NIST Recommended Rest Frequencies for Observed Interstellar Molecular Microwave Transitions—2002 Revision

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Critically evaluated transition frequencies for the molecular transitions detected in interstellar and circumstellar clouds are presented. The tabulated transitions are recommended for reference in future astronomical observations in the microwave and millimeter wavelength regions. The transition frequencies have been selected through a critical examination and analysis of the laboratory spectral data obtained from the literature. The information tabulated includes the species identity, transition frequency, uncertainty, and quantum state labels. For convenience, representative line antenna temperatures are listed for a typical astronomical source for each transition, and the references are cited for the laboratory and astronomical literature that have been employed. © *2004 by the U.S. Secretary of Commerce on behalf of the United States. All rights reserved.*
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Key words: hyperfine structure; interstellar molecules; microwave spectra; molecules; radio astronomy; rotational spectra.

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1. Introduction

The present tabulation of recommended transition frequencies for interstellar molecular species is the third revision of the previously published tables.[1–3] Since the last revision in 1991, approximately 5600 new transitions and 31 new molecular species have been added to the table which now lists more than 10 100 entries. This report updates the previous summaries, provides a current source of radioastronomical molecular line observations, and improves the accuracy for many previously tabulated transition frequencies, important for determining physical properties of the molecular clouds investigated.

2. Sources and Selection of Transition Frequencies

The present tabulation covers the astrophysical literature through December 2002. The 114 molecular species listed in Table 1 have now been identified in interstellar and circumstellar astronomical sources by means of their microwave spectra. The 22 additional interstellar species, identified by their infrared or ultraviolet spectra, and comet molecular species are listed in Table 2. Since no microwave transitions of these species have been reported yet, there will be no entries in Table 4 for these species.

The sources of the transition frequencies selected are as follows: laboratory measurements and predictions from the literature data, previously published tabulations of spectral frequencies,[4–27] spectral predictions of transition frequencies from reanalysis of the literature data carried out in the present work, and web-based catalogs.[26,27] The primary criterion for selection of the transition frequencies is the magnitude quoted for the estimated uncertainty in the measured frequency or the standard deviation of calculated frequencies. For well-behaved species, i.e., those whose spectra are well fit by established Hamiltonians, the calculated frequencies are often more accurate than individual measurements,

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thus many of the entries in Table 4 are calculated values and are identified with an asterisk (*) following the frequency entry. In entries where it was determined that the measured value had the lowest uncertainty value, a reference to the literature value is given.

For many of the interstellar species the previously published tabulations of critically evaluated laboratory data[4–25] were the source of both measured and calculated frequencies cited here. In many cases for species treated in the publications indicated above, new spectral data have been reported and have been combined with the earlier data sets and reanalyzed to provide predicted frequencies employed here. Some of the earlier reviews also have a frequency limit of 200 or 300 GHz, while new interstellar observations range up to 725 GHz. Thus, for most of the smaller species (diatomic, triatomic, etc.) calculations were extended to higher frequencies with new laboratory data included where available. The earlier reviews on CH_3OH,[6] CH_3CHO,[12] and $HCOOCH_3$[19] are outdated and new reviews were used ([Xu_97], [Kle91], and [Oes99]). In a few cases, e.g., for radical species such as C_2H, C_3N, C_4H, etc., the on-line catalogs developed at the Jet Propulsion Laboratory (JPL)[26] and at the University of Cologne[27] were used as the source of calculated frequencies.

3. Description of the Tables

Table 1 provides the identity of molecular species detected in astronomical sources in the radio, microwave, millimeter, and submillimeter region. For a number of the species one or more isotopically substituted forms have been observed and these are listed as well in Table 1. In Tables 1 and 2 the species are listed in alphabetic sequence according to empirical formula (Hill system) in the first column along with the common names of the molecule in the second column, and molecular formula in the third column. The reference(s) given in the last column of Tables 1 and 2 are for the original detection in the astronomical source. Table 3 provides the code and identification of the telescope used in the astronomical reference for each transition in Table 4.

The major emphasis of the present work is to provide the most accurate transition frequencies available for all of the astronomically observed spectral lines which are listed in Table 4. In Table 4 the recommended frequency is listed in column 1, followed by an asterisk in the case of calculated values, and its expanded uncertainty ($k=2$ or 2σ) is shown in units of the least significant digit(s). Uncertainties[28] for calculated frequencies are Type A with coverage factor $k=2$ (2 s.d.). For measured frequencies, the uncertainties are Type B and taken directly from the reference cited. The chemical formula for each molecular species is given in column 2, the chemical name in column 3, and the quantum number labels are shown in column 4. Columns 5, 6, and 7 present astronomical information: antenna temperature (T_r^* or T_a^*) or integrated intensity (full line width at half intensity times peak intensity) molecular cloud for the observation and abbreviation for the telescope employed (see Table 2 for a list of telescopes referenced), respectively. Most often the molecular cloud listed is Orion A (OriMC-1), Sagittarius B2 (SgrB2), Taurus Molecular Cloud 1 (TMC-1), or the circumstellar envelope of the infrared star IRC+10216, since these are the richest molecular sources and often provide the most intense emission lines. In column 8 the reference abbreviation for the astronomical observation is given and column 9 shows the reference to measured (or calculated) frequencies when taken from the literature. The reference code is based on the first three letters of the lead author's last name, plus the last two digits of the year of publication. If no laboratory reference appears, the frequencies presented are calculated in the present work. The reference list for Tables 1, 2, and 4 then follows Table 4.

4. Acknowledgments

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TABLE 1. Listing by empirical formula of the isotopic forms of the 114 interstellar species detected by their microwave spectrum and appearing in Table 4

Empirical formula	Name	Isotopic species	CA Number	Reference
AlCN	Aluminum isocyanide	AlNC[a]		Ziu02
AlCl	Aluminum monochloride	AlCl[a]	[13595-81-8]	Cer87c
		$Al^{37}Cl$[a]		
AlF	Aluminum monofluoride	AlF[a]	[13595-82-9]	Cer87c
CH	Methylidyne	CH	[3315-37-5]	Ryd74, Tur74a, McK40[d]
CH^+	Methyliumylidene	CH^+	[24361-82-8]	Cer97, Dou41
CHN	Hydrocyanic acid (Hydrogen cyanide)	HCN	[74-90-8]	Sny71a
		$H^{13}CN$		
		$HC^{15}N$		
		DCN		
CHN	Hydroisocyanic acid (Hydrogen isocyanide)	HNC	[6914-07-4]	Sny71
		$H^{15}NC$		
		$HN^{13}C$		
		DNC		
		$D^{15}NC$		
CHNO	Isocyanic acid	HNCO	[75-13-8]	Sny71
		DNCO		
CHNS	Isothiocyanic acid	HNCS	[3129-90-6]	Fre79
CHO	Oxomethyl (formyl)	HCO	[2597-44-6]	Sny76
CHO^+	Oxomethylium (formylium)	HCO^+	[17030-74-9]	Buh70
		$H^{13}CO^+$		
		$HC^{17}O^+$		
		$HC^{18}O^+$		
		DCO^+		
		$D^{13}CO^+$		
CHO^+	Hydroxymethylidyne	HOC^+	[60528-75-8]	Woo83, Ziu95a
CHO_2^+	Hydroxyoxomethylium	$HOCO^+$	[638-71-1]	Tha81
CHS^+	Thiooxomethylium	HCS^+	[59348-25-3]	Tha81
CH_2	Methylene	CH_2	[2465-56-7]	Hol89, Hol95
CH_2N^+	Iminomethylium	$HCNH^+$	[38263-97-7]	Ziu86a
CH_2N	Methylene amidogen	CH_2N	[15845-29-1]	Ohi94
CH_2N_2	Cyanamide	NH_2CN	[420-04-2]	Tur75a
CH_2O	Formaldehyde (methanal)	H_2CO	[50-00-0]	Sn
		$H_2{}^{13}CO$		
		$H_2C^{18}O$		
		HDCO		
		D_2CO		
CH_2O_2	Formic acid	HCOOH	[64-18-6]	Zuc71, Win75
		$H^{13}COOH$		
		HCOOD		
		DCOOH		
CH_2S	Methanethial (thioformaldehyde)	H_2CS	[865-36-1]	Sin73
		$H_2{}^{13}CS$		
		$H_2C^{34}S$		
		HDCS		
CH_3N	Methanimine	CH_2NH	[2053-29-4]	God73
		$^{13}CH_2NH$		
CH_3NO	Formamide	NH_2CHO	[75-12-7]	Rub71
		$NH_2{}^{13}CHO$		
CH_3O^+	Hydroxy methylium ion (Protonated formaldehyde)	H_2COH^+	[17691-31-5]	Ohi96
CH_4O	Methanol (methyl alcohol)	CH_3OH	[67-56-1]	Bal70
		$^{13}CH_3OH$		
		$CH_3{}^{18}OH$		
		CH_2DOH		
		CH_3OD		
		CHD_2OH		
CH_4S	Methane thiol (Methyl mercaptan)	CH_3SH	[74-93-1]	Lin79
CH_5N	Methanamine (methylamine)	CH_3NH_2	[74-89-5]	Fou74a, Kai74
CMgN	Magnesium cyanide	MgCN[a]	[74758-76-2]	Ziu95
CMgN	Magnesium isocyanide	$^{24}MgNC$[a]	[96491-22-4]	Gue86, Gue93
		$^{25}MgNC$[a]		
		$^{26}MgNC$[a]		

TABLE 1. Listing by empirical formula of the isotopic forms of the 114 interstellar species detected by their microwave spectrum and appearing in Table 4—Continued

Empirical formula	Name	Isotopic species	CA Number	Reference
CN	Cyanogen	CN ^{13}CN C^{15}N	[2074-87-5]	Jef70, McK40[d]
CNNa	Sodium cyanide	NaCN[a]	[143-33-9]	Tur94
CNSi	Silicon cyanide	SiCN[a]	[29210-66-0]	Gué00
CO	Carbon monoxide	CO ^{13}CO C^{17}O C^{18}O ^{13}C^{18}O	[630-08-0]	Wil70
CO^+	Carbon monoxide ion	CO^+	[12144-04-6]	Eri81, Lat93
COS	Carbon oxide sulfide (carbonyl sulfide)	OCS OC^{34}S O^{13}CS ^{18}OCS	[463-58-1]	Jef71
CP	Carbon monophosphide	CP[a]	[12326-85-1]	Sai89, Gue90
CS	Carbon monosulfide	CS C^{33}S C^{34}S C^{36}S ^{13}CS ^{13}C^{34}S	[2944-05-0]	Lis75
CSi	Silicon monocarbide	SiC[a]	[409-21-2]	Cer89
C_2H	Ethynyl	C_2H ^{13}CCH C^{13}CH C_2D	[2122-48-7]	Tuc78
C_2HN	Cyanomethylene	HCCN	[2612-62-6]	Gue91
C_2H_2N	Cyanomethyl	CH_2CN	[2932-82-3]	Irv88a
C_2H_2O	Ethanone (ketene)	H_2CCO	[463-51-4]	Tur77
C_2H_3N	Acetonitrile (methyl cyanide)	CH_3CN $^{13}CH_3CN$ $CH_3{}^{13}CN$ $CH_3C^{15}N$ CH_2DCN	[75-05-8]	Sol71
C_2H_3N	Isocyanomethane (methyl isocyanide)	CH_3NC	[593-75-9]	Cer88
C_2H_4O	Acetaldehyde (ethanal)	CH_3CHO	[75-07-0]	Got73
C_2H_4O	Oxirane (ethylene oxide)	*c*-C_2H_4O[b]	[75-21-8]	Dic97
C_2H_4O	Ethenol(vinylalcohol)	CH_2CHOH	[557-75-5]	Tur01
$C_2H_4O_2$	Methyl ester formic acid (methyl formate)	CH_3OCHO	[107-31-3]	Bro75
$C_2H_4O_2$	Acetic acid	CH_3COOH	[64-19-7]	Meh97
$C_2H_4O_2$	Hydroxyacetaldehyde (glycolaldehyde)	CH_2OHCHO	[141-46-8]	Hol00
C_2H_6O	trans-Ethanol (ethyl alcohol) gauche-Ethanol	*t*-CH_3CH_2OH *g*-CH_3CH_2OH	[64-17-5]	Zuc75 Pea96
C_2H_6O	Dimethyl ether (oxybismethane)	CH_3OCH_3	[115-10-6]	Sny74
$C_2H_6O_2$	Ethylene glycol	$HOCH_2CH_2OH$	[107-21-1]	Hol02
C_2O	Oxoethenylidene	CCO	[119754-08-4]	Ohi91
C_2S	Thioxoethenylidene	CCS CC^{34}S	[109545-32-6]	Yam90
C_2Si	Silicon carbide (silacyclopropyne)	SiC_2 $^{29}SiC_2$ $^{30}SiC_2$ Si^{13}CC	[12071-27-1]	Tha84
C_3	Tricarbon	C_3	[175780-10-6]	Gie01
C_3H	Cyclopropenylidyne	*c*-C_3H[b]	[16165-40-5]	Yam87a
C_3H	Propenylidyne	*l*-C_3H[c]	[53590-28-6]	Tha85
C_3HN	2-Propynenitrile (cyanoacetylene)	HCCCN H^{13}CCCN HC^{13}CCN HCC^{13}CN	[1070-71-9]	Tur71

TABLE 1. Listing by empirical formula of the isotopic forms of the 114 interstellar species detected by their microwave spectrum and appearing in Table 4—Continued

Empirical formula	Name	Isotopic species	CA Number	Reference
		$HCCC^{15}N$		
		DCCCN		
C_3HN	Ethyneisocyanide	HCCNC	[66723-45-3]	Kaw92
C_3HN	3-imino-1,2-Propadienylidene	HNCCC	[76092-41-6]	Kaw92a
C_3H_2	Cyclopropenylidene	c-C_3H_2[b]	[16165-40-5]	Mat85a
		c-$H^{13}CCCH$		
		c-$HC^{13}CCH$		
		c-C_3HD		
C_3H_2	1,2-Propadienylidene	l-H_2CCC[c]	[60731-10-4]	Cer91
$C_3H_2N^+$	Protonated 2-propynenitrile	$HCCCNH^+$	[76092-42-7]	Kaw94
C_3H_2O	2-Propynal	HCCCHO	[624-67-9]	Irv88
C_3H_3N	2-Propenenitrile (vinyl cyanide)	CH_2CHCN	[107-13-1]	Gar75
C_3H_4	1-Propyne (methyl acetylene)	CH_3CCH	[74-99-7]	Sny71
		$CH_3C^{13}CH$		
		$^{13}CH_3CCH$		
		CH_2DCCH		
C_3H_5N	Propanenitrile (ethyl cyanide)	CH_3CH_2CN	[107-12-0]	Joh77
C_3H_6O	2-Propanone (acetone)	$(CH_3)_2CO$	[67-64-1]	Com87, Sny02
C_3N	Cyanoethynyl	CCCN	[62435-43-2]	Gue77
C_3O	3-oxo-1,2-Propadienylidene	CCCO	[11127-17-6]	Mat84
C_3S	3-thioxo-1,2-Propadienylidene	CCCS	[109545-35-9]	Yam87
C_3Si	3-silanetetrayl-1,2-Propadienylidene (rhomboidal SiC_3)	SiC_3	[184291-25-1]	App99
C_4H	1,3-Butadiynyl radical	C_4H	[53561-65-2]	Gue77
		$H^{13}CCCC$		
		$HC^{13}CCC$		
		$HCC^{13}CC$		
		$HCCC^{13}C$		
		C_4D		
C_4H_2	Butatrienylidene	H_2CCCC	[70571-89-0]	Cer91a
C_4H_3N	2-Butynenitrile	CH_3CCCN	[13752-78-8]	Bro84
C_4Si	Silicon tetracarbide	SiC_4[a]	[144920-67-2]	Ohi89
C_5H	2,4-Pentadiynylidyne	C_5H	[104602-63-3]	Cer86
C_5HN	2,4-Pentadiynenitrile (cyanobutadiyne)	HC_5N	[59866-32-9]	Ave76
		$H^{13}CCCCCN$		
		$HC^{13}CCCCN$		
		$HCC^{13}CCCN$		
		$HCCC^{13}CCN$		
		$HCCCC^{13}CN$		
		DC_5N		
C_5H_4	1,3-Pentadiyne (methyl diacetylene)	CH_3C_4H	[4911-55-1]	Wal84
C_5N	4-Cyano-1,3-butadiynylium	C_5N	[129066-48-4]	Gue98
C_6H	1,3,5-Hexatriynyl	C_6H	[88053-50-3]	Suz86
C_6H_2	1,2,3,4,5-Hexapentaenylidene	$H_2CCCCCC$	[129066-05-3]	Lan97
C_7H	2,4,6-Heptatriynylidyne	C_7H[a]	[129066-03-1]	Gue97
C_7HN	2,4,6-Heptatriynenitrile	HC_7N	[65937-22-6]	Kro78
C_8H	1,3,5,7-Octatetraynyl	C_8H[a]	[88053-51-4]	Cer96
C_9HN	2,4,6,8-Nonatetraynenitrile	HC_9N	[67483-72-1]	Bro78
$C_{11}HN$	2,4,6,8,10-Undecapentaynenitrile	$HC_{11}N$	[78950-25-1]	Bel97
ClH	Hydrochloric acid	$H^{35}Cl$	[7647-01-0]	Sch95
		$H^{37}Cl$		
ClK	Potassium chloride	$K^{35}Cl$[a]	[7447-40-7]	Cer87c
		$K^{37}Cl$		
ClNa	Sodium chloride	$Na^{35}Cl$[a]	[7647-14-5]	Cer87c
		$Na^{37}Cl$[a]		
FH	Hydrogen fluoride	HF	[7664-39-3]	Neu97
FeO	Iron monoxide	FeO	[1345-25-1]	Wal02
HLi	Lithium hydride	^7LiH	[7580-67-8]	Com98
HNO	Nitrosyl hydride	HNO	[14332-28-6]	Uli77, Sny93
HN_2^+	Hydrodinitrogen(1+) (diazenylium)	N_2H^+	[12357-66-3]	Tur74, Gre74
		$^{15}NNH^+$		
		$N^{15}NH^+$		
		N_2D^+		

TABLE 1. Listing by empirical formula of the isotopic forms of the 114 interstellar species detected by their microwave spectrum and appearing in Table 4—Continued

Empirical formula	Name	Isotopic species	CA Number	Reference
HO	Hydroxyl	OH	[3352-57-6]	Wei63
		^{17}OH		
		^{18}OH		
H_2N	Amidogen	NH_2	[13770-40-6]	vDi93
H_2O	Water	H_2O	[7732-18-5]	Che69
		$H_2{}^{18}O$		
		HDO		
H_2S	Hydrogen sulfide	H_2S	[7783-06-4]	Tha72
		$H_2{}^{34}S$		
		HDS		
H_3^+	Hydrogen ion	H_3^+	[28132-48-1]	Geb96
		H_2D^+		Sta99
H_3N	Ammonia	NH_3	[7664-41-7]	Che68
		$^{15}NH_3$		
		NH_2D		
		NHD_2		
		ND_3		
H_3O^+	Oxonium hydride	H_3O^+	[28637-38-9]	Hol86
NO	Nitrogen oxide (nitric oxide)	NO	[10102-43-9]	Lis78a
NP	Phosphorous nitride	NP	[17739-47-8]	Tur87b
NS	Nitrogen sulfide (nitric sulfide)	NS	[12033-56-6]	Got75
		$N^{34}S$		
NSi	Siliconmononitride	SiN[a]	[12033-60-2]	Tur92
N_2O	Nitrogenoxide(nitrousoxide)	N_2O	[10024-97-2]	Ziu94
OS	Sulfurmonoxide	SO	[13827-32-2]	Got73b
		^{34}SO		
		^{33}SO		
		$S^{18}O$		
OS^+	Sulfur(1+), oxo	SO^+	[54724-05-9]	Tur92a
OSi	Silicon monoxide	SiO	[113443-18-8]	Wil71
		^{29}SiO		
		^{30}SiO		
O_2S	Sulfur dioxide	SO_2	[7446-09-5]	Sny75a
		$^{33}SO_2$		
		$^{34}SO_2$		
		$OS^{18}O$		
SSi	Silicon monosulfide	SiS	[25423-24-9]	Mor75
		$Si^{33}S$		
		$Si^{34}S$		
		^{29}SiS		
		^{30}SiS		

[a]Reported only in circumstellar clouds.
[b]The ''c'' refers to cyclic form.
[c]The ''l'' refers to linear form.
[d]Identification of the optical lines in McK40 were confirmed by W.S. Adams (Ada41).

TABLE 2. The 22 other species observed in comets, circumstellar, and interstellar sources at IR and UV wavelengths, which are not included in Table 4.

Empirical formula	Name	Isotopic species	Spectral region	CA Number	Reference
		Interstellar and Circumstellar Species			
CH_3	Methyl	CH_3	IR	[2229-07-4]	Feu00
CH_4	Methane	CH_4	IR	[74-82-8]	Lac91
CO_2	Carbon dioxide	CO_2	IR	[124-38-9]	Jus96
C_2	Carbon molecule	C_2	UV	[12070-15-4]	Cha80
C_2H_2	Ethyne (acetylene)	HCCH	IR	[74-86-2]	Lac89
C_2H_4	Ethylene	H_2CCH_2	IR	[74-85-11]	Cer01a
C_2H_6	Ethane	CH_3CH_3	IR	[74-84-0]	Wea99
C_4H_2	1,3-Butadiyane	HCCCCH	IR	[460-12-8]	Cer01a
C_5	Pentacarbon molecule	C_5	IR	[12595-82-3]	Ber89
C_6H_2	1,3,5-Hexatriyne	C_6H_6	IR	[71-43-2]	Cer01
HN	Imidogen	HN	UV	[13774-92-0]	Mey91, Swi41
HS	Mercapto (thiohydroxyl)	SH	IR	[13940-21-1]	Yam00
H_2	Hydrogen	H_2	UV	[1333-74-0]	Car70
H_4Si	Silane	SiH_4[a]	IR	[7803-62-5]	Kea93
		Species Observed Only in Comets			
CN^+	Cyanogen ion	CN^+	UV	[12539-57-0]	Val92
CN_2	Cyano imidogen	NCN	UV	[1884-64-6]	Val92
CO_2^+	Carbon dioxide ion	CO_2^+	UV	[12181-61-2]	Swi50
HO^+	Oxoniumylidene	OH^+	UV	[12259-29-9]	Val92
H_2O^+	Oxoniumyl	H_2O^+	UV	[56583-62-1]	Weh74
N_2^+	Nitrogen ion	N_2^+	UV	[13966-04-6]	Lut93
S_2	Sulfur	S_2	UV	[23550-45-0]	A'H83

TABLE 3. List of telescope abbreviations employed in Table 4.

ARO 46 m	Algonquin Radio Observatory, Lake Traverse, Ontario, Canada
Arecibo 350 m	Arecibo Observatory, Puerto Rico
BIMA Array	Berkeley–Illinois–Maryland Association Array, Hat Creek Radio Observatory, Hat Creek, California
BTL 7 m	Bell Telephone Laboratory, Holmdel, New Jersey
CAdY 13.7 m	Centro Astromico de Yebes, Guadalajara, Spain
CSO 10.4 m	Caltech Submillimeter Observatory, Mauna Kea, Hawaii
FCRAO 14 m	Five College Radio Astronomy Observatory, Quabbin Reservoir, Massachusetts
Hale 5 m	Hale Telescope, Mount Palomar, California
HHT	Heinrich Hertz Telescope, Mt. Graham, Arizona
IRAM 30 m	IRAM, Picoveleta, Spain
IRTF 3 m	Infrared Telescope Facility, Mauna Kea, Hawaii
IRT 13.7 m	Itapetinga Radio Telescope, Sao Paulo, Brazil
ISO 0.6m	Infrared Space Observatory, European Space Agency
JCMT 15 m	James Clerk Maxwell Telescope, Mauna Kea, Hawaii
KAO 1 m	G. P. Kuiper Airborne Observatory
KOSMA 3m	Kölner Observatorium für Lubman-Astronomie Gornergrat, Switzerland
MMT	Multiple Mirror Telescope, Mt. Lemmon, Arizona
MMWO 4.9 m	McDonald Millimeter Wave Observatory, Fort Davis, Texas
MPI 100 m	Max-Planck-Institut fur Radioastronomie, Effelsberg, Germany
NASA-C 70 m	NASA Canberra Deep Space Communications Complex, Australia
NASA DSN 70 m	NASA Goldstone Deep Space Network Telescope, Goldstone, California
NEROC 37 m (120 ft)	Northeast Radio Observatory Corporation, Haystack Observatory, Westford, Massachusetts
NMA Array	Nobeyama Millimeter Array, University of Tokyo, Nobeyama, Japan
NRAO 11 m (12 m)	National Radio Astronomy Observatory, Kitt Peak, Arizona
NRAO 43 m (140 ft)	National Radio Astronomy Observatory, Greenbank, West Virginia
NRL 26 m (85 ft)	Naval Research Laboratory, Maryland Point Observatory, Maryland
NRO 45 m	Nobeyama Radio Observatory, University of Tokyo, Nobeyama, Japan
OSO 26.6 m	Onsala Space Observatory, Onsala, Sweden
OSO 20 m	Onsala Space Observatory, Onsala, Sweden
OVRO 10.4 m	Owens Valley Radio Observatory, Owens Valley, California
Parkes 64 m	Division of Radiophysics CSIRO, Parkes, Australia
Pushino 22 m	Pushino, USSR
PdBI Array	IRAM Interfermeter on Plateau de Bure, Dépertment des Hautes Alpes, France
PIROG7	European Space Agency, Balloon experiment
SEST 15 m	Swedish ESO Submillimeter Telescope, LaSilla, Chile
SRCAL 25 m	SRC Appleton Laboratory, Chilbolton Observatory, Stockbridge, Hants, England
TAO 6 m	Tokyo Astronomical Observatory, Tokyo, Japan
TRAO 14 m	Taeduk Radio Astronomy Observatory, Korea Astronomy Observatory, Whaam, Yusong, Taejon 305-348, Korea
UKIRT 3.8 m	UK Infrared Telescope, Mauna Kea, Hawaii
UM/UCSD 1.5 m	University of Minnesota/UCSD 60 in, Mt. Lemmon, Arizona

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines.

Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
701.679 (4)	CH	$^2\Pi_{3/2} J=3/2\ F=2-2$	−0.6	W51	Arecibo 350 m	Ziu85	Ziu85
704.175*(10)	CH	$^2\Pi_{3/2}\ J=3/2\ F=2+-1-$	−0.10	W51	Arecibo 350 m	Tur88	Tur88
722.303*(10)	CH	$^2\Pi_{3/2} J=3/2\ F=1+-2-$	−0.12	W51	Arecibo 350 m	Tur88	Tur88
724.791 (4)	CH	$^2\Pi_{3/2}\ J=3/2\ F=1-1$	−0.5	W51	Arecibo 350 m	Ziu85	Ziu85
834.285*(1)	CH_3OH	1(1,0)−1(1,1) A−+	0.58	Sgr A	NRAO 43 m	Bal70	Xu_97
1065.076*(0)	CH_3CHO	1(1,0)−1(1,1) A−+	0.3	Sgr A	NRAO 43 m	Got73	Kle96
1371.722*(7)	CH_2CHCN	2(1,1)−2(1,2) $F=1-1$	0.012	Sgr B2(M)	Parkes 64 m	Gar75	Gar75
1371.797*(2)	CH_2CHCN	2(1,1)−2(1,2) $F=3-3$	0.034	Sgr B2(M)	Parkes 64 m	Gar75	Gar75
1371.934*(7)	CH_2CHCN	2(1,1)−2(1,2) $F=2-2$	0.019	Sgr B2(M)	Parkes 64 m	Gar75	Gar75
1538.108*(3)	NH_2CHO	1(1,0)−1(1,1) $F=1-1$	0.08	Sgr B2(M)	NRAO 43 m	Got73a	
1538.676*(2)	NH_2CHO	1(1,0)−1(1,1) $F=1-2$	0.09	Sgr B2(M)	NRAO 43 m	Got73a	
1539.264*(2)	NH_2CHO	1(1,0)−1(1,1) $F=2-1$	0.10	Sgr B2(M)	NRAO 43 m	Got73a	
1539.527*(4)	NH_2CHO	1(1,0)−1(1,1) $F=1-0$	0.08	Sgr B2(M)	NRAO 43 m	Got73a	
1539.832*(1)	NH_2CHO	1(1,0)−1(1,1) $F=2-2$	0.36	Sgr B2(M)	NRAO 43 m	Got73a	
1540.998*(4)	NH_2CHO	1(1,0)−1(1,1) $F=0-1$	0.10	Sgr B2(M)	NRAO 43 m	Got73a	
1570.805 (5)	$NH_2{}^{13}CHO$	1(1,0)−1(1,1) $F=2-2$	0.04	Sgr B2(M)	Parkes 64 m	Gar80	Gar80
1584.274 (2)	^{18}OH	$^2\Pi_{3/2}\ J=3/2\ F=1-2$	−0.05	Sgr B2(M)	Parkes 64 m	Wil81a	Bea78
1610.247*(2)	CH_3OCHO	1(1,0)−1(1,1) A	0.07	Sgr B2(M)	Parkes 64 m	Bro75	Oes99
1610.900*(2)	CH_3OCHO	1(1,0)−1(1,1) E	0.061	Sgr B2(M)	MPI 100 m	Chu75	Oes99
1612.2310(2)	OH	$^2\Pi_{3/2}\ J=3/2\ F=1-2$	−0.80	OriMC−2	Parkes 64 m	Gar64	ter72
1624.518 (10)	^{17}OH	$^2\Pi_{3/2}\ J=3/2\ F,F_1=7/2,4-7/2,4$	−0.045	Sgr A	Parkes 64 m	Gar76	Got74
1626.161 (10)	^{17}OH	$^2\Pi_{3/2}\ J=3/2\ F,F_1=9/2,4-9/2,4$	−0.056	Sgr A	Parkes 64 m	Gar76	Got74
1637.564 (2)	^{18}OH	$^2\Pi_{3/2}\ J=3/2\ F=1-1$	−0.2	Sgr A	Parkes 64 m	Gar70	Lov74
1638.805 (3)	HCOOH	1(1,0)−1(1,1)	0.04	Sgr B2(M)	NRA O43 m	Zuc71	Zuc71
1639.503 (2)	^{18}OH	$^2\Pi_{3/2}\ J-3/2\ F=2-2$	−0.5	Sgr A	Parkes 64 m	Gar70	Lov74
1665.4018(1)	OH	$^2\Pi_{3/2}\ J=3/2\ F=1-1$	−5.15	OriMC−2	NRAO 43 m	Wei68	ter72
1667.3590(1)	OH	$^2\Pi_{3/2}\ J=3/2\ F=2-2$	−6.30	OriMC−2	NRAO 43 m	Wei63	ter72
1692.795 (2)	^{18}OH	$^2\Pi_{3/2}\ J=3/2\ F=2-1$	−0.04	Sgr B2(M)	Parkes 64 m	Whi81	Bea78
1720.5300(1)	OH	$^2\Pi_{3/2}\ J=3/2\ F=2-1$	−1.10	OriMC−2	Parkes 64 m	Gar64	ter72
2661.61*(5)	HC_5N	$1-0\ F=1-1$	0.020	Sgr B2(M)	Parkes 64 m	Bro76	Bro76
2662.87*(5)	HC_5N	$1-0\ F=2-1$	0.036	Sgr B2(M)	Parkes 64 m	Bro76	Bro76
2664.76*(5)	HC_5N	$1-0\ F=0-1$	0.023	Sgr B2(M)	Parkes 64 m	Bro76	Bro76
3139.404*(1)	H_2CS	2(1,1)−2(1,2)	−0.33	Sgr B2(M)	Parkes 64 m	Sin73	
3195.162*(1)	CH_3CHO	2(1,1)−2(1,2) A−+	0.2	Sgr B2(M)	Parkes 64 m	Fou74	Kle96
3263.794 (3)	CH	$^2\Pi_{1/2} J=1/2\ F=0-1$	0.24	Cas A	OSO 25.6 m	Ryd76	Ryd74
3335.481 (2)	CH	$^2\Pi_{1/2}\ J=1/2\ F=1-1$	0.25	Cas A	OSO 25.6 m	Ryd76	Ryd74
3349.193 (3)	CH	$^2\Pi_{1/2}\ J=1/2\ F=1-0$	0.18	Cas A	OSO 25.6 m	Ryd76	Ryd74
4388.7786(3)	$H_2C^{18}O$	1(1,0)−1(1,1) $F=1-0$	[b]	Sgr B2(M)	Parkes 64 m	Gar71a	Tuc71
4388.7960*(4)	$H_2C^{18}O$	1(1,0)−1(1,1) $F=0-1$	[b]	Sgr B2(M)	Parkes 64 m	Gar71a	Tuc71
4388.7963(2)	$H_2C^{18}O$	1(1,0)−1(1,1) $F=2-2$	n.r.[c]	Sgr B2(M)	Parkes 64 m	Gar71a	Tuc71
4388.8011(2)	$H_2C^{18}O$	1(1,0)−1(1,1) $F=2-1$	[b]	Sgr B2(M)	Parkes 64 m	Gar71a	Tuc71
4388.8035(3)	$H_2C^{18}O$	1(1,0)−1(1,1) $F=1-2$	[b]	Sgr B2(M)	Parkes 64 m	Gar71a	Tuc71
4388.8084(3)	$H_2C^{18}O$	1(1,0)−1(1,1) $F=1-1$	[b]	Sgr B2(M)	Parkes 64 m	Gar71a	Tuc71
4592.9563(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,1/2−1/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4592.9738(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,1/2−3/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4592.9759(3)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,1/2−1/2,3/2	−0.1[b]	W33	MPI 100 m	Wil76b	Tuc71
4592.9857(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,1/2−5/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4592.9934(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,1/2−3/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0494(2)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,1/2−1/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0690(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,1/2−1/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0800(3)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,1/2−3/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0812(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,3/2−1/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0864(3)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,3/2−1/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.08654(5)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 5/2,3/2−5/2,3/2	−0.55[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0942(2)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 5/2,3/2−3/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0961(2)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,3/2−5/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0985(2)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,3/2−3/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.0994(3)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,1/2−3/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.1039(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,3/2−3/2,3/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.1741(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,3/2−1/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.1795(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,3/2−1/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.2003(1)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 5/2,3/2−3/2,1/2	−0.1[b]	W33	MPI 100 m	Wil76b	Tuc71
4593.2046(3)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 1/2,3/2−3/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
4593.2099(2)	$H_2{}^{13}CO$	1(1,0)−1(1,1) 3/2,3/2−3/2,1/2	[b]	W33	MPI 100 m	Wil76b	Tuc71
4617.121*(3)	NH_2CHO	2(1,1)−2(1,2) F=2−2	0.07	Sgr B2(M)	NRAO 43 m	Rub71	
4618.967*(1)	NH_2CHO	2(1,1)−2(1,2) F=3−3	0.30[d]	Sgr B2(M)	NRAO 43 m	Rub71	
4619.993*(3)	NH_2CHO	2(1,1)−2(1,2) F=1−1	<0.05	Sgr B2(M)	NRAO 43 m	Rub71	
4660.242 (3)	OH	$^2\Pi_{1/2}$ J=1/2 F=0−1	0.3	Sgr B2(M)	NRAO 43 m	Tha70	Rad68
4750.656 (3)	OH	$^2\Pi_{1/2}$ J=1/2 F=1−1	0.3[e]	Sgr B2(M)	Parkes 64 m	Gar71	Rad68
4765.562 (3)	OH	$^2\Pi_{1/2}$ J=1/2 F=1−0	1.7	W3	NRAO 43 m	Zuc68	Rad68
4829.6412(2)	H_2CO	1(1,0)−1(1,1) F=1−0	−0.2	TMC−1	NRAO 43 m	Pal69	Kuk75
4829.6587(2)	H_2CO	1(1,0)−1(1,1) F=0−1	[b]	TMC−1	NRAO 43 m	Pal69	Kuk75
4829.6594(2)	H_2CO	1(1,0)−1(1,1) F=2−2	[b]	TMC−1	NRAO 43 m	Pal69	Kuk75
4829.6639(2)	H_2CO	1(1,0)−1(1,1) F=2−1	−0.8[b]	TMC−1	NRAO 43 m	Pal69	Kuk75
4829.6664(2)	H_2CO	1(1,0)−1(1,1) F=1−2	[b]	TMC−1	NRAO 43 m	Pal69	Kuk75
4829.6710(2)	H_2CO	1(1,0)−1(1,1) F=1−1	[b]	TMC−1	NRAO 43 m	Pal69	Kuk75
4916.312 (8)	HCOOH	2(1,1)−2(1,2)	0.04	Sgr B2(M)	MPI 100 m	Win75	Win75
5005.3208(2)	CH_3OH	3(1,2)−3(1,3) A−+	0.05[d]	Sgr B2(M)	Parkes 64 m	Rob74	Heu73
5289.015*(19)	CH_2NH	1(1,0)−1(1,1) F=0−1	0.05	Sgr B2(M)	Parkes 64 m	God73	
5289.678*(22)	CH_2NH	1(1,0)−1(1,1) F=1−0	[b]	Sgr B2(M)	Parkes 64 m	God73	
5289.813*(6)	CH_2NH	1(1,0)−1(1,1) F=2−2	0.15[b]	Sgr B2(M)	Parkes 64 m	God73	
5290.614*(13)	CH_2NH	1(1,0)−1(1,1) F=2−1	[b]	Sgr B2(M)	Parkes 64 m	God73	
5290.879*(11)	CH_2NH	1(1,0)−1(1,1) F=1−2	0.07[b]	Sgr B2(M)	Parkes 64 m	God73	
5291.680*(18)	CH_2NH	1(1,0)−1(1,1) F=1−1	0.05	Sgr B2(M)	Parkes 64 m	God73	
5324.058*(35)	HC_5N	2−1 F=2−2	0.01	Sgr B2(M)	Parkes 64 m	Gar78a	Gar78a
5324.270*(35)	HC_5N	2−1 F=1−0	[b]	Sgr B2(M)	Parkes 64 m	Gar78a	Gar78a
5325.330*(27)	HC_5N	2−1 F=2−1	[b]	Sgr B2(M)	Parkes 64 m	Gar78a	Gar78a
5325.421*(27)	HC_5N	2−1 F=3−2	0.044	Sgr B2(M)	Parkes 64 m	Gar78a	Gar78a
5327.451*(41)	HC_5N	2−1 F=1−1	0.01	Sgr B2(M)	Parkes 64 m	Gar78a	Gar78a
6016.746 (8)	OH	$^2\Pi_{3/2}$ J=5/2 F=2−3	−0.12	G291.3−0.7	Parkes 64 m	Whi76	Rad68
6030.747 (5)	OH	$^2\Pi_{3/2}$ J=5/2 F=2−2	7.	W3(OH)	NRAO 43 m	Zuc72a	Mee75
6035.092 (5)	OH	$^2\Pi_{3/2}$ J−5/2 F=3−3	20.	W3(OH)	NRAO 43 m	Zuc72a	Mee75
6049.084 (8)	OH	$^2\Pi_{3/2}$ J=5/2 F=3−2	0.04	W33	MPI 100 m	Gar83	Bea78
6278.628*(3)	H_2CS	3(1,2)−3(1,3)	n.r.	Sgr B2(M)	ARO 46 m	Mac75	
6389.933*(2)	CH_3CHO	3(1,2)−3(1,3) A−+	0.045	Sgr B2(M)	ARO 46 m	Bel83b	Kle96
6668.5192(8)	CH_3OH	5(1,6)−6(0,6) A++	3880[e]	W3(OH)	NRAO 43 m	Men91	Bre95
7761.747 (5)	OH	$^2\Pi_{1/2}$ J=3/2 F=1−1	−0.10	W3(OH)	MPI 100 m	Wil90	Bal70a
7820.125 (5)	OH	$^2\Pi_{1/2}$ J=3/2 F=2−2	−0.026	W3(OH)	MPI 100 m	Wil90	Bal70a
7895.989 (2)	HC_7N	7−6 F=6−5	[b]	TMC−1	NEROC 37 m	Rod80	McC00
7896.010 (2)	HC_7N	7−6 F=7−6	0.006[b]	TMC−1	NEROC 37 m	Rod80	McC00
7896.023 (2)	HC_7N	7−6 F=8−7	[b]	TMC−1	NEROC 37 m	Rod80	McC00
7987.782 (10)	HC_5N	3−2 F=2−1	0.040	TMC−1	NEROC 37 m	Rod80	Rod80
7987.994 (10)	HC_5N	3−2 F=3−2	0.039	TMC−1	NEROC 37 m	Rod80	Rod80
7988.044 (10)	HC_5N	3−2 F=4−3	0.055	TMC−1	NEROC 37 m	Rod80	Rod80
8135.870 (5)	OH	$^2\Pi_{1/2}$ J=5/2 F=2−2	−0.031	W3(OH)	MPI 100 m	Wil90	Mee75
8189.587 (5)	OH	$^2\Pi_{1/2}$ J=5/2 F=3−3	+0.009	W3(OH)	MPI 100 m	Wil90	Mee75
8775.088 (10)	CH_3NH_2	2(0,2)−1(0,1) F=1−0 Aa	0.05	Sgr B2(M)	Parkes 64 m	Fou74a	Lov85
8777.442 (10)	CH_3NH_2	2(0,2)−1(0,1) F=3−2 Aa	0.18	Sgr B2(M)	Parkes 64 m	Fou74a	Lov85
8778.200 (10)	CH_3NH_2	2(0,2)−1(0,1) F=2−2 Aa	0.04[b]	Sgr B2(M)	Parkes 64 m	Fou74a	Lov85
8778.260 (10)	CH_3NH_2	2(0,2)−1(0,1) F=1−1 Aa	[b]	Sgr B2(M)	Parkes 64 m	Fou74a	Lov85
8779.496 (8)	CH_3NH_2	2(0,2)−1(0,1) F=2−1 Aa	0.1	Sgr B2(M)	Parkes 64 m	Fou74a	Lov85
8815.814 (6)	$H^{13}CCCN$	1−0 F=1−1	0.039	Sgr B2(M)	MPI 100 m	Chu77	Chu77
8817.096 (2)	$H^{13}CCCN$	1−0 F=2−1	0.080	Sgr B2(M)	MPI 100 m	Chu77	Chu77
8819.019 (9)	$H^{13}CCCN$	1−0 F=0−1	0.025	Sgr B2(M)	MPI 100 m	Chu77	Chu77
9024.009*(1)	HC_7N	8−7	0.16	TMC−1	MPI 100 m	Tol81	
9058.447*(6)	$HC^{13}CCN$	1−0 F=1−1	0.025	Sgr B2(M)	MPI 100 m	Chu77	Chu77
9059.318 (2)	$HCC^{13}CN$	1−0 F=1−1	n.r.	Sgr B2(M)	MPI 100 m	Chu77	Cre77
9059.736 (3)	$HC^{13}CCN$	1−0 F=2−1	0.055	Sgr B2(M)	MPI 100 m	Chu77	Chu77
9060.6080(9)	$HCC^{13}CN$	1−0 F=2−1	0.05	Sgr B2(M)	MPI 100 m	Chu77	Cre77
9097.0346(3)	HCCCN	1−0 F=1−1	0.82	Sgr B2(M)	MPI 100 m	Chu77	deZ71
9098.3321(3)	HCCCN	1−0 F=2−1	2.11	Sgr B2(M)	MPI 100 m	Chu77	deZ71
9100.2727(5)	HCCCN	1−0 F=0−1	0.16	Sgr B2(M)	MPI 100 m	Chu77	deZ71
9118.823*(4)	CH_3OCH_3	2(0,2)−1(1,1) AA	[b]	Sgr B2(M)	Parkes 64 m	Win76	Gro98
9119.671*(2)	CH_3OCH_3	2(0,2)−1(1,1) EE	0.05[bg]	SgrB2	Parkes 64 m	Win76	Gro98
9120.509*(2)	CH_3OCH_3	2(0,2)−1(1,1) AE	[b]	Sgr B2(M)	Parkes 64 m	Win76	Gro98
9120.527*(2)	CH_3OCH_3	2(0,2)−1(1,1) EA	[b]	Sgr B2(M)	Parkes 64 m	Win76	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	9235.119*(3)	NH_2CHO	3(1,2)−3(1,3) F=3−3	0.055	Sgr B2(M)	NRAO 43 m	God84	
	9237.034*(1)	NH_2CHO	3(1,2)−3(1,3) F=4−4	0.080	Sgr B2(M)	NRAO 43 m	God84	
	9237.704*(2)	NH_2CHO	3(1,2)−3(1,3) F=2−2	[b]	Sgr B2(M)	NRAO 43 m	God84	
U	9486.71	unidentified		0.025	TMC−1	NRAO 43 m	Mat83a	
	9493.061*(4)	C_4H	3/2−1/2 F=1−0	0.090	TMC−1	NRAO 43 m	Bel83a	Got83
U	9496.4 (1)	unidentified		0.008	CasA	NRAO 43 m	Bel83	
	9497.616*(2)	C_4H	3/2−1/2 F=2−1	0.245	TMC−1	NRAO 43 m	Bel83a	Got83
	9508.005*(4)	C_4H	3/2−1/2 F=1−1	0.080	TMC−1	NRAO 43 m	Bel83a	Got83
	9547.953 (5)	C_4H	1/2−1/2 F=1−0	0.095	TMC−1	NRAO 43 m	Bel83a	Gue82a
	9551.717*(4)	C_4H	1/2−1/2 F=0−1	0.080	TMC−1	NEROC 37 m	Bel83a	Got83
	9562.904*(3)	C_4H	1/2−1/2 F=1−1	0.115	TMC−1	NRAO 43 m	Bel83a	Got83
	9703.508 (5)	C_6H	$^2\Pi_{3/2}$ J=3.5−2.5 F=4−3 e	0.018	TMC−1	NRAO 43 m	Bel99	McC99
	9703.600 (5)	C_6H	$^2\Pi_{3/2}$ J=3.5−2.5 F=3−2 e	0.012	TMC−1	NRAO 43 m	Bel99	McC99
	9703.835 (5)	C_6H	$^2\Pi_{3/2}$ J=3.5−2.5 F=4−3 f	0.012	TMC−1	NRAO 43 m	Bel99	McC99
	9703.936 (5)	C_6H	$^2\Pi_{3/2}$ J=3.5−2.5 F=3−2 f	0.009	TMC−1	NRAO 43 m	Bel99	McC99
	9877.606*(1)	HC_9N	17−16	0.025	TMC−1	NRAO 43 m	Bel98	
	9885.89* (1)	CCCN	1−0 J=3/2−1/2 F=5/2−3/2	0.02	TMC−1	ARO 46 m	Mac81a	Gue82a
	9936.202 (4)	CH_3OH	9(−1,9)−8(−2,7) E	0.25[e]	OriMC−1	NRAO 43 m	Sly93	Bre95
	9978.686 (4)	CH_3OH	4(3,2)−5(2,3) E	0.04[e]	Sgr B2(M)	NRAO 43 m	Sly93	Bre95
	10058.257 (12)	CH_3OH	4(3,1)−5(2,4) E	0.17[e]	W33−Met	NRAO 43 m	Sly93	Bre95
	10152.008*(1)	HC_7N	9−8	0.08	TMC−1	ARO 46 m	Kro78	
	10278.246 (1)	HDO	2(2,0)−2(2,1)	0.032	OriMC−1	NRAO 43 m	Pet88	Kuk77
	10458.639*(1)	HC_9N	18−17	0.021	TMC−1	ARO 46 m	Bro78	
	10463.962*(5)	H_2CS	4(1,3)−4(1,4)	−0.040	Sgr B2(M)	ARO 46 m	Doh74	
	10648.419 (4)	CH_3CHO	4(1,3)−4(1,4) A−+	0.021	Sgr B2(M)	ARO 46 m	Bel83b	Kle91
	10650.563*(5)	HC_5N	4−3 F=3−2	0.13	TMC−1	NRO 45 m	Tak90	
	10650.654*(5)	HC_5N	4−3 F=4−3	0.24[b]	TMC−1	NRO 45 m	Tak90	
	10650.686*(5)	HC_5N	4−3 F=5−4	[b]	TMC−1	NRO 45 m	Tak90	
	11119.445*(2)	CCS	1,0−0,1	0.39	TMC−1	NRO 45 m	Ohi98	
	11280.006*(1)	HC_7N	10−9	0.14	TMC−1	NRO 45 m	Ohi98	
	11561.513*(1)	CCCS	2−1	0.12	TMC−1	NRO 45 m	Ohi98	
	12162.979 (1)	OCS	1−0	0.115	Sgr B2(M)	NRAO 43 m	Mat87a	Kuk74
	12178.593 (4)	CH_3OH	2(0,2)−3(−1,3) E	429.[e]	345.01+1.79	Parkes 64 m	Nor87	Lov88
	12408.003*(1)	HC_7N	11−10	0.09	TMC−1	NRO 45 m	Ohi98	
	12782.769*(1)	HC_9N	22−21	0.081	TMC−1	NRAO 43 m	Bel97	
U	12848.48	unidentified		0.007	TMC−1	NRAO 43 m	Bel97	
	12848.731*(2)	$HC_{11}N$	38−37	0.009	TMC−1	NRAO 43 m	Bel97	
	13043.814 (4)	SO	1(2)−1(1)	0.4	Sgr B2(M)	NRAO 43 m	Cla78	Lov92
U	13116.451	unidentified		0.003	TMC−1	NRAO 43 m	Bel99	
U	13116.569	unidentified		0.003	TMC−1	NRAO 43 m	Bel99	
U	13186.46	unidentified		0.005	TMC−1	NRAO 43 m	Bel97	
	13186.853*(3)	$HC_{11}N$	39−38	0.005	TMC−1	NRAO 43 m	Bel97	
U	13186.98	unidentified		0.006	TMC−1	NRAO 43 m	Bel97	
	13313.312*(1)	HC_5N	5−4	1.77	TMC−1	NRAO 43 m	Bel97	
	13363.801*(1)	HC_9N	23−22	0.082	TMC−1	NRAO 43 m	Bel97	
	13434.596 (10)	OH	$^2\Pi_{3/2}$ J=7/2 F=3−3	−0.20	DR21	MPI 100 m	Gui84	Des75
	13441.4173(2)	OH	$^2\Pi_{3/2}$ J=7/2 F=4−4	3.2	W3(OH)	NRAO 43 m	Tur70	ter76
	13535.998*(1)	HC_7N	12−11	0.475	TMC−1	NRAO 43 m	Bel97	
	13778.804*(1)	$H_2{}^{13}CO$	2(1,1)−2(1,2)	−0.47	Sgr B2(M)	MPI 100 m	Hen83a	
U	13880.54	unidentified		0.014	TMC−1	NRAO 43 m	Bel85	
	13944.832*(1)	HC_9N	24−23	0.058	TMC−1	NRAO 43 m	Bel85	Bel85
	14488.4589(2)	H_2CO	2(1,1)−2(1,2) F=1−1	[b]	Sgr B2(M)	NRL 26 m	Eva70	Kuk75
	14488.4712(2)	H_2CO	2(1,1)−2(1,2) F=1−2	[b]	Sgr B2(M)	NRL 26 m	Eva70	Kuk75
	14488.4801(2)	H_2CO	2(1,1)−2(1,2) F=3−3	−1.3[b]	Sgr B2(M)	NRL 26 m	Eva70	Kuk75
	14488.4899(2)	H_2CO	2(1,1)−2(1,2) F=2−2	[b]	Sgr B2(M)	NRL 26 m	Eva70	Kuk75
	14525.862*(1)	HC_9N	25−24	0.073	TMC−1	NRAO 43 m	Bro78	
	14663.993*(1)	HC_7N	13−12	0.06	TMC−1	Parkes 64 m	Gar78	
	14686.634 (4)	$c-C_3H$	1(1,0)−1(1,1) J=1/2−1/2 F=1−1	0.04	TMC−1	NRO 45 m	Ohi98	Lov92a
	14767.700 (8)	$c-C_3H$	1(1,0)−1(1,1) J=1/2−3/2 F=1−2	0.04	TMC−1	NRO 45 m	Ohi98	Lov92a
	14782.212*(19)	$^{13}CH_3OH$	2(0,2)−3(−1,3) E	0.30	Sgr B2(M)	NASA−c 70 m	Kui89	Xu_97
	14812.002(8)	$c-C_3H$	1(1,0)−1(1,1) J=3/2−1/2 F=2−1	0.04	TMC−1	NRO 45 m	Ohi98	Lov92a
	14877.671(8)	$c-C_3H$	1(1,0)−1(1,1) J=3/2−3/2 F=2−1	0.04	TMC−1	NRO 45 m	Ohi98	Lov92a
	14893.050(4)	$c-C_3H$	1(1,0)−1(1,1) J=3/2−3/2 F=2−2	0.124	TMC−1	NRAO 43 m	Man90a	Lov92
	14895.243(8)	$c-C_3H$	1(1,0)−1(1,1) J=3/2−3/2 F=1−1	0.065	TMC−1	NRAO 43 m	Man90a	Lov92
	15106.892*(1)	HC_9N	26−25	0.07	TMC−1	NRO 45 m	Ohi98	
	15248.225*(13)	C_6H	$^2\Pi_{3/2}$ J=11/2−9/2 F=6−5 f	0.04	TMC−1	NRO 45 m	Ohi98	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	15248.359*(17)	C_6H	$^2\Pi_{3/2}$ J=11/2−9/2 F=5−4 f	0.03	TMC−1	NRO 45 m	Ohi98	JPL01
	15249.064*(13)	C_6H	$^2\Pi_{3/2}$ J=11/2−9/2 F=6−5 e	0.05	TMC−1	NRO 45 m	Ohi98	JPL01
	15249.198*(17)	C_6H	$^2\Pi_{3/2}$ J=11/2−9/2 F=5−4 e	0.04	TMC−1	NRO 45 m	Ohi98	JPL01
	15687.921*(1)	HC_9N	27−26	0.07	TMC−1	NRO 45 m	Ohi98	
	15791.986*(1)	HC_7N	14−13	0.32	TMC−1	NRO 45 m	Ohi98	
	15975.966*(1)	HC_5N	6−5	0.61	TMC−1	NRO 45 m	Ohi98	
	16268.950*(1)	HC_9N	28−27	0.07	TMC−1	NRO 45 m	Ohi98	
	16849.979*(1)	HC_9N	29−28	0.07	TMC−1	NRO 45 m	Ohi98	
	16886.312*(2)	DCCCN	2−1 F=2−1	0.04	TMC−1	NRO 45 m	Ohi98	Laf78
	16886.405*(2)	DCCCN	2−1 F=3−2	0.08	TMC−1	NRO 45 m	Ohi98	Laf78
	16919.979*(1)	HC_7N	15−14	0.32	TMC−1	NRO 45 m	Ohi98	
	17091.742*(1)	CH_3CCH	1(0)−0(0)	0.07	TMC−1	NRO 45 m	Ohi98	
	17342.256*(1)	CCCS	3−2	0.27	TMC−1	NRO 45 m	Ohi98	
	17431.006*(1)	HC_9N	30−59	0.07	TMC−1	NRO 45 m	Ohi98	
	17632.685*(7)	$H^{13}CCCN$	2−1 F=2−2	0.02	TMC−1	NRO 45 m	Ohi98	Laf78
	17633.844*(4)	$H^{13}CCCN$	2−1 F=3−2	0.03	TMC−1	NRO 45 m	Ohi98	Laf78
	17647.479 (10)	C_4D	5/2−3/2 F=5/2−3/2	0.03	TMC−1	NRAO 43 m	Tur89a	Tur89a
	17647.526 (10)	C_4D	5/2−3/2 F=3/2−1/2	0.03	TMC−1	NRAO 43 m	Tur89a	Tur89a
	17647.716 (10)	C_4D	5/2−3/2 F=7/2−5/2	0.05	TMC−1	NRAO 43 m	Tur89a	Tur89a
	17666.995*(5)	$HCCC^{15}N$	2−1	0.04	TMC−1	NRO 45 m	Ohi98	Laf78
	17683.961(10)	C_4D	3/2−1/2 F=5/2−3/2	0.04	TMC−1	NRAO 43 m	Tur89a	Tur89a
	17684.662(10)	C_4D	3/2−1/2 F=3/2−1/2	0.02	TMC−1	NRAO 43 m	Tur89a	Tur89a
U	17736.75	unidentified		0.017	W51	NRAO 43 m	Bel93	
	17788.570*(3)	H_2CCCC	2(1,2)−1(1,1)	0.021	W51	NRAO 43 m	Bel93	
	17863.803*(3)	H_2CCCC	2(0,2)−1(0,1)	0.12	TMC−1	NASADSN 70 m	Lan97	
	17937.956*(4)	H_2CCCC	2(1,1)−1(1,0)	0.012	W51	NRAO 43 m	Bel93	
U	17945.85	unidentified		0.013	W51	NRAO 43 m	Bel93	
U	17951.95	unidentified		0.012	W51	NRAO 43 m	Bel93	
U	17965.09	unidentified		0.017	W51	NRAO 43 m	Bel93	
U	17974.01	unidentified		0.027	W51	NRAO 43 m	Bel93	
	18012.033*(1)	HC_9N	31−30	0.061	TMC−1	NRAO 43 m	Bel98	
U	18012.46	unidentified		0.009	W51	NRAO 43 m	Bel93	
	18017.337*(5)	NH_3	7(3)−7(3)	0.015	W51	NRAO 43 m	Bel93	Poy75
	18020.574(5)	C_6H	$^2\Pi_{3/2}$ J=6.5−5.5 F=7−6 e	0.044	TMC−1	NRAO 43 m	Bel99	McC99
	18020.644(5)	C_6H	$^2\Pi_{3/2}$ J=6.5−5.5 F=6−5 e	0.046	TMC−1	NRAO 43 m	Bel99	McC99
	18021.752(5)	C_6H	$^2\Pi_{3/2}$ J=6.5−5.5 F=7−6 f	0.050	TMC−1	NRAO 43 m	Bel99	McC99
	18021.818(5)	C_6H	$^2\Pi_{3/2}$ J=6.5−5.5 F=6−5 f	0.042	TMC−1	NRAO 43 m	Bel99	McC99
U	18021.86	unidentified		0.069	W51	NRAO 43 m	Bel93	
	18047.969*(1)	HC_7N	16−15	0.37	TMC−1	NRO 45 m	Ohi98	
	18119.029*(5)	$HC^{13}CCN$	2−1 F=2−1	0.022	TMC−1	NRO 45 m	Tak98	Laf78
	18120.773*(2)	$HCC^{13}CN$	2−1 F=2−1	0.033	TMC−1	NRO 45 m	Tak98	Laf78
	18120.865*(2)	$HCC^{13}CN$	2−1 F=3−2	0.06	TMC−1	NRO 45 m	Ohi98	Laf78
	18154.884*(1)	SiS	1−0	1.0	IRC+10216	MPI 100 m	Gra81	
	18186.652*(3)	C_8H	$^2\Pi_{3/2}$ 15.5−15.5 e	0.007	TMC−1	NRAO 43 m	Bel99	McC97
	18186.782*(3)	C_8H	$^2\Pi_{3/2}$ 15.5−15.5 f	0.007	TMC−1	NRAO 43 m	Bel99	McC97
	18194.9206*(8)	HCCCN	2−1 F=2−2	[b]	Sgr B2(M)	Parkes 64 m	McG77	Laf78
	18195.3176*(6)	HCCCN	2−1 F=1−0	[b]	Sgr B2(M)	Parkes 64 m	McG77	Laf78
	18196.2183*(5)	HCCCN	2−1 F=2−1	0.36[b]	Sgr B2(M)	Parkes 64 m	McG77	Laf78
	18196.3119*(7)	HCCCN	2−1 F=3−2	[b]	Sgr B2(M)	Parkes 64 m	McG77	Laf78
	18197.078*(1)	HCCCN	2−1 F=1−2	[b]	Sgr B2(M)	Parkes 64 m	McG77	Laf78
	18198.3756*(9)	HCCCN	2−1 F=1−1	[b]	Sgr B2(M)	Parkes 64 m	McG77	Laf78
U	18222.65	unidentified		0.017	W51	NRAO 43 m	Bel93	
	18285.434*(5)	NH_3	10(7)−10(7)	0.012	W51	NRAO 43 m	Bel93	Poy75
U	18294.20	unidentified		0.007	W51	NRAO 43 m	Bel93	
U	18299.5	unidentified		0.008	W51	NRAO 43 m	Bel93	
U	18306.3	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	18320.7	unidentified		0.006	W51	NRAO 43 m	Bel93	
	18343.144*(1)	$c-C_3H_2$	1(1,0)−1(0,1)	1.82	TMC−1	NRAO 43 m	Mat85a	
U	18360.50	unidentified		0.007	W51	NRAO 43 m	Bel93	
U	18363.045	unidentified		0.003	TMC−1	NRAO 43 m	Bel99	
U	18363.142	unidentified		0.003	TMC−1	NRAO 43 m	Bel99	
U	18363.306	unidentified		0.003	TMC−1	NRAO 43 m	Bel99	
U	18363.406	unidentified		0.004	TMC−1	NRAO 43 m	Bel99	
U	18368.0	unidentified		0.006	W51	NRAO 43 m	Bel93	
U	18379.6	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	18383.3	unidentified		0.005	W51	NRAO 43 m	Bel93	
	18391.562*(5)	NH_3	6(1)−6(1)	0.006	W51	NRAO 43 m	Bel93	Poy76

