	228(76)	22.942	14.5(0.0)	A.3b	1
C_6H	v_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{23}{2}\rightarrow\frac{21}{2}$	32234.82	32234.82(0)	93.4	11.30	152(51)	21.544	14.2(0.0)	A.3b	6
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{55}{2}\rightarrow\frac{53}{2}$ a	32266.33	32266.33(0)	22.0	54.90	455(76)	20.739	14.5(0.0)	A.3b	4
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{55}{2}\rightarrow\frac{53}{2}$ b	32266.74	32266.74(0)	22.0	54.80	455(76)	20.740	14.5(0.0)	A.3b	4
MgC_5N	$N_J=28_{\frac{55}{2}}\rightarrow27_{\frac{53}{2}}$	32278.59	32278.52(7)	22.5	27.50	152(51)	20.098	14.5(0.0)	A.3b	1
MgC_5N	$N_J=28_{\frac{57}{2}}\rightarrow27_{\frac{55}{2}}$	32280.40	32280.53(7)	22.5	28.50	379(0)	20.978	14.5(0.0)	A.3b	2
$HC^{13}CCCCCCN$	J=29→28	32324.86	32324.86(0)	23.3	29.00	302(0)	21.562	14.5(0.0)	A.3b	1
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{55}{2}\rightarrow\frac{53}{2}$ a	32326.79	32326.79(0)	49.9	55.00	226(0)	20.036	14.5(0.0)	A.3b	5
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{55}{2}\rightarrow\frac{53}{2}$ b	32336.63	32336.79(5)	49.9	55.00	452(0)	20.728	14.1(0.4)	A.3b	6
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{37}{2}\rightarrow\frac{35}{2}$ a	32354.93	32354.93(0)	15.1	36.90	376(0)	21.121	14.5(0.0)	A.3b	1
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{37}{2}\rightarrow\frac{35}{2}$ b	32356.56	32356.56(0)	15.1	36.90	301(0)	20.898	14.5(0.0)	A.3b	2
NaCN	$J_{K,k}=2_{1,1}\rightarrow1_{1,0}$	32373.67	32373.79(9)	4.7	1.50	300(0)	23.303	14.6(1.3)	A.3b	2
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{37}{2}\rightarrow\frac{35}{2}$	32429.51	32429.49(4)	52.7	73.50	448(0)	20.605	13.8(0.4)	A.3b	3
MgC_6H	$N_J=28_{\frac{55}{2}}\rightarrow27_{\frac{53}{2}}$	32464.88	32464.93(3)	22.5	27.50	223(0)	22.623	14.5(0.0)	A.4a	3
MgC_6H	$N_J=28_{\frac{57}{2}}\rightarrow27_{\frac{55}{2}}$	32466.84	32466.84(0)	22.5	28.50	74(25)	21.489	14.5(0.0)	A.4a	4
HC_9N	J=56→55	32537.45	32537.44(1)	44.5	56.00	962(0)	21.905	13.9(0.1)	A.4a	7
HC_9N	v_{19}^e J=56→55	32570.25	32570.32(9)	116.6	56.00	443(0)	21.128	14.7(0.4)	A.4a	8
$HCC^{13}CCCCCN$	J=29→28	32577.82	32577.88(32)	23.5	29.00	295(0)	21.531	14.2(0.3)	A.4a	1
$HCCCCC^{13}CCN$	J=29→28	32585.58	32585.55(26)	23.5	26.00	147(49)	20.946	14.5(0.0)	A.4a	1
HC_9N	v_{19}^f J=56→55	32586.63	32586.76(5)	116.7	54.00	368(74)	20.980	14.5(0.0)	A.4a	9
C_3H	J=$\frac{3}{2}\rightarrow\frac{1}{2}$ p=1→-1 F=1→1	32617.02	32617.01(23)	1.6	0.33	588(0)	27.298	14.1(2.1)	A.4a	1
C_3H	J=$\frac{3}{2}\rightarrow\frac{1}{2}$ p=1→-1 F=2→1	32627.30	32627.30(0)	1.6	1.66	3082(73)	27.349	14.1(0.1)	A.4a	2
C_3H	J=$\frac{3}{2}\rightarrow\frac{1}{2}$ p=1→-1 F=1→0	32634.39	32634.34(1)	1.6	0.67	1173(73)	27.298	13.6(0.1)	A.4a	3
C_3H	J=$\frac{3}{2}\rightarrow\frac{1}{2}$ p=-1→1 F=2→1	32660.65	32660.68(23)	1.6	1.66	3439(0)	27.457	14.4(2.1)	A.4a	4
C_3H	J=$\frac{3}{2}\rightarrow\frac{1}{2}$ p=-1→1 F=1→0	32663.36	32663.35(23)	1.6	0.67	1244(0)	27.355	15.2(2.1)	A.4a	5
C_3H	J=$\frac{3}{2}\rightarrow\frac{1}{2}$ p=-1→1 F=1→1	32667.67	32667.48(23)	1.6	0.33	1024(0)	27.855	15.7(2.1)	A.4a	6
$HCCC^{13}CCCCN$	J=29→28	32693.21	32693.05(23)	23.5	29.00	292(0)	21.517	14.5(0.0)	A.4a	1
$HCCCC^{13}CCCN$	J=29→28	32696.08	32695.92(23)	23.5	29.00	219(0)	21.229	14.5(0.0)	A.4a	1
HC_7N	J=29→28	32711.67	32711.65(0)	23.5	29.00	9759(0)	25.027	13.8(0.0)	A.4b	4
HC_7N	v_{15}^e J=29→28	32752.58	32752.58(23)	112.7	29.00	580(0)	22.203	13.7(2.1)	A.4b	5
HC_7N	v_{15}^f J=29→28	32773.43	32773.42(23)	112.7	29.00	507(0)	22.067	13.9(2.1)	A.4b	6
HC_7N	v_{15}=2 J=29→28 (l=0)	32812.96	32812.96(0)	202.2	29.00	72(24)	20.116	14.5(0.0)	A.4b	7
HC_7N	v_{15}=2 J=29→28 (l=-2)	32814.39	32814.39(0)	202.6	28.90	72(24)	20.120	14.5(0.0)	A.4b	7
HC_7N	v_{15}=2 J=29→28 (l=+2)	32815.98	32815.98(0)	202.6	28.90	72(24)	20.120	14.5(0.0)	A.4b	8
C_6H^-	J=12→11	33044.49	33044.45(0)	10.3	12.00	1767(0)	23.127	13.7(0.1)	A.5a	1

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3\,k_B\,W}{8\,\pi^3\,\nu_{rest}\,S_{ul}\,\mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
CH_3C_3N	$N_J=8_3\rightarrow7_3$	33048.75	33049.13(23)	74.5	6.88	71(24)	21.556	15.4(2.1)	A.5a	1
CH_3C_3N	$N_J=8_0\rightarrow7_0$	33051.62	33051.60(23)	7.1	8.00	71(24)	21.405	12.9(2.1)	A.5a	2
$H^{13}CCCCCCCN$	J=30→29	33098.20	33098.00(2)	24.6	30.00	141(0)	20.742	14.6(0.7)	A.5a	1
HC_9N	J=57→56	33118.45	33118.44(23)	46.1	57.00	1053(0)	21.960	13.7(2.1)	A.5a	10
MgC_3N	$N_J=12_{\frac{23}{2}}\rightarrow11_{\frac{21}{2}}$	33138.61	33138.59(23)	10.3	11.50	561(0)	22.562	13.6(2.1)	A.5a	1
MgC_3N	$N_J=12_{\frac{25}{2}}\rightarrow11_{\frac{23}{2}}$	33142.93	33142.98(23)	10.3	12.50	631(0)	22.596	14.2(2.1)	A.5a	2
HC_9N	v_{19}^e J=57→56	33151.84	33151.84(0)	118.2	57.00	350(0)	20.858	14.5(0.0)	A.5a	11
MgC_4H	$N_J=12_{\frac{23}{2}}\rightarrow11_{\frac{21}{2}}$	33153.43	33153.43(0)	10.3	11.50	210(0)	23.761	14.5(0.0)	A.5a	1
MgC_4H	$N_J=12_{\frac{25}{2}}\rightarrow11_{\frac{23}{2}}$	33158.12	33158.12(0)	10.3	12.50	210(0)	23.677	14.5(0.0)	A.5a	2
HC_9N	v_{19}^f J=57→56	33168.52	33168.59(6)	118.3	57.00	350(0)	20.856	13.4(0.5)	A.5a	12
$^{29}SiC_4$	J=11→10	33224.79	33224.75(7)	9.6	11.00	139(0)	21.157	13.0(0.4)	A.5b	1
MgC_5N	$N_J=29_{\frac{57}{2}}\rightarrow28_{\frac{55}{2}}$	33431.38	33431.36(5)	24.1	28.50	273(0)	20.616	14.5(0.0)	A.5b	3
MgC_5N	$N_J=29_{\frac{59}{2}}\rightarrow28_{\frac{57}{2}}$	33433.19	33433.20(6)	24.1	29.50	273(0)	20.582	14.5(0.0)	A.5b	4
$HC^{13}CCCCCCN$	J=30→29	33439.49	33439.49(0)	24.9	30.00	137(46)	20.701	14.5(0.0)	A.5b	2
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{57}{2}\rightarrow\frac{55}{2}$ a	33439.61	33439.61(0)	23.6	56.80	478(68)	20.718	14.5(0.0)	A.5b	7
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{57}{2}\rightarrow\frac{55}{2}$ b	33440.05	33440.05(0)	23.6	56.80	478(68)	20.718	14.5(0.0)	A.5b	7
$HCCCCCC^{13}CN$	J=30→29	33451.94	33451.90(3)	24.9	30.00	273(0)	21.393	13.6(0.4)	A.6a	1
C_6H	v_{11} $N_J=12_{\frac{25}{2}}\rightarrow11_{\frac{23}{2}}$	33462.22	33462.24(1)	26.3	12.50	886(68)	23.167	14.2(0.2)	A.6a	7
C_6H	v_{11} $N_J=12_{\frac{23}{2}}\rightarrow11_{\frac{21}{2}}$	33479.82	33479.79(1)	26.3	11.50	748(68)	23.082	13.9(0.2)	A.6a	8
$^{30}SiC_2$	$J_{K,k}=9_{2,7}\rightarrow9_{2,8}$	33499.56	33497.91(5)	58.7	0.73	543(0)	27.190	17.5(0.5)	A.6a	1
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{57}{2}\rightarrow\frac{55}{2}$ a	33502.47	33502.28(6)	51.5	57.00	272(0)	20.147	13.8(0.5)	A.6a	8
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{57}{2}\rightarrow\frac{55}{2}$ b	33512.28	33512.05(5)	51.5	57.00	271(0)	20.146	15.2(0.5)	A.6a	9
MgC_6H	$N_J=29_{\frac{57}{2}}\rightarrow28_{\frac{55}{2}}$	33624.36	33624.36(0)	24.1	28.50	67(22)	21.351	14.5(0.0)	A.6a	5
MgC_6H	$N_J=29_{\frac{59}{2}}\rightarrow28_{\frac{57}{2}}$	33626.32	33626.31(5)	24.1	29.50	67(22)	21.316	14.5(0.0)	A.6a	6
HC_9N	J=58→57	33699.45	33699.43(1)	47.7	58.00	934(0)	21.806	13.9(0.1)	A.6a	13
$HCC^{13}CCCCCN$	J=30→29	33701.16	33701.09(7)	25.1	30.00	200(0)	21.076	13.6(0.6)	A.6b	2
$HCCCCC^{13}CCN$	J=30→29	33709.19	33709.14(39)	25.1	30.00	133(0)	20.670	13.8(0.6)	A.6b	2
$H^{13}CCCCCN$	J=13→12	33713.33	33713.30(2)	11.3	13.00	867(0)	23.592	13.5(0.2)	A.6b	2
HC_9N	v_{19}^e J=58→57	33733.43	33733.51(4)	119.8	58.00	466(0)	21.109	15.8(0.3)	A.6b	14
SiC_4	J=11→10	33742.68	33742.66(1)	9.7	11.00	1463(0)	23.494	14.0(0.1)	A.6b	1
HC_9N	v_{19}^f J=58→57	33750.40	33750.30(0)	119.9	58.00	532(0)	21.240	14.5(0.0)	A.6b	15
CCS	$N_J=2_3\rightarrow1_2$	33751.37	33751.35(23)	3.2	2.98	3322(0)	27.240	14.5(0.0)	A.6b	1
$HCCC^{13}CCCCN$	J=30→29	33820.53	33820.53(0)	25.2	30.00	132(44)	20.657	14.5(0.0)	A.6b	2
C_8H^-	J=29→28	33833.31	33833.21(4)	24.4	29.00	330(66)	20.068	13.2(0.5)	A.6b	1
HC_7N	J=30→29	33839.63	33839.61(0)	25.2	30.00	9496(66)	24.931	13.7(0.0)	A.6b	9
HC_7N	v_{15}^e J=30→29	33881.95	33881.85(7)	114.4	30.00	657(0)	22.259	14.5(0.2)	A.6b	10
HC_7N	v_{15}^f J=30→29	33903.52	33903.52(5)	114.4	30.00	525(0)	22.034	14.1(0.2)	A.6b	11
HC_7N	v_{15}=2 J=30→29 (l=0)	33944.29	33944.29(0)	203.8	30.00	131(0)	20.643	14.5(0.0)	A.6b	12
HC_7N	v_{15}=2 J=30→29 (l=-2)	33945.89	33945.89(0)	204.2	29.90	392(65)	21.744	14.5(0.0)	A.6b	12
HC_7N	v_{15}=2 J=30→29 (l=+2)	33947.65	33947.65(0)	204.2	29.90	131(0)	20.646	14.5(0.0)	A.6b	13
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{39}{2}\rightarrow\frac{37}{2}$ a	34103.86	34103.75(1)	16.7	39.00	258(0)	20.636	12.8(0.3)	A.7a	4
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{39}{2}\rightarrow\frac{37}{2}$ b	34105.50	34105.37(1)	16.7	39.00	387(0)	21.041	15.4(0.3)	A.7a	4
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{39}{2}\rightarrow\frac{37}{2}$	34182.42	34182.42(0)	54.4	77.50	384(0)	20.345	14.5(0.0)	A.7a	5
$H^{13}CCCCCCCN$	J=31→30	34201.44	34201.50(11)	26.3	31.00	192(64)	20.986	14.9(0.9)	A.7b	2
$HC^{13}CCCCN$	J=13→12	34259.67	34259.62(1)	11.5	13.00	955(0)	23.672	13.6(0.1)	A.7b	2
$HCCCC^{13}CN$	J=13→12	34272.44	34272.43(22)	11.5	13.00	1081(0)	23.796	14.3(0.1)	A.7b	2
HC_9N	J=59→58	34280.46	34280.46(3)	49.4	59.00	1080(0)	21.916	14.5(0.1)	A.7b	16
HC_9N	v_{19}^e J=59→58	34315.01	34315.14(3)	121.5	59.00	317(0)	20.689	13.6(0.3)	A.7b	17
HC_9N	v_{19}^f J=59→58	34332.28	34332.21(5)	121.5	59.00	379(0)	20.869	13.0(0.3)	A.7b	18
$HC^{13}CCCCCCN$	J=31→30	34554.10	34554.10(7)	26.5	31.00	62(21)	19.848	12.1(0.9)	A.8a	3
$HCCCCCC^{13}CN$	J=31→30	34566.97	34567.09(1)	26.5	31.00	124(0)	20.539	13.4(0.1)	A.8a	2
$HCC^{13}CCCN$	J=13→12	34578.54	34578.56(2)	11.6	13.00	867(0)	23.567	14.0(0.1)	A.8a	2
$HCCC^{13}CCN$	J=13→12	34582.75	34582.84(0)	11.6	13.00	1177(0)	23.872	15.0(0.0)	A.8a	2
MgC_5N	$N_J=30_{\frac{59}{2}}\rightarrow29_{\frac{57}{2}}$	34584.17	34584.20(23)	25.7	29.50	310(0)	20.673	14.5(0.0)	A.8a	5
MgC_5N	$N_J=30_{\frac{61}{2}}\rightarrow29_{\frac{59}{2}}$	34585.98	34586.10(23)	25.7	30.50	433(0)	20.976	14.5(0.0)	A.8a	6
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{59}{2}\rightarrow\frac{57}{2}$ a	34612.90	34612.90(0)	25.2	58.80	433(0)	20.549	13.9(0.0)	A.8a	10
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{59}{2}\rightarrow\frac{57}{2}$ b	34613.40	34613.40(0)	25.2	58.80	432(0)	20.549	13.9(0.0)	A.8a	10
HC_5N	J=13→12	34614.39	34614.34(0)	11.6	13.00	38612(124)	27.362	13.8(0.0)	A.8a	4
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{25}{2}\rightarrow\frac{23}{2}$ a	34654.04	34654.01(0)	11.0	24.60	2586(0)	23.527	14.2(0.0)	A.8a	9
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{25}{2}\rightarrow\frac{23}{2}$ b	34658.38	34658.36(0)	11.0	24.60	2462(0)	23.478	14.2(0.0)	A.8a	10
HC_5N	v_{11}^e J=13→12	34671.60	34672.97(3)	165.2	12.90	553(61)	23.123	14.5(0.0)	A.8a	5
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{59}{2}\rightarrow\frac{57}{2}$ a	34678.14	34678.02(1)	53.2	59.00	307(0)	20.202	14.4(0.3)	A.8a	11
C_3S	J=6→5	34684.37	34684.37(0)	5.8	6.00	2518(61)	25.716	14.5(0.0)	A.8a	1
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{59}{2}\rightarrow\frac{57}{2}$ b	34687.93	34687.93(0)	53.2	59.00	307(61)	20.201	14.5(0.0)	A.8a	12
HC_5N	v_{11}^f J=13→12	34701.83	34701.76(4)	165.2	12.90	245(0)	22.309	13.9(0.5)	A.8b	6
C_6H	v_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{25}{2}\rightarrow\frac{23}{2}$	34746.86	34746.94(19)	77.6	12.00	428(0)	22.443	14.2(0.4)	A.8b	11
MgC_6H	$N_J=30_{\frac{59}{2}}\rightarrow29_{\frac{57}{2}}$	34783.84	34784.02(7)	25.7	29.50	244(0)	22.571	14.5(0.0)	A.8b	7
MgC_6H	$N_J=30_{\frac{61}{2}}\rightarrow29_{\frac{59}{2}}$	34785.79	34785.76(5)	25.7	30.50	122(0)	21.844	14.5(0.0)	A.8b	8
C_4H	v_7 $N_{J,F}=4_{\frac{7}{2},3}\rightarrow3_{\frac{5}{2},2}$	34824.89	34824.89(0)	252.2	2.84	546(61)	26.067	14.5(0.0)	A.8b	3
C_4H	v_7 $N_{J,F}=4_{\frac{7}{2},4}\rightarrow3_{\frac{5}{2},3}$	34825.45	34825.45(0)	252.2	3.83	425(61)	25.516	14.5(0.0)	A.8b	3
HC_9N	J=60→59	34861.46	34861.47(1)	51.0	60.00	908(0)	21.709	13.8(0.1)	A.8b	19

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	W=$\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul} \mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{25}{2}\rightarrow\frac{23}{2}$ a	34887.11	34887.10(1)	33.4	25.00	2054(0)	23.274	13.8(0.1)	A.8b	12
HC_9N	v_{19}^e J=60→59	34896.59	34896.60(1)	123.2	60.00	302(0)	20.607	14.0(0.0)	A.8b	20
HC_9N	v_{19}^f J=60→59	34914.15	34914.10(0)	123.2	60.00	362(0)	20.787	14.5(0.0)	A.8b	21
C_4H	v_7 N_J=4$_{\frac{7}{2}}\rightarrow$3$_{\frac{5}{2}}$ b	34917.40	34917.16(0)	252.2	6.68	1024(0)	25.837	14.5(0.0)	A.8b	4
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{25}{2}\rightarrow\frac{23}{2}$ b	34917.89	34917.89(0)	33.4	25.00	1928(0)	23.210	14.5(0.0)	A.8b	13
$HCCC^{13}CCCCN$	J=31→30	34947.85	34947.85(0)	26.8	31.00	60(20)	19.804	14.5(0.0)	A.8b	3
HC_7N	J=31→30	34967.59	34967.59(0)	26.9	31.00	8822(60)	24.792	14.1(0.0)	A.9a	14
C_8H^-	J=30→29	34999.94	34999.94(6)	26.0	30.00	180(60)	19.392	11.7(0.6)	A.9a	2
HC_7N	v_{15}^e J=31→30	35011.32	35011.24(4)	116.0	31.00	598(60)	22.100	13.1(0.4)	A.9a	15
^{30}SiS	J=2→1	35021.16	35021.20(0)	2.5	2.00	657(0)	26.978	14.2(0.0)	A.9a	1
HC_7N	v_{15}^f J=31→30	35033.60	35033.60(0)	116.1	31.00	537(0)	21.992	14.5(0.0)	A.9a	16
C_6H	v_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{25}{2}\rightarrow\frac{23}{2}$	35037.68	35037.68(0)	95.1	12.30	358(0)	22.232	14.5(0.0)	A.9a	14
$H^{13}CCCN$	J=4→3	35267.40	35267.35(0)	4.2	4.00	4276(59)	26.619	13.7(0.0)	A.9b	1
$H^{13}CCCCCCCN$	J=32→31	35304.68	35304.68(0)	28.0	32.00	175(58)	20.832	14.5(0.0)	A.9b	3
$Si^{34}S$	J=2→1	35315.28	35315.28(4)	2.5	2.00	934(0)	27.321	14.0(0.1)	A.9b	1
HC_9N	J=61→60	35442.45	35442.43(1)	52.7	61.00	982(0)	21.755	13.8(0.1)	A.9b	22
SiC_6	J=29→28	35452.02	35451.91(4)	25.5	29.00	231(0)	20.134	12.9(0.4)	A.10a	2
HC_9N	v_{19}^e J=61→60	35478.18	35478.12(4)	126.6	62.00	288(0)	20.511	13.4(0.3)	A.10a	23
HC_9N	v_{19}^f J=61→60	35496.03	35496.01(3)	126.6	62.00	345(0)	20.691	13.2(0.2)	A.10a	24
o-H_2C_4	$J_{K,k}$=$4_{1,4}\rightarrow3_{1,3}$	35577.01	35577.05(3)	3.8	3.75	1086(57)	24.949	14.5(0.3)	A.10a	1
^{29}SiS	J=2→1	35642.47	35642.45(1)	2.6	2.00	967(0)	27.346	13.8(0.1)	A.10a	1
$HC^{13}CCCCCCN$	J=32→31	35668.72	35668.38(27)	28.2	32.00	113(0)	20.387	17.0(1.7)	A.10a	4
o-H_2C_4	$J_{K,k}$=$4_{3,1}\rightarrow3_{3,0}$+$4_{3,2}\rightarrow3_{3,1}$	35716.54	35716.41(1)	112.0	1.75	396(0)	24.698	13.2(0.2)	A.10b	2
p-H_2C_4	$J_{K,k}$=$4_{2,3}\rightarrow3_{2,2}$	35722.91	35722.91(0)	58.4	3.00	169(56)	23.311	14.5(0.0)	A.10b	1
p-H_2C_4	$J_{K,k}$=$4_{2,2}\rightarrow3_{2,1}$	35723.06	35723.06(0)	58.4	3.00	169(56)	23.311	14.5(0.0)	A.10b	1
p-H_2C_4	$J_{K,k}$=$4_{0,4}\rightarrow3_{0,3}$	35727.38	35727.38(2)	4.3	4.00	282(0)	23.533	13.5(0.2)	A.10b	2
MgC_5N	N_J=31$_{\frac{61}{2}}\rightarrow$30$_{\frac{59}{2}}$	35736.95	35736.93(23)	27.4	30.50	282(0)	20.514	14.5(0.0)	A.10b	7
MgC_5N	N_J=31$_{\frac{63}{2}}\rightarrow$30$_{\frac{61}{2}}$	35738.76	35738.74(23)	27.4	31.50	169(0)	19.971	14.5(0.0)	A.10b	8
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{61}{2}\rightarrow\frac{59}{2}$ a	35786.18	35786.17(0)	26.9	60.80	337(56)	20.233	14.5(0.0)	A.10b	13
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{61}{2}\rightarrow\frac{59}{2}$ b	35786.68	35786.68(0)	26.9	60.80	394(56)	20.387	14.5(0.0)	A.10b	13
MgNC	N_J=3$_{\frac{5}{2}}\rightarrow$2$_{\frac{3}{2}}$	35793.32	35794.09(0)	3.4	2.50	1292(56)	25.173	14.5(0.0)	A.10b	1
$Si^{33}S$	J=2→1	35796.67	35796.70(0)	2.6	2.00	618(56)	26.894	14.5(0.0)	A.10b	1
C_6H^-	J=13→12	35798.15	35798.20(0)	12.0	13.00	1460(56)	22.776	14.5(0.0)	A.10b	2
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{15}{2}\rightarrow\frac{13}{2}$ a	35802.89	35802.82(11)	7.2	14.90	2526(112)	24.226	14.2(0.2)	A.10b	2
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{15}{2}\rightarrow\frac{13}{2}$ b	35806.94	35806.88(0)	7.2	14.90	3311(0)	24.496	14.4(0.0)	A.10b	3
MgNC	N_J=3$_{\frac{7}{2}}\rightarrow$2$_{\frac{5}{2}}$	35808.53	35808.63(2)	3.4	3.50	1235(0)	24.790	15.7(0.2)	A.10b	2
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{41}{2}\rightarrow\frac{39}{2}$ a	35852.78	35852.78(0)	18.5	40.90	280(56)	20.619	15.7(0.0)	A.10b	6
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{61}{2}\rightarrow\frac{59}{2}$ a	35853.82	35853.82(0)	54.9	61.00	168(56)	19.530	15.7(0.0)	A.10b	14
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{41}{2}\rightarrow\frac{39}{2}$ b	35854.42	35854.22(0)	18.5	40.90	280(56)	20.619	15.7(0.0)	A.10b	6
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{61}{2}\rightarrow\frac{59}{2}$ b	35863.57	35863.67(0)	54.9	61.00	224(0)	19.816	14.5(0.0)	A.10b	15
o-H_2C_4	$J_{K,k}$=$4_{1,3}\rightarrow3_{1,2}$	35875.78	35875.73(3)	3.9	3.75	782(56)	24.612	13.6(0.3)	A.10b	3
MgC_3N	N_J=13$_{\frac{25}{2}}\rightarrow$12$_{\frac{23}{2}}$	35900.24	35900.21(1)	12.1	12.50	501(0)	22.287	13.9(0.1)	A.10b	3
MgC_3N	N_J=13$_{\frac{27}{2}}\rightarrow$12$_{\frac{25}{2}}$	35904.56	35904.56(3)	12.1	13.50	557(56)	22.315	13.7(0.3)	A.10b	4
MgC_4H	N_J=13$_{\frac{25}{2}}\rightarrow$12$_{\frac{23}{2}}$	35916.32	35916.32(0)	12.1	12.50	56(19)	22.269	14.5(0.0)	A.10b	3
MgC_4H	N_J=13$_{\frac{27}{2}}\rightarrow$12$_{\frac{25}{2}}$	35921.00	35921.00(0)	12.1	13.50	56(19)	22.192	14.5(0.0)	A.10b	4
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{41}{2}\rightarrow\frac{39}{2}$	35935.32	35935.27(2)	56.1	81.50	445(0)	20.391	13.2(0.2)	A.10b	7
MgC_6H	N_J=31$_{\frac{61}{2}}\rightarrow$30$_{\frac{59}{2}}$	35943.31	35943.32(31)	27.4	30.50	111(37)	21.719	14.5(0.0)	A.10b	9
MgC_6H	N_J=31$_{\frac{63}{2}}\rightarrow$30$_{\frac{61}{2}}$	35945.27	35945.15(9)	27.4	31.50	167(56)	22.092	14.5(0.0)	A.10b	10
$HCCCCC^{13}CCN$	J=32→31	35956.41	35956.49(8)	28.5	32.00	222(0)	21.050	13.9(0.8)	A.11a	3
HC_9N	J=62→61	36023.45	36023.44(1)	54.5	62.00	938(0)	21.676	14.1(0.1)	A.11a	25
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{15}{2}\rightarrow\frac{13}{2}$ a	36048.22	36048.21(0)	41.9	13.40	1487(55)	23.795	14.5(0.0)	A.11a	4
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{15}{2}\rightarrow\frac{13}{2}$ b	36048.67	36048.67(0)	41.9	15.30	1432(55)	23.625	14.5(0.0)	A.11a	4
HC_9N	v_{19}^e J=62→61	36059.76	36059.57(4)	124.9	61.00	330(0)	20.647	13.4(0.4)	A.11a	26
$HCCC^{13}CCCCN$	J=32→31	36075.17	36074.37(10)	28.6	32.00	165(0)	20.750	11.1(1.2)	A.11a	4
HC_9N	v_{19}^f J=62→61	36077.91	36078.01(4)	124.9	61.00	495(55)	21.051	15.2(0.4)	A.11a	27
HC_7N	J=32→31	36095.54	36095.49(0)	28.6	32.00	8342(110)	24.673	13.5(0.1)	A.11a	17
C_5N^-	J=13→12	36110.12	36110.18(2)	12.1	13.00	603(55)	22.794	13.9(0.2)	A.11a	1
HC_7N	v_{15}^e J=32→31	36140.68	36140.68(1)	117.8	32.00	711(0)	22.209	14.0(0.2)	A.11a	18