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	18396.7252*(7)	CH_3CN	1(0)−0(0) F=1−1	0.081	TMC−1	NRAO 43 m	Mat83	Bou80
	18397.9965*(6)	CH_3CN	1(0)−0(0) F=2−1	0.120	TMC−1	NRAO 43 m	Mat83	Bou80
	18399.8924*(3)	CH_3CN	1(0)−0(0) F=0−1	0.031	TMC−1	NRAO 43m	Mat83	Bou80
	18413.822*(2)	$c-H^{13}CCCH$	1(1,0)−1(0,1)	0.09	TMC−2	MPI 100 m	Cox89	
U	18422.00	unidentified		0.012	W51	NRAO 43 m	Bel93	
U	18485.07	unidentified		0.016	W51	NRAO 43 m	Bel93	
	18494.1(1)	CH_3 SH	18(2)−17(3) A+	0.014	W51	NRAO 43 m	Bel93	Lee80
	18499.390 (5)	NH_3	9(6)−9(6)	0.3	W51	NRAO 43 m	Mad86	Poy75
	18513.316*(5)	CH_2CHCN	2(1,2)−1(1,1) F=3−2	0.021	TMC−1	NRAO 43 m	Mat83a	
U	18586.06	unidentified		0.012	W51	NRAO 43 m	Bel93	
	18593.060*(1)	HC_9N	32−31	0.003	IRC+10216	NRAO 43 m	Bel92b	
	18638.616*(1)	HC_5N	7−6	0.5	TMC−1	NRAO 43 m	Jen82	
	18650.308*(4)	HCCCHO	2(0,2)−1(0,1)	0.012	TMC−1	NRAO 43 m	Irv88	
	18673.312*(36)	HNCCC	2−1	0.19	TMC−1	NRO 45 m	Ohi98	
U	18698.16	unidentified		0.009	W51	NRAO 43 m	Bel93	
U	18729.12	unidentified		0.021	W51	NRAO 43 m	Bel93	
U	18793.92	unidentified		0.021	W51	NRAO 43 m	Bel93	
	18802.235*(5)	$H_2CCCCCC$	7(1,7)−6(1,6)	0.01	TMC−1	NASADSN 70 m	Lan97	
	18807.888(10)	NH_2D	3(1,3)−3(0,3)	0.2	OriMC−1	MPI 100 m	Wal87	Coh82
	18808.507(5)	NH_3	8(5)−8(5)	0.39	OriMC−1	MPI 100 m	Her88	Poy75
U	18817.66	unidentified		0.017	W51	NRAO 43 m	Bel93	
U	18864.65	unidentified		0.015	W51	NRAO 43 m	Bel93	
	18884.695(5)	NH_3	6(2)−6(2)	0.50	OriMC−1	MPI 100 m	Her88	Poy75
U	18907.54	unidentified		0.013	W51	NRAO 43 m	Bel93	
U	18918.50	unidentified		0.011	W51	NRAO 43 m	Bel93	
U	18961.79	unidentified		0.011	W51	NRAO 43 m	Bel93	
	18965.588*(4)	CH_2CHCN	2(0,2)−1(0,1) F=1−0	0.010	TMC−1	NRAO 43 m	Mat83a	
	18966.535*(5)	CH_2CHCN	2(0,2)−1(0,1) F=2−1	0.032	TMC−1	NRAO 43 m	Mat83a	
	18966.616*(4)	CH_2CHCN	2(0,2)−1(0,1) F=3−2	0.045	TMC−1	NRAO 43 m	Mat83a	
U	18968.48	unidentified		0.011	TMC−1	NRAO 43 m	Mat83a	
U	18986.20	unidentified		0.013	W51	NRAO 43 m	Bel93	
	19014.7204(15)	C_4H	5/2−3/2 F=2−1	0.44	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19015.1435(15)	C_4H	5/2−3/2 F=3−2	0.65	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19025.107 (4)	C_4H	5/2−3/2 F=2−2	0.048	TMC−1	NRAO 43 m	Gue82a	Gue82a
U	19039.50	unidentified		0.020	W51	NRAO 43 m	Bel93	
U	19043.0	unidentified		0.010	W51	NRAO 43 m	Bel93	
	19044.760 (4)	C_4H	3/2−1/2 F=1−1	0.055	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19054.4762(15)	C_4H	3/2−1/2 F=2−1	0.42	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19055.9468(15)	C_4H	3/2−1/2 F=1−0	0.15	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19099.656 (6)	C_4H	3/2−3/2 F=1−1	0.039	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19119.764*(5)	C_4H	J=3/2−3/2 F=2−2	0.05	TMC−1	NRO 45 m	Ohi98	JPL01
	19174.086*(1)	HC_9N	33−32	0.003	IRC+10216	NRAO 43 m	Mat85	
	19175.958*(2)	HC_7N	17−16	0.465	TMC−1	NRAO 43 m	Mat85	
	19218.465 (5)	NH_3	7(4)−7(4)	0.6	OriMC−1	MPI 100 m	Her88	Poy75
	19243.521*(2)	CCCO	2−1	0.035	TMC−1	NRAO 43 m	Mat84	
	19262.140 (4)	CH_3CHO	1(0,1)−0(0,0) E	0.014	TMC−1	NRAO 43 m	Mat85	Kle91
	19265.137*(1)	CH_3CHO	1(0,1)−0(0,0) A++	0.016	TMC−1	NRAO 43 m	Mat85	Kle96
U	19316.70	unidentified		0.013	W51	NRAO 43 m	Bel93	
U	19325.20	unidentified		0.007	W51	NRAO 43 m	Bel93	
U	19336.10	unidentified		0.014	W51	NRAO 43 m	Bel93	
U	19361.50	unidentified		0.008	W51	NRAO 43 m	Bel93	
	19418.661 (2)	$c-C_3HD$	1(1,0)−1(0,1) F=1−1	0.014	L1498	NRAO 43 m	Bel87	Bel87
	19418.686 (1)	$c-C_3HD$	1(1,0)−1(0,1) F=2−1	0.032	L1498	NRAO 43 m	Bel87	Bel87
	19418.712 (1)	$c-C_3HD$	1(1,0)−1(0,1) F=1−2	0.043	L1498	NRAO 43 m	Bel87	Bel87
	19418.724 (1)	$c-C_3HD$	1(1,0)−1(0,1) F=0−1	0.034	L1498	NRAO 43 m	Bel87	Bel87
	19418.740 (1)	$c-C_3HD$	1(1,0)−1(0,1) F=2−2	0.088	L1498	NRAO 43 m	Bel87	Bel87
	19418.796 (2)	$c-C_3HD$	1(1,0)−1(0,1) F=1−0	0.021	L1498	NRAO 43 m	Bel87	Bel87
	19426.679*(4)	CH_2CHCN	2(1,1)−1(1,0) F=2−1	0.010	TMC−1	NRAO 43 m	Mat83a	
	19427.851*(4)	CH_2CHCN	2(1,1)−1(1,0) F=3−2	0.021	TMC−1	NRAO 43 m	Mat83a	
	19429.098*(7)	CH_2CHCN	2(1,1)−1(1,0) F=1−0	0.010	TMC−1	NRAO 43 m	Mat83a	
U	19430.85	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	19609.78	unidentified		0.018	W51	NRAO 43 m	Bel93	
U	19682.50	unidentified		0.012	W51	NRAO 43 m	Bel93	
U	19692.50	unidentified		0.011	W51	NRAO 43 m	Bel93	
	19755.111*(1)	HC_9N	34−33	0.003	IRC+10216	NRAO 43 m	Bel92b	
	19757.538 (5)	NH_3	6(3)−6(3)	1.2	OriMC−1	MPI 100 m	Her88	Poy75
U	19771.50	unidentified		0.015	W51	NRAO 43 m	Bel93	
	19780.800 (3)	CCCN	2−1 J=5/2−3/2 F=5/2−3/2	0.058	TMC−1	NRAO 43 m	Gue82a	Gue82a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	19780.826 (4)	CCCN	2−1 J=5/2−3/2 F=3/2−1/2	0.050	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19781.094 (3)	CCCN	2−1 J=5/2−3/2 F=7/2−5/2	0.094	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19799.951 (5)	CCCN	2−1 J=5/2−3/2 F=3/2−1/2	0.022	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19800.121 (3)	CCCN	2−1 J=5/2−3/2 F=5/2−3/2	0.055	TMC−1	NRAO 43 m	Gue82a	Gue82a
	19838.346 (5)	NH_3	5(1)−5(1)	0.56	OriMC−1	MPI 100 m	Her88	Poy75
	19871.344*(2)	HCCNC	2−1	0.08	TMC−1	NRO 45 m	Ohi98	
	19967.396 (2)	CH_3OH	2(1,1)−3(0,3) E	73.2	W3(OH)	MPI 100 m	Wil85	Meh85
U	19974.50	unidentified		0.007	W51	NRAO 43 m	Bel93	
U	20064.21	unidentified		0.009	W51	NRAO 43 m	Bel93	
	20109.547	CH_2CN	1−03/2−1/25/2−3/25/2−5/2	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	20115.77	CH_2CN	1−01/2−1/23/2−3/25/2−5/2	0.060	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20117.43	CH_2CN	1−03/2−1/25/2−3/23/2−1/2	0.050	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20118.014	CH_2CN	1−03/2−1/25/2−3/25/2−3/2	0.111	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20118.16	CH_2CN	1−03/2−1/21/2−1/23/2−3/2	0.030	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20119.606	CH_2CN	1−03/2−1/25/3−3/27/2−5/2	0.160	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20121.61	CH_2CN	1−03/2−1/23/2−3/23/2−3/2	0.050	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20123.96	CH_2CN	1−03/2−1/21/2−1/23/2−3/2	0.030	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20124.22	CH_2CN	1−01/2−1/23/2−1/23/2−1/2	[b]	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20124.22	CH_2CN	1−03/2−1/23/2−3/21/2−1/2	0.020	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20124.45	CH_2CN	1−03/2−1/23/2−1/23/2−3/2	0.080	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20124.49	CH_2CN	1−01/2−1/23/2−3/25/2−3/2	0.020	TMC−1	NRAO 43 m	Irv88a	Irv88a
	20126.031	CH_2CN	1−03/2−1/23/2−3/23/2−1/2	0.01	TMC−1	NRO 45 m	Ohi98	Ohi98
	20128.770 (4)	CH_2CN	1−01/2−1/23/2−1/23/2−3/2	0.06	TMC−1	NRO 45 m	Ohi98	Ohi98
	20139.76	CH_2CN	1−01/2−1/21/2−3/23/2−5/2	0.060	TMC−1	NRAO 43 m	Irv88a	Irv88a
U	20168.48	unidentified		0.010	W51	NRAO 43 m	Bel93	
	20171.089 (2)	CH_3OH	11(1,11)−10(2,8) A+	−0.65	W3(OH)	MPI 100 m	Men86a	Meh85
U	20203.31	unidentified		0.007	W51	NRAO 43 m	Bel93	
	20209.209*(5)	CH_2CO	1(0,1)−0(0,0)	0.017	TMC−1	NRAO 43 m	Mat86	
U	20281.00	unidentified		0.013	W51	NRAO 43 m	Bel93	
	20303.946*(2)	HC_7N	18−17	0.43	TMC−1	NRO 45 m	Ohi98	
	20336.135*(2)	HC_9N	35−34	0.035	TMC−1	NRAO 43 m	Bel98	
	20357.226 (14)	CH_3C_4H	5(1)−4(1)	0.073	TMC−1	MPI 100 m	Wal84	Wal84
	20357.423(14)	CH_3C_4H	5(0)−4(0)	0.077	TMC−1	MPI 100 m	Wal84	Wal84
	20371.45(10)	NH_3	5(2)−5(2)	0.9	SgrB2(N)	MPI 100 m	Wal84	Poy75
	20460.01(10)	HDO	3(2,1)−4(1,4)	0.16	OriMC−1	MPI 100 m	Hen87	Bel70
U	20501.5	unidentified		0.008	W51	NRAO 43 m	Bel93	
U	20533.235	unidentified		0.006	TMC−1	NRAO 43 m	Bel99	
	20533.289*(3)	C_8H	$^2\Pi_{3/2}$ 17.5−16.5	0.005	TMC−1	NRAO 43 m	Bel99	McC97
U	20533.338	unidentified		0.004	TMC−1	NRAO 43 m	Bel99	
	20533.454*(3)	C_8H	$^2\Pi_{3/2}$ 17.5−16.5	0.004	TMC−1	NRAO 43 m	Bel99	McC97
U	20533.660	unidentified		0.004	TMC−1	NRAO 43 m	Bel99	
	20657.337*(3)	CH_3CCCN	5(0)−4(0)	0.043	TMC−1	NRAO 43 m	Bro84	
U	20707.80	unidentified		0.011	W51	NRAO 43 m	Bel93	
	20719.221(5)	NH_3	8(6)−8(6)	0.7	OriMC−1	MPI 100 m	Her88	Poy75
U	20723.5	unidentified		0.017	W51	NRAO 43 m	Bel93	
U	20728.67	unidentified		0.014	W51	NRAO 43 m	Bel93	
	20735.452(5)	NH_3	9(7)−9(7)	0.25	OriMC−1	MPI 100 m	Her88	Poy75
U	20765.80	unidentified		0.014	W51	NRAO 43 m	Bel93	
U	20790.00	unidentified		0.007	W51	NRAO 43 m	Bel93	
	20792.563*(5)	H_2CCC	1(0,1)−0(0,0)	0.233	TMC−1	MPI 100 m	Cer87a	
	20792.872*(5)	C_6H	$^2\Pi_{3/2}$ J=15/2−13/2 F=8−7 e	0.40	TMC−1	MPI 100 m	Gue87	Gue87
	20792.945*(5)	C_6H	$^2\Pi_{3/2}$ J=15/2−13/2 F=7−6 e	0.36	TMC−1	MPI 100 m	Gue87	Gue87
	20794.444*(5)	C_6H	$^2\Pi_{3/2}$ J=15/2−13/2 F=8−7 f	0.37	TMC−1	MPI 100 m	Gue87	Gue87
	20794.512 (5)	C_6H	$^2\Pi_{3/2}$ J=15/2−13/2 F=7−6 f	0.38	TMC−1	MPI 100 m	Gue87	Gue87
	20804.830 (5)	NH_3	7(5)−7(5)	0.8	OriMC−1	MPI 100 m	Her88	Poy75
U	20838.20	unidentified		0.006	W51	NRAO 43 m	Bel93	
U	20847.50	unidentified		0.003	W51	NRAO 43 m	Bel93	
	20852.527 (5)	NH_3	10(8)−10(8)	0.17	OriMC−1	MPI 100 m	Her88	Poy75
U	20878.00	unidentified		0.006	W51	NRAO 43 m	Bel93	
	20908.848*(21)	CH_3OH	16(−4,13)−15(−5,10) E	0.007	W51	NRAO 43 m	Bel93	Xu_97
	20917.157*(2)	HC_9N	36−35	0.07	TMC−1	NRO 45 m	Ohi98	
	20970.658*(37)	CH_3OH	10(1,10)−11(,9) A+ v_t =1	0.2	W3(OH)	MPI 100 m	Men86a	Xu_97
	20994.617 (5)	NH_3	6(4)−6(4)	1.0	OriMC−1	MPI 100 m	Her88	Poy75
U	20999.79	unidentified		0.009	W51	NRAO 43 m	Bel93	
	21070.739 (5)	NH_3	11(9)−11(9)	0.13	OriMC−1	MPI 100 m	Mau87	Poy75
	21134.311 (5)	NH_3	4(1)−4(1)	0.9	OriMC−1	MPI 100 m	Her88	Poy75
U	21143.18	unidentified		0.017	W51	NRAO 43 m	Bel93	
U	21231.00	unidentified		−0.013	W51	NRAO 43 m	Bel93	
	21285.275(5)	NH_3	5(3)−5(3)	2.1	OriMC−1	MPI 100 m	Her88	Poy75
	21301.261*(1)	HC_5N	8−7	0.031	Sgr B2(M)	ARO 46 m	Bro76	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	21322.50	unidentified		−0.010	W51	NRAO 43 m	Bel93	
	21431.932*(2)	HC_7N	19−18	0.89	TMC−1	NRAO 43 m	Buj81	
U	21447.8	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	21453.93	unidentified		−0.010	W51	NRAO 43 m	Bel93	
U	21470.4	unidentified		0.007	W51	NRAO 43 m	Bel93	
	21480.809(2)	C_5H	$^2\Pi_{1/2}$ J=9/2−7/2 F=5−4 e	0.08[f]	TMC−1	MPI 100 m	Cer87	McC99
	21481.299(2)	C_5H	$^2\Pi_{1/2}$ J=9/2−7/2 F=4−3 e	0.06[f]	TMC−1	MPI 100 m	Cer87	McC99
	21484.695(2)	C_5H	$^2\Pi_{1/2}$ J=9/2−7/2 F=5−4 f	0.07[f]	TMC−1	MPI 100 m	Cer87	McC99
	21485.248(2)	C_5H	$^2\Pi_{1/2}$ J=9/2−7/2 F=4−3 f	0.06[f]	TMC−1	MPI 100 m	Cer87	McC99
	21488.255*(5)	$H_2CCCCCC$	8(1,8)−7(1,7)	0.01	TMC−1	NASADSN 70 m	Lan97	
	21498.182*(2)	HC_9N	37−36	0.06	TMC−1	NRAO 43 m	Buj81	
U	21546.94	unidentified		0.006	W51	NRAO 43 m	Bel93	
	21550.342*(42)	CH_3OH	12(2,11)−11(1,11) A+ v_t =1	−0.4	W3(OH)	MPI 100 m	Men86a	Xu_97
U	21569.5	unidentified		0.008	W51	NRAO 43 m	Bel93	
U	21576.5	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	21582.6	unidentified		0.003	W51	NRAO 43 m	Bel93	
	21587.400*(1)	c−C_3H_2	2(2,0)−2(1,1)	−0.54	TMC−1	NRAO 43 m	Mat86a	
U	21592.1	unidentified		0.004	W51	NRAO 43 m	Bel93	
U	21595.8	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	21598.4	unidentified		0.006	W51	NRAO 43 m	Bel93	
U	21606.30	unidentified		0.005	W51	NRAO 43 m	Bel93	
U	21615.5	unidentified		0.003	W51	NRAO 43 m	Bel93	
	21703.3580(2)	NH_3	4(2)−4(2)	0.6	OriMC−1	MPI 100 m	Nys78	Kuk70
U	21715.8	unidentified		0.008	W51	NRAO 43 m	Bel93	
	21930.476*(6)	$CC^{34}S$	2,1−1,0	0.07	TMC−1	NRO 45 m	Ohi98	
	21980.5453(1)	HNCO	1(0,1)−0(0,0) F=0−1	0.025	TMC−1	NRAO 43 m	Bro81	Kuk71
	21981.4706(1)	HNCO	1(0,1)−0(0,0) F=2−1	0.107	TMC−1	NRAO 43 m	Bro81	Kuk71
	21982.0854(1)	HNCO	1(0,1)−0(0,0) F=1−1	0.040	TMC−1	NRAO 43 m	Bro81	Kuk71
	22079.204*(2)	HC_9N	38−37	0.07	TMC−1	NRO 45 m	Ohi98	
	22235.044(5)	H_2O	6(1,6)−5(2,3) F=7−6	[b]	W49	NRAO 43 m	Mor73	Kuk69
	22235.077(5)	H_2O	6(1,6)−5(2,3) F=6−5	[b]	W49	NRAO 43 m	Mor73	Kuk69
	22235.120(5)	H_2O	6(1,6)−5(2,3) F=5−4	2000[i]	W49	NRAO 43 m	Mor73	Kuk69
	22235.253(5)	H_2O	6(1,6)−5(2,3) F=6−6	[b]	W49	NRAO 43 m	Mor73	Kuk69
	22235.298(5)	H_2O	6(1,6)−5(2,3) F=5−5	[b]	W49	NRAO 43 m	Mor73	Kuk69
	22258.173*(3)	CCO	2,1−1,0	0.033	TMC−1	NRAO 43 m	Ohi91	
	22307.670 (50)	HDO	5(3,2)−5(3,3)	0.09	OriMC−1	MPI 100 m	Hen87	Str48
	22344.030*(3)	CCS	2,1−1,0	1.21	TMC−1	NRO 45 m	Kai87	
	22471.180(1)	HCOOH	1(0,1)−0(0,0)	0.01	L134N	NRAO 43 m	Irv90	Kuk69a
	22559.915*(2)	HC_7N	20−19	0.5	TMC−1	NRO 45 m	Suz92	
	22624.8892(2)	$^{15}NH_3$	1(1)−1(1) F,F_1=1.5,1−1.3,1	[b]	OriMC−1	MPI 100 m	Her85	Kuk67
	22624.9331(2)	$^{15}NH_3$	1(1)−1(1) F,F_1=1.5,1−0.8,1	[b]	OriMC−1	MPI 100 m	Her85	Kuk67
	22624.9410(2)	$^{15}NH_3$	1(1)−1(1) F,F_1=0.5,1−0.8,1	[b]	OriMC−1	MPI 100 m	Her85	Kuk67
	22624.9469(2)	$^{15}NH_3$	1(1)−1(1) F,F_1=1.5,2−1.5,2	0.22[b]	OriMC−1	MPI 100 m	Her85	Kuk67
U	22639.3	unidentified		0.003	IRC+10216	NRAO 43 m	Bel92b	
U	22644.3	unidentified		0.002	IRC+10216	NRAO 43 m	Bel92b	
	22649.843 (1)	$^{15}NH_3$	2(2)−2(2)	0.36	OriMC−1	MPI 100 m	Her85	Kuk68
	22653.022 (5)	NH_3	5(4)−5(4)	0.6	OriMC−1	MPI 100 m	Nys78	Poy75
	22660.225*(3)	HC_9N	39−38	0.003	IRC+10216	NRAO 43 m	Bel92b	
U	22678.6	unidentified		0.001	IRC+10216	NRAO 43 m	Bel92b	
	22688.312(5)	NH_3	4(3)−4(3)	1.2	OriMC−1	MPI 100 m	Nys78	Poy75
	22732.429(5)	NH_3	6(5)−6(5)	0.6	OriMC−1	MPI 100 m	Nys78	Poy75
	22789.421(1)	$^{15}NH_3$	3(3)−3(3)	0.53	OriMC−1	MPI 100 m	Her85	Kuk67
	22827.741*(8)	CH_3OCHO	2(1,2)−1(1,1) E	0.15	OriMC−1	MPI 100 m	Chu80	Oes99
	22828.134*(8)	CH_3OCHO	2(1,2)−1(1,1) A	0.15	OriMC−1	MPI 100 m	Chu80	Oes99
	22834.1851(1)	NH_3	3(2)−3(2)	0.11	Sgr B2(M)	NRAO 11m	Mor73	Kuk65
	22878.949*(10)	DC_5N	9−8	0.019	TMC−1	NRAO 43 m	Sch81	
	22924.940 (5)	NH_3	7(6)−7(6)	1.0	OriMC−1	MPI 100 m	Nys78	Poy75
	23046.0158(2)	$^{15}NH_3$	4(4)−4(4)	0.26	OriMC−1	MPI 100 m	Her85	Kuk68
	23098.8190(1)	NH_3	2(1)−2(1)	0.29	Sgr B2(M)	NRAO 11m	Mor73	Kuk70
	23121.024 (2)	CH_3OH	9(2,7)−10(1,10) A+	9.5[e]	W3(OH)	MPI 100 m	Wil84	Meh85
	23122.983*(1)	CCCS	4−3	0.55	TMC−1	NRO 45 m	Kai87	
U	23142.2	unidentified		0.001	IRC+10216	NRAO 12 m	Bel93a	
U	23228.0	unidentified		0.003	IRC+10216	NRAO 43 m	Bel92b	
	23232.238(5)	NH_3	8(7)−8(7)	0.2	OriMC−1	MPI 100 m	Nys78	Poy75
	23241.246*(3)	HC_9N	40−39	0.003	IRC+10216	NRAO 43 m	Bel92b	
	23421.9823(2)	$^{15}NH_3$	5(5)−5(5)	0.14	OriMC−1	MPI 100 m	Her85	Kuk68
	23444.778(2)	CH_3OH	10(1,9)−9(2,8) A−	−0.77	W3(OH)	MPI 100 m	Men85	Meh85
	23565.160(20)	C_6H	$^2\Pi_{3/2}$ J=17/2−15/2 F=9−8 e	0.156	TMC−1	NRO 45 m	Suz86	Suz86

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	23565.226(20)	C_6H	$^2\Pi_{3/2}$ J=17/2−15/2 F=8−7 e	0.144	TMC−1	NRO 45 m	Suz86	Suz86
	23567.169(20)	C_6H	$^2\Pi_{3/2}$ J=17/2−15/2 F=9−8 f	0.157	TMC−1	NRO 45 m	Suz86	Suz86
	23567.238(20)	C_6H	$^2\Pi_{3/2}$ J=17/2−15/2 F=8−7 f	0.129	TMC−1	NRO 45 m	Suz86	Suz86
	23600.242(4)	SiC_2	1(0,1)−0(0,0)	0.11	IRC+10216	MPI 100 m	Sny85	Sue89
	23657.471(5)	NH_3	9(8)−9(8)	0.1	OriMC−1	MPI 100 m	Nys78	Poy75
	23687.898*(2)	HC_7N	21−20	0.21	TMC−1	NEROC 37 m	Kro78	
	23692.9265(2)	NH_3	1(1)−1(1) F,F_1=1/2,1−1/2,0	0.16	L134N	OSO 20 m	Ryd77	Ryd77
	23692.9688(1)	NH_3	1(1)−1(1) F,F_1=3/2,1−1/2,0	0.24	L134N	OSO 20 m	Ryd77	Kuk67
	23693.8722(1)	NH_3	1(1)−1(1) F,F_1=1/2,1−3/2,2	0.17	L134N	OSO 20 m	Ryd77	Kuk67
	23693.9051(1)	NH_3	1(1)−1(1) F,F_1=3/2,1−5/2,2	0.30[b]	L134N	OSO 20 m	Ho77	Kuk67
	23693.9145(1)	NH_3	1(1)−1(1) F,F_1=3/2,1−3/2,2	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.4591(1)	NH_3	1(1)−1(1) F,F_1=1/2,1−1/2,1	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.4700(1)	NH_3	1(1)−1(1) F,F_1=1/2,1−3/2,1	0.40[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.4709(1)	NH_3	1(1)−1(1) F,F_1=3/2,2−5/2,2	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.4803(1)	NH_3	1(1)−1(1) F,F_1=3/2,2−3/2,2	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.5014(1)	NH_3	1(1)−1(1) F,F_1=3/2,1−1/2,1	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.5060(1)	NH_3	1(1)−1(1) F,F_1=5/2,2−5/2,2	0.50[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.5123(1)	NH_3	1(1)−1(1) F,F_1=3/2,1−3/2,1	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23694.5153(1)	NH_3	1(1)−1(1) F,F_1=5/2,2−3/2,2	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23695.0672(1)	NH_3	1(1)−1(1) F,F_1=3/2,2−3/2,1	0.18[b]	L134N	OSO 20 m	Ho77	Kuk67
	23695.0782(1)	NH_3	1(1)−1(1) F,F_1=3/2,2−3/2,1	[b]	L134N	OSO 20 m	Ho77	Kuk67
	23695.1132(1)	NH_3	1(1)−1(1) F,F_1=5/2,2−3/2,1	0.25	L134N	OSO 20 m	Ho77	Kuk67
	23696.0297(2)	NH_3	1(1)−1(1) F,F_1=1/2,0−1/2,1	0.29[b]	L134N	OSO 20 m	Ho77	Kuk67
	23696.0406(2)	NH_3	1(1)−1(1) F,F_1=1/2,0−3/2,1	[b]	L134N	OSO 20 m	Ho77	Kuk67
U	23697.9	unidentified		0.006	IRC+10216	NEROC 37 m	Bel82	
	23718.325*(11)	$HC^{13}CCCCN$	9−8	0.002	IRC+10216	NRAO 43 m	Bel91	
	23720.575(5)	NH_3	2(2)−2(2) F_1=1−2	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23721.336(5)	NH_3	2(2)−2(2) F_1=3−2	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23722.6323(5)	NH_3	2(2)−2(2) F_1=2−2	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23722.6336(1)	NH_3	2(2)−2(2) F_1=3−3	0.43[j]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23722.6344(5)	NH_3	2(2)−2(2) F_1=1−1	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23723.929(5)	NH_3	2(2)−2(2) F_1=2−3	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23724.691(5)	NH_3	2(2)−2(2) F_1=2−1	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23727.162*(19)	$HCCCC^{13}CN$	9−8	0.12	TMC−1	NRO 45 m	Tak98	
U	23804.5	unidentified		0.004	IRC+10216	NRAO 43 m	Bel92b	
U	23811.0	unidentified		0.002	IRC+10216	NRAO 43 m	Bel92b	
	23817.6153(20)	OH	$^2\Pi_{3/2}$ J=9/2 F=4−4	−0.05	W3(OH)	MPI 100 m	Win78	Mee75
	23822.265*(3)	HC_9N	41−40	0.003	IRC+10216	NRAO 43 m	Bel92b	
	23826.6211(30)	OH	$^2\Pi_{3/2}$ J=9/2 F=5−5	−0.13	W3(OH)	MPI 100 m	Win78	Mee75
	23867.805(5)	NH_3	3(3)−3(3) F_1=2−3	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23868.450(5)	NH_3	3(3)−3(3) F_1=4−3	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23870.1279(5)	NH_3	3(3)−3(3) F_1=3−3	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23870.1296(1)	NH_3	3(3)−3(3) F_1=4−4	0.53[j]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23870.1302(5)	NH_3	3(3)−3(3) F_1=2−2	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23871.807(5)	NH_3	3(3)−3(3) F_1=3−4	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23872.453(5)	NH_3	3(3)−3(3) F_1=3−2	[b]	OriMC−1	NEROC 37 m	Bar77	Kuk67
	23922.3132(2)	$^{15}NH_3$	6(6)−6(6)	0.13	OriMC−1	MPI 100 m	Her85	Kuk68
	23939.089*(10)	$HCC^{13}CCCN$	9−8	0.003	IRC+10216	NRAO 43 m	Bel91	
	23941.99*(5)	$HCC^{13}CCN$	9−8	0.002	IRC+10216	NRAO 43 m	Bel91	
U	23959.5	unidentified		0.003	IRC+10216	NRAO 43 m	Bel91	
	23963.901*(1)	HC_5N	9−8	1.2	TMC−1	SRCAL 25 m	Lit77	
U	23987.5	unidentified		0.003	IRC+10216	NRAO 43 m	Bel92a	
U	23990.2	unidentified		0.002	IRC+10216	NRAO 12 m	Bel93a	
U	23996.7	unidentified		0.005	IRC+10216	NRAO 43 m	Bel92a	
U	24004.5	unidentified		0.005	IRC+10216	NRAO 43 m	Bel92a	
U	24023.2	unidentified		0.002	IRC+10216	NRAO 43 m	Bel92a	
U	24037.1	unidentified		0.006	IRC+10216	NEROC 37 m	Bel82	
U	24048.5	unidentified		0.004	IRC+10216	NRAO 43 m	Bel92a	
	24139.4169(1)	NH_3	4(4)−4(4)	0.25[j]	OriMC−1	NEROC 37 m	Bar77	Kuk70
	24205.287 (5)	NH_3	10(9)−10(9)	0.1	OriMC−1	MPI 100 m	Nys78	Poy75
	24296.491*(8)	CH_3OCHO	2(0,2)−1(0,1) E	0.09	OriMC−1	NRAO 43 m	Chu80	Oes99
	24298.481*(8)	CH_3OCHO	2(0,2)−1(0,1) A	0.12	OriMC−1	NRAO 43 m	Chu80	Oes99
	24325.927(1)	OCS	2−1	0.30	Sgr B2(M)	NEROC 37 m	Gol81	Wan73
U	24375.2	unidentified		0.006	IRC+10216	NEROC 37 m	Bel82	
	24428.652 (16)	CH_3C_4H	6(1)−5(1)	0.107	TMC−1	MPI 100 m	Wal84	Wal84

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
24428.886 (16)	CH_3C_4H	6(0)−5(0)	0.131	TMC−1	MPI 100 m	Wal84	Wal84
24532.9887(1)	NH_3	5(5)−5(5)	0.09[j]	OriMC−1	NEROC 37 m	Bar77	Kuk70
24788.541*(4)	CH_3CCCN	6(1)−5(1)	0.048	TMC−1	NEROC 37 m	Bro84	
24788.780*(4)	CH_3CCCN	6(0)−5(0)	0.076	TMC−1	NEROC 37 m	Bro84	
24815.878*(2)	HC_7N	22−21	0.24	TMC−1	SRCAL 25 m	Lit78	
24928.715*(14)	CH_3OH	3(2,1)−3(1,2) E	1.2	OriMC−1	NEROC 37 m	Bar75	Xu_97
24933.468 (2)	CH_3OH	4(2,2)−4(1,3) E	1.0[i]	OriMC−1	NEROC 37 m	Bar71	Gai74
24934.382 (5)	CH_3OH	2(2,0)−2(1,1) E	0.35	OriMC−1	NEROC 37 m	Bar75	Gai74
24959.079 (2)	CH_3OH	5(2,3)−5(1,4) E	1.1[i]	OriMC−1	NEROC 37 m	Bar71	Meh85
24984.302*(4)	HC_9N	43−42	0.012	IRC+10216	MPI 100 m	Tru93	
24991.19*(21)	SiC_2	8(2,6)−8(2,7)	0.013	IRC+10216	MPI 100 m	Tru93	Sue89
25018.123(2)	CH_3OH	6(2,4)−6(1,5) E	1.7[i]	OriMC−1	NEROC 37 m	Bar71	Meh85
25023.792(10)	NH_2D	4(1,4)−4(0,4)	0.08	OriMC−1	MPI 100 m	Wal87	Coh82
25056.025(5)	NH_3	6(6)−6(6)	0.17[j]	OriMC−1	NEROC 37 m	Bar77	Kak75
25124.872(2)	CH_3OH	7(2,5)−7(1,6) E	1.5[i]	OriMC−1	NEROC 37 m	Bar71	Meh85
25249.938(4)	C_5N	$^2\Pi_{1/2}$ N=9−8 J=9.5−8.5	0.020	TMC−1	MPI 100 m	Gue98	Gue98
25260.649(4)	C_5N	$^2\Pi_{1/2}$ N=9−8 J=8.5−7.5	0.015	TMC−1	MPI 100 m	Gue98	Gue98
25294.417(2)	CH_3OH	8(2,6)−8(1,7) E	0.7[i]	OriMC−1	NEROC 37 m	Bar71	Meh85
25329.441*(2)	DCCCN	3−2	0.6	TMC−1	MPI 100 m	How94	
25421.036*(9)	DC_5N	10−9	0.027	TMC−1	NEROC 37 m	Mac81	
25541.398(2)	CH_3OH	9(2,7)−9(1,8) E	−0.17	W3(OH)	MPI 100 m	Men86	Meh85
25715.182(5)	NH_3	7(7)−7(7)	3.	OriMC−1	MPI 100 m	Mau86	Poy75
25878.266(2)	CH_3OH	10(2,8)−10(1,9) E	0.9	OriMC−1	NRL 26 m	Mat80	Meh85
25911.017*(2)	CCS	2,2−1,1	0.18	TMC−1	NRO 45 m	Ohi98	
25943.855*(2)	HC_7N	23−22	0.37	TMC−1	NRO 45 m	Ohi98	
26337.414*(10)	C_6H	$^2\Pi_{3/2}$ J=19/2−17/2 F=10−9 f	0.17	TMC−1	NRO 45 m	Ohi98	JPL01
26337.463*(10)	C_6H	$^2\Pi_{3/2}$ J=19/2−17/2 F=9−8 f	0.17	TMC−1	NRO 45 m	Ohi98	JPL01
26339.924*(10)	C_6H	$^2\Pi_{3/2}$ J=19/2−17/2 F=10−9 e	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
26339.973*(10)	C_6H	$^2\Pi_{3/2}$ J=19/2−17/2 F=9−8 e	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
26363.491*(17)	$HCCCC^{13}CN$	10−9	0.09	TMC−1	NRO 45 m	Ohi98	
26450.598*(5)	$H^{13}CCCN$	3−2	0.07	TMC−1	NRO 45 m	Ohi98	Laf78
26500.462*(7)	$HCCC^{15}N$	3−2	0.11	TMC−1	NRO 45 m	Ohi98	Laf78
26518.981 (10)	NH_3	8(8)−8(8)	0.70	OriMC−1	MPI 100 m	Ziu81	Poy75
26602.181*(10)	$HCCC^{13}CCN$	10−9	0.08	TMC−1	NRO 45 m	Ohi98	
26626.533*(1)	HC_5N	10−9	1.0	TMC−1	NRAO 43 m	Jen82	
26682.814*(5)	H_2CCCC	3(1,3)−2(1,2)	0.22	TMC−1	NRO 45 m	Ohi98	
26795.635*(5)	H_2CCCC	3(0,3)−2(0,2)	0.16	TMC−1	NRO 45 m	Ohi98	
26847.205*(27)	CH_3OH	12(2,10)−12(1,11) E	3.6	Ori(MEC)	MPI 100 m	Wil96	Xu_97
26906.891*(6)	H_2CCCC	3(1,2)−2(1,1)	0.14	TMC−1	NRO 45 m	Ohi98	
27071.824*(2)	HC_7N	24−23	0.43	TMC−1	NRO 45 m	Ohi98	
27084.348*(2)	$c-C_3H_2$	3(3,0)−3(2,1)	0.04	TMC−1	NRO 45 m	Ohi98	
27178.511*(6)	$HC^{13}CCN$	3−2	0.10	TMC−1	NRO 45 m	Ohi98	Laf78
27181.127*(2)	$HCC^{13}CN$	3−2	0.14	TMC−1	NRO 45 m	Ohi98	Laf78
27292.903*(1)	HCCCN	3−2 F=3−3	0.49	TMC−1	NRO 45 m	Ohi98	Laf78
27294.078*(1)	HCCCN	3−2 F=2−1	0.70	HCL2C	OSO 20 m	Cer84	Laf78
27294.295*(1)	HCCCN	3−2 F=3−2	0.96	HCL2C	OSO 20 m	Cer84	Laf78
27294.347*(1)	HCCCN	3−2 F=4−3	1.1	HCL2C	OSO 20 m	Cer84	Laf78
27296.235*(1)	HCCCN	3−2 F=2−2	0.47	TMC−1	NRO 45 m	Ohi98	Laf78
27472.501*(27)	CH_3OH	13(2,11)−13(1,12) E	1.06	OriMC−1	MPI 100 m	Wil93	Xu_97
27477.943 (10)	NH_3	9(9)−9(9)	0.76	OriMC−1	MPI 100 m	Ziu81	Poy75
28009.975 (20)	HNCCC	3−2	0.19	TMC−1	NRO 45 m	Kaw92a	Kaw92a
28169.437*(28)	CH_3OH	14(2,12)−14(1,13) E	1.5	Ori(MEC)	MPI 100 m	Wil96	Xu_97
28199.804*(3)	HC_7N	25−24	0.29	TMC−1	NRO 45 m	Ohi98	
28199.805*(3)	HC_7N	25−24	0.045	IRC+10216	NRO 45 m	Kaw95	
28316.031*(8)	CH_3OH	4(0,4)−3(1,2) E	4.2[e]	OriMC−1	NRAO 43 m	Sly92	Xu_97
28440.980*(1)	CH_2CHCN	3(0,3)−2(0,2)	0.08	TMC−1	NRO 45 m	Ohi98	
28470.391*(6)	HC_9N	49−48	0.012	IRC+10216	NRO 45 m	Kaw95	
28532.31(1)	C_4H	7/2−5/2 F=3−2	0.42	TMC−1	OSO 20 m	Irv81	Gue82a
28532.46(1)	C_4H	7/2−5/2 F=4−3	0.49	TMC−1	OSO 20 m	Irv81	Gue82a
28542.284*(3)	C_4H	J=5/2−5/2 F=3−3	0.05	TMC−1	NRO 45 m	Ohi98	JPL01
28571.37(1)	C_4H	5/2−3/2 F=3−2	0.39	TMC−1	OSO 20 m	Irv81	Gue82a
28571.53(2)	C_4H	5/2−3/2 F=2−1	0.23	TMC−1	OSO 20 m	Irv81	Gue82a
28604.737(5)	NH_3	10(10)−10(10)	0.68	OriMC−1	MPI 100 m	Wil93	Poy75
28903.688*(2)	CCCS	5−4	0.008	IRC+10216	NRO 45 m	Kaw95	
28905.787*(29)	CH_3OH	15(2,13)−12(1,14) E	0.7	Ori(MEC)	MPI 100 m	Wil96	Xu_97
28919.931*(4)	CH_3CCN	7(1)−6(1)	0.049	TMC−1	OSO 20 m	Bro84	
28920.209*(4)	CH_3CCCN	7(0)−6(0)	0.053	TMC−1	OSO 20 m	Bro84	
28969.954*(20)	CH_3OH	8(2,7)−9(1,8)A−−	0.97	OriMC−1	MPI 100 m	Wil93	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	28974.781(3)	H_2CO	3(1,2)−3(1,3) F=2−2	[b]	Sgr B2(M)	n.r.	Wel70	Tak59
	28974.804(2)	H_2CO	3(1,2)−3(1,3) F=4−4	n.r.[b]	Sgr B2(M)	n.r.	Wel70	Tak59
	28974.814(3)	H_2CO	3(1,2)−3(1,3) F=3−3	[b]	Sgr B2(M)	n.r.	Wel70	Tak59
	28999.814*(15)	$HCCCC^{13}CN$	11−10	0.08	TMC−1	NRO 45 m	Ohi98	
	29051.403*(7)	HC_9N	50−49	0.011	IRC+10216	NRO 45 m	Kaw95	
	29109.644*(11)	C_6H	$^2\Pi_{3/2}$ J=21/2−19/2 F=11−10 f	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
	29109.66* (2)	C_6H	$^2\Pi_{3/2}$ J=21/2−19/2 f	0.020	IRC+10216	NRO 45 m	Kaw95	JPL01
	29109.686*(11)	C_6H	$^2\Pi_{3/2}$ J=21/2−19/2 F=10−9 f	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
	29112.709*(11)	C_6H	$^2\Pi_{3/2}$ J=21/2−19/2 F=11−10 f	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
	29112.73*(3)	C_6H	$^2\Pi_{3/2}$ J=21/2−19/2 e	0.019	IRC+10216	NRO 45 m	Kaw95	JPL01
	29112.750*(11)	C_6H	$^2\Pi_{3/2}$ J=21/2−19/2 F=10−9 f	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
	29138.877*(3)	CH_2CHCN	3(1,2)−2(1,1) F=3−2	0.05	TMC−1	NRO 45 m	Ohi98	
	29139.215*(3)	CH_2CHCN	3(1,2)−2(1,1) F=4−3,2−1	0.08	TMC−1	NRO 45 m	Ohi98	
	29258.834*(8)	$HCC^{13}CCCN$	11−10	0.04	TMC−1	NRO 45 m	Ohi98	
	29289.159*(2)	HC_5N	11−10	0.038	IRC+10216	NRAO 43 m	Bel92a	
	29304.09*(31)	C_6H	$^2\Pi_{1/2}$ J=21/2−19/2 e	0.016	IRC+10216	NRO 45 m	Kaw95	JPL01
U	29310.5	unidentified		0.003	IRC+10216	NRAO 43 m	Bel92a	
	29327.776*(2)	HC_7N	26−25	0.010	IRC+10216	NRAO 43 m	Bel92a	
	29332.45*(31)	C_6H	$^2\Pi_{1/2}$ J=21/2−19/2 f	0.017	IRC+10216	NRO 45 m	Kaw95	JPL01
U	29333.3	unidentified		0.004	IRC+10216	NRAO 43 m	Bel92a	
	29337.57*(10)	HC_5N	11−10 v_{11} =1 ℓ=1 c	0.004	IRC+10216	NRAO 43 m	Bel92a	Hut80
U	29342.0	unidentified		0.009	IRC+10216	NRAO 43 m	Bel92a	
U	29353.8	unidentified		0.004	IRC+10216	NRAO 43 m	Bel92a	
	29363.15*(10)	HC_5N	11−10 v_{11} =1 ℓ=1 d	0.005	IRC+10216	NRAO 43 m	Bel92a	Hut80
U	29365.0	unidentified		0.004	IRC+10216	NRAO 43 m	Bel92a	
	29477.704*(4)	CCS	2,3−1,2	0.15	TMC−1	NRO 45 m	Ohi98	
	29632.406*(7)	HC_9N	51−50	0.07	TMC−1	NRO 45 m	Ohi98	
	31032.803*(5)	C_5H	$^2\Pi_{1/2}$ J=13/2−11/2 F=7−6 e	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	31032.824*(25)	C_5H	$^2\Pi_{1/2}$ J=13/2−11/2 F=7−6 e	0.018[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	31033.037*(20)	C_5H	$^2\Pi_{1/2}$ J=13/2−11/2 F=6−5 e	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	31033.104*(5)	C_5H	$^2\Pi_{1/2}$ J=13/2−11/2 F=6−5 e	0.07	TMC−1	NRO 45 m	Ohi98	Ohi98
U	31092.1	unidentified		0.010	IRC+10216	NRO 45 m	Kaw95	
	31093.029*(8)	C_8H	$^2\Pi_{3/2}$ 26.5−25.5 e	0.16[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	31093.409*(8)	C_8H	$^2\Pi_{3/2}$ 26.5−25.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	31105.220*(2)	CH_3OCH_3	2(1,1)−2(0,2) AE	[b]	OriMC−1	NRL 26 m	Sny74	Gro98
	31105.226*(2)	CH_3OCH_3	2(1,1)−2(0,2) EA	[b]	OriMC−1	NRL 26 m	Sny74	Gro98
	31106.145*(2)	CH_3OCH_3	2(1,1)−2(0,2) EE	0.2[b]	OriMC−1	NRL 26 m	Sny74	Gro98
	31107.068*(4)	CH_3OCH_3	2(1,1)−2(0,2) AA	[b]	OriMC−1	NRL 26 m	Sny74	Gro98
	31226.709*(53)	CH_3OH	19(2,17)−19(1,18) E	0.5[e]	SgrB2(N)	BIMAArray	Pei00	Xu_97
	31241.512*(19)	C_5H	$^2\Pi_{3/2}$ J=13/2−11/2 F=6−5 f	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	31241.765*(19)	C_5H	$^2\Pi_{3/2}$ J=13/2−11/2 F=6−5 e	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	31242.282*(15)	C_5H	$^2\Pi_{3/2}$ J=13/2−11/2 F=7−6 f	0.019[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	31242.536*(15)	C_5H	$^2\Pi_{3/2}$ J=13/2−11/2 F=7−6 e	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	31358.349*(68)	CH_3OH	20(2,18)−20(1,19) E	0.4[e]	SgrB2(N)	BIMAArray	Pei00	Xu_97
	31424.943 (5)	NH_3	12(12)−12(12)	0.30	OriMC−1	MPI 100 m	Wil93	Poy75
	31583.710*(4)	HC_7N	28−27	0.30	TMC−1	OSO 20 m	Sne81	
	31624.347*(7)	$HC^{13}CCCCN$	12−11	0.008	IRC+10216	NRO 45 m	Kaw95	
	31636.129*(12)	$HCCCC^{13}CN$	12−11	0.008	IRC+10216	NRO 45 m	Kaw95	
	31881.849*(13)	C_6H	$^2\Pi_{3/2}$ J=23/2−21/2 F=12−11 f	0.20	TMC−1	NRO 45 m	Ohi98	JPL01
	31881.885*(12)	C_6H	$^2\Pi_{3/2}$ J=23/2−21/2 F=11−10 f	0.20	TMC−1	NRO 45 m	Ohi98	JPL01
	31885.523*(12)	C_6H	$^2\Pi_{3/2}$ J=23/2−21/2 F=12−11 e	0.18	TMC−1	NRO 45 m	Ohi98	JPL01
	31885.559*(12)	C_6H	$^2\Pi_{3/2}$ J=23/2−21/2 F=11−10 e	0.18	TMC−1	NRO 45 m	Ohi98	JPL01
	31914.622*(43)	H_2COH^+	3(0,3)−2(1,2)	0.097	Sgr B2(M)	NRO 45 m	Ohi96	
	31918.695*(6)	$HCC^{13}CCCN$	12−11	0.005	IRC+10216	NRO 45 m	Kaw95	
	31922.565*(7)	$HCCC^{13}CCN$	12−11	0.005	IRC+10216	NRO 45 m	Kaw95	
	31951.777*(2)	HC_5N	12−11	1.77	TMC−1	OSO 20 m	Sne81	
	31956.444*(9)	HC_9N	55−54	0.006	IRC+10216	NRO 45 m	Kaw95	
U	32033.9	unidentified		0.005	IRC+10216	NRO 45 m	Kaw95	
	32095.98*(31)	C_6H	$^2\Pi_{1/2}$ J=23/2−21/2 e	0.011	IRC+10216	NRO 45 m	Kaw95	JPL01
	32124.78*(31)	C_6H	$^2\Pi_{1/2}$ J=23/2−21/2 f	0.010	IRC+10216	NRO 45 m	Kaw95	JPL01
	32266.319*(8)	C_8H	$^2\Pi_{3/2}$ 27.5−26.5 e	0.10[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	32266.728*(8)	C_8H	$^2\Pi_{3/2}$ 27.5−26.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	32537.449*(10)	HC_9N	56−55	0.011	IRC+10216	NRO 45 m	Kaw95	
	32571.440*(15)	CH_3C_4H	8(1)−7(1)	0.08	TMC−1	NRO 45 m	Ohi98	
	32571.758*(19)	CH_3C_4H	8(0)−7(0)	0.08	TMC−1	NRO 45 m	Ohi98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	32617.016*(79)	l−C_3H	$^2\Pi_{1/2}$ J=3/2−1/2 F=1−1 f	0.08	TMC−1	NRO 45 m	Ohi98	JPL01
	32627.300*(15)	l−C_3H	$^2\Pi_{1/2}$ J=3/2−1/2 F=2−1 f	0.28	TMC−1	OSO 20 m	Tha85	JPL01
	32634.390*(20)	l−C_3H	$^2\Pi_{1/2}$ J=3/2−1/2 F=1−0 f	0.13	TMC−1	OSO 20 m	Tha85	JPL01
	32660.655*(15)	l−C_3H	$^2\Pi_{1/2}$ J=3/2−1/2 F=2−1 e	0.35	TMC−1	OSO 20 m	Tha85	JPL01
	32663.375*(15)	l−C_3H	$^2\Pi_{1/2}$ J=3/2−1/2 F=1−0 e	0.17	TMC−1	OSO 20 m	Tha85	JPL01
	32667.637*(75)	l−C_3H	$^2\Pi_{1/2}$ J=3/2−1/2 F=1−1 e	0.06	TMC−1	NRO 45 m	Ohi98	JPL01
	32711.673*(4)	HC_7N	29−28	0.057	IRC+10216	NRO 45 m	Kaw95	
U	33044.8	unidentified	B=1377 J=12−11	0.011	IRC+10216	NRO 45 m	Kaw95	
	33047.262*(5)	DC_5N	13−12	0.06	TMC−1	NRO 45 m	Ohi98	
	33051.304*(5)	CH_3CCCN	8(1)−7(1)	0.043	TMC−1	OSO 20 m	Bro84	
	33051.623*(5)	CH_3CCCN	8(0)−7(0)	0.057	TMC−1	OSO 20 m	Bro84	
	33111.840*(7)	$CC^{34}S$	3,2−2,1	0.18	TMC−1	NRO 45 m	Ohi98	
	33118.453*(10)	HC_9N	57−56	0.008	IRC+10216	NRO 45 m	Kaw95	
	33156.849(5)	NH_3	13(13)−13(13)	0.10	OriMC−1	MPI 100 m	Wil93	Poy75
U	33332.3	unidentified		0.008	IRC+10216	NRO 45 m	Kaw95	
U	33339.3	unidentified		0.008	IRC+10216	NRO 45 m	Kaw95	
	33699.456*(11)	HC_9N	58−57	0.010	IRC+10216	NRO 45 m	Kaw95	
	33742.683*(2)	SiC_4	11−10	0.017	IRC+10216	NRO 45 m	Kaw95	
	33751.370*(4)	CCS	3,2−2,1	0.032	IRC+10216	NRO 45 m	Kaw95	
	33772.538*(3)	DCCCN	4−3	0.19	TMC−1	NRO 45 m	Ohi98	Laf78
	33839.632*(5)	HC_7N	30−29	0.21	TMC−1	NRO 45 m	Ohi98	
	33839.634*(5)	HC_7N	30−29	0.074	IRC+10216	NRO 45 m	Kaw95	
	33844.240*(6)	CCC^{34} S	6−5	0.05	TMC−1	NRO 45 m	Ohi98	
	34182.760*(1)	CH_3CCH	2(1)−1(1)	0.20	TMC−1	OSO 20 m	Irv81	
	34183.413*(1)	CH_3CCH	2(0)−1(0)	0.25	TMC−1	OSO 20 m	Irv81	
	34259.672*(6)	$HC^{13}CCCN$	13−12	0.013	IRC+10216	NRO 45 m	Kaw95	
	34259.672*(7)	$HC^{13}CCCN$	13−12	0.04	TMC−1	NRO 45 m	Ohi98	
	34272.435*(10)	$HCCCC^{13}CN$	13−12	0.011	IRC+10216	NRO 45 m	Kaw95	
	34280.457*(12)	HC_9N	59−58	0.007	IRC+10216	NRO 45 m	Kaw95	
	34351.421*(13)	H_2CS	1(0,1)−0(0,0)	0.684	TMC−1	NRO 45 m	Min97	
U	34487.1	unidentified		0.013	IRC+10216	NRO 45 m	Kaw95	
	34578.547*(5)	$HCC^{13}CCCN$	13−12	0.04	TMC−1	NRO 45 m	Ohi98	
	34582.746*(5)	$HCCC^{13}CCN$	13−12	0.03	TMC−1	NRO 45 m	Ohi98	
	34614.385*(2)	HC_5N	13−12	1.50	TMC−1	OSO 20 m	Sne81	
	34631.914(20)	$HCCCNH^+$	4−3	0.048	TMC−1	NRO 45 m	Kaw94	Kaw94
	34654.029*(14)	C_6H	$^2\Pi_{3/2}$ J=25/2−23/2 F=13−12 f	0.20	TMC−1	NRO 45 m	Ohi98	JPL01
	34654.061*(14)	C_6H	$^2\Pi_{3/2}$ J=25/2−23/2 F=12−11 f	0.20	TMC−1	NRO 45 m	Ohi98	JPL01
	34658.366*(14)	C_6H	$^2\Pi_{3/2}$ J=25/2−23/2 F=13−12e	0.19	TMC−1	NRO 45 m	Ohi98	JPL01
	34658.398*(13)	C_6H	$^2\Pi_{3/2}$ J=25/2−23/2 F=12−11 e	0.19	TMC−1	NRO 45 m	Ohi98	JPL01
U	34673.9	unidentified		0.009	IRC+10216	NRO 45 m	Kaw95	
	34684.367*(2)	CCCS	6−5	0.022	IRC+10216	NRO 45 m	Kaw95	
	34824.98*(18)	C_4H	J=7/2−5/2 e v_7 =1	0.013	IRC+10216	NRO 45 m	Kaw95	JPL01
	34887.83*(30)	C_6H	$^2\Pi_{1/2}$ J=25/2−23/2 e	0.017	IRC+10216	NRO 45 m	Kaw95	JPL01
	34917.10*(30)	C_6H	$^2\Pi_{1/2}$ J=25/2−23/2 f	0.025	IRC+10216	NRO 45 m	Kaw95	JPL01
	34967.591*(5)	HC_7N	31−30	0.070	IRC+10216	NRO 45 m	Kaw95	
U	35010.3	unidentified		0.010	IRC+10216	NRO 45 m	Kaw95	
	35134.303 (10)	NH_3	14(14)−14(14)	0.06	OriMC−1	MPI 100 m	Wil93	Poy75
	35267.316*(8)	$H^{13}CCCN$	4−3 F=3−2	0.084	TMC−1	NRO 45 m	Tak98	Laf78
	35267.408*(7)	$H^{13}CCCN$	4−3 F=4−3	[b]	TMC−1	NRO 45 m	Tak98	Laf78
	35267.440*(7)	$H^{13}CCCN$	4−3 F=5−4	0.19[b]	TMC−1	NRO 45 m	Tak98	Laf78
	35333.892*(9)	$HCCC^{15}N$	4−3	0.11	TMC−1	NRO 45 m	Ohi98	Laf78
U	35393.2	unidentified		0.013	IRC+10216	NRO 45 m	Kaw95	
	35577.009*(7)	H_2CCCC	4(1,4)−3(1,3)	0.006	IRC+10216	NRO 45 m	Kaw95	
	35589.319*(6)	DC_5N	14−13	0.05	TMC−1	NRO 45 m	Ohi98	
U	35717.4	unidentified		0.006	IRC+10216	NRO 45 m	Kaw95	
	35727.383*(7)	H_2CCCC	4(0,4)−3(0,3)	0.17	TMC−1	NRO 45 m	Ohi98	
	35786.170*(10)	C_8H	$^2\Pi_{3/2}$ 30.5−29.5 e	0.10[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	35786.672*(10)	C_8H	$^2\Pi_{3/2}$ 30.5−29.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
U	35787.5	unidentified		0.008	IRC+10216	NRO 45 m	Kaw95	
U	35793.	unidentified	B=1377 J=13−12	0.011	IRC+10216	NRO 45 m	Kaw95	
	35793.315*(10)	$^{24}MgNC$	5/2,3−3/2,2	0.014	IRC+10216	NRO 45 m	Kaw95	
	35802.789*(5)	C_5H	$^2\Pi_{1/2}$ J=15/2−13/2 F=8−7 f	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	35803.023*(5)	C_5H	$^2\Pi_{1/2}$ J=15/2−13/2 F=7−6 f	0.03	TMC−1	NRO 45 m	Ohi98	Ohi98
	35806.837*(5)	C_5H	$^2\Pi_{1/2}$ J=15/2−13/2 F=8−7 e	0.06	TMC−1	NRO 45 m	Ohi98	Ohi98
	35807.084*(5)	C_5H	$^2\Pi_{1/2}$ J=15/2−13/2 F=7−6 e	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	35808.534*(10)	$^{24}MgNC$	7/2,3−5/2,2	[b]	IRC+10216	NRO 45 m	Kaw95	
	35875.776*(8)	H_2CCCC	4(1,3)−3(1,2)	0.38	TMC−1	NRO 45 m	Ohi98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	36023.454*(14)	HC_9N	62−61	0.016	IRC+10216	NRO 45 m	Kaw95	
	36048.538*(14)	C_5H	$^2\Pi_{3/2}$ J=15/2−13/2 F=8−7 f	0.028[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	36048.877*(14)	C_5H	$^2\Pi_{3/2}$ J=15/2−13/2 F=7−6 e	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	36095.546*(6)	HC_7N	32−31	0.083	IRC+10216	NRO 45 m	Kaw95	
	36169.290*(14)	CH_3OH	4(−1,4)−3(0,3) E	12.5	Sgr B2(M)	NRAO 11 m	Lov76	Xu_97
	36202.041*(12)	SO	2(3)−2(2)	0.4	OriMC−1	Parkes 64 m	Bro80	
	36237.862*(9)	$HC^{13}CCN$	4−3 F=3−2	0.083	TMC−1	NRO 45 m	Tak98	Laf78
	36237.954*(9)	$HC^{13}CCN$	4−3 F=4−3	[b]	TMC−1	NRO 45 m	Tak98	Laf78
	36237.987*(9)	$HC^{13}CCN$	4−3 F=5−4	0.19[b]	TMC−1	NRO 45 m	Tak98	Laf78
	36241.350*(3)	$HCC^{13}CN$	4−3 F=3−2	0.12	TMC−1	NRO 45 m	Tak98	Laf78
	36241.442*(3)	$HCC^{13}CN$	4−3 F=4−3	[b]	TMC−1	NRO 45 m	Tak98	Laf78
	36241.475*(3)	$HCC^{13}CN$	4−3 F=5−4	0.29[b]	TMC−1	NRO 45 m	Tak98	Laf78
	36299.951*(40)	H_2COH^+	1(1,1)−2(0,2)	−0.123	Sgr B2(M)	NRO 45 m	Ohi96	
	36306.630*(3)	$H^{13}CCCCCN$	14−13	0.036	TMC−1	NRO 45 m	Tak90	
	36309.624*(3)	SiS	2−1	0.5	IRC+10216	MPI 100 m	Gra81	
	36390.888*(1)	HCCCN	4−3 F=4−4	0.66	TMC−1	NRO 45 m	Ohi98	Laf78
	36392.238*(1)	HCCCN	4−3 F=3−2	0.7	L1512	NEROC 37 m	Ful93	Laf78
	36392.332*(1)	HCCCN	4−3 F=4−3	0.8	L1512	NEROC 37 m	Ful93	Laf78
	36392.365*(1)	HCCCN	4−3 F=5−4	1.0	L1512	NEROC 37 m	Ful93	Laf78
	36394.178*(1)	HCCCN	4−3 F=3−3	0.69	TMC−1	NRO 45 m	Ohi98	Laf78
U	36418.1	unidentified		0.023	IRC+10216	NRO 45 m	Kaw95	
	36451.973*(21)	HCCCN	4−3 v_6 =1 ℓ=1 e	0.8[f]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36480.671*(22)	HCCCN	4−3 v_6 =1 ℓ=1 f	[b]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36481.690*(13)	HCCCN	4−3 v_7 =1 ℓ=1 e	3.2[bf]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36488.813*(2)	OCS	3−2	0.06	TMC−1	NRO 45 m	Ohi98	
	36534.098*(13)	HCCCN	4−3 v_7 =1 ℓ=1 f	2.4[f]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36581.92*(4)	HCCCN	4−3 v_6 =1 v_7 =1 ℓ=0+	[b]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	36582.15*(8)	HCCCN	4−3 v_6 =1 v_7 =1 ℓ=0−	[b]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	36583.53*(4)	HCCCN	4−3 v_6 =1 v_7 =1 ℓ=2−	[b]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	36583.54*(8)	HCCCN	4−3 v_6 =1 v_7 =1 ℓ=2+	0.6[bf]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	36623.177*(23)	HCCCN	4−3 v_7 =2 ℓ=2 e	[b]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36623.329*(23)	HCCCN	4−3 v_7 =2 ℓ=2 f	[b]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36623.461*(20)	HCCCN	4−3 v_7 =2 ℓ=0	1.6[bf]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	36642.812*(27)	CH_3C_4H	9(1)−8(1)	0.06	TMC−1	NRO 45 m	Ohi98	
U	36643.0	unidentified		0.020	IRC+10216	NRO 45 m	Kaw95	
	36643.170*(28)	CH_3C_4H	9(0)−8(0)	0.08	TMC−1	NRO 45 m	Ohi98	
	36793.739*(1)	CH_3CN	2(1)−1(1) F=2−1	0.08	TMC−1	NRO 45 m	Min93	Bou80
	36794.204*(1)	CH_3CN	2(0)−1(0) F=2−2	0.04	TMC−1	NRO 45 m	Min93	Bou80
	36794.340*(1)	CH_3CN	2(1)−1(1) F=2−2	0.03	TMC−1	NRO 45 m	Min93	Bou80
	36794.417*(1)	CH_3CN	2(0)−1(0) F=1−0	0.06	TMC−1	NRO 45 m	Min93	Bou80
	36795.024*(1)	CH_3CN	2(1)−1(1) F=3−2	0.15	TMC−1	NRO 45 m	Min93	Bou80
	36795.475*(1)	CH_3CN	2(0)−1(0) F=2−1	0.13	TMC−1	NRO 45 m	Min93	Bou80
	36795.568*(1)	CH_3CN	2(0)−1(0) F=3−2	0.24	TMC−1	NRO 45 m	Min93	Bou80
	36796.348*(1)	CH_3CN	2(1)−1(1) F=1−0	0.04	TMC−1	NRO 45 m	Min93	Bou80
	36797.584*(1)	CH_3CN	2(0)−1(0) F=1−1	0.04	TMC−1	NRO 45 m	Min93	Bou80
	36810.136*(2)	SiC_4	12−11	0.53[f]	TMC−1	NRO 45 m	Ohi89	
	36894.988*(7)	$HC^{13}CCCCN$	14−13	0.032	TMC−1	NRO 45 m	Tak90	
	36908.733*(11)	$HCCCC^{13}CN$	14−13	0.058	TMC−1	NRO 45 m	Tak90	
	36959.446*(10)	C_8H	$^2\Pi_{3/2}$ 31.5−30.5 e	0.21[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	36959.982*(10)	C_8H	$^2\Pi_{3/2}$ 31.5−30.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	37018.922*(1)	CH_2CHCN	4(1,4)−3(1,3)	0.05	TMC−1	NRO 45 m	Ohi98	
	37182.660*(4)	CH_3CCCN	9(1)−8(1)	0.06	TMC−1	NRO 45 m	Ohi98	
	37183.019*(6)	CH_3CCCN	9(0)−8(0)	0.07	TMC−1	NRO 45 m	Ohi98	
	37185.446*(15)	HC_9N	64−63	0.015	IRC+10216	NRO 45 m	Kaw95	
	37223.497*(6)	HC_7N	33−32	0.092	IRC+10216	NRO 45 m	Kaw95	
	37238.390*(6)	$HCC^{13}CCCN$	14−13	0.042	TMC−1	NRO 45 m	Tak90	
	37242.920*(6)	$HCCC^{13}CCN$	14−13	0.044	TMC−1	NRO 45 m	Tak90	
	37276.985*(2)	HC_5N	14−13	2.09	TMC−1	NRO 45 m	Suz84a	
	37290.154*(8)	HCCCHO	4(0,4)−3(0,3)	0.043	TMC−1	NRAO 43 m	Irv88	
	37346.556 (20)	HNCCC	4−3	0.27	TMC−1	NRO 45 m	Kaw92a	Kaw92a
	37426.187*(15)	C_6H	$^2\Pi_{3/2}$ J=27/2−25/2 F=14−13 f	0.18	TMC−1	NRO 45 m	Ohi98	JPL01
	37426.215*(15)	C_6H	$^2\Pi_{3/2}$ J=27/2−25/2 F=13−12 f	0.18	TMC−1	NRO 45 m	Ohi98	JPL01
	37431.240*(15)	C_6H	$^2\Pi_{3/2}$ J=27/2−25/2 F=14−13 e	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
	37431.268*(15)	C_6H	$^2\Pi_{3/2}$ J=27/2−25/2 F=13−12 e	0.16	TMC−1	NRO 45 m	Ohi98	JPL01
	37679.64* (30)	C_6H	$^2\Pi_{1/2}$ J=27/2−25/2 e	0.015	IRC+10216	NRO 45 m	Kaw95	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	37703.696*(13)	CH_3OH	7(−2,6)−8(−1,8) E	4.0[e]	W3(OH)	NEROC 37 m	Has89	Xu_97
	37709.41* (30)	C_6H	$^2\Pi_{1/2}$ J=27/2−25/2 f	0.030	IRC+10216	NRO 45 m	Kaw95	JPL01
	37904.849*(1)	CH_2CHCN	4(0,4)−3(0,3) F=3−2	0.17	TMC−1	NRO 45 m	Ohi98	
U	38044.1	unidentified		0.016	IRC+10216	NRO 45 m	Kaw95	
	38049.617*(2)	C_4H	J=9/2−7/2 F=4−3 e	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	38049.691*(2)	C_4H	J=9/2−7/2 F=5−4	1.47	TMC−1	NRO 45 m	Ohi98	JPL01
	38049.691*(2)	C_4H	J=9/2−7/2 F=5−4 e	0.088[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	38059.431*(3)	C_4H	J=7/2−7/2 F=4−4	0.06	TMC−1	NRO 45 m	Ohi98	JPL01
	38078.930*(3)	C_4H	J=7/2−7/2 F=3−3	0.08	TMC−1	NRO 45 m	Ohi98	JPL01
	38088.440*(2)	C_4H	J=7/2−5/2 F=4−3,3−2	1.69	TMC−1	NRO 45 m	Ohi98	JPL01
	38088.441*(2)	C_4H	J=7/2−5/2 F=4−3 f	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	38088.481*(2)	C_4H	J=7/2−5/2 F=5−4 f	0.064[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	38131.371*(9)	DC_5N	15−14	0.05	TMC−1	NRO 45 m	Ohi98	
	38212.637*(6)	C_4H	J=7/2−5/2 F=3−3	0.06	TMC−1	NRO 45 m	Ohi98	JPL01
	38224.456*(7)	$c-C_3HD$	2(1,1)−2(0,2)	0.11	TMC−1	NRO 45 m	Ohi98	
	38231.962*(8)	C_4H	J=9/2−7/2 F=4−4	0.05	TMC−1	NRO 45 m	Ohi98	JPL01
	38293.292*(14)	CH_3OH	6(2,5)−5(3,2) A−	9.0[e]	W3(OH)	NEROC 37 m	Has89	Xu_97
	38347.432*(17)	HC_9N	66−65	0.015	IRC+10216	NRO 45 m	Kaw95	
	38351.446*(7)	HC_7N	34−33	0.093	IRC+10216	NRO 45 m	Kaw95	
	38351.446*(7)	HC_7N	34−33	0.19	TMC−1	NRO 45 m	Ohi98	
	38452.653*(14)	CH_3OH	6(2,4)−5(3,3) A+	15.0[e]	W3(OH)	NEROC 37 m	Has89	Xu_97
	38486.892*(4)	CCCO	4−3	0.09	TMC−1	NRO 45 m	Ohi98	
U	38551.9	unidentified	B=1377 J=14−13	0.023	IRC+10216	NRO 45 m	Kaw95	
U	38594.9	unidentified		0.020	IRC+10216	NRO 45 m	Kaw95	
	38847.735*(1)	CH_2CHCN	4(1,3)−3(1,2) F=5−4	0.08	TMC−1	NRO 45 m	Ohi98	
	38866.422*(3)	CCS	3,3−2,2	0.43	TMC−1	NRO 45 m	Kai87	
	38899.910*(5)	$H^{13}CCCCCN$	15−14	0.018	IRC+10216	NRO 45 m	Kaw95	
	39479.391*(8)	HC_7N	35−34	0.097	IRC+10216	NRO 45 m	Kaw95	
	39571.326*(9)	CCCN	4−3 J=9/2−7/2 F=7/2−5/2	[b]	TMC−1	NRO 45 m	Ohi98	Got83
	39571.333*(9)	CCCN	4−3 J=9/2−7/2 F=9/2−7/2	0.14[b]	TMC−1	NRO 45 m	Ohi98	Got83
	39571.405*(9)	CCCN	4−3 J=9/2−7/2 F=11/2−9/2	0.11	TMC−1	NRO 45 m	Ohi98	Got83
	39581.600*(4)	$c-C_2H_4O$	1(0,1)−0(0,0)	0.08	SgrB2(N)	NEROC 37 m	Dic97	
	39590.209*(10)	CCCN	4−3 J=7/2−5/2 F=7/2−5/2	[b]	TMC−1	NRO 45 m	Ohi98	Got83
	39590.217*(10)	CCCN	4−3 J=7/2−5/2 F=9/2−7/2	0.17[b]	TMC−1	NRO 45 m	Ohi98	Got83
	39742.547*(4)	HCCNC	4−3	0.50	TMC−1	NRO 45 m	Kaw92	
	39877.571*(3)	SiC_4	13−12	0.36[f]	TMC−1	NRO 45 m	Ohi89	
	39903.085*(10)	$HCCC^{13}CCN$	15−14	0.06	TMC−1	NRO 45 m	Ohi98	
	39939.574*(2)	HC_5N	15−14	1.8	TMC−1	NRO 45 m	Tak90	
	40039.018*(10)	CH_2CO	2(1,2)−1(1,1)	0.09	TMC−1	NRO 45 m	Ohi98	
	40198.356(30)	C_6H	$^2\Pi_{3/2}$ J=29/2−27/2 e	0.084	TMC−1	NRO 45 m	Suz86	Suz86
	40204.150(30)	C_6H	$^2\Pi_{3/2}$ J=29/2−27/2 f	0.87	TMC−1	NRO 45 m	Suz86	Suz86
	40229.643	CH_2CN	2−15/2−3/27/2−5/27/2−7/2	0.02	TMC−1	NRO 45 m	Ohi98	Ohi98
	40232.796	CH_2CN	2−13/2−1/23/2−1/25/2−3/2	0.038	TMC−1	NRO 45 m	Irv88a	Irv88a
	40239.188	CH_2CN	2−15/2−3/27/2−5/25/2−3/2	0.112	TMC−1	NRO 45 m	Irv88a	Irv88a
	40239.684	CH_2CN	2−15/2−3/27/2−5/27/2−5/2	0.141	TMC−1	NRO 45 m	Irv88a	Irv88a
	40239.993	CH_2CN	2−15/2−3/27/2−5/29/2−7/2	0.241	TMC−1	NRO 45 m	Irv88a	Irv88a
	40240.520	CH_2CN	2−15/2−3/25/2−5/27/2−7/2	0.062	TMC−1	NRO 45 m	Irv88a	Irv88a
	40241.356	CH_2CN	2−15/2−3/25/2−3/23/2−1/2	0.04	TMC−1	NRO 45 m	Ohi98	Ohi98
	40241.360	CH_2CN	2−15/2−3/23/2−3/23/2−5/2	[b]	TMC−1	NRO 45 m	Irv88a	Irv88a
	40241.360	CH_2CN	2−15/2−3/25/2−3/23/2−1/2	0.034	TMC−1	NRO 45 m	Irv88a	Irv88a
	40242.208	CH_2CN	2−15/2−3/25/2−3/25/2−3/2	0.066	TMC−1	NRO 45 m	Irv88a	Irv88a
	40243.207	CH_2CN	2−15/2−3/23/2−3/25/2−3/2	0.103	TMC−1	NRO 45 m	Irv88a	Irv88a
	40243.207	CH_2CN	2−15/2−3/25/2−5/23/2−5/2	[b]	TMC−1	NRO 45 m	Irv88a	Irv88a
	40244.330	CH_2CN	2−15/2−3/25/2−3/27/2−5/2	0.098	TMC−1	NRO 45 m	Irv88a	Irv88a
	40247.556	CH_2CN	2−13/2−1/25/2−3/25/2−3/2	[b]	TMC−1	NRO 45 m	Irv88a	Irv88a
	40247.556	CH_2CN	2−13/2−3/25/2−3/27/2−5/2	0.206[b]	TMC−1	NRO 45 m	Irv88a	Irv88a
	40247.849	CH_2CN	2−15/2−3/23/2−1/23/2−1/2	0.04	TMC−1	NRO 45 m	Ohi98	Ohi98
	40248.212	CH_2CN	2−15/2−3/25/2−5/23/2−3/2	0.02	TMC−1	NRO 45 m	Ohi98	Ohi98
	40248.588	CH_2CN	2−13/2−1/25/2−3/23/2−1/2	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	40249.341	CH_2CN	2−13/2−1/21/2−1/23/2−3/2	0.03	TMC−1	NRO 45 m	Ohi98	Ohi98
	40250.438	CH_2CN	2−13/2−1/23/2−1/21/2−1/2	0.02	TMC−1	NRO 45 m	Ohi98	Ohi98
	40251.887	CH_2CN	2−13/2−1/25/2−3/25/2−5/2	0.03	TMC−1	NRO 45 m	Ohi98	Ohi98
	40253.903	CH_2CN	2−13/2−1/25/2−3/23/2−3/2	0.02	TMC−1	NRO 45 m	Ohi98	Ohi98
	40256.270	CH_2CN	2−13/2−1/23/2−3/23/2−3/2	0.03	TMC−1	NRO 45 m	Ohi98	Ohi98
	40256.813	CH_2CN	2−13/2−3/23/2−3/25/2−5/2	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	40258.143	CH_2CN	2−15/2−1/23/2−3/21/2−1/2	0.02	TMC−1	NRO 45 m	Ohi98	Ohi98
	40260.256	CH_2CN	2−13/2−1/21/2−1/21/2−3/2	0.02	TMC−1	NRO 45 m	Ohi98	Ohi98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	40417.945*(11)	CH_2CO	2(0,2)−1(0,1)	0.08	TMC−1	NRO 45 m	Ohi98	
	40465.013*(2)	CCCS	7−6	0.88	TMC−1	NRO 45 m	Kai87	
	40471.40* (59)	C_6H	$^2\Pi_{1/2}$ J=29/2−27/2 e	0.020	IRC+10216	NRO 45 m	Kaw95	JPL01
	40479.254*(10)	C_8H	$^2\Pi_{3/2}$ 34.5−33.5 e	0.15[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	40479.895*(10)	C_8H	$^2\Pi_{3/2}$ 34.5−33.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	40501.74* (60)	C_6H	$^2\Pi_{1/2}$ J=29/2−27/2 f	0.025	IRC+10216	NRO 45 m	Kaw95	JPL01
	40576.729*(5)	C_5H	$^2\Pi_{1/2}$ J=17/2−15/2 F=9−8 f	0.04	TMC−1	NRO 45 m	Ohi98	Ohi98
	40576.931*(5)	C_5H	$^2\Pi_{1/2}$ J=17/2−15/2 F=8−7 f	0.05	TMC−1	NRO 45 m	Ohi98	Ohi98
	40580.866*(5)	C_5H	$^2\Pi_{1/2}$ J=17/2−15/2 F=9−8 e	0.07	TMC−1	NRO 45 m	Ohi98	Ohi98
	40581.077*(5)	C_5H	$^2\Pi_{1/2}$ J=17/2−15/2 F=8−7 e	0.08	TMC−1	NRO 45 m	Ohi98	Ohi98
	40607.333*(8)	HC_7N	36−35	0.093	IRC+10216	NRO 45 m	Kaw95	
	40671.388*(20)	HC_9N	70−69	0.020	IRC+10216	NRO 45 m	Kaw95	
	40673.413*(14)	DC_5N	16−15	0.05	TMC−1	NRO 45 m	Ohi98	
	40714.164*(40)	CH_3C_4H	10(1)−9(1)	0.10	TMC−1	NRO 45 m	Ohi98	
	40714.561*(41)	CH_3C_4H	10(0)−9(0)	0.12	TMC−1	NRO 45 m	Ohi98	
	40793.839*(10)	CH_2CO	2(1,1)−1(1,0)	0.11	TMC−1	NRO 45 m	Ohi98	
	40854.363*(29)	C_5H	$^2\Pi_{3/2}$ J=17/2−15/2 F=8−7	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	40854.775*(27)	C_5H	$^2\Pi_{3/2}$ J=17/2−15/2 F=9−8	0.047[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	40854.796*(29)	C_5H	$^2\Pi_{3/2}$ J=17/2−15/2 F=8−7	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	40855.210*(27)	C_5H	$^2\Pi_{3/2}$ J=17/2−15/2 F=9−8	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
U	40880.0	unidentified		0.07	Sgr B2(M)	NRAO 11 m	Kut80	
	41198.320*(14)	H_2CCC	2(1,2)−1(1,1)	0.17	TMC−1	NRO 45 m	Ohi98	
U	41305.4	unidentified	B=1377 J=15−14	0.025	IRC+10216	NRO 45 m	Kaw95	
	41313.996*(6)	CH_3CCCN	10(1)−9(1)	0.08	TMC−1	NRO 45 m	Ohi98	
	41314.394*(6)	CH_3CCCN	10(0)−9(0)	0.09	TMC−1	NRO 45 m	Ohi98	
	41493.180*(8)	$H^{13}CCCCCN$	16−15	0.05	TMC−1	NRO 45 m	Ohi98	
	41579.445*(10)	$c-C_2H_4O$	4(2,2)−4(1,3)	0.05	SgrB2(N)	NRO 45 m	Dic97	
	41584.627*(9)	H_2CCC	2(0,2)−1(0,1)	0.11	TMC−1	NRO 45 m	Ohi98	
	41652.515*(10)	C_8H	$^2\Pi_{3/2}$ 35.5−34.5 e	0.23[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	41653.194*(10)	C_8H	$^2\Pi_{3/2}$ 35.5−34.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
U	41712.1	unidentified		0.012	IRC+10216	NRO 45 m	Kaw95	
	41735.271*(8)	HC_7N	37−36	0.085	IRC+10216	NRO 45 m	Kaw95	
	41735.271*(9)	HC_7N	37−36	0.12	TMC−1	NRO 45 m	Ohi98	
	41967.661*(11)	H_2CCC	2(1,1)−1(1,0)	0.20	TMC−1	NRO 45 m	Ohi98	
	42215.539*(5)	DCCCN	5−4 F=4−3	[b]	TMC−1	FCRAO 14 m	Lan80	Laf78
	42215.590*(5)	DCCCN	5−4 F=5−4	0.14[b]	TMC−1	FCRAO 14 m	Lan80	Laf78
	42215.613*(5)	DCCCN	5−4 F=6−5	[b]	TMC−1	FCRAO 14 m	Lan80	Laf78
	42373.365*(22)	^{30}SiO	1−0 v=0	28.[e]	VYCMa	CadY 13.7 m	Bar89	
	42519.373*(27)	SiO	1−0 v=3	2.0	VXSgr	IRT 13.7 m	Sca78	
	42558.044*(14)	$HCC^{13}CCCN$	16−15	0.010	IRC+10216	NRO 45 m	Kaw95	
	42563.241*(15)	$HCCC^{13}CCN$	16−15	0.015	IRC+10216	NRO 45 m	Kaw95	
	42563.241*(15)	$HCCC^{13}CCN$	16−15	0.04	TMC−1	NRO 45 m	Ohi98	
	42602.153*(2)	HC_5N	16−15	0.40	TMC−1	NEROC 37 m	Irv83	
	42674.197*(7)	HCS^+	1−0	0.085	TMC−1	NEROC 37 m	Irv83	
	42820.582*(23)	SiO	1−0 v=2	15.[i]	VYCMa	NRAO 11 m	Buh74	
	42863.206*(10)	HC_7N	38−37	0.086	IRC+10216	NRO 45 m	Kaw95	
	42863.206*(10)	HC_7N	38−37	0.11	TMC−1	NRO 45 m	Ohi98	
	42879.922*(22)	^{29}SiO	1−0 v=0	3.1[e]	VYCMa	CadY 13.7 m	Bar89	
	42944.988*(3)	SiC_4	14−13	0.74[f]	TMC−1	NRO 45 m	Ohi89	
	42970.453 (30)	C_6H	31/2−29/2 e	0.108	TMC−1	NRO 45 m	Suz86	Suz86
	42977.115 (30)	C_6H	31/2−29/2 f	0.13	TMC−1	NRO 45 m	Suz86	Suz86
	42995.321*(24)	HC_9N	74−73	0.01	IRC+10216	NRO 45 m	Kaw95	
	43122.079*(21)	SiO	1−0 v=1	29.[i]	OriMC−1	NRAO 11 m	Sny75	
	43263.11* (29)	C_6H	$^2\Pi_{1/2}$ J=31/2−29/2e	0.028	IRC+10216	NRO 45 m	Kaw95	JPL01
	43289.809 (20)	$HCCCNH^+$	4−3	0.048	TMC−1	NRO 45 m	Kaw94	Kaw94
	43294.04* (29)	C_6H	$^2\Pi_{1/2}$ J=31/2−29/2f	0.022	IRC+10216	NRO 45 m	Kaw95	JPL01
	43423.864*(22)	SiO	1−0 v=0	0.50	OriMC−1	NEROC 37 m	Sny78	
	43624.353*(10)	HCCN	3,2−2,1	0.016	IRC+10216	IRAM 30 m	Gue91	
	43962.014*(8)	HNCO	2(0,2)−1(0,1) F=1−1	0.05	TMC−1	NRO 45 m	Ohi98	
	43962.998*(2)	HNCO	2(0,2)−1(0,1) F=3−2	<1[b]	Sgr B2(M)	NRAO 11 m	Sny72	Win76
	43963.042*(2)	HNCO	2(0,2)−1(0,1) F=2−1	[b]	Sgr B2(M)	NRAO 11 m	Sny72	Win76
	43963.659*(5)	HNCO	2(0,2)−1(0,1) F=1−0,2−2	0.07	TMC−1	NRO 45 m	Ohi98	
	43981.024*(5)	CCS	3,4−2,3	0.38	TMC−1	NRO 45 m	Kai87	
	43991.137*(11)	HC_7N	39−38	0.064	IRC+10216	NRO 45 m	Kaw95	
	43991.137*(11)	HC_7N	39−38	0.08	TMC−1	NRO 45 m	Ohi98	
U	44059.1	unidentified	B=1377 J=16−15	0.020	IRC+10216	NRO 45 m	Kaw95	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	44069.476*(15)	CH_3OH	7(0,7)−6(1,6) A+	3.9	Sgr B2(M)	NRO 45 m	Mor85	Xu_97
	44084.172*(13)	$H^{13}CCCN$	5−4	0.066	IRC+10216	NRO 45 m	Kaw95	
	44084.172*(13)	$H^{13}CCCN$	5−4	0.17	TMC−1	NRO 45 m	Ohi98	Laf78
	44104.781*(3)	$c-C_3H_2$	3(2,1)−3(1,2)	0.025	IRC+10216	NRO 45 m	Kaw95	
	44167.274*(10)	$HCCC^{15}N$	5−4	0.08	TMC−1	NRO 45 m	Ohi98	Laf78
	44471.139*(9)	H_2CCCC	5(1,5)−4(1,4)	0.018	IRC+10216	NRO 45 m	Kaw95	
	44471.139*(9)	H_2CCCC	5(1,5)−4(1,4)	0.28	TMC−1	NRO 45 m	Ohi98	
	44497.600*(8)	$CC^{34}S$	4,3−3,2	0.13	L1498	NRO 45 m	Yam90	
U	44507.7	unidentified	(U48292.3USB)	0.06	OriMC−1	NRO 45 m	Sai89	
	44596.992*(4)	CH_3CH_2CN	5(0,5)−4(0,4)	0.31	OriMC−1	NRO 45 m	Sai89	
	44659.020*(9)	H_2CCCC	5(0,5)−4(0,4)	0.14	TMC−1	NRO 45 m	Ohi98	
	44730.271*(4)	CH_3CH_2CN	5(2,4)−4(2,3)	0.23	OriMC−1	NRO 45 m	Sai89	
	44785.538*(56)	CH_3C_4H	11(1)−10(1)	0.04	TMC−1	NRO 45 m	Ohi98	
	44785.931*(57)	CH_3C_4H	11(0)−10(0)	0.05	TMC−1	NRO 45 m	Ohi98	
	44844.592*(10)	H_2CCCC	5(1,4)−4(1,3)	0.020	IRC+10216	NRO 45 m	Kaw95	
	44844.592*(10)	H_2CCCC	5(1,4)−4(1,3)	0.19	TMC−1	NRO 45 m	Ohi98	
U	44864.5	unidentified	(U47935.5USB)	0.04	OriMC−1	NRO 45 m	Sai89	
	44878.104*(4)	CH_3CH_2CN	5(2,3)−4(2,2)	0.30	OriMC−1	NRO 45 m	Sai89	
	44911.75(1)	HCOOH	2(0,2)−1(0,1)	0.044	L134N	NRO 45 m	Irv90	Bel71
	44955.778*(12)	CH_3OH	2(0,2)−3(1,3) E $v_t=1$	0.85	OriMC−1	NRO 45 m	Sai89	Xu_97
U	45033.5	unidentified	(U47976.5USB)	0.10	OriMC−1	NRO 45 m	Sai89	
	45103.868*(6)	$c-H^{13}CCCH$	2(1,1)−2(0,2)	0.09	TMC−1	NRO 45 m	Ohi98	
	45119.064*(12)	HC_7N	40−39	0.105	CRL2688	NRO 45 m	Fuk94	
	45259.076*(5)	NaCN	3(1,3)−2(1,2)	0.020	IRC+10216	NRO 45 m	Kaw95	
	45264.720*(2)	HC_5N	17−16	0.83	TMC−1	NRAO 11 m	Buj81	
	45297.346*(14)	$HC^{13}CCN$	5−4	0.22	TMC−1	NRO 45 m	Tak98	
	45301.707*(7)	$HCC^{13}CN$	5−4	0.34	TMC−1	NRO 45 m	Tak98	
	45350.68*(3)	C_5H	$^2\Pi_{1/2}$ $J=19/2-17/2$ e $F=10-9$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45350.73*(3)	C_5H	$^2\Pi_{1/2}$ $J=19/2-17/2$ e $F=9-8$	0.047[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45354.92*(3)	C_5H	$^2\Pi_{1/2}$ $J=19/2-17/2$ f $F=10-9$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45354.97*(3)	C_5H	$^2\Pi_{1/2}$ $J=19/2-17/2$ f $F=9-8$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45379.029*(2)	CCS	4,3−3,2	2.23	TMC−1	NRO 45 m	Suz84	
	45488.839*(1)	HCCCN	5−4 $F=5-5$	0.37	TMC−1	NRO 45 m	Ohi98	Laf78
	45490.264*(1)	HCCCN	5−4 $F=4-3$	[b]	Sgr B2(M)	NRAO 11 m	Mor76	Laf78
	45490.316*(1)	HCCCN	5−4 $F=5-4$	2.05[j]	Sgr B2(M)	NRAO 11 m	Mor76	Laf78
	45490.340*(1)	HCCCN	5−4 $F=6-5$	[b]	Sgr B2(M)	NRAO 11 m	Mor76	Laf78
	45492.110*(1)	HCCCN	5−4 $F=4-4$	0.37	TMC−1	NRO 45 m	Ohi98	Laf78
	45564.872*(24)	HCCCN	5−4 $v_6=1$ $\ell=1$ e	1.1[f]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45600.738*(25)	HCCCN	5−4 $v_6=1$ $\ell=1$ f	[b]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45602.145*(25)	HCCCN	5−4 $v_7=1$ $\ell=1$ e	7.1[bf]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45660.66*(1)	C_5H	$^2\Pi_{3/2}$ $J=19/2-17/2$ e $F=9-8$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45660.98*(1)	C_5H	$^2\Pi_{3/2}$ $J=19/2-17/2$ e $F=10-9$	0.057[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45661.21*(1)	C_5H	$^2\Pi_{3/2}$ $J=19/2-17/2$ f $F=9-8$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45661.52*(1)	C_5H	$^2\Pi_{3/2}$ $J=19/2-17/2$ f $F=10-9$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45667.519*(16)	HCCCN	5−4 $v_7=1$ $\ell=1$ f	5.7[f]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45727.13*(5)	HCCCN	5−4 $v_6=1$ $v_7=1$ $\ell=0+$	[b]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	45727.49*(10)	HCCCN	5−4 $v_6=1$ $v_7=1$ $\ell=0-$	[b]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	45729.40*(5)	HCCCN	5−4 $v_6=1$ $v_7=1$ $\ell=2-$	[b]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	45729.48*(10)	HCCCN	5−4 $v_6=1$ $v_7=1$ $\ell=2+$	4.7[bf]	G10.47+0.03	MPI 100 m	Wyr99	Wyr99
	45742.443*(58)	C_6H	$^2\Pi_{3/2}$ $J=33/2-31/2$ f $F=17-16$	0.056[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45742.521*(40)	C_6H	$^2\Pi_{3/2}$ $J=33/2-31/2$ f $F=16-15$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45750.040*(40)	C_6H	$^2\Pi_{3/2}$ $J=33/2-31/2$ e $F=17-16$	0.056[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45750.061*(40)	C_6H	$^2\Pi_{3/2}$ $J=33/2-31/2$ e $F=16-15$	[b]	IRC+10216	NRO 45 m	Kaw95	JPL01
	45778.864*(28)	HCCCN	5−4 $v_7=2$ $\ell=2$ e	[b]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45779.105*(26)	HCCCN	5−4 $v_7=2$ $\ell=0$	4.5[bf]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45779.167*(28)	HCCCN	5−4 $v_7=2$ $\ell=2$ f	[b]	G10.47+0.03	MPI 100 m	Wyr99	Laf78
	45826.733*(4)	CCO	3,2−2,1	0.050	TMC−1	NRO 45 m	Ohi91	
	46012.386*(3)	SiC_4	15−14	[b]	TMC−1	NRO 45 m	Ohi89	
	46054.76* (28)	C_6H	$^2\Pi_{1/2}$ $J=33/2-31/2$ e	0.029	IRC+10216	NRO 45 m	Kaw95	JPL01
	46086.32* (29)	C_6H	$^2\Pi_{1/2}$ $J=33/2-31/2$ f	0.033	IRC+10216	NRO 45 m	Kaw95	JPL01
	46245.621*(5)	CCCS	8−7	0.84	TMC−1	NRO 45 m	Kai87	
	46246.988*(13)	HC_7N	41−40	0.05	TMC−1	NRO 45 m	Ohi98	
	46247.580*(10)	^{13}CS	1−0	0.148	Sgr B2(M)	NRAO 11 m	Tur73	
	46266.934*(1)	CH_2CHCN	5(1,5)−4(1,4)	0.10	TMC−1	NRO 45 m	Ohi98	
	46683.086 (20)	HNCCC	5−4	0.30	TMC−1	NRO 45 m	Kaw92a	Kaw92a
	46755.614*(3)	$c-C_3H_2$	2(1,1)−2(0,2)	1.00	TMC−1	NRO 45 m	Suz85	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	46812.8	unidentified	B=1377 J=17−16	0.025	IRC+10216	NRO 45 m	Kaw95	
	46847.734*(3)	NaCN	3(0,3)−2(0,2)	0.020	IRC+10216	NRO 45 m	Kaw95	
	47064.813*(16)	SiC_2	2(0,2)−1(0,1)	0.233	IRC+10216	NRO 45 m	Kaw95	
	47094.974*(10)	c−C_2H_4O	4(4,1)−4(3,2)	0.05	Sgr B2(N)	NRO 45 m	Dic97	
	47354.648*(1)	CH_2CHCN	5(0,5)−4(0,4)	0.18	TMC−1	NRO 45 m	Ohi98	
	47374.907*(14)	HC_7N	42−41	0.078	IRC+10216	NRO 45 m	Kaw95	
U	47408.5	unidentified		0.026	IRC+10216	NRO 45 m	Kaw95	
U	47423.6	unidentified		0.029	IRC+10216	NRO 45 m	Kaw95	
	47436.151*(32)	$HC^{13}CCCN$	18−17	0.022	IRC+10216	NRO 45 m	Kaw95	
	47534.069*(16)	CH_3OCHO	4(0,4)−3(0,3) E	0.25	OriMC−1	NRO 45 m	Sai89	Oes99
	47536.941*(16)	CH_3OCHO	4(0,4)−3(0,3) A	0.23	OriMC−1	NRO 45 m	Sai89	Oes99
	47556.928*(16)	c−C_2H_4O	5(5,0)−5(4,1)	0.12	Sgr B2(N)	NRO 45 m	Dic97	
	47566.80*(2)	C_4H	11/2−9/2	0.10	Sgr B2(M)	NRO 45 m	Sai89	
	47595.991*(3)	C_4H	J=9/2−9/2 F=4−4	0.06	TMC−1	NRO 45 m	Ohi98	JPL01
	47605.49*(2)	C_4H	9/2−7/2	0.09	Sgr B2(M)	NRO 45 m	Sai89	
	47643.113*(34)	HC_9N	82−81	0.02	IRC+10216	NRO 45 m	Kaw95	
	47660.624*(2)	SO_2	31(5,27)−30(6,24)	0.08	OriMC−1	NRO 45 m	Sai89	
	47674.961*(2)	CH_3OCH_3	1(1,1)−0(0,0) EE	0.09	OriMC−1	NRO 45 m	Sai89	Gro98
	47726.482*(10)	$^{24}MgNC$	7/2,4−5/2,3	0.030	IRC+10216	NRO 45 m	Kaw95	
	47741.702*(10)	$^{24}MgNC$	9/2,4−7/2,3	0.039	IRC+10216	NRO 45 m	Kaw95	
	47746.980*(5)	CH_3CHO	1(1,0)−1(0,1) E	0.06	Sgr B2(M)	NRO 45 m	Sai89	Kle96
	47752.82*(1)	DCOOH	1(1,0)−1(0,1)	0.13	OriMC−1	NRO 45 m	Sai89	Wil80
	47820.620*(4)	CH_3CHO	1(1,0)−1(0,1) A++	0.06	Sgr B2(M)	NRO 45 m	Sai89	Kle96
	47913.426*(2)	SO_2	14(2,12)−13(3,11)	1.15	OriMC−1	NRO 45 m	Sai89	
	47927.275*(2)	HC_5N	18−17	1.50	TMC−1	NRO 45 m	Suz84a	
U	47935.5	unidentified	(U4864.5LSB)	0.04	OriMC−1	NRO 45 m	Sai89	
U	47976.5	unidentified	(U45033.5LSB)	0.10	OriMC−1	NRO 45 m	Sai89	
	48108.475*(5)	CCCO	5−4	0.158	TMC−1	NRO 45 m	Suz84a	
	48120.435*(3)	SO_2	21(2,20)−20(3,17)	0.39	OriMC−1	NRO 45 m	Sai89	
	48178.333*(6)	CH_3OH	1(0,1)−0(0,0) E v_t =2	0.03	OriMC−1	NRO 45 m	Sai89	And90
	48192.12 (10)	CH_3OH	1(0,1)−0(0,0) A+ v_t =2	0.06	OriMC−1	NRO 45 m	Sai89	Ven55
	48206.946*(4)	$C^{34}S$	1−0	0.380	DR21(OH)	NRAO 11 m	Tur73	
	48247.572*(2)	CH_3OH	1(0,1)−0(0,0) E v_t =1	0.23	OriMC−1	NRO 45 m	Sai89	Xu_97
	48257.302*(4)	CH_3OH	1(0,1)−0(0,0) A+ v_t =1	0.09	OriMC−1	NRO 45 m	Sai89	Xu_97
	48284.520*(3)	H_2CO	4(1,3)−4(1,4)	0.63	OriMC−1	NRAO 11 m	Hol77	
U	48292.3	unidentified	(U44507.7LSB)	0.06	OriMC−1	NRO 45 m	Sai89	
	48372.4670(2)	CH_3OH	1(0,1)−0(0,0) A+	0.44	OriMC−1	NRAO 11 m	Hol77	Heu73
	48376.889*(1)	CH_3OH	1(0,1)−0(0,0) E	0.29	OriMC−1	NRAO 11 m	Hol77	Xu_97
	48502.823*(15)	HC_7N	43−42	0.105	IRC+10216	NRO 45 m	Kaw95	
	48514.59* (2)	C_6H	$^2\Pi_{3/2}$ J=35/2−33/2 f	0.064	IRC+10216	NRO 45 m	Kaw95	JPL01
	48523.04* (2)	C_6H	$^2\Pi_{3/2}$ J=35/2−33/2 e	0.066	IRC+10216	NRO 45 m	Kaw95	JPL01
	48548.217*(5)	NaCN	3(1,2)−2(1,1)	0.025	IRC+10216	NRO 45 m	Kaw95	
	48552.562*(1)	CH_2CHCN	5(1,4)−4(1,3)	0.07	TMC−1	NRO 45 m	Ohi98	
	48583.290(30)	$C^{33}S$	1−0 F=1/2−3/2	[b]	Sgr B2(M)	NRAO 11 m	Tur73	Bog81
	48585.918(30)	$C^{33}S$	1−0 F=5/2−3/2	<0.12[b]	Sgr B2(M)	NRAO 11 m	Tur73	Bog81
	48589.074(30)	$C^{33}S$	1−0 F=3/2−3/2	[b]	Sgr B2(M)	NRAO 11 m	Tur73	Bog81
	49866.198*(12)	C_8H	$^2\Pi_{3/2}$ 42.5−41.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	51841.418*(4)	c−C_3H_2	1(1,1)−0(0,0)	1.5	TMC−1	FCRAO 14 m	Mad86a	
	67768.778*(2)	$^{34}SO_2$	6(1,5)−6(0,6)	0.06	OriMC−1	NRAO 12 m	Pet91	
	68305.680*(7)	CH_3OH	1(1,0)−2(0,2) E	0.35	OriMC−1	NRAO 12 m	Hol89	Xu_97
U	68320.	unidentified		0.03	OriMC−1	NRAO 12 m	Hol89	
	68354.502*(1)	CH_3CCH	4,3−3,3	0.05	OriMC−1	NRAO 12 m	Hol89	
	68361.035*(1)	CH_3CCH	4,2−3,2	0.06	OriMC−1	NRAO 12 m	Hol89	
	68364.955*(1)	CH_3CCH	4,1−3,1	[b]	OriMC−1	NRAO 12 m	Hol89	
	68366.262*(1)	CH_3CCH	4,0−3,0	0.18[b]	OriMC−1	NRAO 12 m	Hol89	
	68371.278*(41)	CH_2	4(0,4)−3(1,3) J=5−4 F=6−5	0.017	OriMC−1	NRAO 12 m	Hol89	Lov82b
	68375.875*(39)	CH_2	4(0,4)−3(1,3) J=5−4 F=5−4	0.012	OriMC−1	NRAO 12 m	Hol89	Lov82b
	68380.873(41)	CH_2	4(0,4)−3(1,3) J=5−4 F=4−3	0.019	OriMC−1	NRAO 12 m	Hol95	Lov82b
	68972.154*(2)	SO_2	6(1,5)−6(0,6)	0.8	OriMC−1	NRAO 11 m	Joh76	
	69002.890(3)	NS	$^2\Pi_{1/2}$ J=3/2−1/2 F=5/2−3/2 e	0.141	W51M	NRAO 12 m	Hol95	Lee95
	69017.895(3)	NS	$^2\Pi_{1/2}$ J=3/2−1/2 F=3/2−3/2 e	0.055	W51M	NRAO 12 m	Hol95	Lee95
	69019.187*(44)	CH_2	4(0,4)−3(1,3) J=3−2 F=4−3	0.009	OriMC−1	NRAO 12 m	McG97	Lov82b
	69037.336(10)	NS	$^2\Pi_{1/2}$ J=3/2−1/2 F=3/2−3/2e	0.049	W51M	NRAO 12 m	Hol95	Lee95
	69040.324(2)	NS	$^2\Pi_{1/2}$ J=3/2−1/2 F=1/2−1/2e	0.034	W51M	NRAO 12 m	Hol95	Lee95
	69055.064*(23)	CH_3OH	17(−4,14)−16(−5,11) E	0.044	W51M	NRAO 12 m	Hol95	Xu_97
	69408.371(20)	SO^+	$^2\Pi_{1/2}$ J=3/2−1/2 e	0.051	CB24	NRAO 12 m	Tur96	Ama91
	69411.943(2)	NS	$^2\Pi_{1/2}$ J=3/2−1/2 F=5/2−3/2f	0.33[g]	TMC−1	NRAO 12 m	McG94	Lee95
U	69460.	unidentified		0.18	OriMC−1	NRAO 11 m	Tur89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	69464.082*(2)	SO_2	14(4,10)−15(3,13)	0.70	OriMC−1	OSO 20 m	Sch83	
	69534.307*(7)	CH_3CH_2CN	8(1,8)−7(1,7)	0.20	OriMC−1	OSO 20 m	Joh84	
	69575.923*(2)	SO_2	1(1,1)−0(0,0)	1.3	OriMC−1	OSO 20 m	Sch83	
U	69591.	unidentified		n.r.[a]	OriMC−1	NRAO 11 m	Tur89	
	69606.856*(33)	CH_3OH	9(1,9)−10(2,8) A+ v_t =1	0.30	OriMC−1	OSO 20 m	Joh84	Xu_97
	69653.580*(2)	SO_2	3(2,2)−4(1,3)	0.60	OriMC−1	OSO 20 m	Sch83	
	70260.203*(25)	SiC_2	3(0,3)−2(0,2)	0.08	Sgr B2(M)	NRAO 11 m	Tur89	
U	70525.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
U	70534.033*(9)	$H^{13}CCCN$	8−7	0.24	Sgr B2(M)	NRAO 11 m	Tur89	Laf78
U	70540.	unidentified		0.13	Sgr B2(M)	NRAO 11 m	Tur89	
U	70592.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	70678.633(42)	CH_2	4(0,4)−3(1,3) J=4−3 F=3−2	[b]	OriMC−1	NRAO 12 m	Hol95	Lov82b
	70679.543(45)	CH_2	4(0,4)−3(1,3) J=4−3 F=4−3	0.026[b]	OriMC−1	NRAO 12 m	Hol95	Lov82b
	70680.720(38)	CH_2	4(0,4)−3(1,3) J=4−3 F=5−4	[b]	OriMC−1	NRAO 12 m	Hol95	Lov82b
	70733.206*(38)	$D^{13}CO^+$	1−0	0.079	TMC−1	BTL 7 m	Gue82b	
	70762.549*(21)	SiC_2	3(2,2)−2(2,1)	0.10	IRC+10216	NRAO 12 m	Hol89	
	70844.454*(10)	CH_3OCH_3	3(3,0)−4(2,3) AA	[b]	Sgr B2(M)	NRAO 11 m	Tur89	Gro98
	70845.85*(3)	CH_3OCH_3	3(3,0)−4(2,3) EE	0.06[b]	Sgr B2(M)	NRAO 11 m	Tur89	Lov79
	70847.66*(7)	CH_3OCH_3	3(3,0)−4(2,3) AE	[b]	Sgr B2(M)	NRAO 11 m	Tur89	Lov79
	70926.227*(55)	$^{33}SO_2$	23(3,21)−22(4,18)	0.05	OriMC−1	NRAO 11 m	Tur89	
	70976.795*(12)	$t-CH_3CH_2OH$	5(2,3)−5(1,4)	0.06[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	70979.627*(7)	CH_3CH_2CH	8(0,8)−7(0,7)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	71024.781*(3)	$H_2{}^{13}CO$	1(0,1)−0(0,0)	0.06	OriMC−1	BTL 7 m	Kah84	
U	71055.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	71067.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	71152.973*(14)	H_2CCCC	8(1,8)−7(1,7)	0.122	TMC−1	NRAO 12 m	Tur00	
U	71208.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
U	71228.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	71324.608*(24)	CH_3OCHO	17(4,13)−17(3,14) A	[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	71324.81*(1)	HCOOH	3(1,2)−3(0,3)	0.04[b]	OriMC−1	NRAO 11 m	Tur89	Wil80
U	71362.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	71452.983*(14)	H_2CCCC	8(0,8)−7(0,7)	0.056	TMC−1	NRAO 12 m	Tur00	
	71464.138*(33)	$^{13}CH_3CN$	4(1)−3(1)	[b]	Sgr B2(M)	NRAO 11 m	Tur91	
	71465.497*(34)	$^{13}CH_3CN$	4(0)−3(0)	0.03[b]	SgrB2	NRAO 11 m	Tur91	
	71500.528*(7)	CH_3CH_2CN	8(2,7)−7(2,6)	0.11	OriMC−1	NRAO 11 m	Tur89	
U	71532.	unidentified		0.04	Sgr B2(N)	NRAO 12 m	Hol00	
	71542.200*(8)	CH_2OHCHO	7(0,7)−6(1,6)	0.034	Sgr B2(N)	NRAO 12 m	Hol00	But01
U	71578.	unidentified		0.04	Sgr B2(N)	NRAO 12 m	Hol00	
	71643.168*(6)	CH_3CH_2CN	8(5,*)−7(5,*)	0.09[b]	OriMC−1	NRAO 11 m	Tur89	
	71643.198*(6)	CH_3CH_2CN	8(6,*)−7(6,*)	[b]	OriMC−1	NRAO 11 m	Tur89	
	71674.924*(6)	CH_3CH_2CN	8(3,6)−7(3,5)	0.10	OriMC−1	NRAO 11 m	Tur89	
	71692.939*(6)	CH_3CH_2CN	8(3,5)−7(3,4)	0.06	OriMC−1	NRAO 11 m	Tur89	
	71703.602*(28)	CH_3OCHO	6(3,4)−6(2,5) E	0.05	OriMC−1	NRAO 11 m	Tur89	Oes99
U	71732.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	71743.983*(21)	CH_3OCHO	6(3,4)−6(2,5) A	0.12	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	71830.386*(12)	$a-CH_2CHOH$	1(1,1)−0(0,0)	0.030	Sgr B2(N)	NRAO 12 m	Tur01	
	71889.596*(3)	HC_5N	27−26	0.15	Sgr B2(M)	NRAO 11 m	Tur89	
	71971.774*(25)	$t-CH_3CH_2OH$	10(1,9)−10(0,10)	0.05	Sgr B2(M)	BTL 7 m	Cum86	
	72039.331*(13)	DCO^+	1−0	0.87	L134	NRAO 11 m	Hol76	
U	72075.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	72108.605*(7)	CH_3CH_2CN	8(2,6)−7(2,5)	0.07	Sgr B2(M)	BTL 7 m	Cum86	
	72298.455*(6)	CH_3OCH_3	10(1,9)−10(0,10) AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	72299.970*(4)	CH_3OCH_3	10(1,9)−10(0,10) EE	0.05[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	72301.485*(6)	CH_3OCH_3	10(1,9)−10(0,10) AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
U	72403.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	72409.092*(4)	H_2CO	5(1,4)−5(1,5)	0.1	OriMC−1	NRAO 11 m	Wil73	
	72413.4843(10)	DCN	1−0 F_1=1−1 F=1−0,1,2	[b]	OriMC−1	NRAO 11 m	Wil73	DeL69
	72413.5143(10)	DCN	1−0 F_1=1−1 F=2−1,2	0.2[b]	OriMC−1	NRAO 11 m	Wil73	DeL69
	72413.5584(10)	DCN	1−0 F_1=1−1 F=0−0,1	[b]	OriMC−1	NRAO 11 m	Wil73	DeL69
	72414.9054(10)	DCN	1−0 F_1=2−1 F=1−0,1,2	[b]	OriMC−1	NRAO 11 m	Wil73	DeL69
	72414.9270(10)	DCN	1−0 F_1=2−1 F=2−1,2	0.25[b]	OriMC−1	NRAO 11 m	Wil73	DeL69
	72414.9732(10)	DCN	1−0 F_1=2−1 F=3−2	[b]	OriMC−1	NRAO 11 m	Wil73	DeL69
	72417.0297(10)	DCN	1−0 F_1=0−1 F=1−0,1,2	0.2	OriMC−1	NRAO 11 m	Wil73	DeL69
U	72420.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
U	72426.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	72475.074*(11)	$HC^{13}CCN$	8−7	0.08	IRC+10216	OSO 20 m	Joh84	Laf78
	72482.055*(5)	$HCC^{13}CN$	8−7	0.08	IRC+10216	OSO 20 m	Joh84	Laf78