HC_7N	v_{15}^f J=32→31	36163.68	36163.72(4)	117.8	32.00	710(0)	22.207	14.1(0.2)	A.11a	19
C_8H^-	J=31→30	36166.58	36166.82(2)	27.8	31.00	327(0)	19.927	11.3(0.4)	A.11a	3
HC_7N	v_{15}=2 J=32→31 (l=0)	36206.92	36206.92(0)	207.3	32.00	163(0)	20.736	14.5(0.0)	A.11b	20
HC_7N	v_{15}=2 J=32→31 (l=-2)	36208.88	36208.88(0)	207.6	31.90	163(54)	20.739	14.5(0.0)	A.11b	21
HC_7N	v_{15}=2 J=32→31 (l=+2)	36211.01	36211.01(0)	207.6	31.90	163(0)	20.739	14.5(0.0)	A.11b	22
$HC^{13}CCN$	J=4→3	36237.95	36237.95(0)	4.3	4.00	4071(54)	26.543	14.5(0.0)	A.11b	1
$HCC^{13}CN$	J=4→3	36241.44	36241.44(0)	4.3	4.00	4504(54)	26.644	14.5(0.0)	A.11b	1
$^{29}SiC_4$	J=12→11	36245.16	36245.16(0)	11.3	12.00	217(54)	21.427	14.5(0.0)	A.11b	2
C_6H	v_{11} N_J=13$_{\frac{27}{2}}\rightarrow$12$_{\frac{25}{2}}$	36251.52	36251.49(1)	28.0	13.50	868(0)	22.990	13.9(0.1)	A.11b	15
C_6H	v_{11} N_J=13$_{\frac{25}{2}}\rightarrow$12$_{\frac{23}{2}}$	36268.91	36268.87(0)	28.0	12.50	758(0)	22.931	13.8(0.1)	A.11b	16
$H^{13}CCCCCN$	J=14→13	36306.62	36306.95(0)	13.1	14.00	1404(0)	23.926	16.9(0.1)	A.11b	3
SiS	J=2→1	36309.63	36309.62(0)	2.6	2.00	32067(0)	30.829	14.1(0.0)	A.11b	1
HC_3N	J_F=$4_4\rightarrow3_4$	36390.89	36390.89(0)	4.4	0.25	3273(0)	29.093	14.5(0.0)	A.11b	1
HC_3N	J=4→3	36392.33	36392.33(0)	4.4	4.00	129501(0)	29.998	14.5(0.0)	A.11b	1

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	W=$\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3\,k_B\,W}{8\,\pi^3\,\nu_{rest}\,S_{ul}\,\mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
HC_3N	J_F=4$_3$→3$_3$	36394.18	36394.18(0)	4.4	0.25	2843(0)	28.952	14.5(0.0)	A.11b	2
H^{13}CCCCCCCN	J=33→32	36407.92	36407.88(7)	29.7	33.00	161(0)	20.684	11.0(0.6)	A.11b	4
HC_3N	v_7^e J=4→3	36481.82	36482.06(8)	324.4	3.75	107(0)	22.957	11.5(0.7)	A.12a	3
HC_3N	v_7^f J=4→3	36534.12	36533.92(23)	324.4	3.75	265(0)	23.868	14.2(1.9)	A.12a	4
HC_9N	J=63→62	36604.45	36604.43(23)	56.2	63.00	845(0)	21.539	14.0(1.9)	A.12a	28
HC_9N	v_{19}^e J=63→62	36641.35	36641.46(11)	128.4	63.00	526(53)	21.066	21.5(1.5)	A.12a	29
HC_9N	v_{19}^f J=63→62	36659.78	36659.89(8)	128.4	63.00	263(53)	20.371	14.5(0.6)	A.12a	30
CH_3CN	$J_{K,F}$=2$_{0,2}$ →1$_{0,2}$+2$_{0,1}$ →1$_{0,0}$	36794.33	36794.33(0)	2.6	1.17	937(52)	26.186	14.5(0.0)	A.12b	1
CH_3CN	$J_{K,F}$=2$_{0,2}$ →1$_{0,1}$+2$_{0,3}$ →1$_{0,2}$	36795.54	36795.54(0)	2.6	4.30	1613(52)	25.428	14.5(0.0)	A.12b	1
CH_3CN	$J_{K,F}$=2$_{0,1}$ →1$_{0,1}$	36797.58	36797.58(0)	2.6	0.50	208(52)	25.532	14.5(0.0)	A.12b	2
SiC_4	J=12→11	36810.14	36810.12(1)	11.5	12.00	1559(52)	23.384	14.0(0.1)	A.12b	2
l-HC_4N	N_J=8$_8$→7$_7$	36838.13	36838.07(7)	8.9	7.87	311(52)	22.981	15.9(0.7)	A.12b	2
MgC_5N	N_J=32 $\frac{63}{2}$ →31 $\frac{61}{2}$	36889.72	36889.68(6)	29.2	31.50	155(52)	19.851	14.5(0.0)	A.12b	9
MgC_5N	N_J=32 $\frac{65}{2}$ →31 $\frac{63}{2}$	36891.53	36891.22(0)	29.2	32.50	155(52)	19.820	14.5(0.0)	A.12b	10
HC^{13}CCCCN	J=14→13	36894.98	36894.94(2)	13.3	14.00	826(52)	23.380	13.6(0.2)	A.12b	3
HCCCC^{13}CN	J=14→13	36908.73	36908.67(1)	13.3	14.00	1032(52)	23.602	13.6(0.1)	A.12b	3
l-HC_4N	N_J=8$_9$→7$_8$	36943.21	36943.08(6)	8.3	8.96	154(0)	22.147	14.0(0.7)	A.12b	3
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{63}{2}$ → $\frac{61}{2}$ a	36959.45	36959.45(0)	28.7	62.80	360(51)	20.233	14.5(0.0)	A.13a	16
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{63}{2}$ → $\frac{61}{2}$ b	36959.99	36959.99(0)	28.7	62.80	360(51)	20.233	14.5(0.0)	A.13a	16
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{63}{2}$ → $\frac{61}{2}$ a	37029.49	37029.49(0)	56.7	63.00	102(0)	18.970	14.5(0.0)	A.10b	17
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{63}{2}$ → $\frac{61}{2}$ b	37039.20	37039.20(0)	56.7	63.00	256(0)	19.886	14.5(0.0)	A.10b	18
MgC_6H	N_J=32 $\frac{63}{2}$ →31 $\frac{61}{2}$	37102.79	37102.79(0)	29.2	31.50	102(0)	21.567	14.5(0.0)	A.13a	11
MgC_6H	N_J=32 $\frac{65}{2}$ →31 $\frac{63}{2}$	37104.74	37104.61(4)	29.2	32.50	305(0)	22.634	14.5(0.0)	A.13a	12
SiC_2	$J_{K,k}$=9$_{2,7}$→9$_{2,8}$	37108.78	37108.68(1)	60.2	0.73	813(0)	27.502	14.5(0.0)	A.13a	1
CH_3C_3N	N_J=9$_0$→8$_0$	37183.02	37182.86(23)	8.9	9.00	152(0)	21.934	12.8(1.8)	A.13a	3
HC_9N	J=64→63	37185.44	37185.47(23)	58.0	64.00	708(0)	21.331	13.7(1.8)	A.13a	31
HC_7N	J=33→32	37223.49	37223.49(0)	30.4	33.00	8873(50)	24.673	13.9(0.0)	A.13b	23
HCC^{13}CCCN	J=14→13	37238.38	37238.50(1)	13.4	14.00	1209(50)	23.751	15.0(0.1)	A.13b	3
HCCC^{13}CCN	J=14→13	37242.91	37242.79(1)	13.4	14.00	1208(50)	23.750	14.1(0.1)	A.13b	3
HC_7N	v_{15}^e J=33→32	37270.04	37269.80(20)	119.6	33.00	402(50)	21.577	11.8(0.2)	A.13b	24
HC_5N	J=14→13	37276.99	37276.98(0)	13.4	14.00	41028(0)	27.275	14.1(0.0)	A.13b	7
HC_7N	v_{15}^f J=33→32	37293.76	37293.69(1)	119.6	33.00	401(0)	21.575	13.0(0.2)	A.13b	25
C_8H^-	J=32→31	37333.21	37333.17(23)	29.6	32.00	400(0)	20.064	13.8(1.8)	A.13b	4
HC_5N	v_{11}^e J=14→13	37338.60	37338.45(5)	167.0	13.90	250(0)	22.179	14.5(0.0)	A.13b	8
HNCCC	J=4(3)→3(3)	37346.08	37346.48(6)	4.5	0.25	150(0)	25.149	14.5(0.0)	A.13b	1
HC_5N	v_{11}^f J=14→13	37371.15	37371.29(10)	167.0	13.90	199(0)	21.953	13.4(0.4)	A.13b	9
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{27}{2}$ → $\frac{25}{2}$ a	37426.19	37426.15(1)	12.8	26.70	2484(50)	23.328	13.7(0.0)	A.13b	17
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{27}{2}$ → $\frac{25}{2}$ b	37431.25	37431.23(5)	12.8	26.70	2483(50)	23.327	13.4(0.0)	A.13b	18
H^{13}CCCCCCCN	J=34→33	37511.15	37511.33(43)	31.5	34.00	49(16)	19.444	11.1(1.2)	A.14a	5
C_6H	v_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{27}{2}$ → $\frac{25}{2}$	37526.68	37526.64(23)	79.4	13.00	296(0)	21.917	13.9(1.8)	A.14a	19
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{43}{2}$ → $\frac{41}{2}$ a	37601.70	37601.70(0)	20.3	43.00	245(49)	20.390	14.5(0.0)	A.14a	8
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{43}{2}$ → $\frac{41}{2}$ b	37603.35	37603.35(0)	20.3	43.00	441(49)	20.978	14.5(0.0)	A.14a	8
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{27}{2}$ → $\frac{25}{2}$ a	37678.94	37678.92(0)	35.2	27.00	2146(0)	23.164	14.1(0.0)	A.14a	20
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{43}{2}$ → $\frac{41}{2}$	37688.22	37688.22(0)	57.9	85.50	341(97)	20.031	14.5(0.0)	A.14a	9
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{27}{2}$ → $\frac{25}{2}$ b	37710.20	37710.16(0)	35.2	27.00	1947(0)	23.065	13.7(0.0)	A.14b	21
HC_9N	J=65→64	37766.44	37766.43(0)	59.8	65.00	873(0)	21.509	13.9(0.1)	A.14b	32
HC_9N	v_{19}^e J=65→64	37804.50	37804.48(6)	132.0	65.00	242(0)	20.225	14.2(0.5)	A.14b	33
HC_9N	v_{19}^f J=65→64	37823.52	37823.47(4)	132.0	65.00	290(0)	20.405	13.4(0.2)	A.14b	34
C_6H	v_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{27}{2}$ → $\frac{25}{2}$	37840.50	37840.47(3)	96.9	13.30	193(48)	21.458	12.9(0.4)	A.14b	22
SiC_6	J=31→30	37896.90	37896.98(13)	29.1	31.00	96(0)	19.124	14.5(0.0)	A.14b	3
HC^{13}CCCCCCN	J=34→33	37897.94	37897.90(7)	31.8	34.00	192(0)	20.792	14.5(0.0)	A.14b	5
HCCCCCC^{13}CN	J=34→33	37912.06	37912.03(4)	31.8	34.00	192(0)	20.791	15.4(0.4)	A.14b	3
MgC_5N	N_J=33 $\frac{65}{2}$ →32 $\frac{63}{2}$	38042.49	38042.49(5)	31.0	32.50	143(0)	19.705	14.5(0.0)	A.15a	11
MgC_5N	N_J=33 $\frac{67}{2}$ →32 $\frac{65}{2}$	38044.30	38044.36(2)	31.0	33.50	285(0)	20.368	14.5(0.0)	A.15a	11
C_4H	$N_{J,F}$=4$_{9/2,4}$-3$_{7/2,3}$+4$_{9/2,5}$-3$_{7/2,4}$	38049.65	38049.61(23)	4.6	8.77	7221(0)	27.432	13.7(1.8)	A.15a	5
C_4H	$N_{J,F}$=4$_{7/2,4}$-3$_{5/2,3}$+4$_{7/2,3}$-3$_{5/2,2}$	38088.46	38088.42(0)	4.6	6.73	5638(0)	27.448	14.1(0.0)	A.15a	6
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{65}{2}$ → $\frac{63}{2}$ a	38132.73	38132.73(0)	30.6	64.80	283(47)	19.932	14.5(0.0)	A.15a	19
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{65}{2}$ → $\frac{63}{2}$ b	38133.30	38133.30(0)	30.6	64.80	331(47)	20.086	14.5(0.0)	A.15a	19
^{13}CCCN	N=4→3 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=5→4	38159.86	38160.04(8)	4.6	3.80	94(0)	23.316	10.7(0.6)	A.15a	1
^{13}CCCN	N=4→3 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=4→3	38168.92	38168.92(0)	4.6	3.75	47(16)	22.635	14.5(0.0)	A.15a	2
^{13}CCCN	N=4→3 J=$\frac{7}{2}$ → $\frac{5}{2}$ F=4→3	38170.25	38170.25(0)	4.6	3.55	47(16)	22.690	14.5(0.0)	A.15a	2
^{13}CCCN	N=4→3 J=$\frac{7}{2}$ → $\frac{5}{2}$ F=3→2	38180.56	38180.56(0)	4.6	3.55	47(16)	22.689	14.5(0.0)	A.15a	3
HCC^{13}CCCCCN	J=34→33	38194.50	38194.64(7)	31.8	34.00	141(47)	20.476	13.5(0.6)	A.15a	3
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{65}{2}$ → $\frac{63}{2}$ a	38205.15	38205.15(0)	58.5	65.00	94(0)	18.823	14.5(0.0)	A.15b	20
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{65}{2}$ → $\frac{63}{2}$ b	38214.83	38214.83(0)	58.5	65.00	94(0)	18.822	14.5(0.0)	A.15b	21
C_4H	v_7=2 l=0 N_J=4$_{\frac{9}{2}}$ →3$_{\frac{7}{2}}$	38228.69	38228.69(1)	540.8	8.77	891(0)	25.335	14.0(0.1)	A.15b	7
Na^{37}Cl	J=3→2	38241.48	38241.48(0)	3.7	3.00	94(0)	21.244	14.5(0.0)	A.15b	1
MgC_6H	N_J=33 $\frac{65}{2}$ →32 $\frac{63}{2}$	38262.26	38262.21(9)	31.0	32.50	94(0)	21.422	14.5(0.0)	A.15b	13
MgC_6H	N_J=33 $\frac{67}{2}$ →32 $\frac{65}{2}$	38264.21	38264.21(0)	31.0	33.50	140(0)	21.797	14.5(0.0)	A.15b	14
C_4H	v_7=2 l=0 N_J=4$_{\frac{7}{2}}$ →3$_{\frac{5}{2}}$	38285.57	38285.51(2)	540.9	6.72	607(0)	25.216	14.0(0.1)	A.15b	8