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	72500.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	72568.90(10)	CH_3NH_2	6(1,6)−6(0,6)	0.08	Sgr B2(M)	NRAO 11 m	Tur89	Tak71
U	72578.	unidentified		0.13	OriMC−1	NRAO 11 m	Tur89	
	72618.102*(5)	SiS	4−3	0.77	IRC+10216	OSO 20 m	Joh84	
	72668.076*(4)	SO_2	26(4,22)−25(5,21)	0.30	OriMC−1	OSO 20 m	Sch83	
	72680.767*(20)	CH_3OCHO	6(2,5)−5(2,4) E	0.18	OriMC−1	OSO 20 m	Joh84	Oes99
	72685.593*(21)	CH_3OCHO	6(2,5)−5(2,4) A	0.18	OriMC−1	OSO 20 m	Joh84	Oes99
U	72707.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	72758.235*(2)	SO_2	6(0,6)−5(1,5)	3.4	OriMC−1	OSO 20 m	Sch83	
	72783.818*(3)	HCCCN	8−7	2.29	Sgr B2(M)	NRAO 11 m	Mor76	
U	72823.	unidentified		0.15	Sgr B2(M)	NRAO 11 m	Tur89	
	72837.948*(3)	H_2CO	1(0,1)−0(0,0)	0.5	OriMC−1	TAO 6 m	Aka74	
U	72942.	unidentified		0.20	OriMC−1	NRAO 11 m	Tur89	
	72962.731*(23)	HCCCN	8−7 v_7 =1 ℓ=1 e	0.15	OriMC−1	OSO 20 m	Joh84	Laf78
	72976.7794(10)	OCS	6−5	0.25	Sgr B2(M)	TAO 6 m	Aka74	Dub80
	73001.958*(19)	$t-CH_3CH_2OH$	14(3,11)−13(4,10)	0.08	OriMC−1	NRAO 11 m	Tur89	
U	73013.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	73044.01(10)	CH_3NH_2	5(1,5)−5(0,5) F=4−4	[b]	Sgr B2(M)	TAO 6 m	Kai74	Kai74
	73044.20(10)	CH_3NH_2	5(1,5)−5(0,5) F=6−6	0.5[b]	Sgr B2(M)	TAO 6 m	Kai74	Kai74
	73045.15(10)	CH_3NH_2	5(1,5)−5(0,5) F=5−5	[b]	Sgr B2(M)	TAO 6 m	Kai74	Kai74
	73081.181*(12)	$t-CH_3CH_2OH$	4(2,2)−4(1,3)	0.11	Sgr B2(M)	BTL 7 m	Cum86	
U	U73152.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur91	
	73162.008*(2)	SO_2	3(2,2)−4(1,3) v_2 =1	0.04	OriMC−1	NRAO 11 m	Tur89	
U	U73178.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	73245.034*(38)	HCCCN	8−7 v_7 =2 ℓ=0	0.03[b]	Sgr B2(M)	NRAO 11 m	Tur91	Laf78
	73245.435*(42)	HCCCN	8−7 v_7 =2 ℓ=2 e	[b]	Sgr B2(M)	NRAO 11 m	Tur91	Laf78
	73246.708*(40)	HCCCN	8−7 v_7 =2 ℓ=2 f	[b]	Sgr B2(M)	NRAO 11 m	Tur91	Laf78
	73315.754*(59)	HC_7N	65−64	0.05	OriMC−1	NRAO 11 m	Tur89	
	73345.486*(20)	CH_2N	1(0,1)−0(0,0) 5/2−3/2 5/2−3/	20.018	TMC−1	NRAO 12 m	Ohi94	Yam92
	73346.304*(7)	CH_3CH_2CN	8(1,7)−7(1,6)	0.03	OriMC−1	NRAO 11 m	Tur89	
	73349.648*(20)	CH_2N	1(0,1)−0(0,0) 5/2−3/2 7/2−5/	20.022	TMC−1	NRAO 12 m	Ohi94	Yam92
U	73462.	unidentified		0.08	Sgr B2(M)	NRAO 11 m	Tur89	
	73462.31*(7)	C_6H	$^2\Pi_{3/2}$ J=53/2−51/2 e	0.04	IRC+10216	IRAM 30 m	Gue87	JPL01
	73466.884*(6)	CH_3OCH_3	10(2,8)−10(1,9) EA+AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	73468.670*(2)	CH_3OCH_3	10(2,8)−10(1,9) EE	0.20[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	73470.456*(6)	CH_3OCH_3	10(2,8)−10(1,9)AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	73481.31*(7)	C_6H	$^2\Pi_{3/2}$ J=53/2−51/2f	0.03	IRC+10216	IRAM 30 m	Gue87	JPL01
	73552.419*(5)	$CH_3{}^{13}CN$	4(1)−3(1)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	73553.828*(5)	$CH_3{}^{13}CN$	4(0)−3(0)	0.06[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	73577.454*(1)	CH_3CN	4(3)−3(3)	0.83	OriMC−1	OSO 20 m	Joh84	
	73584.545*(1)	CH_3CN	4(2)−3(2)	1.00	OriMC−1	OSO 20 m	Joh84	
	73588.801*(1)	CH_3CN	4(1)−3(1)	2.20[b]	OriMC−1	OSO 20 m	Joh84	
	73590.220*(1)	CH_3CN	4(0)−3(0)	[b]	OriMC−1	OSO 20 m	Joh84	
	73605.385*(26)	CH_2CHCN	14(1,13)−14(0,14)	0.14	OriMC−1	NRAO 12 m	Hol89	
	73609.893*(7)	$^{33}SO_2$	6(0,6)−5(1,5)	0.06	OriMC−1	NRAO 12 m	Hol89	
	73658.210*(24)	CH_3OCHO	6(5,1)−5(5,0) E	0.04	OriMC−1	NRAO 12 m	Hol89	Oes99
	73663.875*(20)	CH_3OCHO	6(5,2)−5(5,1) E	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	73665.605*(21)	CH_3OCHO	6(5,2)−5(5,1) A	0.15[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	73665.745*(21)	CH_3OCHO	6(5,1)−5(5,0) A	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	73699.370*(14)	CH_3CH_2CN	14(5,10)−15(4,11)	0.03	OriMC−1	NRAO 11 m	Hol89	
	73720.490*(8)	CH_3OCH_3	9(2,7)−9(1,8) AE+EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	73722.376*(2)	CH_3OCH_3	9(2,7)−9(1,8) EE	0.25[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	73724.261*(6)	CH_3OCH_3	9(2,7)−9(1,8) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
U	73766.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	73782.929*(24)	CH_3OCHO	6(4,2)−5(4,1) E	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	73784.532*(21)	CH_3OCHO	6(4,3)−5(4,2) A	0.15[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	73787.494*(20)	CH_3OCHO	6(4,3)−5(4,2) E	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	73796.803*(21)	CH_3OCHO	6(4,2)−5(4,1) A	0.10	OriMC−1	OSO 20 m	Joh84	Oes99
	73810.008*(7)	CH_3CN	4(0)−3(0) v_8 =1 ℓ=1	0.03[b]	OriMC−1	NRAO 11 m	Tur91	Bou80
	73811.589*(8)	CH_3CN	4(2)−3(2) v_8 =1 ℓ=1	[b]	OriMC−1	NRAO 11 m	Tur91	Bou80
	73839.235*(31)	CH_3OH	9(1,8)−10(2,9) A− v_t =1	0.30	OriMC−1	OSO 20 m	Joh84	Xu_97
	73883.958*(2)	SO_2	4(2,2)−5(1,5) v_2 =1	[b]	OriMC−1	NRAO 11 m	Tur89	
	73885.108*(21)	CH_3OCHO	6(3,4)−5(3,3) A	0.12[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	73905.842*(25)	CH_3OCHO	6(3,4)−5(3,3)E	0.12	OriMC−1	NRAO 11 m	Tur89	Oes99
	73968.0*(4)	C_6H	$^2\Pi_{1/2}$ J=53/2−51/2 e	1.3[f]	IRC+10216	IRAM 30 m	Cer86	JPL01
	73981.562*(18)	CH_2CHCN	8(1,8)−7(1,7)	0.04	Sgr B2(M)	NRAO 11 m	Tur89	
	73993.8(3)	C_5H	$^2\Pi_{1/2}$ J=31/2−29/2 e	2.0[f]	IRC+10216	IRAM 30 m	Cer86	Cer86