HCCC^{13}CCCCN	J=34→33	38329.79	38329.79(0)	32.2	34.00	140(0)	20.463	14.5(0.0)	A.15b	5
HC_9N	J=66→65	38347.43	38347.46(3)	61.7	66.00	791(47)	21.381	14.2(0.2)	A.15b	35

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	W=$\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul} \mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
HC_7N	J=34→33	38351.44	38351.42(0)	32.2	34.00	7814(0)	24.486	14.1(0.0)	A.15b	26
HC_9N	v_{19}^e J=66→65	38386.08	38385.83(4)	133.8	66.00	186(0)	19.930	15.1(0.4)	A.15b	36
HC_7N	v_{15}^e J=34→33	38399.40	38399.49(4)	121.4	34.00	464(46)	21.660	14.4(0.3)	A.15b	27
HC_9N	v_{19}^f J=66→65	38404.39	38404.55(9)	133.8	66.00	324(46)	20.488	15.1(0.8)	A.15b	37
HC_7N	v_{15}^f J=34→33	38423.83	38423.77(2)	121.4	34.00	602(46)	21.920	14.4(0.2)	A.15b	28
$HCCN^{13}C$	J=4→3	38438.82	38438.56(17)	6.9	5.00	92(0)	22.941	14.4(1.0)	A.15b	1
KCl	J=5→4	38443.80	38444.02(21)	5.5	5.00	92(31)	20.451	12.3(1.4)	A.15b	1
HC_7N	v_{15}=2 J=34→33 (l=0)	38469.48	38469.48(0)	210.9	34.00	92(31)	20.044	14.5(0.0)	A.16a	29
HC_7N	v_{15}=2 J=34→33 (l=-2)	38471.85	38471.85(0)	211.3	33.90	92(31)	20.047	14.5(0.0)	A.16a	30
HC_7N	v_{15}=2 J=34→33 (l=+2)	38474.41	38474.41(0)	211.3	33.90	92(31)	20.047	14.5(0.0)	A.16a	31
C_8H^-	J=33→32	38499.83	38499.87(23)	31.4	33.00	276(0)	19.632	14.5(1.8)	A.16a	5
C_6H^-	J=14→13	38551.81	38551.77(0)	13.9	14.00	1468(0)	22.633	13.8(0.1)	A.16a	3
$H^{13}CCCCCCCN$	J=35→34	38614.39	38614.04(12)	32.2	34.00	137(0)	20.436	16.2(0.4)	A.16a	6
MgC_3N	N_J=14 $\frac{27}{2}$ →13 $\frac{25}{2}$	38661.85	38661.77(1)	13.9	13.50	592(0)	22.302	13.9(0.1)	A.16a	5
MgC_3N	N_J=14 $\frac{29}{2}$ →13 $\frac{27}{2}$	38666.17	38666.19(2)	13.9	14.50	592(0)	22.230	13.6(0.1)	A.16a	6
MgC_4H	N_J=14 $\frac{27}{2}$ →13 $\frac{25}{2}$	38679.18	38679.18(0)	13.9	13.50	91(0)	22.610	14.5(0.0)	A.16a	5
MgC_4H	N_J=14 $\frac{29}{2}$ →13 $\frac{27}{2}$	38683.86	38683.86(0)	13.9	14.50	45(15)	21.844	14.5(0.0)	A.16a	6
CCS	N_J=3_3→2_2	38866.42	38866.40(1)	12.4	2.67	988(0)	25.996	13.9(0.1)	A.16b	2
C_5N^-	J=14→13	38887.77	38887.69(0)	14.0	14.00	852(45)	22.991	14.2(0.1)	A.16b	2
$H^{13}CCCCCN$	J=15→14	38899.90	38899.86(0)	14.9	15.00	985(45)	23.434	13.9(0.1)	A.16b	4
HC_9N	J=67→66	38928.42	38928.42(2)	63.5	67.00	760(0)	21.311	13.8(0.1)	A.16b	38
HC_9N	v_{19}^e J=67→66	38967.66	38967.61(1)	135.7	67.00	312(0)	20.420	14.4(0.1)	A.17a	39
HC_9N	v_{19}^f J=67→66	38987.26	38987.22(5)	135.7	67.00	223(0)	20.081	14.2(0.4)	A.17a	40
$HC^{13}CCCCCCN$	J=35→34	39012.54	39013.10(3)	32.2	34.00	178(0)	20.686	10.4(0.3)	A.17a	6
$HCCCCCC^{13}CN$	J=35→34	39027.08	39026.79(1)	32.2	34.00	178(0)	20.685	15.3(0.1)	A.17a	4
C_6H	v_{11} N_J=14 $\frac{29}{2}$ →13 $\frac{27}{2}$	39040.82	39040.79(1)	29.9	14.50	843(44)	22.815	13.8(0.1)	A.17a	23
C_6H	v_{11} N_J=14 $\frac{27}{2}$ →13 $\frac{25}{2}$	39057.97	39057.93(0)	29.9	13.50	709(0)	22.713	13.9(0.1)	A.17a	24
NaCl	J=3→2	39077.29	39077.29(0)	3.8	3.00	443(44)	22.775	14.5(0.0)	A.17a	1
MgC_5N	N_J=34 $\frac{67}{2}$ →33 $\frac{65}{2}$	39195.26	39195.18(5)	32.9	33.50	220(0)	20.077	14.5(0.0)	A.17a	12
MgC_5N	N_J=34 $\frac{69}{2}$ →33 $\frac{67}{2}$	39197.06	39197.00(3)	32.9	34.50	307(0)	20.384	14.5(0.0)	A.17a	12
$^{29}SiC_4$	J=13→12	39265.53	39266.31(3)	13.2	13.00	87(0)	20.358	11.8(0.6)	A.17b	3
C_5N	N_J=14 $\frac{29}{2}$ -13 $\frac{27}{2}$	39280.30	39280.40(0)	14.1	14.50	87(29)	21.527	14.5(0.0)	A.23a	1
C_5N	N_J=14 $\frac{27}{2}$ -13 $\frac{25}{2}$	39291.13	39291.13(0)	14.1	13.50	87(29)	21.598	14.5(0.0)	A.23a	2
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{67}{2}$ → $\frac{65}{2}$ a	39306.00	39306.00(0)	32.4	66.90	262(44)	19.789	14.5(0.0)	A.17b	22
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{67}{2}$ → $\frac{65}{2}$ b	39306.60	39306.60(0)	32.4	66.90	262(44)	19.789	14.5(0.0)	A.17b	22
$HCC^{13}CCCCCN$	J=35→34	39317.83	39317.81(0)	32.2	34.00	174(0)	20.658	14.3(0.0)	A.17b	4
$HCCCCC^{13}CCN$	J=35→34	39327.21	39327.02(9)	32.2	34.00	131(44)	20.369	15.7(1.0)	A.17b	4
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{45}{2}$ → $\frac{43}{2}$ a	39350.61	39350.63(3)	22.2	45.00	304(43)	20.515	14.5(0.0)	A.17b	10
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{45}{2}$ → $\frac{43}{2}$ b	39352.26	39352.26(0)	22.2	45.00	261(43)	20.360	14.5(0.0)	A.17b	10
$C^{13}CCN$	N=4→3 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=4→3	39362.32	39362.39(8)	4.7	2.85	87(0)	23.491	11.3(0.4)	A.17b	1
$C^{13}CCN$	N=4→3 J=$\frac{7}{2}$ → $\frac{5}{2}$ F=3→2	39375.57	39374.43(6)	4.7	2.53	217(43)	24.525	12.9(0.5)	A.17b	2
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{67}{2}$ → $\frac{65}{2}$ a	39380.82	39380.82(0)	60.4	67.00	130(0)	19.088	14.5(0.0)	A.17b	23
C_8H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{67}{2}$ → $\frac{65}{2}$ b	39390.46	39390.46(0)	60.4	67.00	130(0)	19.087	14.5(0.0)	A.17b	24
MgC_6H	N_J=34 $\frac{67}{2}$ →33 $\frac{65}{2}$	39421.72	39421.72(0)	32.9	33.50	173(0)	21.976	14.5(0.0)	A.17b	15
MgC_6H	N_J=34 $\frac{69}{2}$ →33 $\frac{67}{2}$	39423.68	39423.39(23)	32.9	34.50	346(0)	22.640	14.5(0.0)	A.17b	16
MgC_6H	N_J=34 $\frac{69}{2}$ →33 $\frac{67}{2}$	39423.68	39423.43(0)	32.9	34.50	130(0)	21.659	14.5(0.0)	A.17b	16
$CC^{13}CN$	N=4→3 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=4→3	39423.69	39423.69(0)	4.7	3.68	130(0)	23.635	14.5(0.0)	A.17b	1
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{45}{2}$ → $\frac{43}{2}$	39441.11	39441.02(2)	59.8	89.60	475(43)	20.270	14.5(0.0)	A.17b	11
$CC^{13}CN$	N=4→3 J=$\frac{7}{2}$ → $\frac{5}{2}$ F=3→2	39441.72	39441.93(5)	4.7	1.71	302(0)	25.247	14.5(0.0)	A.17b	2
$HCCC^{13}CCCCN$	J=35→34	39457.10	39457.10(0)	32.2	34.00	173(0)	20.645	14.5(0.0)	A.18a	6
$HCCCC^{13}CCCN$	J=35→34	39460.57	39460.37(0)	32.2	34.00	173(0)	20.645	14.5(0.0)	A.18a	2
HC_7N	J=35→34	39479.39	39479.37(0)	34.1	35.00	7885(43)	24.437	13.9(0.0)	A.18a	32
HC_9N	J=68→67	39509.41	39509.40(1)	65.4	68.00	774(0)	21.299	13.9(0.1)	A.18a	41
HC_7N	v_{15}^e J=35→34	39528.75	39528.75(23)	123.3	35.00	258(0)	21.015	12.7(1.7)	A.18a	33
$HC^{13}CCCCN$	J=15→14	39530.29	39530.22(23)	15.2	15.00	816(0)	23.229	13.7(1.7)	A.18a	4
$HCCCC^{13}CN$	J=15→14	39545.02	39545.01(1)	15.2	15.00	1030(43)	23.462	14.0(0.1)	A.18a	4
HC_9N	v_{19}^e J=68→67	39549.23	39549.18(5)	137.6	68.00	300(43)	20.351	14.1(0.4)	A.18a	42
HC_7N	v_{15}^f J=35→34	39553.90	39553.77(3)	123.3	35.00	429(0)	21.524	13.9(0.2)	A.18a	34
HC_9N	v_{19}^f J=68→67	39569.13	39568.22(8)	137.6	68.00	86(0)	19.097	7.1(0.6)	A.18a	43
C_3N	N=4→3 a	39571.35	39571.33(0)	4.7	12.90	12806(43)	26.969	14.0(0.0)	A.18a	1
C_3N	N=4→3 b	39590.18	39590.15(0)	4.8	9.72	10181(43)	27.022	13.9(0.0)	A.18a	2
HC_7N	v_{15}=2 J=35→34 (l=-2)	39603.33	39603.33(0)	213.2	34.90	85(28)	19.912	14.5(0.0)	A.18a	35
HC_7N	v_{15}=2 J=35→34 (l=+2)	39606.12	39606.12(0)	213.2	34.90	85(28)	19.912	14.5(0.0)	A.18a	36
C_8H^-	J=34→33	39666.46	39666.49(23)	33.3	34.00	383(0)	19.899	14.0(1.7)	A.18a	6
HCCNC	J=4→3	39742.55	39742.54(3)	4.8	4.00	424(0)	24.653	14.2(0.2)	A.18b	1
SiC_4	J=13→12	39877.57	39877.53(1)	13.4	13.00	1637(42)	23.272	14.1(0.1)	A.18b	3
$HCC^{13}CCCN$	J=15→14	39898.21	39898.20(1)	15.3	15.00	922(0)	23.343	13.8(0.1)	A.18b	4
$HCCC^{13}CCN$	J=15→14	39903.07	39903.02(1)	15.3	15.00	1006(0)	23.429	13.8(0.1)	A.18b	4
HC_5N	J=15→14	39939.57	39939.55(0)	15.3	15.00	41604(0)	27.151	14.1(0.0)	A.18b	10
HC_5N	v_{11}^e J=15→14	40005.59	40005.60(9)	168.9	14.90	83(28)	20.942	13.1(0.7)	A.19a	11
HC_5N	v_{11}^f J=15→14	40040.46	40040.28(6)	168.9	14.90	125(0)	21.344	12.5(0.5)	A.19a	12
HC_9N	J=69→68	40090.40	40090.40(0)	67.3	69.00	621(0)	21.050	13.8(0.1)	A.19a	44
HC_5N	v_{11}=2 (l=0) J=15→14	40105.99	40105.96(0)	322.7	15.00	41(14)	20.233	14.5(0.0)	A.19a	13
HC_5N	v_{11}=2 (l=-2) J=15→14	40106.52	40106.52(0)	323.7	14.70	41(14)	20.253	14.5(0.0)	A.19a	13
HC_5N	v_{11}=2 (l=+2) J=15→14	40107.44	40107.44(0)	323.7	14.70	41(14)	20.253	14.5(0.0)	A.19a	13

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul}\mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
HC_9N	v_{19}^e J=69→68	40130.81	40130.45(10)	139.5	69.00	248(41)	20.130	16.1(0.4)	A.19a	45
$HCCCCCC^{13}CN$	J=36→35	40142.10	40142.41(9)	15.3	15.00	124(0)	21.114	14.8(0.2)	A.19a	5
HC_9N	v_{19}^f J=69→68	40151.00	40150.95(3)	139.5	69.00	206(0)	19.946	13.7(0.2)	A.19a	46
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{29}{2}\rightarrow\frac{27}{2}$ a	40198.32	40198.29(0)	14.7	28.70	2714(41)	23.273	13.8(0.0)	A.19a	25
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{29}{2}\rightarrow\frac{27}{2}$ b	40204.16	40204.15(0)	14.7	28.70	2672(0)	23.257	14.1(0.0)	A.19b	26
C_6H	v_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{29}{2}\rightarrow\frac{27}{2}$	40306.51	40306.52(3)	81.3	14.10	286(41)	21.730	13.3(0.2)	A.19b	27
MgC_5N	N_J=35 $\frac{69}{2}\rightarrow$34 $\frac{67}{2}$	40348.01	40347.94(4)	34.9	34.50	285(41)	20.280	14.5(0.0)	A.19b	13
MgC_5N	N_J=35 $\frac{71}{2}\rightarrow$34 $\frac{69}{2}$	40349.82	40349.69(4)	34.9	35.50	285(41)	20.251	14.5(0.0)	A.19b	13
$HCC^{13}CCCCCN$	J=36→35	40441.15	40441.15(5)	35.9	36.00	162(0)	20.500	13.9(0.4)	A.19b	5
$HCCCCC^{13}CCN$	J=36→35	40450.80	40450.77(4)	35.9	36.00	162(0)	20.499	13.3(0.3)	A.20a	5
C_3S	J=7→6	40465.01	40465.03(0)	7.8	7.00	1658(40)	24.989	14.2(0.1)	A.20a	2
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{29}{2}\rightarrow\frac{27}{2}$ a	40470.71	40470.68(0)	37.2	29.00	2102(40)	23.000	13.7(0.0)	A.20a	28
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{69}{2}\rightarrow\frac{67}{2}$ a	40479.26	40479.25(0)	34.4	68.90	283(40)	19.809	14.5(0.0)	A.20a	25
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{69}{2}\rightarrow\frac{67}{2}$ b	40479.90	40479.90(0)	34.4	68.90	323(40)	19.942	14.5(0.0)	A.20a	25
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{29}{2}\rightarrow\frac{27}{2}$ b	40502.50	40502.46(4)	37.2	29.00	2098(0)	22.997	13.9(0.0)	A.20a	29
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{17}{2}\rightarrow\frac{15}{2}$ a	40576.81	40576.81(0)	9.2	16.90	2690(40)	24.037	14.5(0.0)	A.20a	5
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{17}{2}\rightarrow\frac{15}{2}$ b	40580.95	40580.95(0)	9.2	16.90	2730(40)	24.052	14.5(0.0)	A.20a	6
MgC_6H	N_J=35 $\frac{69}{2}\rightarrow$34 $\frac{67}{2}$	40581.19	40581.19(0)	34.9	34.50	40(13)	20.457	14.5(0.0)	A.20a	17
MgC_6H	N_J=35 $\frac{71}{2}\rightarrow$34 $\frac{69}{2}$	40583.15	40583.15(0)	34.9	35.50	241(40)	22.220	14.5(0.0)	A.20a	17
$HCCC^{13}CCCCN$	J=36→35	40584.40	40584.40(0)	36.0	36.00	120(0)	20.199	14.5(0.0)	A.20a	7
$HCCCC^{13}CCCN$	J=36→35	40587.97	40587.97(0)	36.0	36.00	120(40)	20.199	14.5(0.0)	A.20a	3
HC_7N	J=36→35	40607.33	40607.31(0)	36.1	36.00	7173(40)	24.286	13.8(0.0)	A.20a	37
C_6H	v_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{29}{2}\rightarrow\frac{27}{2}$	40643.28	40643.30(5)	98.9	14.30	160(0)	21.127	13.5(0.4)	A.25b	30
HC_7N	v_{15}^e J=36→35	40658.11	40658.13(2)	125.3	36.00	479(40)	21.579	13.5(0.2)	A.20a	38
HC_9N	J=70→69	40671.39	40671.39(1)	69.3	70.00	639(0)	21.049	14.5(0.1)	A.20a	47
HC_7N	v_{15}^f J=36→35	40683.97	40683.94(4)	125.3	36.00	479(0)	21.577	14.0(0.2)	A.20a	39
HC_9N	v_{19}^e J=70→69	40712.38	40712.28(3)	141.5	70.00	279(0)	20.219	14.5(0.0)	A.20b	48
HC_7N	v_{15}=2 J=36→35 (l=0)	40731.97	40731.90(0)	214.7	36.00	80(27)	19.781	14.5(0.0)	A.20b	40
HC_9N	v_{19}^f J=70→69	40732.86	40732.80(0)	141.5	70.00	199(40)	19.881	14.5(0.0)	A.20b	49
HC_7N	v_{15}=2 J=36→35 (l=-2)	40734.81	40734.80(0)	215.1	35.90	80(27)	19.784	14.5(0.0)	A.20b	41
HC_7N	v_{15}=2 J=36→35 (l=+2)	40737.84	40737.80(0)	215.1	35.90	79(26)	19.783	14.5(0.0)	A.20b	42
MgCN	N_J=4 $\frac{7}{2}\rightarrow$3 $\frac{5}{2}$	40750.24	40750.79(2)	4.9	3.50	79(26)	21.978	10.6(0.2)	A.20b	1
HCN	v_2=1 J=13→13 l=1	40766.88	40766.62(8)	1411.2	0.08	317(40)	28.272	13.6(0.6)	A.20b	1
$H^{13}CCCCCCCN$	J=37→36	40820.83	40820.93(1)	37.2	37.00	119(0)	20.152	13.9(0.3)	A.20b	7
C_8H^-	J=35→34	40833.07	40833.05(4)	35.3	35.00	277(40)	19.515	13.9(0.3)	A.20b	7
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{17}{2}\rightarrow\frac{15}{2}$ a	40854.57	40854.76(1)	43.8	16.40	1539(39)	23.502	15.0(0.0)	A.20b	7
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{17}{2}\rightarrow\frac{15}{2}$ b	40855.01	40854.83(1)	43.8	16.40	1539(39)	23.502	15.0(0.0)	A.20b	7
C_4H	v_7 N_J=4 $\frac{9}{2}\rightarrow$3 $\frac{7}{2}$ a	40924.21	40923.96(2)	249.0	7.92	1022(39)	25.505	14.6(0.2)	A.20b	9
C_4H	v_7 N_J=4 $\frac{9}{2}\rightarrow$3 $\frac{7}{2}$ b	40994.13	40993.77(1)	249.0	7.92	1213(39)	25.675	14.5(0.1)	A.21a	10
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{47}{2}\rightarrow\frac{45}{2}$ a	41099.52	41099.52(0)	24.1	47.00	233(39)	20.162	14.5(0.0)	A.21a	12
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{47}{2}\rightarrow\frac{45}{2}$ b	41101.17	41101.17(0)	24.1	47.00	311(39)	20.449	14.5(0.0)	A.21a	12
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{47}{2}\rightarrow\frac{45}{2}$	41193.99	41193.95(3)	61.8	93.60	271(0)	19.619	13.5(0.2)	A.21a	13
o-H_2C_3	$J_{K,k}$=$2_{1,2}\rightarrow1_{1,1}$	41198.33	41198.33(0)	2.0	1.50	155(0)	23.936	14.5(0.0)	A.21a	1
$HC^{13}CCCCCCN$	J=37→36	41241.74	41241.68(4)	37.6	37.00	116(39)	20.115	13.0(0.3)	A.21b	7
HC_9N	J=71→70	41252.37	41252.40(2)	71.3	71.00	578(39)	20.920	14.0(0.1)	A.21b	50
HC_9N	v_{19}^e J=71→70	41294.00	41293.69(6)	143.4	71.00	269(38)	20.155	17.7(0.5)	A.21b	51
C_6H^-	J=15→14	41305.45	41305.43(1)	15.9	15.00	1612(38)	22.589	14.3(0.1)	A.21b	4
HC_9N	v_{19}^f J=71→70	41314.72	41314.46(6)	143.5	71.00	345(38)	20.404	17.5(0.5)	A.21b	52
MgC_3N	N_J=15 $\frac{29}{2}\rightarrow$14 $\frac{27}{2}$	41423.43	41423.40(2)	15.9	14.50	572(38)	22.127	14.0(0.1)	A.21b	7
MgC_3N	N_J=15 $\frac{31}{2}\rightarrow$14 $\frac{29}{2}$	41427.75	41427.78(2)	15.9	15.50	610(38)	22.124	14.0(0.2)	A.21b	8
MgC_4H	N_J=15 $\frac{29}{2}\rightarrow$14 $\frac{27}{2}$	41442.02	41442.02(0)	15.9	14.50	76(25)	22.291	14.5(0.0)	A.21b	7
l-HC_4N	N_J=$9_9\rightarrow8_8$	41442.83	41442.83(0)	10.8	8.89	152(38)	22.026	14.5(0.0)	A.21b	4
MgC_4H	N_J=15 $\frac{31}{2}\rightarrow$14 $\frac{29}{2}$	41446.70	41446.70(0)	15.9	15.50	76(25)	22.224	14.5(0.0)	A.21b	8
$H^{13}CCCCCN$	J=16→15	41493.17	41493.12(1)	16.9	16.00	797(0)	23.093	13.4(0.1)	A.22a	5
MgC_5N	N_J=36 $\frac{71}{2}\rightarrow$35 $\frac{69}{2}$	41500.77	41500.78(23)	36.8	35.50	266(0)	20.152	14.5(0.0)	A.22a	14
MgC_5N	N_J=36 $\frac{73}{2}\rightarrow$35 $\frac{71}{2}$	41502.57	41502.43(23)	36.9	36.50	152(0)	19.564	14.5(0.0)	A.22a	14
l-HC_4N	N_J=$9_{10}\rightarrow8_9$	41527.91	41527.99(5)	10.2	9.96	114(0)	21.618	13.0(0.7)	A.22a	5
SiC_6	J=34→33	41564.20	41564.20(0)	34.9	34.00	132(38)	19.259	14.5(0.0)	A.22a	4
$HCC^{13}CCCCCN$	J=37→36	41564.47	41564.46(0)	37.9	37.00	132(38)	20.242	14.5(0.0)	A.22a	6
$HCCCCC^{13}CCN$	J=37→36	41574.39	41574.39(0)	37.9	37.00	76(25)	19.682	14.5(0.0)	A.22a	6
p-H_2C_3	$J_{K,k}$=$2_{0,2}\rightarrow1_{0,1}$	41584.68	41584.60(12)	3.0	2.00	75(25)	22.922	12.9(0.8)	A.23a	1
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{71}{2}\rightarrow\frac{69}{2}$ a	41652.52	41652.51(3)	36.4	70.90	263(38)	19.680	15.2(0.2)	A.22a	26
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{71}{2}\rightarrow\frac{69}{2}$ a	41652.52	41652.53(3)	36.4	70.90	263(38)	19.680	15.2(0.2)	A.22a	26
C_5N^-	J=15→14	41665.41	41665.51(2)	16.0	15.00	563(38)	22.440	14.1(0.1)	A.22a	3
$HCCCC^{13}CCCN$	J=37→36	41715.37	41715.67(5)	38.0	37.00	112(37)	20.075	11.3(0.8)	A.22b	4
HC_7N	J=37→36	41735.26	41735.27(23)	38.1	37.00	7257(0)	24.243	14.5(0.0)	A.22b	43
MgC_6H	N_J=36 $\frac{71}{2}\rightarrow$35 $\frac{69}{2}$	41740.66	41740.10(23)	36.8	35.50	150(0)	21.715	14.5(0.0)	A.22b	18
MgC_6H	N_J=36 $\frac{73}{2}\rightarrow$35 $\frac{71}{2}$	41742.61	41742.61(0)	36.9	36.50	112(0)	21.400	14.5(0.0)	A.22b	18
HC_7N	v_{15}^e J=37→36	41787.45	41787.41(3)	127.3	37.00	410(37)	21.369	13.9(0.3)	A.22b	44
$Si^{17}O$	J=1→0	41794.66	41794.66(0)	2.0	1.00	112(37)	24.564	14.5(0.0)	A.22b	1

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul} \mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
HC_7N	v_{15}^f J=37→36	41814.03	41814.03(3)	127.3	37.00	559(37)	21.677	14.7(0.2)	A.22b	45
C_6H	v_{11} N_J=15 $\frac{31}{2}$→14 $\frac{29}{2}$	41830.10	41829.80(2)	31.9	15.50	707(37)	22.503	12.4(0.2)	A.22b	31
HC_9N	J=72→71	41833.35	41833.41(0)	73.3	72.00	669(0)	21.040	13.5(0.0)	A.22b	53
C_6H	v_{11} N_J=15 $\frac{29}{2}$→14 $\frac{27}{2}$	41847.01	41846.98(2)	31.9	14.50	706(37)	22.569	13.7(0.1)	A.22b	32
HC_7N	v_{15}=2 J=37→36 (l=0)	41863.19	41863.19(0)	216.8	37.00	74(25)	19.658	14.5(0.0)	A.22b	46
HC_7N	v_{15}=2 J=37→36 (l=-2)	41866.28	41866.28(0)	217.1	36.90	74(25)	19.660	14.5(0.0)	A.22b	47
HC_7N	v_{15}=2 J=37→36 (l=+2)	41869.57	41869.57(0)	217.1	36.90	74(25)	19.660	14.5(0.0)	A.22b	48
HC_9N	v_{19}^e J=72→71	41875.52	41875.56(5)	145.4	72.00	148(37)	19.532	13.9(0.4)	A.22b	54
HC_9N	v_{19}^f J=72→71	41896.58	41896.53(4)	145.5	72.00	148(37)	19.531	13.8(0.3)	A.22b	55
$H^{13}CCCCCCCN$	J=38→37	41924.05	41924.05(6)	39.2	38.00	185(37)	20.542	13.9(0.4)	A.22b	8
o-H_2C_3	$J_{K,k}=2_{1,1}\rightarrow1_{1,0}$	41967.67	41967.71(2)	2.0	1.50	221(37)	24.277	14.7(0.6)	A.23a	2
C_8H^-	J=36→35	41999.69	41999.59(3)	37.3	36.00	184(0)	19.052	13.6(0.2)	A.23a	8
C_5N	N_J=15 $\frac{31}{2}$ -14 $\frac{29}{2}$	42086.41	42086.04(14)	16.2	15.50	73(24)	21.216	11.1(1.3)	A.23a	3
C_5N	N_J=15 $\frac{29}{2}$ -14 $\frac{27}{2}$	42097.16	42097.10(6)	16.2	14.50	146(37)	21.975	13.1(0.5)	A.23a	4
$HC^{13}CCCCN$	J=16→15	42165.58	42165.52(1)	17.2	16.00	839(36)	23.128	13.9(0.1)	A.23a	5
$HCCCC^{13}CN$	J=16→15	42181.30	42181.26(1)	17.2	16.00	875(36)	23.169	13.8(0.1)	A.23a	5
c-C_3H_2 (para)	$J_{K,k}=4_{3,1}\rightarrow4_{2,2}$	42231.25	42231.20(5)	30.9	3.25	218(36)	23.839	13.8(0.4)	A.23b	1
$^{29}SiC_4$	J=14→13	42285.88	42285.65(1)	15.2	14.00	109(0)	20.427	13.0(0.0)	A.23b	4
$HC^{13}CCCCCCN$	J=38→37	42356.34	42356.38(15)	39.6	38.00	72(24)	19.591	14.4(1.2)	A.23b	8
$HCCCCCC^{13}CN$	J=38→37	42372.13	42372.15(0)	39.7	38.00	144(0)	20.282	14.5(0.0)	A.23b	6
^{30}SiO	J=1→0	42373.42	42373.44(1)	2.0	1.00	1622(36)	27.224	14.5(0.0)	A.23b	1
HC_9N	J=73→72	42414.34	42414.35(2)	75.3	73.00	503(0)	20.727	13.8(0.1)	A.23b	56
HC_9N	v_{19}^e J=73→72	42457.08	42457.10(6)	147.5	73.00	215(0)	19.876	14.1(0.2)	A.24a	57
HC_9N	v_{19}^f J=73→72	42478.44	42478.51(5)	147.5	73.00	143(36)	19.469	13.3(0.4)	A.24a	58
$HCC^{13}CCN$	J=16→15	42558.03	42558.00(1)	17.4	16.00	927(36)	23.219	13.7(0.1)	A.24a	5
$HCCC^{13}CN$	J=16→15	42563.21	42563.19(2)	17.4	16.00	856(36)	23.138	14.1(0.1)	A.24a	5
HC_5N	J=16→15	42602.15	42602.15(0)	17.4	16.00	37916(71)	26.929	13.9(0.0)	A.24a	14