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	73998.9(4)	C_5H	$^2\Pi_{1/2}$ J=31/2−29/2 f	1.9[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	74007.8*(4)	C_6H	$^2\Pi_{1/2}$ J=53/2−51/2 f	1.3[f]	IRC+10216	IRAM 30 m	Cer86	JPL01
U	74034.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	74040.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	74111.24*(8)	$HCNH^+$	1−0 F=1−1	0.13	TMC−1	NRAO 12 m	Ziu92	Ziu92
	74111.312*(7)	$HCNH^+$	1−0	0.10	Sgr B2(M)	NRAO 12 m	Ziu86a	
	74111.42*(8)	$HCNH^+$	1−0 F=2−1	0.21	TMC−1	NRAO 12 m	Ziu92	Ziu92
	74111.60*(8)	$HCNH^+$	1−0 F=0−1	0.05	TMC−1	NRAO 12 m	Ziu92	Ziu92
	74141.7(3)	C_4H	$^2\Pi_{1/2}$ J=15/2−13/2 v_7 =1 e	1.38[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	74149.200*(4)	CH_3OCH_3	11(2,9)−11(1,10) EA+AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74150.895*(2)	CH_3OCH_3	11(2,9)−11(1,10) EE	0.30[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74152.589*(4)	CH_3OCH_3	11(2,9)−11(1,10) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74155.73(10)	NH_2D	2(1,2)−2(0,2) U	0.04	OriMC−1	NRAO 11 m	Tur89	DeL75
	74263.388*(35)	CH_3OCHO	6(3,3)−5(3,2) E	0.15	OriMC−1	OSO 20 m	Joh84	Oes99
	74296.766*(21)	CH_3OCHO	6(3,3)−5(3,2) A	0.20	OriMC−1	OSO 20 m	Joh84	Oes99
U	74395.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	74404.573*(3)	$^{34}SO_2$	6(0,6)−5(1,5)	0.30	OriMC−1	OSO 20 m	Sch83	
	74497.18*(5)	C_5H	$^2\Pi_{3/2}$ J=31/2−29/2 e	5.2[fb]	IRC+10216	IRAM 30 m	Cer86a	Got86
	74498.62*(5)	C_5H	$^2\Pi_{3/2}$ J=31/2−29/2 f	[b]	IRC+10216	IRAM 30 m	Cer86a	Got86
	74501.839*(12)	C_8H	$^2\Pi_{3/2}$ 63.5−62.5 e	0.35[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	74502.992*(12)	C_8H	$^2\Pi_{3/2}$ 63.5−62.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
U	74510.	unidentified		0.003	IRC+10216	IRAM 30 m	Cer96	
	74551.988*(3)	HC_5N	28−27	0.30	IRC+10216	OSO 20 m	Joh84	
U	74655.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	74661.	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Tur89	
	74747.514*(4)	CH_3OCH_3	8(2,6)−8(1,7) AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74747.521*(4)	CH_3OCH_3	8(2,6)−8(1,7) EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74749.506*(4)	CH_3OCH_3	8(2,6)−8(1,7) EE	0.20[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74751.495*(6)	CH_3OCH_3	8(2,6)−8(1,7) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	74866.502*(2)	SO_2	24(6,18)−25(5,21)	0.20	OriMC−1	OSO 20 m	Sch83	
	74891.681*(5)	CH_3CHO	4(1,4)−3(1,3) A++	0.13	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	74924.137*(5)	CH_3CHO	4(−1,4)−3(−1,3) E	0.07	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	74971.479*(36)	CH_3OCH_3	12(6,7)−13(5,8) EE	0.05[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	74975.248*(24)	CH_3OCH_3	12(6,6)−13(5,9) EE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	74976.034*(10)	$t-CH_3CH_2OH$	3(1,3)−2(0,2)	0.23	Sgr B2(M)	BTL 7 m	Cum86	
U	75052.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	75085.91(5)	CH_3 SH	3(1,3)−2(1,2) A++	0.05	Sgr B2(N−LMH)	NRAO 12 m	Hol02	Lee80
	75134.58(5)	CH_3NH_2	4(1,4)−4(0,4) Aa F=5−5	0.12	Sgr B2(N−LMH)	NRAO 12 m	Hol02	Tak73
	75147.910*(4)	CCCS	13−12	2.3[f]	IRC+10216	IRAM 30 m	Cer87b	
	75151.4(20)	$HOCH_2CH_2OH$	8(4,5) v=0 −7(4,4) v=1	0.046	SgrB2(N−LMH)	NRAO 12 m	Hol02	Hol02
	75160.001*(6)	CH_3CHO	6(0,6) −5(1,5)A++	0.08	OriMC−1	NRAO 11 m	Tur89	Kle96
	75186.1(20)	$HOCH_2CH_2OH$	8(3,6) v=0 −7(3,5) v=1	0.03[b]	Sgr B2(N−LMH)	NRAO 12 m	Hol02	Hol02
	75186.1(20)	$HOCH_2CH_2OH$	8(4,4) v=0 −7(4,3) v=1	[b]	Sgr B2(N−LMH)	NRAO 12 m	Hol02	Hol02
	75299.9(20)	$HOCH_2CH_2OH$	7(0,7) v=1 −6(0,6) v=0	0.023	Sgr B2(N−LMH)	NRAO 12 m	Hol02	Hol02
	75347.389*(8)	CH_2OHCHO	8(1,7)−7(2,6)	0.015	Sgr B2(N)	NRAO 12 m	Hol00	But01
	75369.230*(5)	N_2O	3−2	0.030	Sgr B2(M)	NRAO 12 m	Ziu94a	
U	75406.	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Wil81	
	75515.344*(21)	CH_3OH	13(−5,8)−14(−4,11) E	0.37	OriMC−1	OSO 20 m	Joh84	Xu_97
	75527.23*(14)	HC_9N	130−129	0.06	Sgr B2(M)	NRAO 11 m	Tur89	
	75571.341*(65)	HC_7N	67−66	0.05	OriMC−1	NRAO 11 m	Tur89	
	75585.695*(12)	CH_2CHCN	8(0,8)−7(0,7)	0.10	Sgr B2(M)	BTL 7 m	Cum86	
U	75595.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
U	75717.	unidentified		0.20	OriMC−1	NRAO 11 m	Tur89	
	75816.45(5)	CH_3SH	3(−1)−2(−1) E	<0.05	Sgr B2(M)	BTL 7 m	Lin79	Lee80
	75838.867*(10)	CH_2CHCN	8(2,7)−7(2,6)	0.06	Sgr B2(M)	BTL 7 m	Cum86	
	75862.92(7)	CH_3SH	3(0)−2(0) A+	0.19	Sgr B2(M)	BTL 7 m	Lin79	Koj80
	75864.43(5)	CH_3SH	3(0)−2(0) E	0.12	Sgr B2(M)	BTL 7 m	Lin79	Lee80
	75869.630*(16)	CH_3OCHO	3(2,2)−2(1,1) A	[b]	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	75880.49(5)	CH_3 SH	3(2)−2(2) A+	0.07	Sgr B2(M)	NRAO 11 m	Tur89	Lee80
	75906.353*(4)	CH_3OCH_3	12(2,10)−12(1,11) AE+EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	75907.967*(4)	CH_3OCH_3	12(2,10)−12(1,11) EE	0.30[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	75909.581*(4)	CH_3OCH_3	12(2,10)−12(1,11) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	75921.979*(10)	CH_2CHCN	8(4,5)−7(4,4)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	75922.001*(10)	CH_2CHCN	8(4,4)−7(4,3)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	75926.796*(12)	CH_2CHCN	8(5)−7(5)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	75927.706*(10)	CH_2CHCN	8(3,6)−7(3,5)	0.06[b]	Sgr B2(M)	BTL 7 m	Cum86	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	75931.858*(10)	CH_2CHCN	8(3,5)−7(3,4)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	75937.823*(14)	CH_2CHCN	8(6)−7(6)	0.13	Sgr B2(M)	BTL 7 m	Cum86	
U	75979.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	75987.149*(4)	DCCCN	9−8	0.11	TMC−1	FCRAO 14 m	Sch81	Laf78
	76117.43*(1)	C_4H	17/2−15/2	0.17	IRC+10216	OSO 20 m	Joh84	Got83
	76128.890*(10)	CH_2CHCN	8(2,6)−7(2,5)	0.10	OriMC−1	OSO 20 m	Joh84	
U	76152.	unidentified		0.10	OriMC−1	OSO 20 m	Joh84	
	76156.02*(1)	C_4H	15/2−13/2	0.17	IRC+10216	OSO 20 m	Joh84	Got83
U	76162.	unidentified		0.20	OriMC−1	NRAO 11 m	Tur89	
	76198.724*(13)	l−C_3H	$^2\Pi_{1/2}$ J=7/2−5/2, F=4−3 f	0.12[b]	IRC+10216	OSO 20 m	Tha85	JPL01
	76199.925*(15)	l−C_3H	$^2\Pi_{1/2}$ J=7/2−5/2, F=4−3 f	[b]	IRC+10216	OSO 20 m	Tha85	JPL01
	76204.198*(20)	l−C_3H	$^2\Pi_{1/2}$ 3−2 J=7/2−5/2 F=4−3	0.129	TMC−1	NRAO 12 m	Tur00	Yam90a
	76205.108*(20)	l−C_3H	$^2\Pi_{1/2}$ 3−2 J=7/2−5/2 F=3−2	0.102	TMC−1	NRAO 12 m	Tur00	Yam90a
	76247.312*(23)	CH_3OH	11(1,10)−10(2,9) A−	0.6	OriMC−1	NRAO 11 m	Jen79	Xu_97
	76305.717*(5)	DNC	1−0	0.34	NGC2264	NRAO 11 m	God77	
	76362.181*(4)	CH_3OCH_3	7(2,5)−7(1,6) AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	76362.194*(4)	CH_3OCH_3	7(2,5)−7(1,6) EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	76364.277*(4)	CH_3OCH_3	7(2,5)−7(1,6) EE	0.30[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	76366.367*(8)	CH_3OCH_3	7(2,5)−7(1,6) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
U	76379.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	76383.84*(4)	HCOOD	6(1,5)−6(0,6)	0.03	Sgr B2(M)	NRAO 11 m	Tur89	Wil80
	76405.166*(48)	CH_3OH	13(2,11)−12(1,12) A+ v_t=1	0.10	OriMC−1	NRAO 11 m	Tur89	Xu_97
	76412.158*(2)	SO_2	10(1,9)−9(2,8)	2.5	OriMC−1	OSO 20 m	Sch83	
U	76415.	unidentified		0.12	Sgr B2(M)	NRAO 11 m	Tur91	
U	76491.	unidentified		0.20	OriMC−1	NRAO 11 m	Tur89	
U	76499.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur91	
	76509.628*(8)	CH_3OH	5(0,5)−4(1,3) E	0.6	OriMC−1	NRAO 11 m	Jen79	Xu_97
	76539.02(10)	CH_3SH	7(0)−6(1) A+	0.07	Sgr B2(M)	NRAO 11 m	Tur89	Lee80
U	76648.6(15)	unidentified		0.09	Sgr B2(M)	BTL 7 m	Cum86	
	76662.423*(13)	t−CH_3CH_2OH	2(2,0)−2(1,1)	0.07	Sgr B2(M)	NRAO 11 m	Tur89	
	76699.124*(68)	HC_7N	68−67	0.05[b]	OriMC−1	NRAO 11 m	Tur91	
	76701.743*(21)	CH_3OCHO	6(2,4)−5(2,3) E	0.25[b]	OriMC−1	OSO 20 m	Ell80	Oes99
	76711.177*(24)	CH_3OCHO	6(2,4)−5(2,3) A	0.22	OriMC−1	OSO 20 m	Ell80	Oes99
	76795.962*(20)	CH_3OCHO	6(1,5)−5(1,4) E	0.22	OriMC−1	OSO 20 m	Joh84	Oes99
	76804.025*(21)	CH_3OCHO	6(1,5)−5(1,4) A	0.23	OriMC−1	OSO 20 m	Joh84	Oes99
	76838.70(10)	CH_3NH_2	3(1,3)−3(0,3) Aa	0.05	OriMC−1	NRAO 11 m	Tur89	Tak73
	76866.437*(5)	CH_3CHO	4(0,4)−3(0,3) E	0.13[b]	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	76868.83(5)	CH_3OD	6(1,6)−5(2,3) E	[b]	Sgr B2(M)	NRAO 11 m	Tur89	Kau80
	76878.958*(5)	CH_3CHO	4(0,4)−3(0,3) A++	0.10	Sgr B2(M)	BTL 7 m	Cum86	Kle96
U	76966.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
	76972.590*(7)	CCCO	8−7	0.059	TMC−1	NRAO 12 m	Bro85	
	77038.605*(5)	CH_3CHO	4(2,3)−3(2,2) A−	0.04	Sgr B2(M)	NRAO 11 m	Tur89	Kle96
U	77071.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	77107.86(9)	N_2D^+	1−0 F_1=1−1	0.25	L134N	NRAO 11 m	Sny77	And77
	77109.61(8)	N_2D^+	1−0 F_1=2−1	0.30	L134N	NRAO 11 m	Sny77	And77
	77112.2(1)	N_2D^+	1−0 F_1=0−1	0.15	L134N	NRAO 11 m	Sny77	And77
	77125.695*(5)	CH_3CHO	4(2,2)−3(2,1) E	0.05[b]	OriMC−1	NRAO 11 m	Tur89	Kle96
	77126.418*(5)	CH_3CHO	4(−2,3)−3(−2,2) E	[b]	OriMC−1	NRAO 11 m	Tur89	Kle96
	77214.360*(3)	HC_5N	29−28	0.25	IRC+10216	OSO 20 m	Joh84	
	77218.295*(5)	CH_3CHO	4(2,2)−3(2,1) A++	0.17[b]	Sgr B2(M)	NRAO 11 m	Tur89	Kle96
	77231.384*(5)	$^{34}SO_2$	20(3,17)−19(4,16)	0.04[b]	OriMC−1	NRAO 11 m	Tur89	
	77235.127*(22)	t−CH_3CH_2OH	8(5,3)−9(4,6)	0.03[b]	OriMC−1	NRAO 11 m	Tur89	
	77269.81*(15)	HC_9N	133−132	0.12	Sgr B2(M)	NRAO 11 m	Tur89	
U	77290.	unidentified		0.12	Sgr B2(M)	NRAO 11 m	Tur89	
U	77445.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
U	77458.	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Tur89	
	77498.900*(16)	CH_3CH_2CN	19(2,17)−18(3,16)	0.05	OriMC−1	NRAO 11 m	Tur89	
U	77511.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	77633.828*(12)	CH_2CHCN	8(1,7)−7(1,6)	0.12	Sgr B2(M)	BTL 7 m	Cum86	
U	77687.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	77731.725*(7)	CCS	6,6−5,5	0.07	Sgr B2(M)	NRAO 11 m	Tur91	
	77735.05*(14)	CH_3OCH_3	18(8,11)−19(7,13) EA	[b]	Sgr B2	NRAO 11 m	Tur89	Gro98
	77736.28*(14)	CH_3OCH_3	18(8,11)−19(7,13) EE	[b]	Sgr B2	NRAO 11 m	Tur89	Gro98
	77737.34*(14)	CH_3OCH_3	18(8,11)−19(7,12) AA	[b]	Sgr B2	NRAO 11 m	Tur89	Gro98
	77737.57*(14)	CH_3OCH_3	18(8,10)−19(7,13) AA	0.20[b]	Sgr B2	NRAO 11 m	Tur89	Gro98
	77737.80*(14)	CH_3OCH_3	18(8,11)−19(7,12) AE	[b]	Sgr B2	NRAO 11 m	Tur89	Gro98
	77738.03*(14)	CH_3OCH_3	18(8,10)−19(7,13) AE	[b]	Sgr B2	NRAO 11 m	Tur89	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	77739.09*(14)	CH_3OCH_3	18(8,10)−19(7,12) EE	[b]	Sgr B2	NRAO 11 m	Tur89	Gro98
U	77744.	unidentified		0.14	Sgr B2(M)	NRAO 11 m	Tur89	
	77826.902*(71)	HC_7N	69−68	0.05	Sgr B2(M)	NRAO 11 m	Tur91	
	77836.702*(12)	NaCN	5(0,5)−4(0,4)	0.01	IRC+10216	NRAO 12 m	Tur94	Tur94
U	77930.4	unidentified		0.008	IRC+10216	NRAO 12 m	Tur94	
U	77976.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
U	77978.5(13)	unidentified		0.13	Sgr B2(M)	BTL 7 m	Cum86	
U	77988.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	78063.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	78068.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	78183.628*(7)	CH_3CH_2CN	9(1,9)−8(1,8)	0.25	OriMC−1	OSO 20 m	Joh84	
U	78262.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	78361.417*(6)	CH_3OCH_3	6(2,4)−6(1,5) AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	78361.442*(6)	CH_3OCH_3	6(2,4)−6(1,5) EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	78363.614*(4)	CH_3OCH_3	6(2,4)−6(1,5) EE	0.25[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	78365.799*(8)	CH_3OCH_3	6(2,4)−6(1,5) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	78397.020*(3)	$^{34}SO_2$	8(3,5)−9(2.8)	0.05	OriMC−1	NRAO 11 m	Tur91	
	78436.847*(16)	CH_3CH_2CN	23(2,21)−23(1,22)	0.05	Sgr B2	NRAO 11 m	Tur91	
	78479.327*(24)	CH_3OCHO	7(1,7)−6(1,6) E	0.75[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	78481.411*(24)	CH_3OCHO	7(1,7)−6(1,6) A	0.65[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	78517.409*(58)	CH_3OCHO	10(1,9)−10(0,10) E	0.09	OriMC−1	NRAO 11 m	Tur89	Oes99
	78633.527*(16)	NH_2CHO	16(2,14)−15(3,13)	0.04	OriMC−1	NRAO 11 m	Tur89	
	78637.457(50)	$g-CH_3CH_2OH$	5(0,5)−5(1,5) $v_t=1-0$	0.05	OriMC−1	NRO 45 m	Tur89	Pea97
	78711.403*(3)	SO_2	19(5,15)−20(4,16) $v_2=1$	0.05	OriMC−1	NRAO 11 m	Tur89	
U	78752.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	78856.274*(4)	CH_3OCH_3	13(2,11)−13(1,12) AE+EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	78857.824*(4)	CH_3OCH_3	13(2,11)−13(1,12) EE	0.38[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	78859.373*(4)	CH_3OCH_3	13(2,11)−13(1,12) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
U	78867.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur91	
	78954.672*(74)	HC_7N	70−69	0.03	Sgr B2(M)	NRAO 11 m	Tur91	
	79007.11(10)	CH_3NH_2	1(1,1)−1(0,1) Aa $F=0-1$	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	79008.70(10)	CH_3NH_2	1(1,1)−1(0,1) Aa $F=2-2$	0.08[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	79010.36(10)	CH_3NH_2	1(1,1)−1(0,1) Aa $F=1-0$	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	79012.35*(16)	HC_9N	136−135	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
U	79055.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur91	
	79099.313*(5)	CH_3CHO	4(1,3)−3(1,2) E	0.15	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	79150.172*(5)	CH_3CHO	4(1,3)−3(1,2) A−−	0.3	Sgr B2(M)	NRAO 11 m	Lis78	Kle96
	79151.01*(2)	CCCN	8−7 $J=17/2-15/2$	0.27	IRC+10216	OSO 20 m	Joh84	Got83
	79169.77*(2)	CCCN	8−7 $J=15/2-13/2$	0.27	IRC+10216	OSO 20 m	Joh84	Got83
U	79221.9(50)	unidentified		0.05	Sgr B2(M)	BTL 7 m	Cum86	
U	79289.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
U	79334.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	79350.476*(8)	$H^{13}CCCN$	9−8	0.56	Sgr B2(M)	BTL 7 m	Wan78	Laf78
	79432.720*(28)	CH_3OCHO	9(3,7)−9(2,8) A	0.06	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
U	79438.	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Tur89	
	79449.73(9)	NH_2CN	4(1,4)−3(1,3)	0.27	Sgr B2(M)	BTL 7 m	Wan78	Joh76a
U	79465.	unidentified		0.08	Sgr B2(M)	NRAO 11 m	Tur89	
	79488.290*(58)	CH_3OCHO	9(2,8)−9(1,9) A	0.05	W51 M	NRAO 12 m	Woo92	Oes99
	79581.804*(19)	$^{13}CH_3OH$	5(−1,5)−4(0,4) E	0.15	OriMC−1	OSO 20 m	Joh84	Xu_97
U	79624.	unidentified		0.10	W51 M	NRAO 12 m	Woo92	
	79677.504*(7)	CH_3CH_2CN	9(0,9)−8(0,8)	0.25	OriMC−1	OSO 20 m	Joh84	
U	79699.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
	79753.698*(4)	CH_3OCH_3	15(3,13)−14(4,10) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	79756.610*(6)	CH_3OCH_3	15(3,13)−14(4,10) EE	0.06[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	79759.451*(8)	CH_3OCH_3	15(3,13)−14(4,10) EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	79759.595*(8)	CH_3OCH_3	15(3,13)−14(4,10) AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	79781.648*(24)	CH_3OCHO	7(0,7)−6(0,6) E	0.30[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	79783.908*(24)	CH_3OCHO	7(0,7)−6(0,6) A	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	79812.322*(14)	$c-C_3HD$	2(1,2)−1(0,1)	0.34	TMC−1	NRAO 12 m	Ger87	
U	79813.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
U	79870.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	79876.711*(4)	HC_5N	30−29	0.25	IRC+10216	OSO 20 m	Joh84	
	79963.261*(2)	NH_2CN	4(2,3)−3(2,2)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	JPL01
	79965.006*(2)	NH_2CN	4(2,2)−3(2,1)	0.07[b]	Sgr B2(M)	NRAO 11 m	Tur89	JPL01
	79979.596(90)	NH_2CN	4(0,4)−3(0,3)	0.07	Sgr B2(M)	NRAO 11 m	Tur77	Joh76a
	80076.644*(20)	CH_2CO	4(1,4)−3(1,3)	0.1[b]	Sgr B2(M)	NRAO 11 m	Tur77	
	80082.436*(77)	HC_7N	71−70	[b]	Sgr B2(M)	NRAO 11 m	Tur91	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	80160.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	80266.195*(13)	$t-CH_3CH_2OH$	2(2,1)−2(1,2)	0.07	Sgr B2(M)	NRAO 11 m	Tur89	
U	80319.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	80383.895*(15)	H_2CCCC	9(0,9)−8(0,8)	0.10	IRC+10216	IRAM 30 m	Cer91a	Kil90
U	80393.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	80404.894*(7)	CH_3CH_2CN	9(2,8)−8(2,7)	0.25	OriMC−1	OSO 20 m	Joh84	
	80421.883*(5)	CH_3NC	4−3	2.7[f]	Sgr B2(M)	IRAM 30 m	Cer88	
U	80479.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	80480.25	CH_2CN	4−311/2−9/2	0.12	Sgr B2(M)	FCRAO 14m	Irv88a	Irv88a
	80484.5	CH_2CN	4−39/2−7/2	0.12	Sgr B2(M)	FCRAO 14m	Irv88a	Irv88a
	80504.60(10)	NH_2CN	4(1,3)−3(1,2)	0.36[g]	Sgr B2(M)	NRAO 11 m	Tur75a	Joh76a
	80522.3(10)	$^{26}MgNC$	13/2,7−11/2,6	0.60[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
U	80525.0(10)	unidentified		0.45[f]	IRC+10216	IRAM 30 m	Gue95	
	80535.1(5)	$^{26}MgNC$	15/2,7−13/2,6	0.52[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	80536.354*(6)	CH_3OCH_3	5(2,3)−5(1,4) AE	[b]	Sgr B2(M)	NRAO 11 m	Tur75a	Gro98
	80536.405*(6)	CH_3OCH_3	5(2,3)−5(1,4) EA	[b]	Sgr B2(M)	NRAO 11 m	Tur75a	Gro98
	80538.646*(4)	CH_3OCH_3	5(2,3)−5(1,4) EE	0.2[bg]	Sgr B2(M)	NRAO 11 m	Tur75a	Gro98
	80540.913*(8)	CH_3OCH_3	5(2,3)−5(1,4) AA	[b]	Sgr B2(M)	NRAO 11 m	Tur75a	Gro98
	80547.628*(9)	CH_3CH_2CN	9(2,8)−9(1,9)	0.03	Sgr B2	NRAO 11 m	Tur89	
	80578.283*(53)	HDO	1(1,0)−1(1,1)	<0.4[g]	OriMC−1	NRAO 11 m	Tur75b	
	80602.135*(6)	CH_3CH_2CN	9(6,*)−8(6,*)	0.3	OriMC−1	OSO 20 m	Olo84	
	80604.578*(7)	CH_3CH_2CN	9(5,*)−8(5,*)	0.4	OriMC−1	OSO 20 m	Olo84	
	80606.213*(6)	CH_3CH_2CN	9(7,*)−8(7,*)	0.2	OriMC−1	OSO 20 m	Olo84	
	80619.231*(7)	CH_3CH_2CN	9(4,6)−8(4,5)	0.12[b]	OriMC−1	NRAO 11 m	Hol80	
	80619.686*(7)	CH_3CH_2CN	9(4,5)−8(4,4)	[b]	OriMC−1	NRAO 11 m	Hol80	
	80649.870*(7)	CH_3CH_2CN	9(3,7)−8(3,6)	0.04	OriMC−1	NRAO 11 m	Hol80	
	80662.304*(14)	SiC_3	8(0,7)−6(0,6)	0.005	IRC+10216	NRAO 12 m	App99	
	80682.810*(7)	CH_3CH_2CN	9(3,6)−8(3,5)	0.05	OriMC−1	NRAO 11 m	Hol80	
	80723.186*(5)	$c-C_3H_2$	4(2,2)−4(1,3)	0.05	Sgr B2(M)	NRAO 11 m	Tur89	
U	80733.(1)	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Hol80	
	80802.061*(20)	CH_2CO	4(3,1)−3(3,0)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	80802.062*(20)	CH_2CO	4(3,2)−3(3,1)	0.10[b]	Sgr B2(M)	NRAO 11 m	Tur89	
U	80808.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
	80820.409*(18)	CH_2CO	4(2,3)−3(2,2)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	80824.314*(18)	CH_2CO	4(2,2)−3(2,1)	0.06[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	80832.107*(21)	CH_2CO	4(0,4)−3(0,3)	0.1	Sgr B2(M)	NRAO 11 m	Tur77	
U	80876.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
	80988.*	SiC	$^3\Pi_1$ 2−1 e	0.03	IRC+10216	IRAM 30 m	Cer89	Cer89
	80993.257*(19)	CH_3OH	7(2,6)−8(1,7) A−	1.50	OriMC−1	OSO 20 m	Joh84	Xu_97
U	81033.	unidentified		0.14	OriMC−1	NRAO 11 m	Tur89	
	81062.*	SiC	$^3\Pi_1$ 2−1 f	0.03	IRC+10216	IRAM 30 m	Cer89	Cer89
	81210.194*(81)	HC_7N	72−71	0.04	Sgr B2(M)	NRAO 11 m	Tur91	
U	81230.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	81261.436*(7)	CH_3CH_2CN	9(2,7)−8(2,6)	0.40	OriMC−1	OSO 20 m	Joh84	
	81392.284*(17)	CH_3OCHO	3(2,1)−2(1,2) A	0.06	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
U	81398.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	81469.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur91	
	81477.49(10)	HNO	1(0,1)−0(0,0)	0.033	Sgr B2(M)	NRAO 11 m	Uli77	Sai72
	81505.208*(10)	CCS	7,6−6,5	0.19	Sgr B2(M)	BTL 7 m	Cum86	
U	81518.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	81534.125*(11)	$HC^{13}CCN$	9−8	0.050	Sgr B2(M)	BTL 7 m	Wan78	Laf78
	81541.981*(5)	$HCC^{13}CN$	9−8	0.052	Sgr B2(M)	BTL 7 m	Wan78	Laf78
U	81570.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	81586.229*(20)	CH_2CO	4(1,3)−3(1,2)	0.15	Sgr B2(M)	NRAO 11 m	Tur77	
	81652.931*(40)	CH_3OH	18(4,14)−19(3,16) E	0.35	OriMC−1	OSO 20 m	Joh84	Xu_97
U	81674.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	81683.433*(21)	$t-CH_3CH_2OH$	8(1,7)−7(2,6)	0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	81693.444*(1)	NH_2CHO	4(1,4)−3(1,3)	0.18	Sgr B2(M)	BTL 7 m	Cum86	
U	81727.	unidentified		0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
U	81737.	unidentified		0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
u	81742.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	81746.513*(29)	CH_3CH_2CN	18(1,17)−18(0,18)	0.05	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
U	81768.	unidentified		0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
U	81777.	unidentified		0.02	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
	81777.90*(8)	C_6H	$^2\Pi_{3/2}$ J=59/2−57/2e	0.05	IRC+10216	IRAM 30m	Gue87	JPL01
	81789.000*(16)	$(CH_3)_2CO$	7(1,6)−6(2,5) AE	0.03[b]	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
	81789.275*(16)	$(CH_3)_2CO$	7(1,6)−6(2,5) EA	[b]	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
	81801.25*(8)	C_6H	$^2\Pi_{3/2}$ J=59/2−57/2 f	0.04	IRC+10216	IRAM 30 m	Gue87	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	81807.889*(14)	$(CH_3)_2CO$	7(2,6)−6(1,5) EA	0.03[b]	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
	81807.951*(16)	$(CH_3)_2CO$	7(2,6)−6(1,5) AE	[b]	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
	81813.725*(12)	$(CH_3)_2CO$	7(1,6)−6(2,5) EE	0.04	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
	81833.051*(12)	$(CH_3)_2CO$	7(2,6)−6(1,5) EE	0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
	81838.238*(18)	$(CH_3)_2CO$	7(1,6)−6(2,5) AA	0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
U	81847.	unidentified		0.04	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
	81858.110*(18)	$(CH_3)_2CO$	7(2,6)−6(1,5) AA	0.05	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Gro02
U	81866.	unidentified		0.10	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
	81881.462*(3)	HCCCN	9−8	2.51	Sgr B2(M)	BTL 7 m	Wan78	
U	81906.	unidentified		−0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
	81935.004*(59)	HCCCN	9−8 v_5 =1 ℓ=1 f	0.04	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Laf78
U	81948.	unidentified		0.04	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
U	81957.	unidentified		0.03	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
	81970.0(20)	$^{25}MgNC$	7−6	1.40[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	81980.071*(33)	CH_2NH	11(2,9)−11(2,10)	0.04	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
	82082.730*(26)	HCCCN	9−8 v_7 =1 ℓ=1 e	0.30	OriMC−1	OSO 20 m	Joh84	Laf78
	82093.555*(7)	$c-C_3H_2$	2(0,2)−1(1,1)	0.12	Sgr B2(M)	BTL 7 m	Cum86	
	82101.67*(5)	HNCS	7(0,7)−6(0,6)	0.05	Sgr B2(M)	NRAO 11 m	Fre79	
	82115.670*(13)	$t-CH_3CH_2OH$	3(2,2)−3(1,3)	0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	82124.345*(3)	$^{34}SO_2$	10(1,9)−9(2,8)	0.10	OriMC−1	OSO 20 m	Joh84	
	82200.372*(26)	HCCCN	9−8 v_7 =1 ℓ=1 f	0.23	OriMC−1	OSO 20 m	Joh84	Laf78
	82242.942*(25)	CH_3OCHO	7(1,7)−6(0,6) E	0.03[b]	Sgr B2(OH)	IRAM 30 m	Gom86	Oes99
	82244.488*(28)	CH_3OCHO	7(1,7)−6(0,6) A	[b]	Sgr B2(OH)	IRAM 30 m	Gom86	Oes99
	82303.756*(26)	$c-HC^{13}CCH$	2(1,2)−1(0,1)	0.035	Sgr B2(OH)	IRAM 30 m	Gom86	
	82337.944*(84)	HC_7N	73−72	0.04	Sgr B2(OH)	IRAM 30 m	Gom86	
	82383.4*(4)	C_6H	$^2\Pi_{1/2}$ J=59/2−57/2 f	1.10[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	82399.91*(4)	HCCCN	9−8 v_7 =2 ℓ=0	0.04	OriMC−1	NRAO 11 m	Tur89	Laf78
	82456.986*(6)	CH_3OCH_3	11(1,10)−11(0,11) AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	82458.611*(7)	CH_3CH_2CN	9(1,8)−8(1,7)	0.45[b]	OriMC−1	OSO 20 m	Joh84	
	82458.660*(6)	CH_3OCH_3	11(1,10)−11(0,11) EE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	82460.334*(8)	CH_3OCH_3	11(1,10)−11(0,11) AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	82470.670*(8)	CH_2OHCHO	8(0,7)−7(1,7)	0.045	Sgr B2(N)	NRAO 12 m	Hol00	But01
U	82516.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur91	
U	82518.	unidentified		0.06	Sgr B2(N)	NRAO 12 m	Hol00	
	82539.040*(4)	HC_5N	31−30	0.13	OriMC−1	NRAO 11 m	Buj81	
	82539.375*(47)	HCCCN	9−8 v_7 =3 ℓ=1 e	0.03[b]	Sgr B2(M)	NRAO 11 m	Tur89	Laf78
	82548.615*(4)	NH_2CHO	1(1,1)−0(0,0) F=0−1	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	82549.561*(2)	NH_2CHO	1(1,1)−0(0,0) F=2−1	0.07[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	82550.034*(2)	NH_2CHO	1(1,1)−0(0,0) F=1−1	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	82649.435*(8)	CH_3OCH_3	3(1,3)−2(0,2) AE+EA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	82650.306*(27)	$t-CH_3CH_2OH$	11(1,10)−11(0,11)	[b]	OriMC−1	NRAO 11 m	Tur91	
	82650.316*(2)	CH_3OCH_3	3(1,3)−2(0,2) EE	0.2[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	82651.197*(4)	CH_3OCH_3	3(1,3)−2(0,2) AA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	82659.675*(35)	HCCCN	9−8 v_7 =3 ℓ=3	0.036	Sgr B2(M)	NRAO 11 m	Tur89	Laf78
	82686.358*(6)	CH_3OCH_3	4(2,2)−4(1,3) AE	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	82686.482*(6)	CH_3OCH_3	4(2,2)−4(1,3) EA	0.10	OriMC−1	NRAO 11 m	Cla79	Gro98
	82688.746*(4)	CH_3OCH_3	4(2,2)−4(1,3) EE	0.12	OriMC−1	NRAO 11 m	Cla79	Gro98
	82691.073*(8)	CH_3OCH_3	4(2,2)−4(1,3) AA	0.08	OriMC−1	NRAO 11 m	Cla79	Gro98
	82713.423*(12)	C_8H	$^2\Pi_{3/2}$ 70.5−69.5 e	0.24[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	82716.069*(12)	C_8H	$^2\Pi_{3/2}$ 70.5−69.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	82776.235*(44)	HCCCN	9−83 v_7 =1 ℓ=1 f	0.07[b]	Sgr B2(N−LMH)	NRAO 12 m	Sny02	Laf78
	82777.116*(46)	$^{33}SO_2$	26(4,22)25(5,21)	[b]	Sgr B2(N−LMH)	NRAO 12 m	Sny02	
U	82783.	unidentified		0.03	Sgr B2(M)	IRAM 30 m	Com87	
	82825.639*(10)	CH_3CHO	10(1,9)−10(0,10) A−+	0.04	SgrB2(N−LMH)	NRAO 12 m	Sny02	Kle96
U	82833.	unidentified		0.05	SgrB2(N−LMH)	NRAO 12 m	Sny02	
U	82870.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	82875.	unidentified		0.04	SgrB2(N−LMH)	NRAO 12 m	Sny02	
U	82889.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
	82894.863*(14)	$CH_3C^{13}CH$	5(2)−4(2)	0.03	Sgr B2(M)	IRAM 30 m	Com87	
	82897.08*(10)	CH_3OH	22(5,18)−23(4,19) A+	0.03	Sgr B2(M)	IRAM 30 m	Com87	Xu_97
	82899.528*(15)	$CH_3C^{13}CH$	5(1)−4(1)	0.02	Sgr B2(M)	IRAM 30 m	Com87	
	82901.083*(16)	$CH_3C^{13}CH$	5(0)−4(0)	0.01	Sgr B2(M)	IRAM 30 m	Com87	
	82908.641*(20)	$(CH_3)_2CO$	8(0,8)−7(1,7) AE	0.02[b]	Sgr B2(M)	NRAO 43 m	Com87	Gro02a
	82908.666*(20)	$(CH_3)_2CO$	8(1,8)−7(0,7) AE	[b]	Sgr B2(M)	NRAO 43 m	Com87	Gro02a
	82908.690*(18)	$(CH_3)_2CO$	8(0,8)−7(1,7) EA	0.02[b]	Sgr B2(M)	NRAO 43 m	Com87	Gro02a
	82908.714*(18)	$(CH_3)_2CO$	8(1,8)−7(0,7) EA	[b]	Sgr B2(M)	NRAO 43 m	Com87	Gro02a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	82916.512*(14)	$(CH_3)_2CO$	8(0,8)−7(1,7) EE	0.04[b]	Sgr B2(M)	IRAM 30 m	Com87	Gro02a
	82916.538*(14)	$(CH_3)_2CO$	8(1,8)−7(0,7) EE	[b]	Sgr B2(M)	IRAM 30 m	Com87	Gro02a
	82924.311*(22)	$(CH_3)_2CO$	8(0,8)−7(1,7) AA	0.03[b]	Sgr B2(M)	IRAM 30 m	Com87	Gro02a
	82924.338*(22)	$(CH_3)_2CO$	8(1,8)−7(0,7) AA	[b]	Sgr B2(M)	IRAM 30 m	Com87	Gro02a
	82951.942*(2)	SO_2	13(4,10)−14(3,11)	1.10	OriMC−1	OSO 20 m	Sch83	
	82966.201*(5)	$c-C_3H_2$	3(1,2)−3(0,3)	0.16	Sgr B2(M)	BTL 7 m	Cum86	
	82983.51*(17)	$H^{13}CCCCCN$	32−31	0.24[f]	IRC+10216	IRAM 30 m	Gue00	
	82990.44*(2)	SiCN	$^2\Pi_{1/2}$ J=15/2−13/2 e	0.16[f]	IRC+10216	IRAM 30 m	Gue00	App00
U	82995.	unidentified		0.04	SgrB2(N−LMH)	NRAO 12 m	Sny02	
	83015.62*(2)	SiCN	$^2\Pi_{1/2}$ J=15/2−13/2 f	0.15[f]	IRC+10216	IRAM 30 m	Gue00	App00
	83025.430*(19)	CH_3CH_2CN	10(2,9)−10(1,10)	0.06	SgrB2(N−LMH)	NRAO 12 m	Sny02	
	83043.818*(3)	$^{34}SO_2$	8(1,7)−8(0,8)	0.50	OriMC−1	OSO 20 m	Sch83	
	83048.423*(23)	$CCC^{13}CH$	$^2\Pi_{3/2}$ J=8.5−7.5	0.006	IRC+10216	IRAM 30 m	Gue97	COL01
	83057.970*(2)	$OC^{34}S$	7−6	0.040	Sgr B2(M)	BTL 7 m	Gol81	
	83072.857*(8)	C_7H	$^2\Pi_{1/2}$ 47.5−46.5 f	0.06[f]	IRC+10216	IRAM 30 m	Gue97	McC97
	83085.838*(30)	$CCC^{13}CH$	$^2\Pi_{3/2}$ J=9.5−8.5	0.006	IRC+10216	IRAM 30 m	Gue97	COL01
	83097.425*(4)	CH_3OCH_3	14(2,12)−14(1,13) AE+EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	83098.929*(4)	CH_3OCH_3	14(2,12)−14(1,13) EE	0.35[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	83100.433*(4)	CH_3OCH_3	14(2,12)−14(1,13) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	83123.4(3)	C_4H	$^2\Pi_{1/2}$ J=17/2−15/2 v_7 =1 f	2.10[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	83129.18(4)	CHD_2OH	2(0)−1(0) e1	0.02	IRAS16293−2422	IRAM 30 m	Par02	Su_89
	83131.077*(15)	$^{13}CH3CCH$	5(0)−4(0)	0.002	IRC+10216	IRAM 30 m	Gue97	
U	83163.	unidentified		0.12	IRC+10216	OSO 20 m	Joh84	
	83165.256*(18)	H_2CCC	4(0,3)−3(0,2)	0.060	TMC−1	NRAO 12 m	Tur00	
	83207.510*(12)	CH_2CHCN	9(1,9)−8(1,8)	0.20	OriMC−1	OSO 20 m	Joh84	
	83260.240*(12)	C_7H	$^2\Pi_{3/2}$ 47.5−46.5 f	0.08[bf]	IRC+10216	IRAM 30 m	Gue97	McC97
	83260.473*(12)	C_7H	$^2\Pi_{3/2}$ 47.5−46.5 e	[b]	IRC+10216	IRAM 30 m	Gue97	McC97
	83289.63(4)	CHD_2OH	2(0)−1(0) e0	0.02	IRAS16293−2422	IRAM 30 m	Par02	Su_89
	83303.74(4)	CHD_2OH	2(0)−1(0) o1	0.02	IRAS16293−2422	IRAM 30 m	Par02	Su_89
	83319.414*(8)	CH_3OCH_3	8(1,7)−7(2,6) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	83321.256*(6)	CH_3OCH_3	8(1,7)−7(2,6) EE	0.17[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	83323.091*(6)	CH_3OCH_3	8(1,7)−7(2,6) AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	83323.105*(6)	CH_3OCH_3	8(1,7)−7(2,6) EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
U	83336.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	83345.812*(17)	$^{33}SO_2$	8(1,7)−8(0,8)	0.04	OriMC−1	NRAO 11 m	Tur89	
	83465.687*(85)	HC_7N	74−73	0.04	Sgr B2(M)	NRAO 11 m	Tur89	
	83523.142*(10)	$^{24}MgNC$	13/2,7−11/2,6	3.7	IRC+10216	IRAM 30 m	Gue93	Kaw93
	83538.361*(10)	$^{24}MgNC$	15/2,7−13/2,6	3.9	IRC+10216	IRAM 30 m	Gue93	Kaw93
	83540.677*(20)	$^{33}SO_2$	18(5,13)−19(4,16)	0.02	OriMC−1	NRAO 11 m	Tur89	
	83541.5(8)	C_5H	$^2\Pi_{1/2}$ J=35/2−33/2 e	1.7[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	83547.1(6)	C_5H	$^2\Pi_{1/2}$ J=35/2−33/2 f	2.2[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	83584.282*(6)	CH_3CHO	2(−1,2)−1(0,1) E	0.05	Sgr B2(M)	NRAO 12 m	Ziu86a	Kle96
	83688.086*(2)	SO_2	8(1,7)−8(0,8)	0.86	OriMC−1	NRAO 11 m	Tur91	
U	83805.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	83842.*	SiC	$^3\Pi_0$ 2−1 e	0.02	IRC+10216	IRAM 30 m	Cer89	Cer89
	83879.8(4)	C_4H	$^2\Pi_{1/2}$ J=17/2−15/2 v_7 =1 e	1.52[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	83886.478*(12)	C_8H	$^2\Pi_{3/2}$ 71.5−70.5 e	0.32[fb]	IRC+10216	IRAM 30 m	Cer96	McC97
	83889.197*(12)	C_8H	$^2\Pi_{3/2}$ 71.5−70.5 f	[b]	IRC+10216	IRAM 30 m	Cer96	McC97
	83903.30(10)	CH_3OD	4(2,2)−5(1,5) A−	0.12	Sgr B2(M)	NRAO 11 m	Tur89	Kau80
	83933.681*(22)	H_2CCC	4(1,3)−3(1,2)	0.083	TMC−1	NRAO 12 m	Tur00	
	83978.60(10)	CH_3NH_2	5(1,5)−5(0,5) As F=6−6	0.05[b]	Sgr B2(M)	BTL 7 m	Cum86	Tak73
	83979.57(10)	CH_3NH_2	5(1,5)−5(0,5) As F=5−5	[b]	Sgr B2(M)	BTL 7 m	Cum86	Tak73
	84108.58*(5)	C_5H	$^2\Pi_{3/2}$ J=35/2−33/2 e	4.7[fb]	IRC+10216	IRAM 30 m	Cer86a	Got86
	84110.41*(5)	C_5H	$^2\Pi_{3/2}$ J=35/2−33/2 f	[b]	IRC+10216	IRAM 30 m	Cer86a	Got86
	84151.845*(8)	CH_3CH_2CN	11(0,11)−10(1,10)	0.10[b]	Sgr B2(OH)	IRAM 30 m	Gom86	
U	84163.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
	84185.632*(13)	$c-H^{13}CCCH$	2(1,2)−1(0,1)	0.13	TMC−1	NRAO 12 m	Ger87	
U	84215.	Unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	84219.750*(6)	CH_3CHO	2(1,2)−1(0,1) A++	0.05	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	84233.263*(34)	CH_3OCHO	11(4,7)−11(3,8) A	0.06	OriMC−1	NRAO 11 m	Tur89	Oes99
	84320.887*(5)	SO_2	32(5,27)−31(6,26)	0.10	OriMC−1	OSO 20 m	Joh84	
U	84356.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
U	84385.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur91	
	84410.693*(6)	^{34}SO	2(2)−1(1)	0.03	Sgr B2(M)	BTL 7 m	Cum86	
	84423.706*(21)	CH_3OH	13(−3,11)−14(−2,13) E	0.80	OriMC−1	OSO 20 m	Joh84	Xu_97
	84449.102*(21)	CH_3OCHO	7(2,6)−6(2,5) E	0.45	OriMC−1	OSO 20 m	Joh84	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	84454.787*(24)	CH_3OCHO	7(2,6)−6(2,5) A	0.45	OriMC−1	OSO 20 m	Joh84	Oes99
U	84468.	unidentified		0.18	OriMC−1	NRAO 11 m	Tur89	
U	84478.	unidentified		0.18	OriMC−1	NRAO 11 m	Tur89	
U	84496.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	84505.350*(10)	$c-C_2H_4O$	8(5,4)−8(4,5)	0.08	OriMC−1	NRAO 11 m	Kui77	
	84521.206*(14)	CH_3OH	5(−1,5)−4(0,4) E	2.8	Sgr B2(M)	NRAO 11 m	Zuc72	Xu_97
	84542.331*(3)	NH_2CHO	4(0,4)−3(0,3)	0.21	Sgr B2(M)	BTL 7 m	Cum86	
	84549.73*(8)	C_6H	$^2\Pi_{3/2}$ J=61/2−59/2 e	0.04	IRC+10216	IRAM 30 m	Gue87	JPL01
	84574.7*(5)	C_6H	$^2\Pi_{3/2}$ J=61/2−59/2 f	0.03	IRC+10216	IRAM 30 m	Gue87	JPL01
	84575.208*(47)	^{29}SiO	2−1 v=2	0.07	VYCMa	IRAM 30 m	Cer92	
	84595.787*(13)	$t-CH_3CH_2OH$	4(2,3)−4(1,4)	0.06[b]	Sgr B2(M)	BTL 7 m	Cum86	
	84597.64(10)	CH_3NH_2	2(1)−2(0) Ea F=2−2	[b]	Sgr B2(M)	BTL 7 m	Cum86	Tak73
	84598.54(10)	CH_3NH_2	2(1)−2(0) Ea F=3−3	[b]	Sgr B2(M)	BTL 7 m	Cum86	Tak73
U	84608.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
U	84616.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
U	84628.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	84631.897*(6)	CH_3OCH_3	3(2,1)−3(1,2) AE	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	84632.275*(6)	CH_3OCH_3	3(2,1)−3(1,2) EA	0.14[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	84634.413*(4)	CH_3OCH_3	3(2,1)−3(1,2) EE	<0.09[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	84636.739*(10)	CH_3OCH_3	3(2,1)−3(1,2) AA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	84727.691*(4)	$c-C_3H_2$	3(2,2)−3(1,3)	0.04	Sgr B2(M)	BTL 7 m	Cum86	
U	84738.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
	84743.896*(43)	CH_3OH	19(4,15)−18(5,14) E	0.46[b]	OriMC−1	OSO 20 m	Joh84	Xu_97
	84746.047*(45)	^{30}SiO	2−1 v=0	0.08[b]	OriMC−1	NRAO 11 m	Cla77	
	84807.791*(1)	NH_2CHO	4(2,3)−3(2,2)[n,t]	0.18	Sgr B2(M)	NRAO 11 m	Wil81	
	84819.719*(8)	C_7H	$^2\Pi_{1/2}$ 48.5−47.5 e	0.08[f]	IRC+10216	IRAM 30 m	Gue97	McC97
	84865.153*(3)	$O^{13}CS$	7−6	0.032	Sgr B2(M)	BTL 7 m	Gol81	
	84888.986*(1)	NH_2CHO	4(3,2)−3(3,1)[n,t]	0.08[b]	Sgr B2(M)	NRAO 11 m	Wil81	
	84890.980*(1)	NH_2CHO	4(3,1)−3(3,0)[n,t]	[b]	Sgr B2(M)	NRAO 11 m	Wil81	
	84946.005*(12)	CH_2CHCN	9(0,9)−8(0,8)	0.10	OriMC−1	OSO 20 m	Joh84	
	84970.232*(23)	$^{13}CH_3OH$	8(0,8)−7(1,7) A+	0.20	OriMC−1	OSO 20 m	Joh84	Xu_97
	85012.850*(12)	C_7H	$^2\Pi_{3/2}$ 47.5−46.5 f	0.08[bf]	IRC+10216	IRAM 30 m	Gue97	McC97
	85013.093*(12)	C_7H	$^2\Pi_{3/2}$ 47.5−46.5 e	[b]	IRC+10216	IRAM 30 m	Gue97	McC97
	85093.268*(1)	NH_2CHO	4(2,2)−3(2,1)	0.12	Sgr B2(M)	BTL 7 m	Cum86	
	85131.3*(3)	C_6H	$^2\Pi_{1/2}$ J=61/2−59/2 e	1.37[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	85139.104*(1)	OCS	7−6	0.7	Sgr B2(M)	NRAO 11 m	Sol73	
	85162.157(44)	$HC^{18}O^+$	1−0	0.1	L134N	BTL 7 m	Lan78	Woo81
	85175.3*(4)	C_6H	$^2\Pi_{1/2}$ J=61/2−59/2 f	1.45[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	85201.347*(4)	HC_5N	32−31	0.030	IRC+10216	BTL 7 m	Gol81	
	85229.326(16)	$C^{13}CH$	1−0 3/2−1/2 F=2,2.5−1,1.5	0.10[f]	OriMC−1	SEST 15 m	Sal94	McC95
	85232.792(17)	$C^{13}CH$	1−0 3/2−1/2 F=2,1.5−1,0.5	0.08[f]	OriMC−1	SEST 15 m	Sal94	McC95
	85247.798(18)	$C^{13}CH$	1−0 3/2−1/2 F=1,0.5−0,0.5	0.05[f]	OriMC−1	SEST 15 m	Sal94	McC95
	85256.952(29)	$C^{13}CH$	1−0 3/2−1/2 F=1,1.5−0,0.5	0.07[f]	OriMC−1	SEST 15 m	Sal94	McC95
	85265.507*(15)	$t-CH_3CH_2OH$	6(0,6)−5(1,5)	0.25	Sgr B2(M)	NRAO 11 m	Zuc75	
	85302.655*(12)	CH_2CHCN	9(2,8)−8(2,7)	0.12	Sgr B2(M)	BTL 7 m	Cum86	
	85330.991*(12)	$c-C_2H_4O$	9(6,4)−9(5,5)	0.03	OriMC−1	NRAO 11 m	Tur89	
	85338.906*(7)	$c-C_3H_2$	2(1,2)−1(0,1)	3.1	TMC−1	NRAO 11 m	Tha81	
	85347.878*(14)	HCS^+	2−1	0.4	OriMC−1	NRAO 11 m	Tha81	Gud81
U	85396.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	85416.763*(10)	CH_2CHCN	9(4,6)−8(4,5)	0.12[b]	OriMC−1	OSO 20 m	Joh84	
	85416.814*(10)	CH_2CHCN	9(4,5)−8(4,4)	[b]	OriMC−1	OSO 20 m	Joh84	
	85426.933*(10)	CH_2CHCN	9(3,7)−8(3,6)	0.10	OriMC−1	OSO 20 m	Joh84	
	85434.543*(15)	CH_2CHCN	9(3,6)−8(3,5)	0.03	Sgr B2(M)	NRAO 11 m	Tur91	
	85442.600*(1)	CH_3CCH	5(3)−4(3)	0.11	OriMC−1	NRAO 11 m	Chu83	
	85450.765*(1)	CH_3CCH	5(2)−4(2)	0.14	OriMC−1	NRAO 11 m	Chu83	
	85455.665*(1)	CH_3CCH	5(1)−4(1)	0.23	OriMC−1	NRAO 11 m	Chu83	
	85457.299*(1)	CH_3CCH	5(0)−4(0)	0.28	OriMC−1	NRAO 11 m	Chu83	
	85497.11*(37)	CH_3C_4H	21(1)−20(1)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	85497.95*(37)	CH_3C_4H	21(0)−20(0)	0.10[b]	Sgr B2(M)	NRAO 11 m	Tur89	
U	85506.	unidentified		0.10	OriMC−1	OSO 20 m	Joh84	
	85531.480*(21)	$HOCO^+$	4(0,4)−3(0,3)	0.5	Sgr B2(M)	NRAO 11 m	Tha81	
	85568.074*(13)	CH_3OH	6(−2,5)−7(−1,7) E	0.3	OriMC−1	NRAO 11 m	Lov76a	Xu_97
	85634.00*(1)	C_4H	19/2−17/2	0.08	IRC+10216	NRAO 11 m	Gue78	Got83
	85638.349*(17)	CH_3OCHO	4(2,3)−3(1,2) E	0.09	OriMC−1	NRAO 11 m	Tur89	Oes99
	85640.446*(47)	SiO	2−1 v=2	0.11	RCas	NRAO 11 m	Cla81	
	85655.805*(17)	CH_3OCHO	4(2,3)−3(1.2) A	0.09[b]	OriMC−1	NRAO 11 m	Tur89	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	85656.418*(4)	$c-C_3H_2$	4(3,2)−4(2,3)	[b]	OriMC−1	NRAO 11 m	Tur89	
	85672.57*(1)	C_4H	17/2−15/2	0.07	IRC+10216	NRAO 11 m	Gue78	Got83
U	85705.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	85715.434*(12)	CH_2CHCN	9(2,7)−8(2,6)	0.06	Sgr B2(M)	BTL 7 m	Cum86	
	85759.144*(45)	^{29}SiO	2−1 v=0	0.13	OriMC−1	NRAO 11 m	Lov76a	
U	85781.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	85886.133*(6)	SiC_4	28−27	0.41[f]	TMC−1	NRO 45 m	Ohi89	
	85919.086*(28)	CH_3OCHO	7(6,1)−6(6,0) E	0.12	OriMC−1	OSO 20 m	Ell80	Oes99
	85924.747(20)	NH_2D	1(1,1)0+−1(0,1)0− F=0−1	0.40	L183	OSO 20 m	Olb85	Bes83
	85925.684(20)	NH_2D	1(1,1)0+−1(0,1)0− F=2−1	0.40	L183	OSO 20 m	Olb85	Bes83
	85926.263(10)	NH_2D	1(1,1)0+−1(0,1)0−	0.14	OriMC−1	NRAO 11 m	Tur78	Bes83
	85926.263(10)	NH_2D	1(1,1)0+−1(0,1)0− F=2−2	0.99[b]	L183	OSO 20 m	Olb85	Bes83
	85926.508*(21)	CH_3OCHO	7(6,2)−6(6,1)A+E	0.3[b]	OriMC−1	OSO 20 m	Ell80	Oes99
	85926.858(20)	NH_2D	1(1,1)0+−1(0,1)0− F=1−2	0.40	L183	OSO 20 m	Olb85	Bes83
	85927.230*(24)	CH_3OCHO	7(6,1)−6(6,0)A	[b]	OriMC−1	OSO 20 m	Ell80	Oes99
	85927.721(20)	NH_2D	1(1,1)0+−1(0,1)0− F=1−0	0.40	L183	OSO 20 m	Olb85	Bes83
U	85943.	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Tur89	
	85973.249*(8)	CH_3OCH_3	13(2,12)−12(3,9) AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	85976.131*(8)	CH_3OCH_3	13(2,12)−12(3,9) EE	0.06[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	85979.002*(8)	CH_3OCH_3	13(2,12)−12(3,9) EA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	85979.025*(8)	CH_3OCH_3	13(2,12)−12(3,9) AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	86021.008*(25)	CH_3OCHO	7(5,2)−6(5,1) E	0.12	OriMC−1	OSO 20 m	Ell80	Oes99
	86027.674*(21)	CH_3OCHO	7(5,3)−6(5,2) E	[b]	OriMC−1	OSO 20 m	Ell80	Oes99
	86029.445*(24)	CH_3OCHO	7(5,3)−6(5,2) A	0.20[b]	OriMC−1	OSO 20 m	Ell80	Oes99
	86030.212*(24)	CH_3OCHO	7(5,2)−6(5,1) A	0.32	OriMC−1	OSO 20 m	Ell80	Oes99
	86048.50(25)	C_4H	$^2\Sigma$ J=9−8 v_7 =2 L	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	86054.961(25)	$HC^{15}N$	1−0	0.80[g]	OriMC−1	NRAO 11 m	Lin77	
	86074.20(10)	CH_3NH_2	4(1,4)−4(0,4) F=3−3	[b]	Sgr B2(M)	NRAO 11 m	Kai74	Tak73
	86074.44(10)	CH_3NH_2	4(1,4)−4(0,4) F=5−5	0.2[b]	Sgr B2(M)	NRAO 11 m	Kai74	Tak73
	86075.43(10)	CH_3NH_2	4(1,4)−4(0,4) F=4−4	[b]	Sgr B2(M)	NRAO 11 m	Kai74	Tak73
	86093.983*(4)	SO	2(2)−1(1)	<1.7	OriMC−1	NRAO 11 m	Cla74	
	86104.44(25)	C_4H	$^2\Sigma$ J=9−8 v_7 =2 U	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	86181.413*(10)	CCS	6,7−5,6	1.6[f]	IRC+10216	IRAM 30 m	Cer87b	Yam90
	86210.079*(24)	CH_3OCHO	7(4,4)−6(4,3) A	0.18	OriMC−1	OSO 20 m	Joh84	Oes99
	86223.548*(25)	CH_3OCHO	7(4,3)−6(4,2) E	0.35[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	86223.780*(6)	CH_3OCH_3	2(2,0)−2(1,1) AE	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	86224.106*(21)	CH_3OCHO	7(4,4)−6(4,3) E	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	86225.615*(12)	CH_3OCH_3	2(2,0)−2(1,1) EA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	86226.727*(4)	CH_3OCH_3	2(2,0)−2(1,1) EE	0.28[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	86228.720*(10)	CH_3OCH_3	2(2,0)−2(1,1) AA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	86243.440*(41)	SiO	2−1 v=1	17.4[i]	OriMC−1	NRAO 11 m	Sny74a	
	86250.576*(24)	CH_3OCHO	7(4,3)−6(4,2) A	0.08	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	86265.826*(24)	CH_3OCHO	7(3,5)−6(3,4) A	0.15	OriMC−1	OSO 20 m	Joh84	Oes99
	86268.659*(21)	CH_3OCHO	7(3,5)−6(3,4) E	0.20	OriMC−1	OSO 20 m	Joh84	Oes99
U	86312.7	unidentified		0.06	Sgr B2(N)	SEST 15 m	Dic01	
U	86317.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	86338.735*(5)	$H^{13}CN$	1−0 F=1−1	[b]	OriMC−1	NRAO 11 m	Sny71	
	86340.167*(6)	$H^{13}CN$	1−0 F=2−1	<2.[b]	OriMC−1	NRAO 11 m	Sny71	
	86342.256*(6)	$H^{13}CN$	1−0 F=0−1	[b]	OriMC−1	NRAO 11 m	Sny71	Pea76
U	86395.8(15)	unidentified		0.06	Sgr B2(M)	BTL 7 m	Cum86	
U	86416.9(13)	unidentified		0.05	Sgr B2(M)	BTL 7 m	Cum86	
	86458.271*(3)	CH_2 DCN	5(1,5)−4(1,4)	0.41[f]	G34.3	IRAM 30 m	Ger92a	
U	86473.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur91	
U	86481.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur91	
	86492.97*(2)	HCOOD	4(0,4)−3(0,3)	0.05	Sgr B2(OH)	SEST 15 m	Ger89	Wil80
	86546.18*(1)	HCOOH	4(1,4)−3(1,3)	0.07	Sgr B2(M)	BTL 7 m	Cum86	Wil80
	86557.564*(38)	$s-CH_2CHOH$	2(1,2)−1(0,1)	0.027	Sgr B2(N)	NRAO 12 m	Tur01	
	86562.78*(16)	$Si^{13}CC$	4(1,4)−3(1,3)	n.r.	IRC+10216	IRAM 30 m	Gue97	
	86570.249*(8)	C_7H	$^2\Pi_{1/2}$ 49.5−48.5 f	0.07[f]	IRC+10216	IRAM 30 m	Gue97	McC97
	86593.687*(8)	CCCO	9−8	0.028	TMC−1	FCRAO 14 m	Bro85	
	86615.602*(14)	CH_3OH	7(2,6)−6(3,3) A−	0.6	OriMC−1	NRAO 11 m	Lov76a	Xu_97
	86617.924*(22)	$^{29}Si^{34}$ S	5−4	0.006	IRC+10216	IRAM 30 m	Gue97	
	86639.095*(2)	SO_2	8(3,5)−9(2,8)	0.2	OriMC−1	NRAO 11 m	Tur91	
	86670.82(4)	HCO	1(0,1)−0(0,0) 3/2−1/2 F=2−1	0.15	OriMC−2	NRAO 11 m	Sny76	Pic78
	86708.35(4)	HCO	1(0,1)−0(0,0) 3/2−1/2 F=1−0	0.04	Sgr B2(M)	BTL 7 m	Cum86	Pic78
	86708.374*(5)	CCCS	15−14	2.4[f]	IRC+10216	IRAM 30 m	Cer87b	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	86745.317*(9)	CH_3CH_2CN	8(1,8)−7(0,7)	0.02	Sgr B2(M)	NRAO 11 m	Tur89	
	86754.330(50)	$H^{13}CO^+$	1−0	0.6	OriMC−1	NRAO 11 m	Sny76a	Woo81
	86777.43(4)	HCO	1(0,1)−0(0,0) 1/2−1/2 F=1−1	0.021	DR21	OSO 20 m	Sch86	Pic78
	86805.75(4)	HCO	1(0,1)−0(0,0) 1/2−1/2 F=0−1	0.015	DR21	OSO 20 m	Sch86	Pic78
	86814.388*(4)	CH_2DCN	5(4,*)−4(4,*)	0.11[f]	G34.3	IRAM 30 m	Ger92a	
	86819.848*(8)	CH_3CH_2CN	10(1,10)−9(1,9)	0.50	OriMC−1	OSO 20 m	Joh84	
	86824.595*(3)	CH_2DCN	5(3,3)−4(3,2)	0.18[bf]	G34.3	IRAM 30 m	Ger92a	
	86824.597*(4)	CH_2DCN	5(3,2)−4(3,1)	[b]	G34.3	IRAM 30 m	Ger92a	
	86833.932*(3)	CH_2DCN	5(0,5)−4(0,4)	0.24[f]	G34.3	IRAM 30 m	Ger92a	
	86847.010*(45)	SiO	2−1 v=0	1.5	OriMC−1	NRAO 11 m	Dic76	
U	86864.	unidentified		0.08	OriMC−1	OSO 20 m	Dow82	
	86902.947*(14)	CH_3OH	7(2,5)−6(3,4) A+	0.2	OriMC−1	NRAO 11 m	Lov76a	Xu_97
	86993.51*(20)	SiC_2	4(1,4)−3(1,3) v_3 =1	0.005	IRC+10216	NRAO 12 m	Gen97	Bog91
	87056.966(20)	$HC^{17}O^+$	1−0 F=3/2−5/2	0.02	L1544	IRAM 30 m	Dor01	Dor01
	87057.258(20)	$HC^{17}O^+$	1−0 F=7/2−5/2	0.04	L1544	IRAM 30 m	Dor01	Dor01
	87058.294(20)	$HC^{17}O^+$	1−0 F=5/2−5/2	0.02	L1544	IRAM 30 m	Dor01	Dor01
	87090.735(46)	$HN^{13}C$	1−0 F=0−1	0.08	L134N	BTL 7 m	Fre79a	Fre79a
	87090.859(46)	$HN^{13}C$	1−0 F=2−1	0.42	L134N	BTL 7 m	Fre79a	Fre79a
	87090.942(46)	$HN^{13}C$	1−0 F=1−1	0.25	L134N	BTL 7 m	Fre79a	Fre79a
U	87110.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
U	87116.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	87142.3(4)	C_4H	$^2\Pi_{3/2}$ J=19/2−17/2 v_7 =1 e	1.45[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	87143.198*(28)	CH_3OCHO	7(3,4)−6(3,3) E	0.37	OriMC−1	OSO 20 m	Joh84	Oes99
	87161.313*(24)	CH_3OCHO	7(3,4)−6(3,3) A	0.25	OriMC−1	OSO 20 m	Joh84	Oes99
U	87215.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
U	87260.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	87284.156(30)	C_2H	1−0 3/2−1/2 F=1−1	0.53	OriMC−1	NRAO 11 m	Got83a	Got83a
U	87299.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	87312.827*(18)	CH_2CHCN	9(1,8)−8(1,7)	0.18	OriMC−1	NRAO 11 m	Tur89	
	87316.925(4)	C_2H	1−0 3/2−1/2 F=2−1	4.00	OriMC−1	NRAO 11 m	Got83a	Got83a
U	87323.	uniden tified		0.23	OriMC−1	NRAO 11 m	Tur89	
	87328.624(6)	C_2H	1−0 3/2−1/2 F=1−0	2.27	OriMC−1	NRAO 11 m	Got83a	Got83a
	87348.02*(8)	C_6H	$^2\Pi_{3/2}$ J=63/2−61/2 f	0.05	IRC+10216	IRAM 30 m	Gue87	JPL01
	87371.8(4)	C_4H	$^2\Pi_{3/2}$ J=19/2−17/2 v_7 =1 f	2.40[f]	IRC+10216	IRAM 30 m	Gue87	Yam87b
	87402.004(5)	C_2H	1−0 1/2−1/2 F=1−1	2.25	OriMC−1	NRAO 11 m	Got83a	Got83a
	87407.165(11)	C_2H	1−0 1/2−1/2 F=0−1	1.02	OriMC−1	NRAO 11 m	Got83a	Got83a
	87446.512(23)	C_2H	1−0 1/2−1/2 F=1−0	0.56	OriMC−1	NRAO 11 m	Tuc78	Got83a
	87458.286*(42)	$Al^{35}Cl$	6−5	0.73[f]	IRC+10216	IRAM 30 m	Cer87c	
U	87479.	unidentified		0.05	IRC+10216	OSO 20 m	Joh84	
U	87525.	unidentified		0.18	OriMC−1	NRAO 11 m	Tur89	
	87550.556*(17)	^{30}SiS	5−4	0.027	IRC+10216	FCRAO 14m	Ziu85	
	87559.811(11)	SiN	2−1 J=5/2−3/2 F=7/2−5/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	87567.496(12)	SiN	2−1 J=5/2−3/2 F=5/2−3/2	0.006[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	87571.654(12)	SiN	2−1 J=5/2−3/2 F=3/2−1/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
U	87580.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	87597.333*(3)	HNCO	4(1,4)−3(1,3)	0.13	OriMC−1	OSO 20 m	Joh84	
	87716.024*(13)	$t-CH_3CH_2OH$	5(2,4)−5(1,5)	0.06	Sgr B2(M)	BTL 7 m	Cum86	
	U87726.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	87766.301*(25)	CH_3OCHO	8(0,8)−7(1,7) E	0.03[b]	Sgr B2(M)	BTL 7 m	Cum86	Oes99
	87767.302*(15)	HCCN	5,4−4,3	0.85[f]	IRC+10216	IRAM 30 m	Gue91	
	87769.067*(25)	CH_3OCHO	8(0,8)−7(1,7) A	[b]	Sgr B2(M)	BTL 7 m	Cum86	Oes99
U	87777.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
U	87779.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	87782.23(10)	CH_3NH_2	3(1,3)−3(0,3) As F=4−4	0.03[b]	Sgr B2(M)	BTL 7 m	Cum86	Tak73
	87783.09(10)	CH_3NH_2	3(1,3)−3(0,3) As F=3−3	[b]	Sgr B2(M)	BTL 7 m	Cum86	Tak73
	87848.871*(1)	NH_2CHO	4(1,3)−3(1,2)	0.31	Sgr B2(M)	BTL 7 m	Cum86	
	87863.631*(4)	HC_5N	33−32	0.23	IRC+10216	OSO 20 m	Joh84	
	87876.544*(22)	$S^{18}O$	4(5)−4(4)	0.04	OriMC−1	NRAO 11 m	Tur89	
	87890.195*(18)	HCCN	4,4−3,3	0.72[f]	IRC+10216	IRAM 30 m	Gue91	
	87898.416*(4)	HNCO	4(2,3)−3(2,2)	0.06[b]	Sgr B2(M)	BTL 7 m	Cum86	
	87898.620*(4)	HNCO	4(2,2)−3(2,1)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	87922.0*(3)	C_6H	$^2\Pi_{1/2}$ J=63/2−61/2 e	1.19[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	87925.238*(4)	HNCO	4(0,4)−3(0,3)	3.7	Sgr B2(M)	NRAO 11 m	Tur91	
	87967.1*(3)	C_6H	$^2\Pi_{1/2}$ J=63/2−61/2 f	1.31[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	88018.(1)	unidentified		0.10	IRC+10216	IRAM 30 m	Cer87a	
	88085.86(5)	CH_3 SH	14(1)−13(2) A−	0.08	OriMC−1	NRAO 11 m	Tur89	Lee80