MgC_5N	N_J=37 $\frac{73}{2}$→36 $\frac{71}{2}$	42653.51	42653.55(4)	38.9	36.50	177(0)	19.693	14.5(0.0)	A.24a	15
MgC_5N	N_J=37 $\frac{75}{2}$→36 $\frac{73}{2}$	42655.32	42655.25(3)	38.9	37.50	177(0)	19.666	14.5(0.0)	A.24a	15
HC_5N	v_{11}^e J=16→15	42672.57	42672.84(2)	170.9	15.90	602(35)	22.791	13.0(0.2)	A.24a	15
$HCC^{13}CCCCCN$	J=38→37	42687.79	42687.61(2)	40.0	38.00	71(24)	19.564	13.0(0.1)	A.24a	7
$HCCCCC^{13}CCN$	J=38→37	42697.98	42698.05(20)	40.0	38.00	71(24)	19.563	13.2(2.6)	A.24a	7
HC_5N	v_{11}^f J=16→15	42709.76	42709.81(10)	171.0	15.90	141(35)	21.341	14.2(0.8)	A.24b	16
SiC_6	J=35→34	42786.62	42786.79(8)	37.0	35.00	141(35)	19.264	12.4(0.6)	A.24b	5
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{73}{2}$ → $\frac{71}{2}$ a	42825.78	42825.78(0)	38.4	72.90	211(35)	19.402	14.5(0.0)	A.24b	27
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{73}{2}$ → $\frac{71}{2}$ b	42826.50	42826.50(0)	38.4	72.90	211(35)	19.402	14.5(0.0)	A.24b	27
$HCCC^{13}CCCCN$	J=38→37	42839.00	42839.45(23)	40.0	38.00	140(0)	20.245	13.0(1.6)	A.24b	8
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{49}{2}$ → $\frac{47}{2}$ a	42848.42	42848.39(23)	26.2	49.00	210(0)	19.976	13.9(1.6)	A.24b	14
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{49}{2}$ → $\frac{47}{2}$ b	42850.08	42850.56(23)	26.2	49.00	386(0)	20.582	17.7(1.6)	A.24b	14
HC_7N	J=38→37	42863.20	42863.16(0)	40.1	38.00	6098(35)	24.016	13.8(0.0)	A.24b	49
^{29}SiO	J=1→0	42879.95	42879.96(1)	2.1	1.00	2241(35)	27.536	14.1(0.1)	A.24b	1
MgC_6H	N_J=37 $\frac{73}{2}$→36 $\frac{71}{2}$	42900.12	42900.43(9)	38.9	36.50	210(35)	21.999	14.5(0.0)	A.24b	19
MgC_6H	N_J=37 $\frac{75}{2}$→36 $\frac{73}{2}$	42902.07	42901.47(24)	38.9	37.50	70(23)	20.873	14.5(0.0)	A.24b	19
HC_7N	v_{15}^e J=38→37	42916.79	42916.86(3)	129.3	38.00	559(35)	21.625	13.6(0.2)	A.24b	50
HC_7N	v_{15}^f J=38→37	42944.09	42944.24(5)	129.3	38.00	454(70)	21.415	14.5(0.0)	A.24b	51
SiC_4	J=14→13	42944.99	42944.98(1)	15.5	14.00	1500(105)	23.037	14.5(0.0)	A.24b	4
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{49}{2}$ → $\frac{47}{2}$	42946.87	42946.94(6)	63.8	97.60	279(35)	19.567	14.5(0.0)	A.24b	15
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{31}{2}$ → $\frac{29}{2}$ a	42970.43	42970.44(2)	16.8	30.70	2334(35)	22.988	13.9(0.0)	A.25a	33
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{31}{2}$ → $\frac{29}{2}$ b	42977.09	42977.04(1)	16.8	30.70	2472(35)	23.045	14.1(0.0)	A.25a	34
HC_7N	v_{15}=2 J=38→37 (l=0)	42994.40	42994.00(0)	218.8	38.00	209(35)	20.638	14.5(0.0)	A.25a	52
HC_9N	J=74→73	42995.32	42995.40(0)	77.4	74.00	452(35)	20.593	14.5(0.0)	A.25a	59
HC_7N	v_{15}=2 J=38→37 (l=-2)	42997.75	42997.54(0)	219.2	37.90	139(35)	20.235	14.5(0.0)	A.25a	53
HC_7N	v_{15}=2 J=38→37 (l=+2)	43001.31	43001.10(0)	219.2	37.90	35(12)	18.848	14.5(0.0)	A.25a	54
$H^{13}CCCCCCCN$	J=39→38	43027.27	43027.73(0)	41.3	39.00	139(35)	20.204	14.7(0.0)	A.25a	9
HC_9N	v_{19}^e J=74→73	43038.65	43038.65(5)	149.5	74.00	139(35)	19.411	13.2(0.3)	A.25a	60
HC_9N	v_{19}^f J=74→73	43060.30	43060.30(0)	149.6	74.00	139(35)	19.409	14.5(0.0)	A.25a	61
C_6H	v_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{31}{2}$ → $\frac{29}{2}$	43086.35	43085.94(10)	83.4	15.10	381(35)	21.881	16.6(0.8)	A.25a	35
C_8H^-	J=37→36	43166.30	43166.15(4)	39.4	37.00	207(34)	19.113	13.3(0.3)	A.25a	9
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{31}{2}$ → $\frac{29}{2}$ a	43262.44	43262.43(1)	39.2	31.00	1851(34)	22.739	14.0(0.0)	A.25b	36
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{31}{2}$ → $\frac{29}{2}$ b	43294.79	43294.76(1)	39.3	31.00	1813(34)	22.718	14.0(0.0)	A.25b	37
$Si^{13}CC$	$J_{K_a,K_b}=2_{1,2}\rightarrow1_{1,1}$	43413.98	43414.29(5)	5.0	1.50	136(34)	24.832	11.5(0.4)	A.25b	1
SiO	J=1→0	43423.85	43423.84(0)	2.1	1.00	35364(34)	30.282	14.0(0.0)	A.25b	1
C_6H	v_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{31}{2}$ → $\frac{29}{2}$	43446.00	43446.17(6)	101.0	15.40	271(34)	21.515	14.9(0.3)	A.25b	38
$HCCCCCC^{13}CN$	J=39→38	43487.14	43487.10(7)	41.3	39.00	203(34)	20.573	14.6(0.4)	A.26a	7
HC_9N	J=75→74	43576.30	43576.37(5)	79.5	75.00	472(34)	20.608	13.8(0.2)	A.26a	62
HC_9N	v_{19}^e J=75→74	43620.21	43620.21(0)	151.6	75.00	235(34)	19.912	14.5(0.0)	A.26a	63
HCCN	$N_J=2_3\rightarrow1_2$	43624.20	43624.20(0)	3.1	2.84	504(34)	24.682	14.5(0.0)	A.26a	1
HC_9N	v_{19}^f J=75→74	43642.16	43642.30(6)	151.7	75.00	134(34)	19.350	13.3(0.4)	A.26a	64
AlCl	J=3→2	43731.80	43731.78(7)	4.2	0.93	234(33)	26.777	14.9(0.5)	A.26b	1
MgC_5N	N_J=38 $\frac{75}{2}$→37 $\frac{73}{2}$	43806.25	43806.45(3)	41.0	37.50	100(0)	19.065	14.5(0.0)	A.26b	16
MgC_5N	N_J=38 $\frac{77}{2}$→37 $\frac{75}{2}$	43808.06	43807.98(5)	41.0	38.50	200(33)	19.731	14.5(0.0)	A.26b	16
$HCC^{13}CCCCCN$	J=39→38	43811.10	43810.74(6)	41.3	39.00	166(33)	20.366	14.5(0.0)	A.26b	8
$HCCCCC^{13}CCN$	J=39→38	43821.56	43821.56(0)	41.3	39.00	100(33)	19.854	14.1(0.0)	A.26b	8
$HCCC^{13}CCCCN$	J=39→38	43966.29	43966.29(0)	41.3	39.00	99(33)	19.843	14.5(0.0)	A.27a	9

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul}\mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
CCS	N_J=4$_3$→3$_2$	43981.02	43981.06(0)	12.9	2.67	989(33)	25.874	14.5(0.1)	A.27a	3
HC_7N	J=39→38	43991.13	43991.15(0)	42.2	39.00	5535(33)	23.867	14.0(0.0)	A.27a	55
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{75}{2}$ → $\frac{73}{2}$ a	43999.03	43999.03(0)	40.5	74.90	231(33)	19.438	14.5(0.0)	A.27a	28
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{75}{2}$ → $\frac{73}{2}$ b	43999.79	43999.79(0)	40.5	74.90	296(33)	19.689	14.5(0.0)	A.27a	28
HC_7N	ν_{15}^e J=39→38	44046.13	44046.17(4)	131.4	39.00	361(33)	21.137	13.8(0.3)	A.27a	56
C_6H^-	J=16→15	44059.08	44059.09(0)	18.0	16.00	1576(0)	22.437	14.5(0.0)	A.27a	5
C_6H^-	J=16→15	44059.08	44059.14(23)	18.0	16.00	98(0)	19.665	14.5(0.0)	A.27a	5
MgC_6H	N_J=38$_{\frac{77}{2}}$→37$_{\frac{75}{2}}$	44061.53	44061.53(0)	41.0	38.50	66(22)	20.757	14.5(0.0)	A.27a	20
HC_7N	ν_{15}^f J=39→38	44074.15	44074.21(3)	131.5	39.00	492(33)	21.445	14.6(0.2)	A.27a	57
$H^{13}CCCN$	J=5→4	44084.16	44084.16(0)	6.3	5.00	4557(0)	26.236	14.5(0.0)	A.27a	2
$H^{13}CCCCCN$	J=17→16	44086.43	44086.43(0)	19.0	17.00	656(33)	22.776	14.5(0.0)	A.27a	6
c-C_3H_2 (ortho)	$J_{K,k}$=3$_{2,1}$→3$_{1,2}$	44104.78	44104.76(1)	15.8	2.09	1998(33)	26.452	13.9(0.0)	A.27a	1
HC_7N	ν_{15}=2 J=39→38 (l=0)	44125.58	44125.50(0)	220.9	39.00	33(11)	18.733	14.5(0.0)	A.27a	58
HC_7N	ν_{15}=2 J=39→38 (l=-2)	44129.21	44129.20(0)	221.3	38.90	33(11)	18.735	14.5(0.0)	A.27a	59
$H^{13}CCCCCCCN$	J=40→39	44130.48	44130.50(0)	41.3	39.00	131(33)	20.119	14.5(0.0)	A.27a	10
HC_7N	ν_{15}=2 J=39→38 (l=+2)	44133.06	44133.20(0)	221.3	38.90	33(11)	18.735	14.5(0.0)	A.27a	60
$H^{13}CCCCCCCN$	J=40→39	44130.48	44130.53(4)	41.3	39.00	131(33)	20.119	14.2(0.4)	A.27a	10
HC_9N	J=76→75	44157.28	44157.26(3)	81.6	76.00	327(33)	20.214	13.4(0.2)	A.27a	65
MgC_3N	N_J=16$_{\frac{31}{2}}$→15$_{\frac{29}{2}}$	44184.99	44185.02(3)	18.0	15.50	424(33)	21.696	14.0(0.2)	A.27a	9
MgC_3N	N_J=16$_{\frac{33}{2}}$→15$_{\frac{31}{2}}$	44189.30	44189.27(3)	18.0	16.50	456(33)	21.708	13.9(0.2)	A.27a	10
HC_9N	ν_{19}^e J=76→75	44201.78	44201.78(0)	153.8	76.00	163(33)	19.517	14.5(0.0)	A.27b	66
MgC_4H	N_J=16$_{\frac{31}{2}}$→15$_{\frac{29}{2}}$	44204.83	44204.83(0)	18.0	15.50	33(11)	21.311	14.5(0.0)	A.27b	9
MgC_4H	N_J=16$_{\frac{33}{2}}$→15$_{\frac{31}{2}}$	44209.51	44209.51(0)	18.0	16.50	65(22)	21.941	14.5(0.0)	A.27b	10
HC_9N	ν_{19}^f J=76→75	44224.01	44224.54(7)	153.8	76.00	260(33)	19.986	16.0(0.5)	A.27b	67
C_8H^-	J=38→37	44332.91	44333.02(2)	41.5	38.00	291(32)	19.402	15.2(0.2)	A.27b	10
C_5N^-	J=16→15	44443.04	44443.10(23)	18.1	16.00	611(0)	22.392	13.9(1.5)	A.27b	4
o-H_2C_4	$J_{K,k}$=5$_{1,5}$→4$_{1,4}$	44471.14	44471.13(23)	6.0	4.80	996(0)	24.392	14.3(1.5)	A.28a	4
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{51}{2}$ → $\frac{49}{2}$ a	44597.31	44597.31(0)	28.3	51.00	191(32)	19.801	14.5(0.0)	A.28a	16
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{51}{2}$ → $\frac{49}{2}$ b	44598.98	44598.98(0)	28.3	51.00	191(32)	19.801	14.5(0.0)	A.28a	16
C_6H	ν_{11} N_J=16$_{\frac{33}{2}}$→15$_{\frac{31}{2}}$	44619.38	44619.36(1)	34.0	16.50	638(32)	22.273	13.8(0.1)	A.28a	39
C_6H	ν_{11} N_J=16$_{\frac{31}{2}}$→15$_{\frac{29}{2}}$	44636.02	44635.98(1)	34.0	15.50	701(32)	22.430	13.8(0.1)	A.28a	40
o-H_2C_4	$J_{K,k}$=5$_{3,3}$→4$_{3,2}$+5$_{3,2}$→4$_{3,1}$	44645.59	44645.47(2)	114.1	3.20	700(32)	24.442	13.6(0.1)	A.28a	5
p-H_2C_4	$J_{K,k}$=5$_{2,4}$→4$_{2,3}$	44653.53	44653.62(3)	60.5	4.20	382(32)	23.563	14.1(0.2)	A.28a	3
p-H_2C_4	$J_{K,k}$=5$_{0,5}$→4$_{0,4}$	44659.01	44659.00(3)	6.4	5.00	286(32)	23.101	14.0(0.2)	A.28a	4
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{51}{2}$ → $\frac{49}{2}$	44699.74	44699.68(4)	66.0	102.00	254(32)	19.388	13.6(0.2)	A.24b	17
C_4H	ν_7 N_J=5$_{\frac{9}{2}}$ → 4$_{\frac{7}{2}}$ a	44712.64	44712.49(2)	254.3	8.73	888(32)	25.179	15.4(0.1)	A.28b	11
HC_9N	J=77→76	44738.25	44738.28(3)	83.7	77.00	253(32)	19.934	13.7(0.2)	A.28b	68
$HC^{13}CCCCN$	J=17→16	44800.86	44800.82(1)	19.4	17.00	758(32)	22.905	13.7(0.1)	A.28b	6
$HCCCC^{13}CN$	J=17→16	44817.56	44817.53(1)	19.4	17.00	883(32)	23.058	14.0(0.1)	A.28b	6
C_4H	ν_7 N_J=5$_{\frac{9}{2}}$ → 4$_{\frac{7}{2}}$ b	44830.60	44830.67(2)	254.3	8.73	757(32)	25.017	13.0(0.1)	A.28b	12
o-H_2C_4	$J_{K,k}$=5$_{1,4}$→4$_{1,3}$	44844.58	44844.54(1)	6.0	4.80	945(32)	24.332	13.7(0.1)	A.28b	6
$HCC^{13}CCCCCN$	J=40→39	44934.41	44934.41(0)	41.3	39.00	94(31)	19.771	14.5(0.0)	A.28b	9
MgC_5N	N_J=39$_{\frac{77}{2}}$→38$_{\frac{75}{2}}$	44958.98	44958.88(18)	43.2	38.50	94(31)	18.952	14.5(0.0)	A.29a	17
MgC_5N	N_J=39$_{\frac{79}{2}}$→38$_{\frac{77}{2}}$	44960.79	44960.46(7)	43.2	39.50	157(63)	19.437	14.5(0.0)	A.29a	17
$HCCCC^{13}CCCN$	J=40→39	45097.55	45098.02(14)	41.3	39.00	93(31)	19.759	11.5(1.0)	A.29a	5
HC_7N	J=40→39	45119.06	45119.07(0)	44.4	40.00	4630(31)	23.638	14.1(0.0)	A.29a	61
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{77}{2}$ → $\frac{75}{2}$ a	45172.28	45172.28(0)	42.7	76.90	186(0)	19.170	14.5(0.0)	A.29a	29
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{77}{2}$ → $\frac{75}{2}$ b	45173.08	45173.08(0)	42.7	76.90	186(0)	19.170	14.5(0.0)	A.29a	29
HC_7N	ν_{15}^f J=40→39	45204.20	45204.11(4)	133.6	40.00	371(31)	21.112	13.8(0.2)	A.29b	62
$HCC^{13}CCCN$	J=17→16	45217.84	45217.83(1)	19.5	17.00	742(31)	22.875	14.0(0.1)	A.29b	6
$HCCC^{13}CCN$	J=17→16	45223.35	45223.33(1)	19.5	17.00	773(31)	22.915	13.8(0.1)	A.29b	6
SiC_6	J=37→36	45231.46	45231.90(3)	41.2	37.00	154(31)	19.245	12.3(0.6)	A.29b	6
NaCN	$J_{K,k}$=3$_{1,3}$→2$_{1,2}$	45259.08	45259.07(0)	6.7	2.67	370(31)	22.600	14.5(0.0)	A.29b	3
NaCN	$J_{K,k}$=3$_{1,3}$→2$_{1,2}$	45259.08	45259.08(0)	6.7	2.67	370(31)	22.600	14.5(0.0)	A.29b	3
HC_5N	J=17→16	45264.72	45264.71(0)	19.6	17.00	31463(93)	26.621	13.9(0.0)	A.29b	17
$HC^{13}CCN$	J=5→4	45297.33	45297.29(0)	6.5	5.00	4188(31)	26.125	13.7(0.0)	A.29b	2
$HCC^{13}CN$	J=5→4	45301.71	45301.69(0)	6.5	5.00	4865(31)	26.274	14.2(0.0)	A.29b	2
$^{29}SiC_4$	J=15→14	45306.21	45306.21(0)	17.4	15.00	154(31)	20.637	14.5(0.0)	A.29b	5
HC_9N	J=78→77	45319.22	45319.33(4)	85.9	78.00	461(31)	20.508	15.8(0.2)	A.29b	69
HC_5N	ν_{11}^e J=17→16	45339.53	45339.31(10)	173.1	16.90	154(31)	21.303	11.9(0.7)	A.29b	18
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{19}{2}$ → $\frac{17}{2}$ a	45350.72	45350.92(1)	11.3	18.90	2027(31)	23.531	15.8(0.1)	A.29b	8
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{19}{2}$ → $\frac{17}{2}$ b	45354.96	45354.88(2)	11.3	18.90	1658(31)	23.330	14.4(0.1)	A.29b	9
HC_9N	ν_{19}^e J=78→77	45364.90	45365.16(7)	158.1	78.00	123(31)	19.183	12.9(0.5)	A.29b	70
CCS	N_J=3$_4$→2$_3$	45379.03	45378.99(0)	5.4	3.97	3374(31)	26.673	13.8(0.0)	A.29b	4
HC_9N	ν_{19}^f J=78→77	45387.72	45387.72(0)	158.1	78.00	92(31)	18.893	14.5(0.0)	A.29b	71
CH_3C_3N	N_J=11$_0$→10$_0$	45445.75	45445.50(9)	13.1	11.00	153(31)	21.540	15.7(0.6)	A.29b	4
HC_3N	J_F=5$_5$→4$_5$	45488.84	45488.84(0)	6.5	0.20	2623(31)	28.871	14.5(0.0)	A.30a	5
HC_3N	J=5→4	45490.31	45490.24(0)	6.5	5.00	109408(976)	29.383	13.6(0.0)	A.30a	5
HC_3N	J_F=5$_4$→4$_4$	45492.11	45492.11(0)	6.5	0.20	2257(30)	28.721	14.5(0.0)	A.30a	6
HC_3N	ν_7^e J=5→4	45602.17	45602.06(4)	326.6	4.80	303(30)	23.534	13.8(0.3)	A.30a	7
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{19}{2}$ → $\frac{17}{2}$ a	45660.82	45660.98(2)	46.0	18.50	1059(60)	22.896	14.4(0.1)	A.30a	10
C_5H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{19}{2}$ → $\frac{17}{2}$ b	45661.37	45661.21(2)	46.0	18.50	1059(60)	22.896	14.4(0.1)	A.30a	10
HC_3N	ν_7^f J=5→4	45667.55	45667.42(2)	326.6	4.80	242(0)	23.306	13.0(0.4)	A.30a	8
$HCCCCCC^{13}CN$	J=41→40	45717.14	45717.28(10)	46.1	41.00	151(30)	20.176	13.6(0.7)	A.30b	8

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul} \mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{33}{2}\rightarrow\frac{31}{2}$ a	45742.52	45742.48(23)	19.0	32.70	1898(0)	22.655	13.7(1.5)	A.30b	41
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{33}{2}\rightarrow\frac{31}{2}$ b	45750.05	45750.01(23)	19.0	32.70	1867(0)	22.639	13.7(1.5)	A.30b	42
$^{30}SiC_2$	$J_{K,k}=2_{0,2}\rightarrow1_{0,1}$	45754.87	45755.22(23)	3.3	2.00	301(0)	25.287	13.6(1.5)	A.30b	2
C_6H	ν_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{33}{2}\rightarrow\frac{31}{2}$	45866.22	45866.07(6)	85.6	16.10	359(30)	21.697	13.4(0.2)	A.30b	43
HC_9N	J=79→78	45900.20	45900.08(5)	88.1	79.00	448(30)	20.454	14.2(0.2)	A.30b	72
HC_9N	ν_{19}^e J=79→78	45946.45	45946.45(0)	160.3	79.00	119(30)	19.129	14.5(0.0)	A.30b	73
HC_9N	ν_{19}^f J=79→78	45969.57	45969.57(0)	160.3	79.00	179(30)	19.532	14.5(0.0)	A.31a	74
$Si^{13}CC$	$J_{Ka,Kb}=2_{0,2}\rightarrow1_{0,1}$	45970.88	45970.88(0)	3.3	2.00	387(30)	25.534	14.5(0.0)	A.31a	2
SiC_4	J=15→14	46012.39	46012.39(1)	17.7	15.00	1754(30)	23.055	14.2(0.1)	A.31a	5
l-HC_4N	$N_J=10_{10}\rightarrow9_9$	46047.50	46047.58(7)	13.1	9.90	148(30)	21.788	13.6(0.5)	A.31a	6
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{33}{2}\rightarrow\frac{31}{2}$ a	46054.11	46054.03(1)	41.5	33.00	1751(30)	22.559	13.5(0.1)	A.31a	44
$HCCCCC^{13}CCN$	J=41→40	46068.71	46068.62(4)	46.4	41.00	178(30)	20.333	12.7(0.4)	A.31a	9
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{33}{2}\rightarrow\frac{31}{2}$ b	46087.06	46087.04(1)	41.5	33.00	2015(30)	22.698	14.0(0.1)	A.31a	45
MgC_5N	$N_J=40_{\frac{79}{2}}\rightarrow39_{\frac{77}{2}}$	46111.71	46111.60(1)	45.4	39.50	118(30)	19.132	14.5(0.0)	A.31a	18
MgC_5N	$N_J=40_{\frac{81}{2}}\rightarrow39_{\frac{79}{2}}$	46113.51	46113.74(7)	45.4	40.50	178(30)	19.512	14.5(0.0)	A.31a	18
KCl	J=6→5	46131.70	46131.52(1)	7.7	6.00	266(30)	21.143	12.3(0.0)	A.31a	2
$HCCC^{13}CCCCN$	J=41→40	46220.87	46220.87(0)	46.6	41.00	118(29)	19.917	14.5(0.0)	A.31b	10
$HCCCC^{13}CCCN$	J=41→40	46224.93	46224.93(0)	46.6	41.00	118(29)	19.917	14.5(0.0)	A.31b	6
C_3S	J=8→7	46245.62	46245.57(23)	10.0	8.00	3675(0)	25.518	14.5(0.0)	A.31b	3
HC_7N	J=41→40	46246.98	46246.96(23)	46.6	41.00	4087(0)	23.463	14.5(0.0)	A.31b	63
^{13}CS	J=1→0	46247.56	46247.41(23)	2.2	1.00	3410(0)	28.798	14.5(0.0)	A.31b	1
C_6H	ν_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{33}{2}\rightarrow\frac{31}{2}$	46248.68	46248.68(0)	103.2	16.40	294(88)	21.469	14.5(0.0)	A.25b	46
HC_7N	ν_{15}^e J=41→40	46304.80	46304.64(7)	135.8	41.00	440(29)	21.233	15.3(0.4)	A.31b	64
HC_7N	ν_{15}^f J=41→40	46334.25	46334.16(5)	135.9	41.00	264(29)	20.720	13.1(0.3)	A.31b	65
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$ a	46346.20	46346.20(0)	30.6	53.00	234(29)	19.925	14.5(0.0)	A.31b	18
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$ b	46347.88	46347.88(0)	30.6	53.00	234(29)	19.925	14.5(0.0)	A.31b	18
MgC_6H	$N_J=40_{\frac{79}{2}}\rightarrow39_{\frac{77}{2}}$	46378.49	46378.49(0)	45.4	39.50	146(49)	21.480	14.5(0.0)	A.31b	21
MgC_6H	$N_J=40_{\frac{81}{2}}\rightarrow39_{\frac{79}{2}}$	46380.45	46380.45(0)	45.4	40.50	29(10)	19.845	14.5(0.0)	A.31b	21
$^{29}SiC_2$	$J_{K,k}=2_{0,2}\rightarrow1_{0,1}$	46387.49	46387.47(2)	3.3	2.00	672(29)	26.076	14.4(0.1)	A.31b	1
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{53}{2}\rightarrow\frac{51}{2}$	46452.60	46452.60(0)	68.2	106.00	291(29)	19.448	14.5(0.0)	A.32a	19
SiC_6	J=38→37	46453.86	46453.86(0)	43.5	38.00	146(29)	19.133	14.5(0.0)	A.32a	7
HC_9N	J=80→79	46481.17	46481.30(3)	90.4	80.00	494(29)	20.526	14.6(0.3)	A.32a	75
HC_9N	ν_{19}^e J=80→79	46528.01	46527.87(8)	162.5	80.00	232(29)	19.769	15.4(0.5)	A.32a	76
HC_9N	ν_{19}^f J=80→79	46551.42	46549.29(4)	162.6	80.00	261(29)	19.885	14.6(0.4)	A.32a	77
C_8H^-	J=40→39	46666.11	46666.06(5)	45.9	40.00	317(29)	19.385	14.1(0.3)	A.32a	11
$H^{13}CCCCCN$	J=18→17	46679.68	46679.66(3)	21.3	18.00	720(29)	22.756	14.0(0.2)	A.32a	7
HNCCC	J=5→4	46683.09	46683.02(3)	6.7	5.00	317(29)	22.678	14.7(0.4)	A.32a	2
c-C_3H_2 (para)	$J_{K,k}=2_{1,1}\rightarrow2_{0,2}$	46755.61	46755.61(1)	8.7	1.05	1521(29)	26.810	14.1(0.0)	A.32b	2
C_6H^-	J=17→16	46812.71	46812.67(0)	20.2	17.00	1431(29)	22.220	13.8(0.1)	A.32b	6
$HCCCCCC^{13}CN$	J=42→41	46832.14	46832.14(0)	48.3	42.00	57(19)	19.158	14.2(0.0)	A.32b	9
NaCN	$J_{K,k}=3_{0,3}\rightarrow2_{0,2}$	46847.73	46847.68(0)	4.5	3.00	1000(29)	23.443	14.0(0.1)	A.32b	4
NaCN	$J_{K,k}=3_{2,2}\rightarrow2_{2,1}$	46900.65	46900.72(6)	14.1	1.67	371(29)	23.035	17.9(0.5)	A.32b	5
MgC_3N	$N_J=17_{\frac{33}{2}}\rightarrow16_{\frac{31}{2}}$	46946.51	46946.36(4)	20.3	16.50	455(28)	21.644	13.1(0.2)	A.32b	11
MgC_3N	$N_J=17_{\frac{35}{2}}\rightarrow16_{\frac{33}{2}}$	46950.83	46950.71(2)	20.3	17.50	569(28)	21.808	14.6(0.1)	A.33a	12
NaCN	$J_{K,k}=3_{2,1}\rightarrow2_{2,0}$	46972.35	46972.41(5)	14.1	1.67	512(28)	23.355	14.1(0.4)	A.33a	6
HCN	ν_2=1 J=14→14 l=1	47023.15	47023.15(0)	1471.0	0.07	85(28)	26.886	14.5(0.0)	A.33a	2
SiC_2	$J_{K,k}=2_{0,2}\rightarrow1_{0,1}$	47064.82	47064.82(0)	3.4	2.00	13215(28)	29.040	13.9(0.0)	A.33a	2
$HCCCCC^{13}CCN$	J=42→41	47192.29	47192.15(9)	48.7	42.00	141(28)	20.050	13.7(0.5)	A.33a	10
C_5N^-	J=17→16	47220.65	47220.79(3)	20.4	17.00	450(28)	21.964	14.9(0.2)	A.33b	5
MgC_5N	$N_J=41_{\frac{81}{2}}\rightarrow40_{\frac{79}{2}}$	47264.42	47264.57(23)	47.6	40.50	168(28)	19.434	14.5(0.0)	A.33b	19
MgC_5N	$N_J=41_{\frac{83}{2}}\rightarrow40_{\frac{81}{2}}$	47266.23	47266.21(23)	47.6	41.50	84(28)	18.716	14.5(0.0)	A.33b	19
HC_7N	J=42→41	47374.90	47374.84(0)	48.9	42.00	4130(28)	23.426	13.8(0.0)	A.33b	66
C_6H	ν_{11} $N_J=17_{\frac{35}{2}}\rightarrow16_{\frac{33}{2}}$	47408.64	47408.63(2)	36.3	17.50	669(28)	22.201	13.8(0.1)	A.33b	47