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	88130.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	88166.808*(8)	$H^{13}CCCN$	10−9	0.15	IRC+10216	OSO 20 m	Joh84	Laf78
U	88204.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	88211.347*(21)	HCCN	3,4−2,3	0.9[f]	IRC+10216	IRAM 30 m	Gue91	
	88239.027*(3)	HNCO	4(1,3)−3(1,2)	0.09	Sgr B2(M)	NRAO 11 m	Tur91	
	88285.828*(20)	$Si^{34}S$	5−4	0.10	IRC+10216	OSO 20 m	Joh84	
U	88292.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	88315.2(4)	C_5H	$^2\Pi_{1/2}$ J=37/2−35/2 e	0.8[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	88321.0(4)	C_5H	$^2\Pi_{1/2}$ J=37/2−35/2 f	1.1[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	88323.754*(8)	CH_3CH_2CN	10(0,10)−9(0,9)	0.12	OriMC−1	NRAO 11 m	Joh77	
U	88349.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	88358.420*(37)	CH_3OCHO	22(5,17)−22(4,18) A	0.07	OriMC−1	NRAO 11 m	Tur89	Oes99
U	88402.	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Tur89	
U	88445.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
U	88481.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur91	
U	88540.6	unidentified		0.02	G327.3−0.6	SEST 15 m	Dic01	
	88594.809*(19)	CH_3OH	15(3,13)−14(4,10) A+	0.73	OriMC−1	OSO 20 m	Joh84	Xu_97
	88630.4157(10)	HCN	1−0 F=1−1	9.6	OriMC−1	NRAO 11 m	Uli76	DeL69
	88631.8473(10)	HCN	1−0 F=2−1	17.2	OriMC−1	NRAO 11 m	Uli76	DeL69
	88633.9360(10)	HCN	1−0 F=0−1	6.8	OriMC−1	NRAO 11 m	Uli76	DeL69
	88668.06(10)	CH_3NH_2	2(0,2)−1(0,1) Aa	[b]	Sgr B2(M)	NRAO 11 m	Kai75	Kai75
	88668.62(10)	CH_3NH_2	2(0,2)−1(0,1) Es	0.15[b]	Sgr B2(M)	NRAO 11 m	Kai75	Kai75
	88668.63(10)	CH_3NH_2	2(0,2)−1(0,1) A+E	0.04	Sgr B2(M)	NRAO 11 m	Kut80	Joh72
	88669.61(10)	CH_3NH_2	2(0,2)−1(0,1) As,Ea	[b]	Sgr B2(M)	NRAO 11 m	Kai75	Kai75
	88706.220*(4)	CH_3OCH_3	15(2,13)−15(1,14) EA+AE	[b]	OriMC−1	NRAO 11 m	Kut80	Gro98
	88707.701*(4)	CH_3OCH_3	15(2,13)−15(1,14) EE	0.05[b]	OriMC−1	NRAO 11 m	Kut80	Gro98
	88709.181*(4)	CH_3OCH_3	15(2,13)−15(1,14) AA	0.06	OriMC−1	NRAO 11 m	Kut80	Gro98
	88720.567*(3)	$^{34}SO_2$	7(3,5)−8(2,6)	0.10[b]	OriMC−1	OSO 20 m	Sch83	
	88723.239*(40)	CH_3OCHO	11(3,9)−11(2,10) A	[b]	OriMC−1	OSO 20 m	Sch83	Oes99
U	88741.8	unidentified		0.03	OriMC−1	NRAO 11 m	Kut80	
U	88749.8	unidentified		0.03	OriMC−1	NRAO 11 m	Kut80	
	88758.419*(14)	CH_3CH_2CN	27(3,24)−27(2,25)	0.08	OriMC−1	NRAO 11 m	Tur89	
	U88770.8	unidentified		0.03	OriMC−1	NRAO 11 m	Kut80	
	88843.117*(21)	CH_3OCHO	7(1,6)−6(1,5) E	0.09	OriMC−1	NRAO 11 m	Kut80	Oes99
	88851.641*(24)	CH_3OCHO	7(1,6)−6(1,5) A	0.07	OriMC−1	NRAO 11 m	Kut80	Oes99
	U88861.	unidentified		0.15	OriMC−1	OSO 20 m	Gol81b	
	88865.692(26)	$H^{15}NC$	1−0	0.15	DR21(OH)	NRAO 11 m	Bro77	Say76
	88914.14*(5)	C_5H	$^2\Pi_{3/2}$ J=37/2−35/2 e	4.9[fb]	IRC+10216	IRAM 30 m	Cer86a	Got86
U	88916.	unidentified		0.16	OriMC−1	NRAO 11 m	Tur89	
	88916.19*(5)	C_5H	$^2\Pi_{3/2}$ J=37/2−35/2 f	[b]	IRC+10216	IRAM 30 m	Cer86a	Got86
	88939.993*(20)	CH_3OH	15(3,12)−14(4,11) A−	1.30	OriMC−1	OSO 20 m	Joh84	Xu_97
	88940.238*(18)	H_2CCCC	10(1,10)−9(1,9)	0.099	IRC+10216	IRAM 30 m	Cer91a	Kil90
U	88957.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
U	88977.	unidentified		0.09	OriMC−1	NRAO 11 m	Tur89	
U	89043.5	unidentified		0.04	Sgr B2(N)	SEST 15 m	Dic01	
	89045.59*(2)	CCCN	9−8 J=19/2−17/2	0.13[l]	IRC+10216	NRAO 11 m	Gue77	Got83
	89060.827*(20)	$t-CH_3CH_2OH$	18(4,14)−17(5,13)	0.08	OriMC−1	NRAO 11 m	Tur89	
	89064.36*(2)	CCCN	9−8 J=17/2−15/2	0.14[l]	IRC+10216	NRAO 11 m	Gue77	Got83
U	89082.2	unidentified		0.05	Sgr B2(N)	SEST 15 m	Dic01	
U	89084.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	89086.423*(3)	HCN	1−0 F=1−1 $2v_\ell$ =0	[b]	IRC+10216	IRAM 30 m	Luc88	Mak02
	89087.914*(3)	HCN	1−0 F=2−1 $2v_\ell$ =0	0.20[b]	IRC+10216	IRAM 30 m	Luc88	Mak02
	89090.130*(3)	HCN	1−0 F=0−1 $2v_\ell$ =0	[b]	IRC+10216	IRAM 30 m	Luc88	Mak02
U	89093.2	unidentified		0.05	Sgr B2(N)	SEST 15 m	Dic01	
	89103.743*(9)	^{29}SiS	5−4	0.07	IRC+10216	OSO 20 m	Joh84	
	89104.30*(11)	HC_7N	79−78	0.03	OriMC−1	NRAO 11 m	Tur91	
	89188.526*(21)	HCO^+	1−0	10.8	OriMC−1	NRAO 11 m	Uli76	
U	89234.	unidentified		0.15	OriMC−1	NRAO 11 m	Tur89	
	89251.16(8)	CH_2DOH	2(0,2)−1(0,1) o1	0.04	IRAS16293−2422	IRAM 30 m	Par02	Qua80
	89275.41(7)	CH_2DOH	2(0,2)−1(0,1) e1	0.06	IRAS16293−2422	IRAM 30 m	Par02	Qua80
	89297.647*(8)	CH_3CH_2CN	10(2,9)−9(2,8)	0.32	OriMC−1	OSO 20 m	Joh84	
	89314.589*(25)	CH_3OCHO	8(1,8)−7(1,7) E	0.35[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	89316.668*(25)	CH_3OCHO	8(1,8)−7(1,7) A	[b]	OriMC−1	OSO 20 m	Joh84	Oes99
	89329.586*(14)	$^{13}CH_3CN$	5(1)−4(1)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	89331.267*(14)	$^{13}CH_3CN$	5(0)−4(0)	0.22[b]	Sgr B2(M)	BTL 7 m	Cum86	
	89407.91(7)	CH_2 DOH	2(0,2)−1(0,1) e0	0.06	IRAS16293−2422	IRAM 30 m	Par02	Qua80
U	89411.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	89419.262*(8)	HCCNC	9−8	0.26	TMC−1	NRO 45 m	Kaw92	
	89487.414(15)	HOC^+	1−0	0.08	Sgr B2(M)	FCRAO 14 m	Woo83	Gud82
	89489.238*(11)	$Si^{33}S$	5−4	0.022	IRC+10216	IRAM 30 m	Kah88	
	89505.778*(17)	CH_3OH	8(−4,5)−9(−3,7) E	0.3	OriMC−1	NRAO 11 m	Lov76a	Xu_97
	89548.911*(6)	CH_3CH_2CN	10(9,1)−9(9,0)	1.5[eb]	OriMC−1(HC)	BIMA Array	Liu01	
	89548.911*(6)	CH_3CH_2CN	10(9,2)−9(9,1)	[b]	OriMC−1(HC)	BIMA Array	Liu01	
	89562.318*(7)	CH_3CH_2CN	10(6)−9(6)	0.08[b]	OriMC−1	NRAO 11 m	Joh77	
	89565.034*(6)	CH_3CH_2CN	10(7)−9(7)	0.05[b]	OriMC−1	NRAO 11 m	Joh77	
	89568.100*(7)	CH_3CH_2CN	10(5)−9(5)	0.11[b]	OriMC−1	NRAO 11 m	Joh77	
	89573.057*(6)	CH_3CH_2CN	10(8)−9(8)	0.03[b]	OriMC−1	NRAO 11 m	Joh77	
	89579.17*(1)	HCOOH	4(0,4)−3(0,3)	0.05	Sgr B2(M)	FCRAO 14 m	Woo83	Wil80
	89590.033*(7)	CH_3CH_2CN	10(4,7)−9(4,6)	0.05[b]	OriMC−1	NRAO 11 m	Joh77	
	89591.017*(7)	CH_3CH_2CN	10(4,6)−9(4,5)	0.05[b]	OriMC−1	NRAO 11 m	Joh77	
	89628.448*(8)	CH_3CH_2CN	10(3,8)−9(3,7)	0.13	OriMC−1	NRAO 11 m	Joh77	
U	89651.	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Tur89	
	89684.715*(8)	CH_3CH_2CN	10(3,7)−9(3,6)	0.22	OriMC−1	OSO 20 m	Joh84	
	89695.902*(10)	CH_3OCH_3	2(2,1)−2(1,2) EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	89697.737*(6)	CH_3OCH_3	2(2,1)−2(1,2) AE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	89699.797*(6)	CH_3OCH_3	2(2,1)−2(1,2) EE	0.06[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	89702.809*(10)	CH_3OCH_3	2(2,1)−2(1,2) AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
U	89726.	unidentified		0.07	IRC+10216	OSO 20 m	Joh84	
	89730.54(10)	l−C_3H	$^2\Pi_{1/2}$ 4−3 J=9/2−7/2 v_4 =1 ℓ=2	0.03	IRC+10216	IRAM 30 m	Gue98	Gue98
	89745.662*(58)	CH_3OCHO	11(1,10)−11(0,11) E	0.06	OriMC−1	NRAO 11 m	Tur89	Oes99
	89757.105*(16)	a−CH_2CHOH	2(1,2)−1(0,1)	0.035	Sgr B2(N)	NRAO 12 m	Tur01	
	89759.17(12)	l−C_3H	$^2\Pi_{1/2}$ 4−3 J=7/2−5/2 v_4 =1 ℓ=2	0.02	IRC+10216	IRAM 30 m	Gue98	Gue98
	89785.6(4)	C_5N	$^2\Pi_{1/2}$ N=32−31 J=32.5−31.5	0.003	IRC+10216	IRAM 30 m	Gue98	Gue98
	89797.0(3)	C_5N	$^2\Pi_{1/2}$ N=32−31 J=31.5−30.5	0.003	IRC+10216	IRAM 30 m	Gue98	Gue98
U	89823.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
U	89834.	unidentified		0.11	OriMC−1	NRAO 11 m	Tur89	
	89861.48*(1)	HCOOH	4(2,3)−3(2,2)	0.13	Sgr B2(M)	BTL 7 m	Cum86	Wil80
U	89898.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	89927.70(10)	CH_3SH	17(1)−16(2) A+	0.07	OriMC−1	NRAO 11 m	Tur89	Lee80
	89948.21*(1)	HCOOH	4(3,2)−3(3,1)	0.02[e]	OriMC−1(CR)	BIMAArray	Liu01	Wil80
U	89952.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	89960.	unidentified		0.20	OriMC−1	OSO 20 m	Joh84	
U	90038.	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Tur89	
U	90051.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
U	90061.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
	90093.34*(9)	C_6H	$^2\Pi_{3/2}$ J=65/2−63/2 e	0.05	IRC+10216	IRAM 30 m	Gue87	JPL01
	90117.593*(13)	t−CH_3CH_2OH	4(1,4)−3(0,3)	0.25[g]	Sgr B2(M)	NRAO 11 m	Zuc75	
	90121.43*(9)	C_6H	$^2\Pi_{3/2}$ J=65/2−63/2 f	0.06	IRC+10216	IRAM 30 m	Gue87	JPL01
	90145.634*(24)	CH_3OCHO	7(2,5)−6(2,4) E	0.32	OriMC−1	OSO 20 m	Joh84	Oes99
	90156.511*(25)	CH_3OCHO	7(2,5)−6(2,4) A	0.25	OriMC−1	OSO 20 m	Joh84	Oes99
	90164.62*(1)	HCOOH	4(2,2)−3(2,1)	0.05[e]	OriMC−1(CR)	BIMA Array	Liu01	Wil80
U	90166.	unidentified		0.29[e]	W51 e2	BIMA Array	Rem02	
U	90199.6	unidentified		0.3[e]	Sgr B2(N)	BIMA Array	Meh97	
U	90203.	unidentified		0.20[e]	W51 e2	BIMA Array	Rem02	
	90203.444*(20)	CH_3COOH	8(−1,8)−7(−1,7) E	[b]	Sgr B2(N)	BIMA Array	Meh97	Ily00
	90203.444*(20)	CH_3COOH	8(−1,8)−7(0,7) E	[b]	Sgr B2(N)	BIMA Array	Meh97	Ily00
	90203.444*(20)	CH_3COOH	8(0,8)−7(−1,7) E	0.6[be]	Sgr B2(N)	BIMA Array	Meh97	Ily00
	90203.444*(20)	CH_3COOH	8(0,8)−7(0,7) E	[b]	Sgr B2(N)	BIMA Array	Meh97	Ily00
U	90212.(1)	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Hol80	
	90227.595*(25)	CH_3OCHO	8(0,8)−7(0,7) E	0.15	OriMC−1	NRAO 11 m	Hol80	Oes99
	90229.647*(28)	CH_3OCHO	8(0,8)−7(0,7) A	0.15	OriMC−1	NRAO 11 m	Hol80	Oes99
U	90240.	unidentified		0.08[e]	W51 e2	BIMA Array	Rem02	
	90246.250*(50)	CH_3COOH	8(0,8)−7(0,7) A++	[b]	Sgr B2(N)	BIMA Array	Meh97	Ily00
	90246.250*(50)	CH_3COOH	8(0,8)−7(1,7) A++	0.21[be]	Sgr B2(N)	BIMA Array	Meh97	Ily00
	90246.250*(50)	CH_3COOH	8(1,8)−7(0,7) A++	[b]	Sgr B2(N)	BIMA Array	Meh97	Ily00
	90246.250*(50)	CH_3COOH	8(1,8)−7(1,7) A++	[b]	Sgr B2(N)	BIMA Array	Meh97	Ily00
U	90251.	unidentified		0.06[e]	W51 e2	BIMA Array	Rem02	
U	90254.	unidentified		0.06[e]	W51 e2	BIMA Array	Rem02	
	90263.833(30)	$^{15}NNH^+$	1−0	0.035	DR21(OH)	BTL 7 m	Lin83	Gud82a
	90354.336(50)	g−CH_3CH_2OH	21(1,20)−21(2,10) v_t =1−0	0.08	OriMC−1	NRO 45 m	Tur89	Pea97
	90453.354*(8)	CH_3CH_2CN	10(2,8)−9(2,7)	0.35	OriMC−1	OSO 20 m	Joh84	
	90482.482*(12)	CH_3CH_2CN	7(4,4)−8(3,5)	0.02	Sgr B2(OH)	IRAM 30 m	Gom86	
U	90506.	unidentified		0.12	Sgr B2(M)	NRAO 11 m	Tur89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	90515.644*(12)	CH_3CH_2CN	7(4,3)−8(3,6)	0.02	Sgr B2(OH)	IRAM 30 m	Gom86	
	90525.891*(4)	HC_5N	34−33	0.20	IRC+10216	OSO 20 m	Joh84	
	90530.939*(11)	CH_3CH_2CN	23(3,20)−23(2,21)	0.015	OriMC−1	FCRAO 14 m	Ziu88	
	90548.160*(3)	SO_2	25(3,23)−24(4,20)	0.6	OriMC−1	OSO 20 m	Sch83	
	90562.18*(26)	$^{30}SiC_2$	4(0,4)−3(0,3)	0.06	IRC+10216	IRAM 30 m	Cer86b	
	90593.059*(11)	$HC^{13}CCN$	10−9	0.35	Sgr B2(M)	NRAO 11 m	Uli78	Laf78
	90601.791*(5)	$HCC^{13}CN$	10−9	0.18	Sgr B2(M)	NRAO 11 m	Uli78	Laf78
U	90609.	unidentified		0.015	OriMC−1	FCRAO 14 m	Ziu88	
U	90619.	unidentified		0.008	OriMC−1	FCRAO 14 m	Ziu88	
U	90635.	unidentified		0.015	OriMC−1	FCRAO 14 m	Ziu88	
	90663.450(10)	HNC	1−0 F=0−1	n.r.	L134N	BTL 7 m	Fre79a	Fre79a
	90663.572*(4)	HNC	1−0	1.6	L134	NRAO 11 m	Sny77a	Pea76
	90663.574(10)	HNC	1−0 F=2−1	n.r.	L134N	BTL 7 m	Fre79a	Fre79a
	90663.656(10)	HNC	1−0 F=1−1	n.r.	L134N	BTL 7 m	Fre79a	Fre79a
	90686.383*(8)	CCS	7,7−6,6	0.2	Sgr B2(M)	NRAO 11 m	Sch85	
U	90689.	unidentified		0.025	OriMC−1	FCRAO 14 m	Ziu88	
U	90700.	unidentified		0.010	OriMC−1	FCRAO 14 m	Ziu88	
	90703.78(5)	CH_3OD	2(−1,2)−1(−1,1) E	0.14[b]	Sgr B2(M)	NRAO 11 m	Got79	Lov78
	90705.77(5)	CH_3OD	2(0,2)−1(0,1) A+	[b]	Sgr B2(M)	NRAO 11 m	Got79	Lov78
	90712.5*(3)	C_6H	$^2\Pi_{1/2}$ J=65/2−63/2 e	1.09[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	90727.	unidentified		0.13	Sgr B2(M)	NRAO 11 m	Tur89	
U	90729.	unidentified		0.01	W51	NRAO 12 m	Ziu91a	
	90743.56(5)	CH_3OD	2(1,1)−1(1,0)E	0.09	Sgr B2(M)	NRAO 11 m	Tur91	Kau80
U	90757.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	90758.9*(3)	C_6H	$^2\Pi_{1/2}$ J=65/2−63/2 f	1.21[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	90760.	unidentified		0.02	Sgr B2(M)	NRAO 12 m	Ziu91a	
	90771.553*(7)	SiS	5−4	0.35	IRC+10216	NRAO 11 m	Mor75	
U	90809.	unidentified		0.010	OriMC−1	FCRAO 14 m	Ziu88	
	90812.39*(23)	CH_3OH	20(−3,17)−19(−2,17) E	0.02	W51	NRAO 12 m	Ziu91a	
U	90814.	unidentified		0.030	OriMC−1	FCRAO 14 m	Ziu88	
U	90820.	unidentified		0.008	OriMC−1	FCRAO 14 m	Ziu88	
U	90820.	unidentified		0.03	Sgr B2(M)	NRAO 12 m	Ziu91a	
U	90838.	unidentified		0.015	OriMC−1	FCRAO 14 m	Ziu88	
	90841.134*(32)	$(CH_3)_2CO$	12(2,10)−12(1,11) AE	[b]	Sgr B2	NRAO 11 m	Cla79	Vac86
	90841.141*(32)	$(CH_3)_2CO$	12(3,10)−12(2,11) AE	0.08[b]	Sgr B2	NRAO 11 m	Cla79	Vac86
	90841.223*(25)	$(CH_3)_2CO$	12(2,10)−12(1,11) EA	[b]	Sgr B2	NRAO 11 m	Cla79	Vac86
	90841.230*(25)	$(CH_3)_2CO$	12(3,10)−12(2,11) EA	[b]	Sgr B2	NRAO 11 m	Cla79	Vac86
U	90864.	unidentified		0.18	Sgr B2(M)	NRAO 11 m	Tur91	
	90889.253*(10)	CH_3OCH_3	15(3,12)−14(4,11) AA	[b]	OriMC−1	FCRAO 14 m	Ziu88	Gro98
	90892.254*(8)	CH_3OCH_3	15(3,12)−14(4,11) EE	0.04[b]	OriMC−1	FCRAO 14 m	Ziu88	Gro98
	90895.183*(8)	CH_3OCH_3	15(3,12)−14(4,11) AE	[b]	OriMC−1	FCRAO 14 m	Ziu88	Gro98
	90895.326*(8)	CH_3OCH_3	15(3,12)−14(4,11) EA	[b]	OriMC−1	FCRAO 14 m	Ziu88	Gro98
U	90908.(3)	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Cla79	
U	90912.	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	90926.036*(20)	$^{13}C^{34}S$	2−1	0.10	OriMC−1	NRAO 11 m	Tur89	
U	90928.(1)	unidentified		0.07	Sgr B2(M)	NRAO 11 m	Cla79	
	90937.505*(4)	CH_3OCH_3	6(0,6)−5(1,5) AA	[b]	OriMC−1	NRAO 11 m	Sny74	Gro98
	90938.103*(4)	CH_3OCH_3	6(0,6)−5(1,5) EE	0.17[b]	OriMC−1	NRAO 11 m	Sny74	Gro98
	90938.700*(4)	CH_3OCH_3	6(0,6)−5(1,5) AE+EA	[b]	OriMC−1	NRAO 11 m	Sny74	Gro98
U	90949.	unidentified		0.01	OriMC−1	FCRAO 14 m	Ziu88	
U	90964.	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu88	
	90978.989*(3)	HCCCN	10−9	1.77	OriMC−1	NRAO 11 m	Mor76	
	90987.005*(59)	HCCCN	10−9 v_5 =1 ℓ=1 e	0.43	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
U	91000.	unidentified		0.01	OriMC−1	FCRAO 14 m	Ziu88	
	91007.729*(24)	$t-CH_3CH_2OH$	14(2,13)−13(3,10)	0.015	OriMC−1	FCRAO 14 m	Ziu88	
U	91022.	unidentified		0.008	OriMC−1	FCRAO 14 m	Ziu88	
	91038.307*(61)	HCCCN	10−9 v_5 =1 ℓ=1 f	0.32	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
U	91045.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
U	91063.	unidentified		0.09	OriMC−1	NRAO 11 m	Tur89	
U	91074.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
U	91086.	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Tur89	
U	91096.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	91128.19*(3)	HCCCN	10−9 v_6 =1 ℓ=1 e	0.10[h]	Sgr B2(M)	NRAO 11 m	Tur89	Laf78
U	91135.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur91	
	91169.920*(53)	$Na^{35}Cl$	7−6	1.91[f]	IRC+10216	IRAM 30 m	Cer87c	
	91175.217*(14)	CH_3OCH_3	5(4,2)−6(3,3) EE	0.04	OriMC−1	NRAO 11 m	Tur89	Gro98
	91199.796*(32)	HCCCN	10−9 v_6 =1 ℓ=1 f	0.49	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	91202.607*(27)	HCCCN	10−9 v_7 =ℓ ℓ=1 e	0.2	OriMC−1	NRAO 11 m	Cla76	Laf78

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	91204.328(30)	$N^{15}NH^+$	1−0 F=1−1	0.02	DR21(OH)	BTL 7 m	Lin83	Gud82a
	91205.999(30)	$N^{15}NH^+$	1−0 F=2−1	0.025	DR21(OH)	BTL 7 m	Lin83	Gud82a
	91208.663(70)	$N^{15}NH^+$	1−0 F=0−1	0.01	DR21(OH)	BTL 7 m	Lin83	Gud82a
	91333.308*(27)	HCCCN	10−9 v_7 =1 ℓ=1 f	0.2	OriMC−1	NRAO 11 m	Cla76	Laf78
	91366.593*(59)	CH_3OCHO	9(4,5)−9(3,6) E	0.08	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	91473.760*(6)	CH_3OCH_3	3(2,2)−3(1,3) EA	0.4[b]	OriMC−1	NRO 45 m	Ohi95	Gro98
	91474.139*(6)	CH_3OCH_3	3(2,2)−3(1,3) AE	[b]	OriMC−1	NRO 45 m	Ohi95	Gro98
	91476.596*(6)	CH_3OCH_3	3(2,2)−3(1,3) EE	>0.5	OriMC−1	NRO 45 m	Ohi95	Gro98
	91479.244*(10)	CH_3OCH_3	3(2,2)−3(1,3) AA	0.4	OriMC−1	NRO 45 m	Ohi95	Gro98
	91485.095*(13)	$t-CH_3CH_2OH$	6(2,5)−6(1,6)	0.07	Sgr B2(M)	NRAO 11 m	Tur89	
	91494.349(30)	$c-C_3H$	2(1,2)−1(1,1) 5/2,3−3/2,2	0.19	TMC−1	NRO 45 m	Yam87a	Yam87a
	91497.608(30)	$c-C_3H$	2(1,2)−1(1,1) 5/2,2−3/2,1	0.13	TMC−1	NRO 45 m	Yam87a	Yam87a
U	91520.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
U	91541.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	91549.117*(8)	CH_3CH_2CN	10(1,9)−9(1,8)	0.36[b]	OriMC−1	NRAO 11 m	Tur89	
	91550.442*(2)	SO_2	18(5,13)−19(4,16)	[b]	OriMC−1	NRAO 11 m	Tur89	
	91554.521*(43)	HCCCN	10−9 v_7 =2 ℓ=0	[b]	OriMC−1	NRAO 11 m	Tur89	Laf78
	91555.932*(49)	HCCCN	10−9 v_7 =2 ℓ=2 e	[b]	OriMC−1	NRAO 11 m	Tur89	Laf78
	91558.432*(44)	HCCCN	10−9 v_7 =2 ℓ=2 f	[b]	OriMC−1	NRAO 11 m	Tur89	Laf78
	91572.549*(14)	HCCCHO	10(1,10)−9(1,9)	0.02	Sgr B2(M)	NRAO 11 m	Tur91	
	91586.97(5)	CH_2 DOH	4(1,3)−4(0,4)	1.0[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
U	91603.	unidentified		0.16	SgrB2(N−LMH)	NRAO 12 m	Sny02	
U	91605.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	91609.12*(18)	$^{30}SiC_2$	4(2,3)−3(2,2)	0.06	IRC+10216	IRAM 30 m	Cer86b	
	91610.027*(18)	$(CH_3)_2CO$	8(1,7)−7(2,6) AE	0.05[b]	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
	91610.153*(16)	$(CH_3)_2CO$	8(1,7)−7(2,6) EA	[b]	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
	91612.792*(18)	$(CH_3)_2CO$	8(2,7)−7(1,6) AE	[b]	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
	91612.866*(16)	$(CH_3)_2CO$	8(2,7)−7(1,6) EA	[b]	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
	91634.636*(14)	$(CH_3)_2CO$	8(1,7)−7(2,6) EE	0.07	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
	91637.465*(14)	$(CH_3)_2CO$	8(2,7)−7(1,6) EE	0.06	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
U	91654.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
	91659.108*(20)	$(CH_3)_2CO$	8(1,7)−7(2,6) AA	0.14	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
U	91660.	unidentified		0.01	IRC+10216	IRAM 30 m	Ziu95	
	91662.028*(20)	$(CH_3)_2CO$	8(2,7)−7(1,6) AA	0.18	SgrB2(N−LMH)	NRAO 12 m	Sny02	Gro02
U	91665.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	91692.752(30)	$c-C_3H$	2(1,2)−1(1,1) 3/2,1−1/2,0	0.10	TMC−1	NRO 45 m	Yam87a	Yam87a
U	91697.	unidentified		0.05	SgrB2(N−LMH)	NRAO 12 m	Sny02	
	91699.471(30)	$c-C_3H$	2(1,2)−1(1,1) 3/2,2−1/2,1	0.16	TMC−1	NRO 45 m	Yam87a	Yam87a
U	91703.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	91709.980*(55)	HCCCN	10−9 v_7 =3 ℓ=1 e	0.23	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
U	91711.	unidentified		0.08	SgrB2(N−LMH)	NRAO 12 m	Sny02	
	91737.258*(50)	$g-CH_3CH_2OH$	11(0,11)−11(1,11) t=1−0	0.07	SgrB2(N−LMH)	NRAO 12 m	Sny02	Pea97
U	91750.	unidentified		0.14	SgrB2(N−LMH)	NRAO 12 m	Sny02	
	91771.65*(22)	$^{29}SiC_2$	4(0,4)−3(0,3)	0.08	IRC+10216	IRAM 30 m	Cer86b	
	91775.884*(25)	CH_3OCHO	8(1,8)−7(0,7) E	0.07[b]	SgrB2(N−LMH)	NRAO 12 m	Sny02	Oes99
	91777.248*(29)	CH_3OCHO	8(1,8)−7(0,7) A	[b]	SgrB2(N−LMH)	NRAO 12 m	Sny02	Oes99
U	91808.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	91844.796*(17)	SiC_3	8(0,8)−7(0,7)	0.007	IRC+10216	NRAO 12 m	App99	
U	91848.	unidentified		0.15	Sgr B2(M)	NRAO 11 m	Tur91	
U	91913.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
	91925.708*(5)	$CH_3{}^{13}CN$	5(3)−4(3)	0.03	Sgr B2(M)	IRAM 30 m	Cer88	
	91934.536*(4)	$CH_3{}^{13}CN$	5(2)−4(2)	[b]	Sgr B2(M)	IRAM 30 m	Cer88	
	91939.834*(4)	$CH_3{}^{13}CN$	5(1)−4(1)	[b]	Sgr B2(M)	IRAM 30 m	Cer88	
	91941.600*(5)	$CH_3{}^{13}CN$	5(0)−4(0)	0.15[b]	Sgr B2(M)	IRAM 30 m	Cer88	
	91959.024*(2)	CH_3CN	5(4)−4(4) F=6−5	0.08[b]	OriMC−1	NRAO 11 m	Lov76a	Bou80
	91959.359*(2)	CH_3CN	5(4)−4(4) F=4−3	[b]	OriMC−1	NRAO 11 m	Lov76a	Bou80
	91971.310*(1)	CH_3CN	5(3)−4(3) F=6−5	0.20[b]	OriMC−1	NRAO 11 m	Lov76a	Bou80
	91971.465*(1)	CH_3CN	5(3)−4(3) F=4−3	[b]	OriMC−1	NRAO 11 m	Lov76a	Bou80
	91980.089*(1)	CH_3CN	5(2)−4(2) F=6−5	0.16	OriMC−1	NRAO 11 m	Lov76a	Bou80
	91985.316*(1)	CH_3CN	5(1)−4(1)	0.28[b]	OriMC−1	NRAO 11 m	Lov76a	
	91987.089*(1)	CH_3CN	5(0)−4(0)	[b]	OriMC−1	NRAO 11 m	Lov76a	
	92000.901*(12)	CH_3CH_2CN	13(2,12)−13(1,13)	0.10	Sgr B2	NRAO 11 m	Tur89	
	92019.8(5)	SiC_4	30−29	0.40[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	92023.7( )	$^{26}MgNC$	15/2,8−13/2,7	0.50[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	92038.4( )	$^{26}MgNC$	17/2,8−15/2,7	0.44[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
U	92044.3(5)	unidentified		0.50[f]	IRC+10216	IRAM 30 m	Gue95	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	92064.63*(6)	$Si^{13}CC$	4(2,3)−3(2,2)	0.4[f]	IRC+10216	IRAM 30 m	Cer91b	
	92075.51(5)	CH_3OD	2(1,1)−1(1,0) A−	0.07	OriMC−1	NRAO 11 m	Tur89	Kau80
	92261.440(60)	CH_3CN	5(0)−4(0) v_8 =1 ℓ=1	0.04[b]	OriMC−1	NRAO 11 m	Tur91	Bou80
	92263.992(60)	CH_3CN	5(2)−4(2) v_8 =1 ℓ=1	[b]	OriMC−1	NRAO 11 m	Tur91	Bou80
U	92334.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
U	92342.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	92353.516(60)	CH_3CN	5(1)−4(1) v_8 =1 ℓ=1	0.04	OriMC−1	NRAO 11 m	Tur91	Bou80
	92426.260*(18)	CH_2CHCN	10(1,10)−9(1,9)	0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	92488.488*(5)	CCCS	16−15	2.2[f]	IRC+10216	IRAM 30 m	Cer87b	
	92494.303*(19)	^{13}CS	2−1	0.215	OriMC−1	NRAO 11 m	Tur73	
U	92715.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	92794.24*(34)	$^{30}SiC_2$	4(2,2)−3(2,1)	0.03	IRC+10216	IRAM 30 m	Cer86b	
	92865.12*(9)	C_6H	$^2\Pi_{3/2}$ J=67/2−65/2 e	0.05	IRC+10216	IRAM 30 m	Gue87	JPL01
U	92877.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	92882.18*(20)	$^{29}SiC_2$	4(2,3)−3(2,2)	0.06	IRC+10216	IRAM 30 m	Cer86b	
	92894.88*(9)	C_6H	$^2\Pi_{3/2}$ J=67/2−65/2 f	0.06	IRC+10216	IRAM 30 m	Gue87	JPL01
U	92916.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	92975.9(20)	$HOCH_2CH_2OH$	9(1,9) v=1−8(1,8) v=0	0.038	SgrB2(N−LMH)	NRAO 12 m	Hol02	Hol02
	92981.593*(5)	HDCS	3(0,3)−2(0,2)	0.071	TMC−1	NRO 45 m	Min97	
	93052.672*(10)	CH_2OHCHO	9(0,7)−8(1,8)	0.040	Sgr B2(N)	NRAO 12 m	Hol00	But01
	93059.801*(16)	CH_3CH_2CN	30(3,27)−30(2,28)	0.07	Sgr B2(N)	NRAO 12 m	Hol00	
	93063.639(9)	SiC_2	4(0,4)−3(0,3)	0.11	IRC+10216	NRAO 11 m	Sny83	Got89
	93089.0(3)	C_5H	$^2\Pi_{1/2}$ J=39/2−37/2 e	1.3[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	93094.9(4)	C_5H	$^2\Pi_{1/2}$ J=39/2−37/2 f	1.5[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	93098.35*(1)	HCOOH	4(1,3)−3(1,2)	0.12	Sgr B2(M)	NRAO 11 m	Tur89	Wil80
	93125.626*(14)	SiC_3	8(2,7)−7(2,6)	0.005	IRC+10216	NRAO 12 m	App99	
U	93126.1	unidentified		0.006	IRC+10216	NRAO 12 m	Tur94	
	93171.621(7)	N_2H^+	1−0 F_1=1−1 F=0−1	0.5	L134N	NRAO 11 m	Cas95	Cas95
	93171.917(7)	N_2H^+	1−0 F_1=1−1 F=2−2	0.7	L134N	NRAO 11 m	Cas95	Cas95
	93172.053(7)	N_2H^+	1−0 F_1=1−1 F=1−0	0.8	L134N	NRAO 11 m	Cas95	Cas95
	93173.480(7)	N_2H^+	1−0 F_1=2−1 F=2−1	0.9	L134N	NRAO 11 m	Cas95	Cas95
	93173.777(7)	N_2H^+	1−0 F_1=2−1 F=3−2	0.9	L134N	NRAO 11 m	Cas95	Cas95
	93173.967(7)	N_2H^+	1−0 F_1=2−1 F=1−1	0.6	L134N	NRAO 11 m	Cas95	Cas95
	93176.265(7)	N_2H^+	1−0 F_1=0−1 F=1−2	0.7	L134N	NRAO 11 m	Cas95	Cas95
	93188.126*(4)	HC_5N	35−34	0.09	OriMC−1	NRAO 11 m	Lov82	
	93196.657*(12)	CH_3OH	1(0,1)−2(1,2) E v_t =1	0.18	OriMC−1	NRAO 11 m	Lov82	Xu_97
	93206.081*(23)	NaCN	6(0,6)−5(0,5)	0.011	IRC+10216	NRAO 12 m	Tur94	Tur94
	93212.885*(34)	$t-CH_3CH_2OH$	16(8,9)−17(7,10)	[b]	OriMC−1	NRAO 11 m	Tur89	
	93213.003*(34)	$t-CH_3CH_2OH$	16(8,8)−17(7,11)	0.06[b]	OriMC−1	NRAO 11 m	Tur89	
	93230.603*(14)	HCCCHO	10(2,9)−9(2,8)	0.01	Sgr B2	NRAO 11 m	Tur89	
	93261.760*(77)	CH_3OCHO	14(2,12)−14(1,13) A	0.07	OriMC−1	NRAO 11 m	Tur89	Oes99
U	93294.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	93327.1	unidentified		0.006	IRC+10216	NRAO 12 m	Tur94	
U	93355.	unidentified		0.1	Sgr B2(M)	NRAO 11 m	Tur89	
U	93361.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	93421.32*(19)	SiC_3	8(6,2)−7(6,1)	[b]	IRC+10216	NRAO 12 m	App99	
	93421.32*(19)	SiC_3	8(6,3)−7(6,2)	0.002[b]	IRC+10216	NRAO 12 m	App99	
U	93454.2	unidentified		0.06	TMC−1	IRAM 30 m	Ger92	
	93484.063*(37)	SiC_3	8(4,5)−7(4,4)	0.004[b]	IRC+10216	NRAO 12 m	App99	
	93484.939*(37)	SiC_3	8(4,4)−7(4,3)	[b]	IRC+10216	NRAO 12 m	App99	
	93503.0*(3)	C_6H	$^2\Pi_{1/2}$ J=67/2−65/2 e	0.90[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	93550.5*(3)	C_6H	$^2\Pi_{1/2}$ J=67/2−65/2 f	1.20[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	93561.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	93580.914*(6)	CH_3CHO	5(1,5)−4(1,4) A++	0.17	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	93586.5(3)	C_4H	$^2\Pi_{1/2}$ J=19/2−17/2 v_7 =1 e	1.80[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	93595.238*(6)	CH_3CHO	5(−1,5)−4(−1,4) E	0.17	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	93619.431*(4)	$^{13}CH_3OH$	2(1,2)−1(1,1) A+	0.12[b]	OriMC−1	NRAO 11 m	Tur89	Xu_97
U	93656.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	93660.027*(28)	CH_3OCHO	8(4,4)−8(3,5) A	0.09	OriMC−1	NRAO 11 m	Tur89	Oes99
	93666.459*(6)	CH_3OCH_3	12(1,11)−12(0,12) EE	0.10	OriMC−1	NRAO 11 m	Hol80	Gro98
	93679.5(10)	$^{25}MgNC$	8−7	0.75[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	93692.448*(2)	HNCS	8(1,8)−7(1,7)	0.03	OriMC−1	NRAO 11 m	Tur89	
U	93730.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	93812.514*(21)	$t-CH_3CH_2OH$	13(7,7)−14(6,8)	0.03[b]	OriMC−1	NRAO 11 m	Tur89	
	93813.062*(21)	$t-CH_3CH_2OH$	13(7,6)−14(6,9)	[b]	OriMC−1	NRAO 11 m	Tur89	
	93830.050(20)	HNCS	8(0,8)−7(0,7)	0.05	OriMC−1	BTL 7 m	Fre79	Yam79
U	93839.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	93844.(2)	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Cla79	
	93854.437*(6)	CH_3OCH_3	4(2,3)−4(1,4) EA	0.14	OriMC−1	NRAO 11 m	Cla79	Gro98
	93854.560*(6)	CH_3OCH_3	4(2,3)−4(1,4) AE	0.14	OriMC−1	NRAO 11 m	Cla79	Gro98
	93857.103*(4)	CH_3OCH_3	4(2,3)−4(1,4) EE	0.20	OriMC−1	NRAO 11 m	Cla79	Gro98
	93859.708*(10)	CH_3OCH_3	4(2,3)−4(1,4) AA	0.03	OriMC−1	NRAO 11 m	Cla79	Gro98
	93863.3(10)	C_4H	$^2\Pi_{1/2}$ J=19/2−17/2 v_7 =1 f	2.4[bf]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	93870.098*(12)	CCS	8,7−7,6	0.2[bs]	Sgr B2(M)	NRAO 11 m	Cla79	
	93871.700*(7)	NH_2CHO	3(2,2)−4(1,3)	[b]	Sgr B2(M)	NRAO 11 m	Tur91	
	93979.78(10)	PN	2−1	0.023	OriMC−1	NRAO 12 m	Tur87b	Wys72
	93995.203*(3)	HNCS	8(1,7)−7(1,6)	0.01	Sgr B2(M)	NRAO 11 m	Tur89	
	94056.44*(2)	SiCN	$^2\Pi_{1/2}$ J=17/2−15/2 e	0.16[f]	IRC+10216	IRAM 30 m	Gue00	App00
	94064.686*(2)	SO_2	23(6,18)−24(5,19)	0.13	OriMC−1	NRAO 11 m	Tur89	
	U94077.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	94081.38*(2)	SiCN	$^2\Pi_{1/2}$ J=17/2−15/2 f	0.13[f]	IRC+10216	IRAM 30 m	Gue00	App00
	94137.35*(29)	$^{29}SiC_2$	4(2,2)−3(2,1)	0.06	IRC+10216	IRAM 30 m	Cer86b	
U	94175.	unidentified		0.12	Sgr B2(M)	NRAO 11 m	Tur89	
U	94195.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
U	94200.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	94237.	unidentified		0.10	Sgr B2(M)	NRAO 11 m	Tur89	
	94245.393(9)	SiC_2	4(2,3)−3(2,2)	0.10	IRC+10216	NRAO 11 m	Tha84	Got89
	94247.464*(2)	NH_2CHO	8(1,7)−8(0,8)	0.05	Sgr B2(M)	NRAO 11 m	Tur89	
	94276.640*(12)	CH_2CHCN	10(0,10)−9(0,9)	0.08	Sgr B2(M)	NRAO 11 m	Joh77	
	94351.596*(3)	CH_2CHCN	13(3,10)−14(2,13)	0.12	OriMC−1	NRAO 11 m	Tur89	
	94405.223*(4)	$^{13}CH_3OH$	2(−1,2)−1(−1,1) E	[b]	Sgr B2(M)	NRAO 11 m	Got79	Xu_97
	94407.129*(4)	$^{13}CH_3OH$	2(0,2)−1(0,1) A+	0.8[b]	Sgr B2(M)	NRAO 11 m	Got79	Xu_97
	94410.895*(4)	$^{13}CH_3OH$	2(0,2)−1(0,1) E	[b]	Sgr B2(M)	NRAO 11 m	Got79	Xu_97
	U94414.6	unidentified		0.03	G327.3−0.6	SEST 15 m	Dic01	
	94420.439*(5)	$^{13}CH_3OH$	2(1,1)−1(1,0) E	1.0	OriMC−1	IRAM 30 m	Men88	Xu_97
U	94473.	unidentified		0.09	OriMC−1	NRAO 11 m	Tur91	
U	94486.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
U	94499.	unidentified		0.17	OriMC−1	NRAO 11 m	Tur89	
	94541.806*(19)	CH_3OH	8(3,5)−9(2,7) E	0.43	OriMC−1	NRAO 11 m	Hol83	Xu_97
	94632.718*(20)	CH_3OCHO	5(2,4)−4(1,3) E	0.16	OriMC−1	NRAO 11 m	Tur89	Oes99
	94634.705*(22)	SiC_3	8(2,6)−7(2,5)	0.005	IRC+10216	NRAO 12 m	App99	
	94664.552*(12)	$c-C_2H_4O$	3(1,3)−2(0,2)	0.20[f]	NGC6334F	SEST 15 m	Num98a	
	94666.935*(45)	CH_3OCHO	12(3,10)−12(2,11) A	0.2	OriMC−1	NRAO 12 m	Ike01	Oes99
U	94774.	unidentified		0.16	OriMC−1	NRAO 11 m	Tur89	
	94913.139*(14)	CH_2CHCN	10(4,7)−9(4,6)	[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	94913.250*(14)	CH_2CHCN	10(4,6)−9(4,5)	0.04[b]	Sgr B2(M)	NRAO 11 m	Tur89	
	94964.915*(1)	CH_2CHCN	10(8,2)−9(8,1)	2.5[eb]	Sgr B2(N)	BIMAArray	Mia95	
	94964.915*(1)	CH_2CHCN	10(8,3)−9(8,2)	[b]	Sgr B2(N)	BIMAArray	Mia95	
	95016.679*(14)	$C^{36}S$	2−1	0.04	NGC6334A	SEST 15m	Mau96	
U	95143.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
U	95145.	unidentified		0.24	Sgr B2(M)	NRAO 11 m	Tur89	
	95150.32*(2)	C_4H	21/2−19/2	0.08	IRC+10216	NRAO 11 m	Gue78	Got83
	95164.158(23)	CP	2−1 J=3/2−1/2 F=2−1	0.015	IRC+10216	IRAM 30 m	Gue90	Sai89
	95169.516*(16)	CH_3OH	8(0,8)−7(1,7) A+	0.85	OriMC−1	NRAO 11 m	Lov76a	Xu_97
	95188.94*(2)	C_4H	19/2−17/2	0.08	IRC+10216	NRAO 11 m	Gue78	Got83
	95208.776*(4)	$^{13}CH_3OH$	2(1,1)−1(1,0) A−	0.15	OriMC−1	NRAO 11 m	Tur89	Xu_97
U	95220.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	95247.990*(56)	CH_3OCHO	7(4,3)−7(3,4) E	0.11	OriMC−1	NRAO 11 m	Tur89	Oes99
U	95295.	unidentified		0.03	Sgr B2(M)	NRAO 11 m	Tur89	
	95325.490*(17)	CH_2CHCN	10(2,8)−9(2,7)	0.12	Sgr B2(M)	NRAO 11 m	Tur89	
U	95339.	unidentified		0.04	Sgr B2(M)	NRAO 11 m	Tur89	
	95442.479*(9)	CH_3CH_2CN	11(1,11)−10(1,10)	0.20[b]	OriMC−1	NRAO 11 m	Joh77	
	95444.067*(20)	$t-CH_3CH_2OH$	16(2,14)−16(1,13)	[b]	OriMC−1	NRAO 11 m	Tur89	
	95454.077*(10)	$^{24}MgNC$	15/2,8−13/2,7	3.2	IRC+10216	IRAM 30 m	Gue93	Kaw93
	95469.296*(10)	$^{24}MgNC$	17/2,8−15/2,7	2.9	IRC+10216	IRAM 30 m	Gue93	Kaw93
	95502.417*(13)	CH_3CH_2CN	14(2,13)−(14(1,14)	0.07	OriMC−1	NRO 45 m	Sai89	
	95553.325*(64)	CH_3OCH_3	14(7,8)−15(6,9) EE	0.16[b]	OriMC−1	NRO 45 m	Sai89	Gro98
	95553.757*(66)	CH_3OCH_3	14(7,8)−15(6,9) AE	[b]	OriMC−1	NRO 45 m	Sai89	Gro98
	95556.318*(66)	CH_3OCH_3	14(7,7)−15(6,10) AA	[b]	OriMC−1	NRO 45 m	Sai89	Gro98
	95556.750*(66)	CH_3OCH_3	14(7,7)−15(6,10) EE	0.13[b]	OriMC−1	NRO 45 m	Sai89	Gro98
	95557.422*(70)	CH_3OCH_3	14(7,7)−15(6,10) EA	[b]	OriMC−1	NRO 45 m	Sai89	Gro98
U	95570.	unidentified		0.07	Sgr B2(M)	NRAO 11 m	Tur89	
	95579.381(15)	SiC_2	4(2,2)−3(2,1)	0.10	IRC+10216	NRAO 11 m	Cum80	Got89
U	95585.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur91	
	95611.13(25)	C_4H	10−9 v_7 =2 L	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	95613.0	unidentified		0.18	OriMC−1	NRO 45 m	Sai89	
	95636.90*(9)	C_6H	$^2\Pi_{3/2}$ J=69/2−67/2 e	0.05	IRC+10216	IRAM 30 m	Gue87	JPL01
	95667.89(25)	C_4H	10−9 v_7 =2 U	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	95668.35*(9)	C_6H	$^2\Pi_{3/2}$ J=69/2−67/2 f	0.09[b]	IRC+10216	IRAM 30 m	Gue87	JPL01
	95689.778*(8)	CH_3CH_2CN	3(2,2)−2(1,1)	0.34	OriMC−1	NRO 45 m	Sai89	
	95710.245(22)	CP	2−1 J=5/2−3/2 F=3−2	0.018	IRC+10216	IRAM 30 m	Gue90	Sai89
U	95710.7	unidentified		0.05	OriMC−1	NRO 45 m	Sai89	
	95712.631(15)	CP	2−1 J=5/2−3/2 F=2−1	0.018	IRC+10216	IRAM 30 m	Gue90	Sai89
	95729.768*(6)	CH_3OCH_3	16(2,14)−16(1,15) EA+AE	0.58	OriMC−1	NRO 45 m	Sai89	Gro98
	95731.250*(4)	CH_3OCH_3	16(2,14)−16(1,15) EE	1.14	OriMC−1	NRO 45 m	Sai89	Gro98
	95732.732*(6)	CH_3OCH_3	16(2,14)−16(1,15) AA	0.53	OriMC−1	NRO 45 m	Sai89	Gro98
U	95741.3	unidentified		0.09	OriMC−1	NRO 45 m	Sai89	
U	95747.2	unidentified		0.08	OriMC−1	NRO 45 m	Sai89	
U	95783.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	95810.412*(3)	$^{34}SO_2$	2(2,0)−3(1,3)	0.07	OriMC−1	NRAO 11 m	Tur89	
	95850.336*(4)	HC_5N	36−35	19.5[f]	IRC+10216	IRAM 30 m	Cer86a	
	95870.37*(14)	HC_7N	85−84	0.06	Sgr B2(M)	NRAO 11 m	Tur89	
U	95877.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
	95914.310*(3)	CH_3OH	2(1,2)−1(1,1) A+	0.81	OriMC−1	NRAO 11 m	Tur89	Xu_97
	95947.439*(6)	CH_3CHO	5(0,5)−4(0,4) E	0.35	Sgr B2(M)	NRAO 11 m	Tur89	Kle96
	95963.465*(6)	CH_3CHO	5(0,5)−4(0,4) A++	0.30	Sgr B2(M)	NRAO 11 m	Tur89	Kle96
U	95989.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	96033.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	96070.654*(24)	CH_3OCHO	8(2,7)−7(2,6) E	0.08	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	96076.878*(24)	CH_3OCHO	8(2,7)−7(2,6) A	0.08	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	96086.660*(29)	CH_3OCHO	6(4,2)−6(3,3) A	0.03	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	96167.640*(51)	CH_3OCHO	6(4,2)−6(3,3) E	0.03	Sgr B2(M)	NRAO 11 m	Tur89	Oes99
	96204.058*(4)	$^{34}SO_2$	27(7,21)−28(6,22)	0.11[b]	Sgr B2	NRAO 11 m	Tur91	
	96205.252*(56)	$^{33}SO_2$	32(5,27)−31(6,26)	[b]	Sgr B2	NRAO 11 m	Tur91	
U	96258.	unidentified		0.02	Sgr B2(M)	NRAO 11 m	Tur89	
	96261.16(10)	H_2O	4(4,0)−5(3,3) v_2 =1	4.2[f]	VYCMa	IRAM 30 m	Men89	Kuz80
	96274.257*(5)	CH_3CHO	5(2,4)−4(2,3) A−−	0.09	Sgr B2(M)	NRAO 11 m	Tur89	Kle96
	96293.4*(3)	C_6H	$^2\Pi_{1/2}$ J=69/2−67/2 e	1.12[f]	IRC+10216	IRAM 30 m	Sai87	JPL01
	96342.1*(3)	C_6H	$^2\Pi_{1/2}$ J=69/2−67/2 f	1.28[f]	IRC+10216	IRAM 30 m	Sai87	JPL01
	96367.790*(5)	CH_3CHO	5(3,3)−4(3,3) A++	[b]	Sgr B2(M)	NRAO 11 m	Got78a	Kle96
	96368.376*(5)	CH_3CHO	5(3,2)−4(3,1) E	0.07[b]	Sgr B2(M)	NRAO 11 m	Got78a	Kle96
	96371.794*(5)	CH_3CHO	5(3,2)−4(3,1) A−−	[b]	Sgr B2(M)	NRAO 11 m	Got78a	Kle96
	96384.417*(5)	CH_3CHO	5(−3,3)−4(−3,2) E	0.1	Sgr B2(M)	NRAO 11 m	Got78a	Kle96
	96396.055*(4)	CH_3OH	2(1,2)−1(1,1) A+ v_t =1	0.09	OriMC−1	NRAO 11 m	Tur89	Xu_97
	96412.961*(7)	$C^{34}S$	2−1	0.62	OriMC−1	NRAO 11 m	Tur73	
	96425.620*(5)	CH_3CHO	5(−2,4)−4(−2,3) E	0.10	Sgr B2(M)	NRAO 11 m	Tur89	Kle96
U	96437.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	96475.523*(5)	CH_3CHO	5(2,3)−4(2,2) E	0.08	Sgr B2(M)	NRAO 11 m	Got78a	Kle96
	96478.3(3)	C_4H	$^2\Pi_{3/2}$ J=21/2−19/2 v_7 =1 e	2.85[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	96492.164*(4)	CH_3OH	2(1,2)−1(1,1) E v_t =1	0.13	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96493.553*(4)	CH_3OH	2(0,2)−1(0,1) E v_t =1	0.12	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96501.698*(6)	CH_3OH	2(−1,1)−1(−1,0) E v_t =1	0.06	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96513.671*(8)	CH_3OH	2(0,2)−1(0,1) A+ v_t =1	0.08	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96536.802*(5)	CH_2CHCN	31(5,27)−32(4,28)	0.1	OriMC−1	NRAO 11 m	Sny83	
	96588.593*(5)	CH_3OH	2(1,1)−1(1,0) A− v_t =1	0.10	OriMC−1	NRAO 11 m	Tur89	Xu_97
	96613.156*(53)	CH_3OCHO	8(4,5)−8(3,6) E	0.2	OMC−IRc2	IRAM 30 m	Ger89	Oes99
	96632.668*(5)	CH_3CHO	5(2,3)−4(2,2) A++	0.12	OMC−IRc2	IRAM 30 m	Ger89	Kle96
	96637.769*(28)	CH_3OCHO	7(4,4)−7(3,5) A	0.2	OMC−IRc2	IRAM 30 m	Ger89	Oes99
	96648.099*(37)	CH_3OCHO	5(4,1)−5(3,2) E	n.r.	OMC−IRc2	IRAM 30 m	Ger89	Oes99
	96670.896*(45)	CH_3OCHO	5(4,2)−5(3,3) E	0.05	OMC−IRc2	IRAM 30 m	Ger89	Oes99
	96691.570()	CH_2DCCH	6(1,6)−5(1,5)	0.06	TMC−1	IRAM 30 m	Ger92	Ger92
	96693.517*(29)	CH_3OCHO	6(4,3)−6(3,4) A	0.1	OMC−IRc2	IRAM 30 m	Ger89	Oes99
	96709.210*(25)	CH_3OCHO	8(4,5)−8(3,6) A	0.2	OMC−IRc2	IRAM 30 m	Ger89	Oes99
U	96720.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	96739.393*(3)	CH_3OH	2(−1,2)−1(−1,1) E	0.96	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96741.377*(3)	CH_3OH	2(0,2)_1(0,1) A+	1.13	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96744.549*(3)	CH_3OH	2(0,2)−1(0,1) E	0.88	OriMC−1	NRAO 11 m	Hol83	Xu_97
	96755.507*(3)	CH_3OH	2(1,1)−1(1,0) E	0.54	OriMC−1	NRAO 11 m	Hol83	Xu_97
U	96775.	unidentified		0.20	OriMC−1	NRAO 11 m	Tur89	
	96781.827*(22)	^{34}SO	4(5)−4(4)	0.04[b]	OriMC−1	NRAO 11 m	Tur89	
U	96797.(3)	unidentified		0.05	Sgr B2(M)	NRAO 11 m	Cla79	
U	96822.	unidentified		0.06	Sgr B2(M)	NRAO 11 m	Tur89	
	96847.241*(6)	CH_3OCH_3	5(2,4)−5(1,5) AE	0.11[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	96847.241*(6)	CH_3OCH_3	5(2,4)−5(1,5) EA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	96849.881*(4)	CH_3OCH_3	5(2,4)−5(1,5) EE	0.14	OriMC−1	NRAO 11 m	Cla79	Gro98
	96852.496*(8)	CH_3OCH_3	5(2,4)−5(1,5) AA	0.13	OriMC−1	NRAO 11 m	Cla79	Gro98
	96919.754*(9)	CH_3CH_2CN	11(0,11)−10(0,10)	0.08	OriMC−1	NRAO 11 m	Joh77	
	96988.123*(3)	$O^{13}CS$	8−7	0.069	Sgr B2(M)	BTL 7 m	Gol81	
U	97069.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
	97080.695()	CH_2DCCH	6(0,6)−5(0,5)	0.10	TMC−1	IRAM 30 m	Ger92	Ger92
	97169.513(50)	$C^{33}S$	2−1 3/2−3/2	[b]	Sgr B2(M)	BTL 7 m	Cum86	Bog81
	97171.84(10)	$C^{33}S$	2−1 1/2−1/2	[b]	Sgr B2(M)	BTL 7 m	Cum86	Bog81
	97171.840(30)	$C^{33}S$	2−1 7/2−5/2 + 5/2−3/2	0.17[b]	Sgr B2(M)	BTL 7 m	Cum86	Bog81
	97174.996(30)	$C^{33}S$	2−1 5/2−5/2	[b]	SgrB2(M)	BTL 7 m	Cum86	Bog81
	97175.271(60)	C^{33} S	2−1 3/2−1/2	[b]	SgrB2(M)	BTL 7 m	Cum86	Bog81
	97218.353*(4)	CH_2CHCHO	11(2,10)−10(2,9)	0.05	OriMC−1	NRO 45 m	Ohi88	
	97244.70*(19)	C_4H	J=21/2−19/2 v_7 =2 ℓ=2	0.003	IRC+10216	NRAO 12 m	Hig00	JPL01
	97263.540(50)	$g-CH_3CH_2OH$	23(0,23)−23(1,23) v_t =1−0	0.01	OriMC−1	NRO 45 m	Tur89	Pea97
	97271.020*(11)	CS	2−1 v=1	0.007	IRC+10216	NRAO 12 m	Tur87	
U	97276.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	97282.	unidentified		0.01	OriMC−1	NRAO 11 m	Tur89	
	97286.836*(28)	CH_2CHCN	6(1,6)−5(0,5)	0.02	OriMC−1	NRAO 11 m	Tur89	
	97294.123*(77)	CH_3OCH_3	28(7,21)−27(8,19) EE	0.03[b]	SgrB2	NRAO 11 m	Tur89	Gro98
	97295.48*(14)	$Si^{13}CC$	4(1,3)−3(1,2)	0.6[f]	IRC+10216	IRAM 30 m	Cer91b	
	97301.2085(2)	OCS	8−7	0.85	SgrB2(M)	NRAO 11 m	Sol73	Dij71
	97318.571*(20)	CH_3OCHO	4(2,2)−3(1,3) E	0.01	OriMC−1	NRAO 11 m	Tur89	Oes99
	97535.908(50)	$g-CH_3CH_2OH$	21(1,21)−21(0,21) v_t =1−0	0.08[b]	OriMC−1	NRO 45 m	Ohi88	Pea97
	97536.849(50)	$g-CH_3CH_2OH$	23(1,23)−23(0,23) v_t =1−0	[b]	OriMC−1	NRO 45 m	Ohi88	Pea97
	97546.875(50)	$g-CH_3CH_2OH$	29(1,28)−29(2,28) v_t =1−0	0.06	OriMC−1	NRO 45 m	Ohi88	Pea97
	97549.692(50)	$g-CH_3CH_2OH$	26(0,26)−26(1,26) v_t =1−0	0.05	OriMC−1	NRO 45 m	Ohi88	Pea97
	97562.844(50)	$g-CH_3CH_2OH$	24(1,24)−24(0,24) v_t =1−0	0.05	OriMC−1	NRO 45 m	Ohi88	Pea97
U	97569.0	unidentified		0.04	OriMC−1	NRO 45 m	Ohi88	
	97574.042(50)	$g-CH_3CH_2OH$	20(1,20)−20(0,20) v_t =1−0	0.09	OriMC−1	NRO 45 m	Ohi88	Pea97
U	97577.9	unidentified		0.14	OriMC−1	NRO 45 m	Ohi88	
	97582.808*(3)	CH_3OH	2(1,1)−1(1,0) A−	<2.5	OriMC−1	OSO 20 m	Fri84	Xu_97
	97600.390(50)	$g-CH_3CH_2OH$	25(1,25)−25(0,25) v_t =1−0	0.21[b]	OriMC−1	NRO 45 m	Ohi88	Pea97
U	97603.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	97618.7	unidentified		0.05	OriMC−1	NRO 45 m	Ohi88	
	97631.329(50)	$g-CH_3CH_2OH$	27(0,27)−27(1,27) v_t =1−0	0.06	OriMC−1	NRO 45 m	Ohi88	Pea97
	97632.226*(34)	$H_2{}^{13}CS$	3(1,3)−2(1,2)	0.04	SgrB2(M)	BTL 7 m	Cum86	
	97649.502(50)	$g-CH_3CH_2OH$	19(1,19)−19(0,19) v_t =1−0	0.12	OriMC−1	NRO 45 m	Ohi88	Pea97
	97651.392*(25)	CH_3OCHO	10(4,7)−10(3,8) E	0.22	OriMC−1	NRO 45 m	Ohi88	Oes99
U	97662.0	unidentified		0.21	OriMC−1	NRO 45 m	Ohi88	
	97678.26*(10)	CH_3OH	21(6,16)−22(5,17) A−	0.29	OriMC−1	NRO 45 m	Ohi88	Xu_97
	97679.38*(10)	CH_3OH	21(6,15)−22(5,18) A+	0.34	OriMC−1	NRO 45 m	Ohi88	Xu_97
	97694.197*(24)	CH_3OCHO	10(4,7)−10(3,8) A	0.2	OriMC−1	NRO 45 m	Ohi88	Oes99
	97702.340*(2)	SO_2	7(3,5)−8(2,6)	<0.3	OriMC−1	NRAO 11 m	Sny75a	
	97715.401*(16)	^{34}SO	3(2)−2(1)	0.14	OriMC−1	NRAO 11 m	Got78	
U	97729.4	unidentified		0.06	OriMC−1	NRO 45 m	Ohi88	
U	97739.3	unidentified		0.10	OriMC−1	NRO 45 m	Ohi88	
U	97753.4	unidentified		0.19	OriMC−1	NRO 45 m	Ohi88	
	97755.610(50)	$g-CH_3CH_2OH$	28(1,28)−28(0,28) v_t =1−0	0.05	OriMC−1	NRO 45 m	Ohi88	Pea97
	97774.307(50)	$g-CH_3CH_2OH$	18(1,18)−18(0,18) v_t =1−0	0.07	OriMC−1	NRO 45 m	Ohi88	Pea97
	97815.987(50)	$g-CH_3CH_2OH$	29(1,29)−29(0,20) v_t =1−0	0.05	OriMC−1	NRO 45 m	Ohi88	Pea97
	97833.634*(19)	H_2CCCC	11(1,11)−10(1,10)	0.106	IRC+10216	IRAM 30 m	Cer91a	Kil90
U	97846.3	unidentified		0.12	OriMC−1	NRO 45 m	Ohi88	
	97862.6(4)	C_5H	$^2\Pi_{1/2}$ J=41/2−39/2 e	1.2[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
	97868.8(4)	C_5H	$^2\Pi_{1/2}$ J=41/2−39/2 f	1.1[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
U	97869.8	unidentified		0.07	OriMC−1	NRO 45 m	Ohi88	
U	97874.0	unidentified		0.07	OriMC−1	NRO 45 m	Ohi88	
U	97886.0	unidentified		0.17	OriMC−1	NRO 45 m	Ohi88	
U	97897.5	unidentified		0.22	OriMC−1	NRO 45 m	Ohi88	
U	97915.6	unidentified		0.06	OriMC−1	NRO 45 m	Ohi88	
U	97926.	unidentified		0.02[b]	OriMC−1	NRAO 11 m	Tur89	
U	97931.2	unidentified		0.06	OriMC−1	NRO 45 m	Ohi88	
	97932.445(50)	$g-CH_3CH_2OH$	31(0,31)−31(1,31) v_t =1−0	0.06	OriMC−1	NRO 45 m	Ohi88	Pea97
U	97957.2	unidentified		0.04	OriMC−1	NRO 45 m	Ohi88	
	97962.858(50)	$g-CH_3CH_2OH$	17(1,17)−17(0,17) v_t =1−0	0.09	OriMC−1	NRO 45 m	Ohi88	Pea97
	97980.953*(4)	CS	2−1	6.94	OriMC−1	NRAO 11 m	Tur73	
	97995.212*(20)	$l-C_3H$	$^2\Pi_{1/2}$ J=9/2−7/2 F=5−4 e	0.1	OriMC−1	NRO 45 m	Ohi88	Yam90a
	97995.951*(20)	$l-C_3H$	$^2\Pi_{1/2}$ J=9/2−7/2 F=4−3 e	0.2	OriMC−1	NRO 45 m	Ohi88	Yam90a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	98011.649*(20)	l−C_3H	$^2\Pi_{1/2}$ J=9/2−7/2 F=5−4 f	0.09[b]	IRC+10216	OSO 20 m	Tha85	Yam90a
	98012.576*(20)	l−C_3H	$^2\Pi_{1/2}$ J=9/2−7/2 F=4−3 f	[b]	IRC+10216	OSO 20 m	Tha85	Yam90a
	98177.578*(8)	CH_3CH_2CN	11(2,10)−10(2,9)	0.15	OriMC−1	NRAO 11 m	Joh77	
	98182.199*(29)	CH_3OCHO	8(7,1)−7(7,0) E	0.07[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	98190.653*(28)	CH_3OCHO	8(7,1)−7(7,0) A	0.08[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	98190.653*(28)	CH_3OCHO	8(7,2)−7(7,1) A	[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	98191.414*(25)	CH_3OCHO	8(7,2)−7(7,1) E	[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	98218.353*(20)	H_2CCCC	11(3,9)−10(3,8)	0.08[b]	IRC+10216	IRAM 30 m	Cer87b	Kil90
	98218.355*(20)	H_2CCCC	11(3,8)−10(3,7)	[b]	IRC+10216	IRAM 30 m	Cer87b	Kil90
	98230.313(50)	$g-CH_3CH_2OH$	16(1,16)−16(0,16) v_t =1−0	0.02	OriMC−1	NRO 45 m	Kut80	Pea97
	98238.285*(20)	H_2CCCC	11(2,9)−10(2,8)	0.03	IRC+10216	IRAM 30 m	Cer87b	Kil90
	98244.941*(18)	H_2CCCC	11(0,11)−10(0,10)	0.038	IRC+10216	IRAM 30 m	Cer91a	Kil90
U	98257.7	unidentified		0.03	OriMC−1	NRAO 11 m	Kut80	
U	98265.9(9)	unidentified		0.04	SgrB2(M)	BTL 7 m	Cum86	
	98268.515*(5)	CCCS	17−16	2.2[f]	IRC+10216	IRAM 30 m	Cer87b	
	98270.369*(29)	CH_3OCHO	8(6,2)−7(6,1) E	0.06	OriMC−1	NRAO 11 m	Kut80	Oes99
	98278.870*(24)	CH_3OCHO	8(6,3)−7(6,2) E	[b]	OriMC−1	NRAO 11 m	Kut80	Oes99
	98279.746*(25)	CH_3OCHO	8(6,3)−7(6,2) A	0.12[b]	OriMC−1	NRAO 11 m	Kut80	Oes99
	98279.788*(25)	CH_3OCHO	8(6,2)−7(6,1) A	[b]	OriMC−1	NRAO 11 m	Kut80	Oes99
U	98333.9	unidentified		0.02	OriMC−1	NRAO 11 m	Kut80	
U	98351.9	unidentified		0.02	OriMC−1	NRAO 11 m	Kut80	
	98408.66*(9)	C_6H	$^2\Pi_{3/2}$ J=71/2−69/2 e	0.04	IRC+10216	IRAM 30 m	Gue87	JPL01
	98424.082*(28)	CH_3OCHO	8(5,3)−7(5,2) E	0.10	OriMC−1	NRAO 11 m	Tur89	Oes99
	98431.748*(24)	CH_3OCHO	8(5,4)−7(5,3) E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	98432.773*(25)	CH_3OCHO	8(5,4)−7(5,3) A	0.04[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	98435.820*(25)	CH_3OCHO	8(5,3)−7(5,2) A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	98441.85*(9)	C_6H	$^2\Pi_{3/2}$ J=71/2−69/2 f	0.04	IRC+10216	IRAM 30 m	Gue87	JPL01
	98474.55*(13)	^{33}SO	3(2)−2(1) F=3/2−1/2	[b]	OriMC−1	NRAO 11 m	Tur89	
	98482.15*(8)	^{33}SO	3(2)−2(1) F=5/2−3/2	[b]	OriMC−1	NRAO 11 m	Tur89	
	98489.08*(7)	^{33}SO	3(2)−2(1) F=7/2−5/2	0.10[b]	OriMC−1	NRAO 11 m	Tur89	
	98493.68*(13)	^{33}SO	3(2)−2(1) F=9/2−7/2	[b]	OriMC−1	NRAO 11 m	Tur89	
	98512.521*(4)	HC_5N	37−36	0.08	OriMC−1	NRAO 11 m	Buj81	
	98523.881*(7)	CH_3CH_2CN	11(6)−10(6)	0.13	OriMC−1	NRAO 11 m	Joh77	
	98524.663*(7)	CH_3CH_2CN	11(7)−10(7)	0.10	OriMC−1	NRAO 11 m	Joh77	
	98524.94*(5)	C_5H	$^2\Pi_{3/2}$ J=41/2−39/2 e	4.5[fb]	IRC+10216	IRAM 30 m	Cer86a	Got86
	98527.44*(5)	C_5H	$^2\Pi_{3/2}$ J=41/2−39/2 f	[b]	IRC+10216	IRAM 30 m	Cer86a	Got86
	98532.075*(7)	CH_3CH_2CH	11(8)−10(8)	0.06	OriMC−1	NRAO 11 m	Joh77	
	98533.983*(13)	CH_3CH_2CN	11(5)−10(5)	0.17	OriMC−1	NRAO 11 m	Joh77	
	98544.152*(6)	CH_3CH_2CN	11(9,*)−10(9,*)	0.08	OriMC−1	NRAO 11 m	Tur89	
	98564.832*(8)	CH_3CH_2CN	11(4,8)−10(4,7)	0.09	OriMC−1	NRAO 11 m	Joh77	
	98566.797*(8)	CH_3CH_2CN	11(4,7)−10(4,6)	0.09	OriMC−1	NRAO 11 m	Joh77	
	98606.771*(24)	CH_3OCHO	8(3,6)−7(3,5)E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	98610.104*(8)	CH_3CH_2CN	11(3,9)−10(3,8)	0.14	OriMC−1	NRAO 11 m	Joh77	
	98611.195*(25)	CH_3OCHO	8(3,6)−7(3,5) A	0.08[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
U	98630.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
	98655.097*(22)	H_2CCCC	11(1,10)−10(1,9)	0.124	IRC+10216	IRAM 30 m	Cer91a	Kil90
U	98663.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
	98682.635*(25)	CH_3OCHO	8(4,5)−7(4,4) A	0.02	SgrB2(M)	BTL 7 m	Cum86	Oes99
U	98696.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	98701.106*(8)	CH_3CH_2CN	11(3,8)−10(3,7)	0.12	OriMC−1	NRAO 11 m	Joh77	
	98711.931*(24)	CH_3OCHO	8(4,5)−7(4,4) E	0.04	SgrB2(M)	BTL 7 m	Cum86	Oes99
	98747.797*(32)	CH_3OCHO	8(4,4)−7(4,3) E	0.04	SgrB2(M)	BTL 7 m	Cum86	Oes99
U	98771.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	98792.314*(25)	CH_3OCHO	8(4,4)−7(4,3) A	0.05	SgrB2(M)	BTL 7 m	Cum86	Oes99
	98863.314*(6)	CH_3CHO	5(1,4)−4(1,3) E	0.23	SgrB2(M)	BTL 7 m	Cum86	Kle96
	98875.160*(24)	CH_3OCHO	11(4,8)−11(3,9) A	0.2	OriMC−1	NRAO 12 m	Ike01	Oes99
	98900.951*(6)	CH_3CHO	5(1,4)−4(1,3) A−−	0.18	SgrB2(M)	BTL 7 m	Cum86	Kle96
	98926.723*(17)	AlF	3−2	0.97[f]	IRC+10216	IRAM 30 m	Cer87c	
	98940.02*(2)	CCCN	10−9 J=21/2−19/2	0.18	IRC+10216	NRAO 11 m	Gue77	Got83
	98958.78*(2)	CCCN	10−9 J=19/2−17/2	0.13	IRC+10216	NRAO 11 m	Gue77	Got83
	98976.278*(2)	SO_2	28(7,21)−29(6,24)	0.08	OriMC−1	NRAO 11 m	Tur91	
U	99011.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
U	99068.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur91	
	99083.7*(3)	C_6H	$^2\Pi_{1/2}$ J=71/2−69/2 e	0.97[f]	IRC+10216	IRAM 30 m	Sai87	JPL01
U	99087.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
	99118.6(1)	NH_2D	5(2,4)−4(1,4)	0.04	SgrB2(M)	BTL 7 m	Cum86	DeL75
U	99120.	unidentified		0.15	OriMC−1	OSO 20 m	Fri84	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	99133.6*(3)	C_6H	$^2\Pi_{1/2}$ J=71/2−69/2 f	1.05[f]	IRC+10216	IRAM 30 m	Sai87	JPL01
	99143.725(50)	$g-CH_3CH_2OH$	27(2,26)−27(1,26) v_t =1−0	0.10	OriMC−1	NRO 45 m	Tur89	Pea97
	99203.46*(10)	CH_3SH	2(1)−2(0) E	0.10	SgrB2(M)	NRAO 11 m	Tur89	Lee80
	99264.98(5)	CH_3SH	3(1)−3(0) E	0.08	OriMC−1	NRAO 11 m	Tur89	Lee80
	99299.905*(14)	SO	3(2)−2(1)	1.59[m]	OriMC−1	NRAO 11 m	Got78	
	99311.195(75)	NH_2CN	5(1,5)−4(1,4)	0.40	SgrB2(M)	BTL 7 m	Cum86	Joh76a
	99324.358*(6)	CH_3OCH_3	4(1,4)−3(0,3) EA+AE	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	99325.208*(4)	CH_3OCH_3	4(1,4)−3(0,3) EE	0.2[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
	99326.058*(4)	CH_3OCH_3	4(1,4)−3(0,3) AA	[b]	OriMC−1	NRAO 11 m	Cla79	Gro98
U	99361.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
U	99378.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
	99392.526*(3)	SO_2	29(4,26)−28(5,23)	<0.50	OriMC−1	OSO 20 m	Fri84	
	99409.74(10)	CH_3SH	4(1)−4(0) E	0.05	SgrB2(M)	NRAO 11 m	Tur89	Lee80
U	99586.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur89	
	99651.863*(11)	$HC^{13}CCN$	11−10	0.13	SgrB2(M)	BTL 7 m	Cum86	Laf78
	99661.471*(6)	$HCC^{13}CN$	11−10	0.14	SgrB2(M)	BTL 7 m	Cum86	Laf78
	99672.23(5)	CH_2DOH	6(1,5)−6(0,6)	0.3[f]	OriMC−1	IRAM 30 m	Jac92	Jac93
	99681.511*(8)	CH_3CH_2CN	11(2,9)−10(2,8)	0.05	SgrB2(M)	BTL 7 m	Cum86	
U	99727.0(16)	unidentified		0.04	SgrB2(M)	BTL 7 m	Cum86	
	99730.959*(14)	CH_3OH	6(1,6)−5(0,5) E v_t =1	0.20	OriMC−1	NRAO 11 m	Chu80	Xu_97
	99774.15(5)	$H_2C^{34}S$	3(1,3)−2(1,2)	<0.2	OriMC−1	OSO 20 m	Gar85	Lov84
	99866.509*(12)	CCS	7,8−6,7	0.08	SgrB2(M)	BTL 7 m	Cum86	
U	99903.	unidentified		0.15	SgrB2(M)	NRAO 11 m	Tur89	
	99929.54(10)	$K^{35}Cl$	13−12	0.43[f]	IRC+10216	IRAM 30 m	Cer87c	Clo64
	99953.27(6)	NH_2CN	5(2,4)−4(2,3)	0.08[b]	SgrB2(M)	BTL 7 m	Cum86	Joh76a
	99956.60(4)	NH_2CN	5(2,3)−4(2,2)	[b]	SgrB2(M)	BTL 7 m	Cum86	Joh76a
	99972.66(8)	NH_2CN	5(0,5)−4(0,4)	0.12	SgrB2(M)	BTL 7 m	Cum86	Joh76a
	100029.565*(29)	SO	4(5)−4(4)	0.38[m]	OriMC−1	NRAO 11 m	Got78	
	100076.385*(3)	HCCCN	11−10	1.28	OriMC−1	NRAO 11 m	Mor76	
	100094.500*(24)	CH_2CO	5(1,5)−4(1,4)	0.17	SgrB2(M)	NRAO 11 m	Tur77	
	100110.27(10)	CH_3SH	4(1)−3(1) A+	0.06	SgrB2(M)	BTL 7 m	Lin79	Lee80
U	100122.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
U	100157.0	unidentified		0.07	SgrB2(M)	NRAO 11 m	Tur77	
	100173.10(10)	CH_3SH	7(2)−8(1) A+	0.08	OriMC−1	NRAO 11 m	Tur89	Lee80
U	100185.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	100197.2(8)	unidentified		0.09	SgrB2(M)	BTL 7 m	Cum86	
u	100200.4	unidentified		0.09	SgrB2(M)	NRAO 11 m	Tur77	
	100240.524*(31)	HCCCN	11−10 v_6 =1 ℓ=1 e	0.02	SgrB2(M)	NRAO 11 m	Tur91	Laf78
	100294.508*(25)	CH_3OCHO	8(3,5)−7(3,4) E	0.05	SgrB2(M)	BTL 7 m	Cum86	Oes99
	100308.210*(25)	CH_3OCHO	8(3,5)−7(3,4) A	0.08	OriMC−1	BTL 7 m	Gol82	Oes99
	100322.349*(29)	HCCCN	11−10 v_7 =1 ℓ=1 e	0.07	OriMC−1	BTL 7 m	Gol82	Laf78
U	100332.	unidentified		0.06	SgrB2(M)	NRAO 11 m	Tur89	
U	100365.	unidentified		0.18	OriMC−1	NRAO 11 m	Tur89	
U	100373.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
U	100421.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	100436.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur91	
	100452.072 (50)	$g-CH_3CH_2OH$	24(2,23)−24(1,23) v_t =1−0	0.08	SgrB2(M)	NRO 45 m	Tur89	Pea97
	100460.412*(6)	CH_3OCH_3	6(2,5)−6(1,6) EA+AE	[b]	OriMC−1	NRAO 11 m	Wil81	Gro98
	100463.066*(4)	CH_3OCH_3	6(2,5)−6(1,6) EE	0.12[b]	OriMC−1	NRAO 11 m	Wil81	Gro98
	100465.708*(8)	CH_3OCH_3	6(2,5)−6(1,6) AA	[b]	OriMC−1	NRAO 11 m	Wil81	Gro98
	100466.106*(29)	HCCCN	11−10 v_7 =1 ℓ=1 f	0.04	OriMC−1	NRAO 11 m	Tur91	Laf78
	100482.174*(24)	CH_3OCHO	8(1,7)−7(1,6) E	0.08	OriMC−1	BTL 7 m	Gol82	Oes99
	100490.715*(24)	CH_3OCHO	8(1,7)−7(1,6) A	0.08	OriMC−1	BTL 7 m	Gol82	Oes99
	100491.715*(6)	N_2O	4−3	0.038	SgrB2(M)	NRAO 12 m	Ziu94a	
U	100498.5	unidentified		0.05	OriMC−1	NRAO 11 m	Wil81	
U	100509.	unidentified		0.03	SgrB2(M)	NRAO 12 m	Ziu94a	
	100526.506*(8)	CH_3NC	5−4	1.8[f]	SgrB2(M)	IRAM 30 m	Cer88	
	100598.34	CH_2CN	5−411/2−9/2	0.55	SgrB2(M)	FCRAO 14 m	Irv88a	Irv88a
	100614.291*(8)	CH_3CH_2CN	11(1,10)−10(1,9)	0.10	OriMC−1	NRAO 11 m	Joh77	
	100629.50(12)	NH_2CN	5(1,4)−4(1,3)	0.17	SgrB2(M)	NRAO 11 m	Tur75a	Joh76a
	100638.870*(24)	CH_3OH	13(2,11)−12(3,9) E	0.35	OriMC−1	NRAO 11 m	Tur89	Xu_97
	100681.476*(25)	CH_3OCHO	9(0,9)−8(0,8) E	0.07[b]	SgrB2(M)	NRAO 11 m	Chu80	Oes99
	100683.392*(28)	CH_3OCHO	9(0,9)−8(0,8) A	[b]	SgrB2(M)	NRAO 11 m	Chu80	Oes99
	100708.837*(44)	HCCCN	11−10 v_7 =2 ℓ=0	0.05[b]	SgrB2(M)	BTL 7 m	Cum86	Laf78
	100710.972*(52)	HCCCN	11−10 v_7 =2 ℓ=2 e	[b]	SgrB2(M)	BTL 7 m	Cum86	Laf78
	100714.306*(46)	HCCCN	11−10 v_7 =2 ℓ=2 f	[b]	SgrB2(M)	BTL 7 m	Cum86	Laf78
U	100841.3	unidentified		0.5[e]	SgrB2(N)	BIMA Array	Meh97	
	100855.437*(20)	CH_3COOH	9(−1,9)−8(−1,8) E	[b]	SgrB2(N)	BIMA Array	Meh97	Ily00