C_6H	ν_{11} $N_J=17_{\frac{33}{2}}\rightarrow16_{\frac{31}{2}}$	47425.01	47424.92(1)	36.3	16.50	612(28)	22.172	13.8(0.2)	A.33b	48
$HC^{13}CCCCN$	J=18→17	47436.13	47436.14(2)	21.6	18.00	974(28)	23.042	14.8(0.1)	A.33b	7
$HCCCC^{13}CN$	J=18→17	47453.81	47453.85(0)	21.6	18.00	667(28)	22.663	14.2(0.1)	A.34a	7
HC_7N	ν_{15}^f J=42→41	47464.29	47464.24(1)	138.1	42.00	389(28)	21.062	13.7(0.2)	A.34a	67
$C^{36}S$	J=1→0	47508.78	47507.65(8)	2.3	1.00	166(0)	25.751	14.5(0.0)	A.34a	1
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{81}{2}\rightarrow\frac{79}{2}$ a	47518.77	47518.77(0)	47.2	80.90	194(55)	19.111	14.5(0.0)	A.34a	30
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{81}{2}\rightarrow\frac{79}{2}$ b	47519.65	47519.65(0)	47.2	80.90	166(55)	18.957	14.5(0.0)	A.34a	30
MgC_6H	$N_J=41_{\frac{81}{2}}\rightarrow40_{\frac{79}{2}}$	47537.94	47537.76(33)	47.6	40.50	55(18)	20.460	14.5(0.0)	A.34a	22
MgC_6H	$N_J=41_{\frac{83}{2}}\rightarrow40_{\frac{81}{2}}$	47539.90	47539.43(66)	47.6	41.50	28(9)	19.743	14.5(0.0)	A.34a	22
C_4H	$N_{J,F}=5_{11/2,5}$-$4_{9/2,4}$+$5_{11/2,6}$-$4_{9/2,5}$	47566.85	47566.77(0)	6.8	10.80	6750(28)	26.933	13.9(0.0)	A.34a	13
C_4H	$N_{J,F}=5_{9/2,5}$-$4_{7/2,4}$+$5_{9/2,4}$-$4_{7/2,3}$	47605.41	47605.47(0)	6.9	8.78	5965(28)	27.016	13.9(0.0)	A.34a	14
HC_9N	J=82→81	47643.11	47643.13(5)	94.9	82.00	248(28)	19.787	13.0(0.3)	A.34a	78
$^{13}CCCN$	N=5→4 J=$\frac{11}{2}\rightarrow\frac{9}{2}$ F=5→4	47711.04	47711.04(0)	6.9	4.80	55(18)	22.320	14.5(0.0)	A.34a	4
$^{13}CCCN$	N=5→4 J=$\frac{9}{2}\rightarrow\frac{7}{2}$ F=4→3	47722.07	47722.07(0)	6.9	3.64	55(18)	22.596	14.5(0.0)	A.34a	5
MgNC	$N_J=4_{\frac{7}{2}}\rightarrow3_{\frac{5}{2}}$	47726.48	47727.18(23)	5.7	3.50	1730(27)	24.841	15.8(1.4)	A.34b	3
MgNC	$N_J=4_{\frac{9}{2}}\rightarrow3_{\frac{7}{2}}$	47741.70	47741.37(23)	5.7	4.50	2224(27)	24.840	15.9(1.4)	A.34b	4
C_4H	ν_7=2 l=0 $N_J=5_{\frac{11}{2}}\rightarrow4_{\frac{9}{2}}$	47792.85	47792.83(1)	543.1	10.80	959(27)	24.976	14.1(0.1)	A.34b	15
C_8H^-	J=41→40	47832.71	47832.57(3)	48.2	41.00	273(27)	19.187	13.4(0.3)	A.34b	12
C_4H	ν_7=2 l=0 $N_J=5_{\frac{9}{2}}\rightarrow4_{\frac{7}{2}}$	47849.61	47849.54(2)	543.1	8.78	710(27)	24.882	13.7(0.1)	A.34b	16

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Molecular species	Quantum numbers of the transition	ν_{rest} (MHz)	ν_{obs} (MHz)	E_{up} (K)	S_{ul}	$W=\int T_{MB} dv$ (mK·kms^{-1})	$ln\frac{3k_B W}{8\pi^3 \nu_{rest} S_{ul} \mu^2}$ (Rot. Diagram)	Vexp (kms^{-1})	Fig.	Line count
$HCC^{13}CCCN$	J=18→17	47877.64	47877.59(2)	21.8	18.00	737(27)	22.753	14.2(0.1)	A.34b	7
$HCCC^{13}CCN$	J=18→17	47883.47	47883.44(2)	21.8	18.00	737(27)	22.753	14.0(0.1)	A.34b	7
HC_5N	J=18→17	47927.27	47927.24(0)	21.9	18.00	29133(27)	26.430	14.0(0.0)	A.34b	19
HC_5N	v_{11}^f J=18→17	48048.32	48048.32(0)	175.4	17.90	81(27)	20.551	14.5(0.0)	A.35a	20
$HCCN^{13}C$	J=5→4	48048.41	48048.41(0)	6.9	5.00	108(27)	22.876	14.5(0.0)	A.35a	2
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{55}{2}$ → $\frac{53}{2}$ a	48095.09	48095.09(0)	32.9	55.00	135(27)	19.302	14.5(0.0)	A.35a	20
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{55}{2}$ → $\frac{53}{2}$ b	48096.76	48096.76(0)	32.9	55.00	162(27)	19.484	14.5(0.0)	A.35a	20
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{55}{2}$ → $\frac{53}{2}$	48205.45	48205.45(0)	70.5	110.00	404(0)	19.700	14.5(0.0)	A.35a	21
$C^{34}S$	J=1→0	48206.94	48206.94(0)	2.3	1.00	5003(27)	29.140	14.5(0.0)	A.35b	1
HC_9N	J=83→82	48224.07	48224.14(5)	97.2	83.00	188(27)	19.486	13.7(0.4)	A.35b	79
$HCC^{13}CCCCCN$	J=43→42	48304.31	48305.10(1)	51.0	43.00	188(27)	20.291	10.7(0.0)	A.35b	10
$HCCCCC^{13}CCN$	J=43→42	48315.85	48316.60(4)	51.0	43.00	80(27)	19.443	10.1(0.5)	A.35b	11
MgC_5N	N_J=42 $\frac{83}{2}$ →41 $\frac{81}{2}$	48417.14	48417.28(31)	50.0	41.50	53(18)	18.236	14.5(0.0)	A.35b	20
MgC_5N	N_J=42 $\frac{85}{2}$ →41 $\frac{83}{2}$	48418.94	48419.07(16)	50.0	42.50	80(27)	18.618	14.5(0.0)	A.35b	20
HC_7N	J=43→42	48502.81	48502.78(1)	51.2	43.00	4250(106)	23.407	13.7(0.1)	A.36a	68
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{35}{2}$ → $\frac{33}{2}$ a	48514.58	48514.57(0)	21.3	34.70	2283(27)	22.722	14.0(0.1)	A.36a	49
C_6H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{35}{2}$ → $\frac{33}{2}$ b	48523.04	48523.01(0)	21.3	34.70	2256(27)	22.710	13.9(0.0)	A.36a	50
NaCN	$J_{K,k}$=$3_{1,2}$→$2_{1,1}$	48548.22	48548.22(4)	7.1	2.67	769(27)	23.260	14.2(0.2)	A.36a	7
HC_7N	v_{15}^e J=43→42	48563.45	48563.49(2)	140.4	43.00	397(26)	21.036	14.1(0.3)	A.36a	69
$C^{33}S$	J=1→0	48586.50	48586.11(23)	2.3	1.00	715(26)	27.186	15.9(1.4)	A.36a	1
HC_7N	v_{15}^f J=43→42	48594.33	48594.33(0)	140.5	43.00	291(53)	20.724	14.5(0.0)	A.36a	70
C_6H	v_{11} $^2\Delta_{\frac{5}{2}}$ J=$\frac{35}{2}$ → $\frac{33}{2}$	48646.10	48645.82(6)	87.9	17.10	317(26)	21.452	14.8(0.4)	A.36a	51
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{83}{2}$ → $\frac{81}{2}$ a	48692.00	48692.00(0)	49.6	82.90	184(53)	19.012	14.5(0.0)	A.36a	31
C_8H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{83}{2}$ → $\frac{81}{2}$ b	48692.93	48692.93(0)	49.6	82.90	105(35)	18.452	14.5(0.0)	A.36a	31
MgC_6H	N_J=42 $\frac{83}{2}$ →41 $\frac{81}{2}$	48697.40	48697.07(16)	50.0	41.50	158(26)	21.460	14.5(0.0)	A.36a	23
MgC_6H	N_J=42 $\frac{85}{2}$ →41 $\frac{83}{2}$	48699.35	48698.96(12)	50.0	42.50	79(26)	20.743	14.5(0.0)	A.36a	23
HC_9N	J=84→83	48805.04	48806.79(16)	99.6	84.00	79(26)	18.590	10.8(2.7)	A.36b	80
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{35}{2}$ → $\frac{33}{2}$ a	48845.73	48845.70(1)	43.8	35.00	1597(26)	22.349	13.9(0.1)	A.36b	52
C_6H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{35}{2}$ → $\frac{33}{2}$ b	48879.32	48879.33(1)	43.8	35.00	1778(26)	22.456	14.1(0.1)	A.36b	53
CS	J=1→0	48990.96	48990.91(0)	2.4	1.00	88117(130)	31.992	13.9(0.0)	A.37a	1
C_6H	v_{11} $^2\Delta_{\frac{3}{2}}$ J=$\frac{35}{2}$ → $\frac{33}{2}$	49051.30	49051.19(7)	105.6	17.40	234(26)	21.122	13.2(0.5)	A.25b	54
SiC_4	J=16→15	49079.76	49079.72(1)	20.0	16.00	1296(26)	22.624	13.9(0.1)	A.37a	6
$C^{13}CCN$	N=5→4 J=$\frac{11}{2}$ → $\frac{9}{2}$ F=6→5	49197.23	49197.67(0)	7.1	4.83	77(26)	22.625	11.1(0.1)	A.37a	3
$C^{13}CCN$	N=5→4 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=5→4	49210.54	49210.54(0)	7.1	4.60	103(26)	22.961	14.5(0.0)	A.37a	4
$H^{13}CCCCCN$	J=19→18	49272.91	49272.87(2)	23.6	19.00	566(26)	22.407	13.9(0.2)	A.37b	8
$CC^{13}CN$	N=5→4 J=$\frac{11}{2}$ → $\frac{9}{2}$ F=6→5	49280.90	49280.90(0)	7.1	4.83	103(34)	22.908	14.5(0.0)	A.37b	3
$CC^{13}CN$	N=5→4 J=$\frac{11}{2}$ → $\frac{9}{2}$ F=5→4	49281.41	49281.41(0)	7.1	4.74	103(34)	22.926	14.5(0.0)	A.37b	3
$CC^{13}CN$	N=5→4 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=5→4	49299.11	49299.11(0)	7.1	3.78	51(17)	22.458	14.5(0.0)	A.37b	4
$CC^{13}CN$	N=5→4 J=$\frac{9}{2}$ → $\frac{7}{2}$ F=4→3	49299.64	49299.64(0)	7.1	2.78	51(17)	22.766	14.5(0.0)	A.37b	4
C_3N	N=5→4 a	49466.42	49466.39(0)	7.1	16.00	9904(26)	26.273	14.2(0.0)	A.38a	3
C_3N	N=5→4 b	49485.22	49485.19(0)	7.1	12.90	8085(102)	26.285	14.2(0.0)	A.38a	4
C_6H^-	J=18→17	49566.31	49566.27(0)	22.6	18.00	1169(25)	21.903	13.9(0.1)	A.38a	7
CH_3C_3N	N_J=12_3→11_3	49572.77	49572.77(0)	82.9	11.30	254(51)	21.935	14.5(0.0)	A.38a	5
HC_7N	J=44→43	49630.72	49630.68(0)	53.6	44.00	3347(51)	23.123	13.9(0.0)	A.38a	71
HCCNC	J=5→4	49678.07	49678.04(17)	7.2	5.00	278(51)	23.787	13.5(0.9)	A.38a	2
HC_7N	v_{15}^e J=44→43	49692.77	49692.86(23)	142.8	44.00	152(51)	20.028	13.6(0.0)	A.38a	72
MgC_3N	N_J=18 $\frac{35}{2}$ →17 $\frac{33}{2}$	49708.00	49708.13(7)	22.7	17.50	253(51)	20.940	14.2(0.3)	A.38b	13
MgC_3N	N_J=18 $\frac{37}{2}$ →17 $\frac{35}{2}$	49712.32	49712.02(1)	22.7	18.50	430(51)	21.415	16.3(0.1)	A.38b	14
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{57}{2}$ → $\frac{55}{2}$ a	49843.96	49843.96(0)	35.3	57.00	226(25)	19.746	14.5(0.0)	A.38b	22
C_7H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{57}{2}$ → $\frac{55}{2}$ b	49845.64	49845.64(0)	35.3	57.00	75(25)	18.647	14.5(0.0)	A.38b	22
C_7H	$^2\Pi_{\frac{3}{2}}$ J=$\frac{57}{2}$ → $\frac{55}{2}$	49958.30	49958.24(8)	72.9	114.00	225(25)	19.046	13.4(0.5)	A.39a	23
C_5N^-	J=18→17	49998.25	49998.76(9)	22.8	18.00	400(50)	21.733	14.2(0.3)	A.39a	6
$HC^{13}CCCCN$	J=19→18	50071.39	50071.38(23)	24.0	19.00	598(25)	22.446	14.1(1.4)	A.39a	8
$HCCCC^{13}CN$	J=19→18	50090.05	50090.09(4)	24.0	19.00	523(25)	22.311	13.5(0.3)	A.39a	8
C_4H	v_7 N_J=5 $\frac{11}{2}$ → 4 $\frac{9}{2}$ a	50097.69	50097.21(3)	251.4	10.10	896(50)	24.929	14.4(0.2)	A.39a	17
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{21}{2}$ → $\frac{19}{2}$ a	50124.61	50124.63(1)	13.7	20.90	1592(50)	23.089	14.5(0.1)	A.39a	11
C_5H	$^2\Pi_{\frac{1}{2}}$ J=$\frac{21}{2}$ → $\frac{19}{2}$ b	50129.05	50128.90(1)	13.7	20.90	1567(50)	23.073	14.7(0.1)	A.39a	12
C_8H^-	J=43→42	50165.89	50165.63(17)	53.0	43.00	124(25)	18.302	16.9(1.0)	A.39a	13
C_4H	v_7 N_J=5 $\frac{11}{2}$ → 4 $\frac{9}{2}$ b	50196.75	50196.48(1)	251.5	10.10	794(25)	24.805	14.5(0.0)	A.39a	18
C_6H	v_{11} N_J=18 $\frac{37}{2}$ →17 $\frac{35}{2}$	50197.90	50197.92(5)	38.7	18.50	422(25)	21.627	14.5(0.0)	A.39b	55
C_6H	v_{11} N_J=18 $\frac{35}{2}$ →17 $\frac{33}{2}$	50213.97	50213.90(23)	38.7	17.50	347(25)	21.488	13.8(1.4)	A.39b	56