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	100855.437*(20)	CH_3COOH	9(−1,9)−8(0,8) E	[b]	SgrB2(N)	BIMA Array	Meh97	Ily00
	100855.437*(20)	CH_3COOH	9(0,9)−8(−1,8) E	0.19[be]	SgrB2(N)	BIMA Array	Meh97	Ily00
	100855.437*(20)	CH_3COOH	9(0,9)−8(0,8) E	[b]	SgrB2(N)	BIMA Array	Meh97	Ily00
U	100856.6	unidentified		0.2[e]	SgrB2(N)	BIMA Array	Meh97	
U	100864.8	unidentified		0.7[e]	SgrB2(N)	BIMA Array	Meh97	
u	100866.3	unidentified		0.8[e]	SgrB2(N)	BIMA Array	Meh97	
	100878.105*(3)	SO_2	2(2,0)−3(1,3)	0.08	SgrB2(M)	BTL 7 m	Cum86	
	100897.459*(20)	CH_3COOH	9(*,9)−8(*,8) A	0.11[e]	W51e2	BIMA Array	Rem02	Ily00
	100898.58(5)	CH_3SH	7(1)−7(0) E	0.2[e]	SgrB2(N)	BIMA Array	Meh97	Lee80
	100990.034*(15)	$t-CH_3CH_2OH$	8(2,7)−8(1,8)	0.05	SgrB2(M)	BTL 7 m	Lin79	
	101002.355*(24)	CH_2CO	5(3,3)−4(3,2)	0.06[b]	SgrB2(M)	BTL 7 m	Cum86	
	101002.360*(24)	CH_2CO	5(3,2)−4(3,1)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	101024.438*(22)	CH_2CO	5(2,4)−4(2,3)	0.05[b]	SgrB2(M)	NRAO 11 m	Tur89	
	101029.75(5)	CH_3SH	4(−1)−3(−1) E	[b]	SgrB2(M)	BTL 7 m	Lin79	Lin79
	101036.589*(27)	CH_2CO	5(0,5)−4(0,4)	0.12[b]	SgrB2(M)	NRAO 11 m	Tur77	
	101139.16(5)	CH_3SH	4(0)−3(0) A	0.27[b]	SgrB2(M)	BTL 7 m	Lin79	Lin79
	101139.65(4)	CH_3SH	4(0)−3(0) E	[b]	SgrB2(M)	BTL 7 m	Lin79	Lin79
	101159.46(10)	CH_3SH	4(2)−3(2) A−	0.03	SgrB2(M)	BTL 7 m	Cum86	Lee80
	101167.15(4)	CH_3SH	4(−2)−3(−2) E	0.13[b]	SgrB2(M)	BTL 7 m	Cum86	Lin79
	101168.34(4)	CH_3SH	4(2)−3(2) E	[b]	SgrB2(M)	BTL 7 m	Cum86	Lin79
	101174.678*(4)	HC_5N	38−37	0.09[b]	SgrB2(M)	BTL 7 m	Lin79	
	101179.76(10)	CH_3SH	4(2)−3(2) A	[b]	SgrB2(M)	BTL 7 m	Lin79	Lee80
	101180.40*(9)	C_6H	$^2\Pi_{3/2}$ J=73/2−71/2 e	1.20[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	101185.367*(17)	CH_3OH	6(−2,5)−6(1,5) E	n.r.	OriMC−1	IRAM 30 m	Com96	Xu_97
U	101200.4	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	101211.5	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	101215.37*(9)	C_6H	$^2\Pi_{3/2}$ J=73/2−71/2 f	0.70[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	101243.6	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	101253.8	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
U	101272.9	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	101279.2	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
	101284.36(4)	CH_3SH	4(1)−3(1) E	0.09	SgrB2(M)	BTL 7 m	Lin79	Lin79
U	101287.3	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
	101293.328*(16)	CH_3OH	7(−2,6)−7(1,6) E	n.r.	OriMC−1	IRAM 30 m	Com96	Xu_97
	101299.309*(18)	NH_2CHO	18(2,16)−18(2,17)	n.r.	OriMC−1	IRAM 30 m	Com96	
	101302.116*(37)	CH_3OCHO	25(6,19)−25(5,20) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	101305.534*(34)	CH_3OCHO	25(6,19)−25(5,20) E	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	101314.830*(7)	DCCCN	12−11	n.r.	OriMC−1	IRAM 30 m	Com96	
U	101318.6	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	101332.987*(6)	H_2CO	6(1,5)−6(1,6)	<0.1	SgrB2(M)	BTL 7 m	Lin79	
	101343.448*(7)	CH_3CHO	3(−1,3)−2(0,2) E	0.08	SgrB2(M)	BTL 7 m	Cum86	Kle96
U	101348.8	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	101357.0	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	101371.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	101382.335*(4)	DNCO	5(1,5)−4(1,4)	n.r.	OriMC−1	IRAM 30 m	Com96	
U	101408.9	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	101414.723*(51)	CH_3OCHO	13(3,11)−13(2,12) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	101426.664*(20)	$(CH_3)_2CO$	9(1,8)−8(2,7) AE	0.08[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	101426.759*(17)	$(CH_3)_2CO$	9(1,8)−8(2,7) EA	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	101427.041*(20)	$(CH_3)_2CO$	9(2,8)−8(1,7) AE	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	101427.130*(17)	$(CH_3)_2CO$	9(2,8)−8(1,7) EA	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
U	101435.9	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	101451.059*(14)	$(CH_3)_2CO$	9(1,8)−8(2,7) EE	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	101451.446*(14)	$(CH_3)_2CO$	9(1,8)−8(2,7) EE	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	101469.719*(16)	CH_3OH	8(−2,7)−8(1,7) E	0.17	OriMC−1	NRAO 11 m	Tur89	Xu_97
	101477.764*(33)	H_2CS	3(1,3)−2(1,2)	0.49	OriMC−1	BTL 7 m	Van84	
U	101499.2	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	101503.8	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	101523.6	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	101534.00* (53)	$H^{13}COOH$	9(3,6)−10(2,9)	n.r.	OriMC−1	IRAM 30 m	Com96	Wil80
	101545.423*(70)	CH_3OCHO	18(3,15)−18(3,16) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	101559.383*(10)	CH_3OCH_3	12(2,10)−11(3,9) AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	101560.264*(18)	$^{33}SO_2$	17(5,13)−18(4,14)	n.r.	OriMC−1	IRAM 30 m	Com96	
	101562.117*(8)	CH_3OCH_3	12(2,10)−11(3,9) EE	0.10[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	101564.832*(8)	CH_3OCH_3	12(2,10)−11(3,9) AE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	101564.872*(8)	CH_3OCH_3	12(2,10)−11(3,9) EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
U	101575.5	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	101626.822*(28)	CH_3OCHO	9(1,9)−8(0,8) E	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Oes99
	101628.167*(29)	CH_3OCHO	9(1,9)−8(0,8) A	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Oes99
	101637.243*(18)	CH_2CHCN	11(1,11)−10(1,10)	0.05	OriMC−1	NRAO 11 m	Tur91	
U	101659.0	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	101668.7	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	101677.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
	101688.880*(13)	$^{33}SO_2$	12(4,8)−12(3,11)	0.03	SgrB2(M)	NRAO 11 m	Tur89	
	101690.002*(18)	CH_3CH_2CN	27(2,25)−27(1,26)	n.r.	OriMC−1	IRAM 30 m	Com96	
U	101708.8	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	101713.6	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	101737.211*(17)	CH_3OH	9(−2,8)−9(1,8) E	0.36	OriMC−1	OSO 20 m	Mil87	Xu_97
	101771.892*(56)	CH_3OCHO	24(5,19)−24(4,20) A	0.06	OriMC−1	OSO 20 m	Mil87	Oes99
	101873.9*(3)	C_6H	$^2\Pi_{1/2}$ J=73/2−71/2 e	0.75[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	101892.56(10)	MgCN	10−9 J=21/2−19/ 2	0.006	IRC+10216	IRAM 30 m	Ziu95	And94
	101925.1*(3)	C_6H	$^2\Pi_{1/2}$ J=73/2−71/2 f	0.78[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	101961.512*(59)	$Na^{37}Cl$	8−7	0.68[f]	IRC+10216	IRAM 30 m	Cer87c	
U	101970.	unidentified		0.05	SgrB2(M)	NRAO 11 m	Tur89	
	101981.426*(24)	CH_2CO	5(1,4)−4(1,3)	0.22	SgrB2(M)	NRAO 11 m	Tur77	
	102031.874*(4)	$^{34}SO_2$	3(1,3)−2(0,2)	0.05	OriMC−1	NRAO 11 m	Tur89	
	102031.94*(5)	$Al^{35}Cl$	7−6	0.82[f]	IRC+10216	IRAM 30 m	Cer87c	
U	102043.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	102064.263*(1)	NH_2CHO	5(1,5)−4(1,4)	0.2	SgrB2(M)	NRAO 11 m	Tur78a	
	102065.856*(44)	H_2COH^+	4(0,4)−3(1,3)	0.398	SgrB2(M)	NRO 45 m	Ohi96	
	102122.701*(18)	CH_3OH	10(−2,9)−10(1,9) E	0.41	OriMC−1	OSO 20 m	Mil87	Xu_97
	102202.49(4)	CH_3SH	4(1)−3(1) A−	0.08	SgrB2(M)	BTL 7 m	Lin79	Lin79
	102217.571*(2)	NH_2CHO	2(1,2)−1(0,1)	0.09	SgrB2(M)	NRAO 11 m	Tur89	
U	102274.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	102298.085*(16)	HCCCHO	11(0,11)−10(0,10)	0.03	SgrB2(M)	NRAO 11 m	Tur89	
U	102319.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
U	102375.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
U	102399.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
U	102407.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
U	102423.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	102432.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	102489.386 (50)	$g-CH_3CH_2OH$	11(1,11)−11(0,11) v_t =1−0	0.03	OriMC−1	NRO 45 m	Tur89	Pea97
	102516.635*(3)	CH_3CCH	6(4)−5(4)	0.23	W51e1/e2	OSO 20 m	Ala02	
	102530.346*(1)	CH_3CCH	6(3)−5(3)	0.14	OriMC−1	NRAO 11 m	Chu83	
	102540.143*(1)	CH_3CCH	6(2)−5(2)	0.23	OriMC−1	NRAO 11 m	Chu83	
	102546.023*(1)	CH_3CCH	6(1)−5(1)	0.29	OriMC−1	NRAO 11 m	Chu83	
	102547.983*(1)	CH_3CCH	6(0)−5(0)	0.33	OriMC−1	NRAO 11 m	Chu83	
	102635.7(7)	C_5H	$^2\Pi_{1/2}$ J=43/2−41/2 e	1.1[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
U	102640.	unidentified		0.08	OriMC−1	OSO 20 m	Mil87	
	102642.4(7)	C_5H	$^2\Pi_{1/2}$ J=43/2−41/2 f	1.0[f]	IRC+10216	IRAM 30 m	Cer86	Cer86
U	102644.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	102650.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	102658.096*(18)	CH_3OH	11(−2,10)−11(1,10) E	0.15	OriMC−1	NRAO 11 m	Lov82	Xu_97
	102690.055*(3)	SO_2	33(8,26)−34(7,27)	0.07	OriMC−1	OSO 20 m	Mil87	
	102734.338*(34)	CH_3OCHO	16(5,11)−16(4,12) E	[b]	OriMC−1	OSO 20 m	Mil87	Oes99
	102736.773*(37)	CH_3OCHO	16(5,11)−16(4,12) A	0.12[b]	OriMC−1	OSO 20 m	Mil87	Oes99
	102807.354*(76)	$H_2C^{34}S$	3(1,2)−2(1,1)	0.02	SgrB2(M)	NRAO 11 m	Tur89	
	102916.085*(21)	SiC_3	9(0,9)−8(0,8)	0.006	IRC+10216	NRAO 12 m	App99	
	102957.99* (11)	CH_3OH	15(−2,13)−16(−3,13) E	0.12	OriMC−1	NRAO 11 m	Tur89	Xu_97
	102992.345*(32)	H_2CCC	5(1,5)−4(1,4)	0.230	TMC−1	IRAM 30 m	Cer91	
U	103028.	unidentified		0.03[b]	SgrB2(M)	NRAO 11 m	Tur89	
	103040.416*(35)	H_2CS	3(0,3)−2(0,2)	0.2	SgrB2(M)	NRAO 11 m	Got78a	
	103051.791*(34)	H_2CS	3(2,1)−2(2,0)	0.13	SgrB2(M)	BTL 7 m	Van84	
U	103071.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
U	103075.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	103114.824*(56)	CH_3OCHO	21(4,17)−21(3,18)A	0.05	OriMC−1	NRAO 11 m	Tur89	Oes99
	103188.64*(10)	NH_2D	8(3,6)−8(2,6)U	0.01	SgrB2(M)	NRAO 11 m	Tur89	
U	103196.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
U	103216.6(12)	unidentified		0.04	SgrB2(M)	BTL 7 m	Cum86	
U	103227.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	103266.0(3)	C_4H	$^2\Pi_{1/2}$ J=21/2−19/2 v_7 =1e	2.75[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
U	103297.	unidentified		0.05	SgrB2(M)	NRAO 11 m	Tur89	
	103319.278*(20)	$l-C_3H$	$^2\Pi_{3/2}$ J=9/2−7/2 F=5−4f	0.054[b]	IRC+10216	FCRAO 14 m	Tha85	Yam90a
	103319.818*(20)	$l-C_3H$	$^2\Pi_{3/2}$ J=9/2−7/2 F=4−3f	[b]	IRC+10216	FCRAO 14 m	Tha85	Yam90a
U	103328.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	103330.(1)	C_5H	$^2\Pi_{3/2}$ J=45/2−43/2	0.07	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	103372.506*(20)	l−C_3H	$^2\Pi_{3/2}$ J=9/2−7/2 F=5−4e	0.078[b]	IRC+10216	FCRAO 14 m	Tha85	Yam90a
	103373.129*(20)	l−C_3H	$^2\Pi_{3/2}$ J=9/2−7/2 F=4−3e	[b]	IRC+10216	FCRAO 14 m	Tha85	Yam90a
	103376.784*(37)	CH_3OCHO	24(6,18)−24(5,17)A	0.06	SgrB2(N)	NRAO 12 m	Hol00	
	103381.209*(19)	CH_3OH	12(−2,11)−12(1,11)E	0.07	OriMC−1	NRAO 11 m	Tur89	Xu_97
	103387.227*(34)	CH_3OCHO	24(6,18)−24(5,17)E	0.06[b]	SgrB2(N)	NRAO 12 m	Hol00	
	103391.283*(10)	CH_2OHCHO	10(0,10)−9(1,9)	[b]	SgrB2(N)	NRAO 12 m	Hol00	But01
	103466.479*(25)	CH_3OCHO	8(2,6)−7(2,5)E	0.07	SgrB2(M)	BTL 7 m	Cum86	Oes99
	103478.699*(25)	CH_3OCHO	8(2,6)−7(2,5)A	0.04	SgrB2(M)	BTL 7 m	Cum86	Oes99
	103525.2(5)	^{26}MgNC	17/2,9−15/2,8	0.34[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	103540.2(5)	^{26}MgNC	19/2,9−17/2,8	0.36[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
U	103549.0(19)	unidentified		0.04	SgrB2(M)	BTL 7 m	Cum86	
	103575.401*(14)	CH_2CHCN	11(0,11)−10(0,10)	0.07	SgrB2(M)	BTL 7 m	Cum86	
	103576.5(3)	C_4H	$^2\Pi_{1/2}$ J=21/2−19/2 v_7 =1f	0.10	IRC+10216	IRAM 30 m	Cer87b	Yam87b
	103640.754*(8)	CCS	8,8−7,7	0.05	SgrB2(M)	BTL 7 m	Cum86	
	103667.907*(10)	CH_2OHCHO	10(1,9)−9(2,8)	0.025	SgrB2(N)	NRAO 12 m	Hol00	But01
	103699.756*(3)	SO_2	7(3,5)−8(2,6) v_2 =1	0.04	OriMC−1	NRAO 11 m	Tur89	
	103702.897*(21)	t−CH_3CH_2OH	9(1,8)−8(2,7)	0.04	SgrB2(M)	BTL 7 m	Cum86	
	103705.964*(44)	s−CH_2CHOH	3(1,3)−2(0,2)	0.049	SgrB2(N)	NRAO 12 m	Tur01	
U	103714.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
	103836.808*(4)	HC_5N	39−38	0.05	SgrB2(M)	BTL 7 m	Cum86	
	103867.284*(25)	CH_3CH_2CN	21(1,20)−21(0,21)	0.03	SgrB2	NRAO 11 m	Tur89	
U	103932.	unidentified		0.01	OriMC−1	NRAO 11 m	Tur89	
	103952.13*(9)	C_6H	$^2\Pi_{3/2}$ J=75/2−73/2e	1.25[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	103988.91*(9)	C_6H	$^2\Pi_{3/2}$ J=75/2−73/2f	0.90[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	104029.410*(3)	SO_2	3(1,3)−2(0,2)	3.0	OriMC−1	NRAO 11 m	Hol76a	
	104048.451*(5)	CCCS	18−17	2.1[f]	IRC+10216	IRAM 30 m	Cer87b	
	104051.278*(9)	CH_3CH_2CN	12(1,12)−11(1,11)	0.08	OriMC−1	NRAO 11 m	Joh77	
	104060.717*(19)	CH_3OH	13(−3,11)−12(−4,9)E	0.2	OriMC−1	NRAO 11 m	Kui77	Xu_97
	104175.867*(6)	CH_3OCH_3	17(2,15)−17(1,16)EA+AE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	104177.378*(6)	CH_3OCH_3	17(2,15)−17(1,16)EE	0.09[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	104178.889*(6)	CH_3OCH_3	17(2,15)−17(1,16)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	104187.114*(19)	c−C_3HD	3(0,3)−2(1,2)	0.39	TMC−1	NRAO 12 m	Ger87	
	104189.709*(59)	Na^{35}Cl	8−7	1.24[f]	IRC+10216	IRAM 30 m	Cer87c	
	104201.180*(3)	CH_2 DCN	6(2,4)−5(2,3)	0.07	SgrB2	BTL 7 m	Cum86	
	104212.655*(12)	CH_2CHCN	11(2,10)−10(2,9)	0.06	SgrB2(M)	BTL 7 m	Cum86	
	104239.293*(3)	SO_2	10(1,9)−10(0,10)	0.29	SgrB2(M)	BTL 7 m	Cum86	
	104300.396*(16)	CH_3OH	11(−1,11)−10(−2,9)E	0.12	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	104336.637*(20)	CH_3OH	13(−2,12)−13(1,12)E	0.03	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	104354.861*(17)	CH_3OH	10(4,7)−11(3,8)A−	0.06	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	104391.703*(4)	$^{34}SO_2$	10(1,9)−10(0,10)	0.04	SgrB2(M)	BTL 7 m	Cum86	
	104408.903*(13)	CH_2CHCN	11(5,*)−10(5,*)	0.08[b]	SgrB2(M)	BTL 7 m	Cum86	
	104410.489*(17)	CH_3OH	10(4,6)−11(3,9)A+	[b]	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	104411.262*(13)	CH_2CHCN	11(4,8)−10(4,7)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	104411.485*(13)	CH_2CHCN	11(4,7)−10(4,6)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	104419.308*(15)	CH_2CHCN	11(6,*)−10(6,*)	[b]	SgrB2(M)	BTL 7 m	Cum86	
U	104425.	unidentified		0.08	SgrB2(M)	NRAO 11 m	Tur89	
	104432.793*(15)	CH_2CHCN	11(3,9)−10(3,8)	0.04[b]	SgrB2(M)	BTL 7 m	Cum86	
	104437.516*(17)	CH_2CHCN	11(7,*)−10(7,*)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	104453.927*(15)	CH_2CHCN	11(3,8)−10(3,7)	0.06	SgrB2(M)	BTL 7 m	Cum86	
	104477.51*(30)	CH_3OD	4(2,2)−5(1,5)A+	0.10	SgrB2(M)	NRAO 11 m	Tur89	And88
	104487.254*(16)	t−CH_3CH_2OH	7(0,7)−6(1,6)	0.20	SgrB2(M)	BTL 7 m	Cum86	
U	104531.	unidentified		0.05	SgrB2(M)	NRAO 11 m	Tur89	
U	104589.	unidentified		0.15[x]	SgrB2(M)	NRAO 11 m	Lis78	
	104616.988*(33)	H_2CS	3(1,2)−2(1,1)	0.77	SgrB2(M)	NRAO 11 m	Lis78	
	104666.56*(2)	C_4H	23/2−21/2	0.10	IRC+10216	NRAO 11 m	Gue78	Got83
	104688.654*(10)	c−C_2H_4O	3(1,2)−2(2,1)	0.07	SgrB2(N)	NRO 45 m	Dic97	
U	104696.	unidentified		0.04	SgrB2(M)	NRAO 11 m	Tur89	
	104700.574*(20)	CH_3OCH_3	7(2,6)−7(1,7)AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	104703.253*(4)	CH_3OCH_3	7(2,6)−7(1,7)EE	0.08[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	104705.10*(2)	C_4H	21/2−19/2	0.10	IRC+10216	NRAO 11 m	Gue78	Got83
	104705.932*(8)	CH_3OCH_3	7(2,6)−7(1,7)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	104711.398*(2)	$^{13}C^{18}O$	1−0	n.r.	OriMC−2	NRAO 11 m	Wan76	
U	104720.	unidentified		0.07	SgrB2(M)	NRAO 11 m	Tur89	
	104798.888*(36)	a−CH_2CHOH	19(1,9)−10(0,10)	0.05	SgrB2	NRAO 11 m	Tur89	
	104808.618*(15)	t−CH_3CH_2OH	5(1,5)−4(0,4)	0.18	SgrB2(M)	NRAO 11 m	Zuc75	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	104819.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
	104873.45*(1)	HCOOH	7(0,7)−6(1,6)	0.12	SgrB2	BTL 7 m	Cum86	Wil80
	104891.35*(18)	HC_7N	93−92	0.09	SgrB2(M)	NRAO 11 m	Tur89	
	104915.562*(26)	H_2CCC	5(1,4)−4(1,3)	0.257	TMC−1	IRAM 30 m	Cer91	
	104960.550*(16)	CH_2CHCN	11(2,9)−10(2,8)	0.06	SgrB2(M)	BTL 7 m	Cum86	
	105011.1(3)	$H_2CCCCCC$	39(1,38)−38(1,37)	0.06[f]	IRC+10216	IRAM 30 m	Gue00	
	105022.583*(71)	$t-CH_3CH_2OH$	25(6,20)−24(7,17)	0.04	OriMC−1	NRAO 11 m	Tur89	
U	105027.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	105036.99(5)	CH_2DOH	7(1,6)−7(0,7)	0.8[f]	OriMC−1	IRAM 30 m	Jac92	Jac93
	105059.202*(20)	^{30}SiS	6−5	4.75[f]	IRC+10216	IRAM 30 m	Gue00	
	105063.761*(30)	CH_3OH	13(1,13)−12(2,10)A+	0.55	OriMC−1	FCRAO 14 m	Gol83	Xu_97
	105121.98*(2)	SiCN	$^2\Pi_{1/2}$ J=19/2−17/2e	0.13[f]	IRC+10216	IRAM 30 m	Gue00	App00
	105146.68*(2)	SiCN	$^2\Pi_{1/2}$ J=19/2−17/2f	0.14[f]	IRC+10216	IRAM 30 m	Gue00	App00
	105174.58(20)	C_4H	$^2\Sigma$ J=11−10 v_7=2L	0.15	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	105230.65(20)	C_4H	$^2\Sigma$ J=11−10 v_7=2U	0.15	IRC+10216	IRAM 30 m	Gue87a	Gue87a
U	105278.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	105355.629*(22)	$t-CH_3CH_2OH$	17(2,15)−17(1,16)	0.04	SgrB2(M)	NRAO 11 m	Tur89	
U	105412.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	105464.216*(1)	NH_2CHO	5(0,5)−4(0,4)	0.31	SgrB2(M)	BTL 7 m	Cum86	
	105469.300*(9)	CH_3CH_2CN	12(0,12)−11(0,11)	0.2	OriMC−1	NRAO 11 m	Kui77	
U	105540.	unidentified		0.05	OriMC−1	OSO 20 m	Joh84	
	105558.077*(4)	HNCS	9(0,9)−8(0,8)	0.05	SgrB2(M)	BTL 7 m	Fre79	
	105576.385*(21)	CH_3OH	14(−2,13)−14(1,13)E	0.2[z]	OriMC−1	NRAO 11 m	Kui77	Xu_97
U	105590.	unidentified		0.15	OriMC−1	OSO 20 m	Joh84	
U	105610.	unidentified		0.05	SgrB2(M)	NRAO 11 m	Tur89	
U	105618.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
U	105728.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	105739.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	105743.859*(3)	HNCS	9(1,8)−8(1,7)	0.13	OriMC−1	NRAO 11 m	Tur89	
	105768.276*(8)	CH_3OCH_3	13(1,12)−13(0,13)EA+AE	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	105770.340*(6)	CH_3OCH_3	13(1,12)−13(0,13)EE	0.20[b]	OriMC−1	OSO 20 m	Joh84	Gro98
	105772.403*(10)	CH_3OCH_3	13(1,12)−13(0,13)AA	[b]	OriMC−1	OSO 20 m	Joh84	Gro98
U	105787.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	105794.057*(58)	CH_2NH	4(0,4)−3(1,3)	0.27[b]	SgrB2(M)	BTL 7 m	Cum86	
	105799.093*(10)	$H^{13}CCCN$	12−11	[b]	SgrB2(M)	BTL 7 m	Cum86	Laf78
	105799.093*(10)	$H^{13}CCCN$	12−11	0.10	OriMC−1	OSO 20 m	Joh84	Laf78
	105838.0(3)	C_4H	$^2\Pi_{3/2}$ J=23/2−21/2 v_7=1e	3.50[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	105871.110(4)	^{14}CO	1−0	0.002	IRC+10216	BTL 7 m	Wri94	Ros58
	105941.503*(24)	$Si^{34}S$	6−5	0.12	IRC+10216	BTL 7 m	Wri94	Tie76
	105972.593*(1)	NH_2CHO	5(2,4)−4(2,3)	0.1[o]	SgrB2(M)	NRAO 11 m	Got78a	
	105998.3*(10)	$HCCC^{15}N$	12−11	2.8[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	106062.3*(10)	$H^{13}CCCN$	12−11 v_7=1ℓ=1e	5.3[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	106132.8(3)	C_4H	$^2\Pi_{3/2}$ J=23/2−21/2 v_7=1f	3.10[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	106134.418*(2)	NH_2CHO	5(3,3)−4(3,2)	0.10[b]	SgrB2(M)	BTL 7 m	Cum86	
	106141.391*(2)	NH_2CHO	5(3,2)−4(3,1)	[b]	SgrB2(M)	BTL 7 m	Cum86	
U	106156.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	106210.5*(10)	$H^{13}CCCN$	12−11 v_7=1ℓ=1f	3.8[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	106347.740*(13)	CCS	9,8−8,7	0.19	SgrB2(M)	BTL 7 m	Cum86	
U	106367.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	106374.247*(7)	$^{34}SO_2$	33(5,27)−32(6,26)	0.03[b]	OMC−IRc2	SEST 15 m	Ger89	
	106375.018*(11)	CH_3CH_2CN	15(3,12)−12(2,13)	[b]	OMC−IRc2	SEST 15 m	Ger89	
U	106386.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	106474.1*(10)	$H^{13}CCCN$	12−11 v_7=2	9.5[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	106493.936*(43)	$HOCO^+$	5(1,5)−4(1,4)	[b]	SgrB2(M)	NRAO 12 m	Tur87b	
	106498.910*(4)	HC_5N	40−39	0.04[b]	SgrB2(M)	NRAO 12 m	Tur87b	
	106541.674*(1)	NH_2CHO	5(2,3)−4(2,2)	0.15	SgrB2(M)	BTL 7 m	Cum86	
	106641.394*(17)	CH_2CHCN	11(1,10)−10(1,9)	0.05	SgrB2(M)	BTL 7 m	Cum86	
	106723.494*(17)	$t-CH_3CH_2OH$	9(2,8)−9(1,9)	0.06	SgrB2(M)	BTL 7 m	Cum86	
	106743.374*(18)	^{34}SO	2(3)−1(2)	0.16[d]	OriMC−1	NRAO 11 m	Got78	
	106762.47*(9)	C_6H	$^2\Pi_{3/2}$ J=77/2−75/2f	1.00[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	106775.679*(8)	CH_3OCH_3	9(1,8)−8(2,7)AA	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	106777.371*(6)	CH_3OCH_3	9(1,8)−8(2,7)EE	0.05[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	106779.062*(14)	CH_3OCH_3	9(1,8)−8(2,7)EA+AE	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	106787.388*(2)	$OC^{34}S$	9−8	0.089	SgrB2(M)	BTL 7 m	Gol81	
	106913.524*(25)	$HOCO^+$	5(0,5)−4(0,4)	0.4	SgrB2(M)	BTL 7 m	Tha81	
	106922.973*(11)	^{29}SiS	6−5	0.012	IRC+10216	BTL 7 m	Hen85	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	106942.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	106949.482*(20)	$a-CH_2CHOH$	3(1,3)−2(0,2)	0.034	SgrB2(N)	NRAO 12 m	Tur01	
U	106963.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
U	106981.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	106995.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	107013.770*(13)	CH_3OH	3(1,3)−4(0,4)A+	4.5	OriMC−1	FCRAO 14 m	Gol83	Xu_97
	107043.521*(9)	CH_3CH_2CN	12(2,11)−11(2,10)	0.05	SgrB2(M)	BTL 7 m	Cum86	
	107060.225*(3)	SO_2	27(3,25)−26(4,22)	0.07	SgrB2(M)	BTL 7 m	Cum86	
U	107103.2	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
	107159.915*(23)	CH_3OH	15(−2,14)−15(1,14)E	0.31	OriMC−1	NRAO 11 m	Tur89	Xu_97
	107164.298*(16)	$^{13}CH_3CN$	6(4)−5(4)	0.9[f]	G10.47	IRAM 30 m	Olm96	
	107178.410*(16)	$^{13}CH_3CN$	6(3)−5(3)	0.04[b]	SgrB2(M)	BTL 7 m	Cum86	
	107188.495*(16)	$^{13}CH_3CN$	6(2)−5(2)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	107194.547*(17)	$^{13}CH_3CN$	6(1)−5(1)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	107196.564*(17)	$^{13}CH_3CN$	6(0)−5(0)	0.07[b]	SgrB2(M)	BTL 7 m	Cum86	
U	107207.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
U	107258.8	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
	107288.948*(4)	$^{13}C^{17}O$	1−0	0.029	rhoOphC	SEST 15 m	Ben01	
	107315.359*(49)	$HOCO^+$	5(1,4)−4(1,3)	[b]	SgrB2(M)	NRAO 12 m	Tur87b	
	107316.46*(10)	CH_3SH	3(−1)−3(0)A	0.04[b]	SgrB2(M)	BTL 7 m	Cum86	
U	107350.0	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	107367.3	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
	107384.201*(10)	$^{24}MgNC$	17/2,9−15/2,8	2.8	IRC+10216	IRAM 30 m	Gue93	Kaw93
	107399.420*(10)	$^{24}MgNC$	19/2,9−17/2,8	2.6	IRC+10216	IRAM 30 m	Gue93	Kaw93
U	107404.2	unidentified		0.06	SgrB2(N)	SEST 15m	Dic01	
U	107406.5	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	107423.655*(19)	$c-C_3HD$	3(1,3)−2(0,2)	0.5	TMC−1	IRAM 30 m	Ger87	
U	107426.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	107454.09*(22)	C_6H	$^2\Pi_{1/2}$ J=77/2−75/2e	0.66[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	107481.465*(15)	CH_3CH_2CN	17(2,16)−17(1,17)	0.10[b]	SgrB2(OH)	IRAM 30 m	Gom86	
	107485.181*(7)	CH_3CH_2CN	12(7,*)−11(7,*)	0.05[b]	SgrB2(M)	BTL 7 m	Cum86	
	107486.962*(8)	CH_3CH_2CN	12(6,*)−11(6,*)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	107491.579*(7)	CH_3CH_2CN	12(8,*)−11(8,*)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	107502.426*(8)	CH_3CH_2CN	12(5,8)−11(5,7)	0.05[b]	SgrB2(M)	BTL 7 m	Cum86	
	107502.473*(8)	CH_3CH_2CN	12(5,7)−11(5,6)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	107507.90*(24)	C_6H	$^2\Pi_{1/2}$ J=77/2−75/2f	0.58[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	107516.	unidentified		0.03	SgrB2(M)	BTL 7 m	Cum86	
	107519.944*(7)	CH_3CH_2CN	12(10,*)−11(10,*)	0.7[e]	G34.3+02	BIMA Array	Meh96	
U	107520.	unidentified		n.r.	SgrB2(N)	BIMA Array	Sny94	
	107537.189*(25)	CH_3OCHO	9(2,8)−8(2,7)E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	107539.857*(7)	CH_3CH_2CN	12(11,*)−11(11,*)	0.7[e]	G34.3+02	BIMA Array	Meh96	
	107543.746*(25)	CH_3OCHO	9(2,8)−8(2,7)A	0.07[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	107543.924*(8)	CH_3CH_2CN	12(4,9)−11(4,8)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	107547.599*(8)	CH_3CH_2CN	12(4,8)−11(4,7)	[b]	SgrB2(M)	BTL 7 m	Cum86	
U	107574.6	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	107594.046*(9)	CH_3CH_2CN	12(3,10)−11(3,9)	0.06	SgrB2(M)	BTL 7 m	Cum86	
U	107604.	unidentified		0.02[b]	SgrB2(M)	NRAO 11 m	Tur89	
	107611.54*(14)	$K^{35}Cl$	14−13	0.25[f]	IRC+10216	IRAM 30 m	Cer87c	
	107622.956*(23)	H_2CCCC	12(1,11)−11(1,10)	0.103	IRC+10216	IRAM 30 m	Cer91a	Kil90
	107734.738*(9)	CH_3CH_2CN	12(3,9)−11(3,8)	0.04	SgrB2(M)	BTL 7 m	Cum86	
U	107751.	unidentified		0.02	OriMC−1	NRAO 11 m	Tur89	
	107843.478*(2)	SO_2	12(4,8)−13(3,11)	0.06	SgrB2(M)	BTL 7 m	Cum86	
	107971.65*(20)	$Si^{13}CC$	5(1,4)−4(1,4)	0.6[f]	IRC+10216	IRAM 30 m	Cer91b	
U	108024.	unidentified		0.15	OriMC−1	NRAO 11 m	Tur89	
	108126.71*(1)	HCOOH	5(1,5)−4(1,4)	0.06	SgrB2(M)	BTL 7 m	Cum86	Wil80
	108210.388*(11)	CH_3CH_2CN	11(1,11)−10(0,10)	0.08	SgrB2	NRAO 11 m	Tur89	
U	108216.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
U	108255.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	108394.288*(8)	SiS	6−5 v=1	0.012	IRC+10216	NRAO 12 m	Tur94	
U	108412.3	unidentified		0.012	IRC+10216	NRAO 12 m	Tur94	
U	108426.9	unidentified		0.020	IRC+10216	NRAO 12 m	Tur94	
U	108444.2	unidentified		0.012	IRC+10216	NRAO 12 m	Tur94	
U	108453.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
	108471.967*(38)	NaCN	7(0,7)−6(0,6)	0.013	IRC+10216	NRAO 12 m	Tur94	Tur94
	108514.40*(24)	SiC_2	5(1,5)−4(1,4) v_3 =1	0.002	IRC+10216	NRAO 12 m	Gen97	Bog91
	108651.297(50)	^{13}CN	1/2−1/2 F=2−1, F_1=0, F_2=1−0	0.07	SgrB2(M)	BTL 7 m	Ger84	Bog84a
	108657.646(50)	^{13}CN	1/2−1/2 F=2−2, F_1=1, F_2=1−1	0.07[b]	SgrB2(M)	BTL 7 m	Ger84	Bog84a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	108658.948(50)	^{13}CN	1/2−1/2 F=1−2, F_1=1, F_2=1−1	[b]	SgrB2(M)	BTL 7 m	Ger84	Bog84a
	108710.523*(11)	HC^{13}CCN	12−11	0.15	SgrB2(M)	BTL 7 m	Cum86	Laf78
	108721.008*(7)	HCC^{13}CN	12−11	0.15	SgrB2(M)	BTL 7 m	Cum86	Laf78
U	108778.	unidentified		0.035	OriMC−1	FCRAO 14 m	Ziu88	
	108780.201(50)	^{13}CN	3/2−1/2 F=3−2, F_1=1, F_2=2−1	0.13[b]	SgrB2(M)	BTL 7 m	Ger84	Bog84a
	108782.374(50)	^{13}CN	3/2−1/2 F=2−1, F_1=1, F_2=2−1	[b]	SgrB2(M)	BTL 7 m	Ger84	Bog84a
	108786.982(50)	^{13}CN	3/2−1/2 F=1−0, F_1=1, F_2=2−1	[b]	SgrB2(M)	BTL 7 m	Ger84	Bog84a
	108793.753(50)	^{13}CN	3/2−1/2 F=1−1	[b]	SgrB2(OH)	NRAO 12 m	Sav02	Bog84a
U	108796.	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu88	
	108796.400(50)	^{13}CN	3/2−1/2 F=2−2	0.04[b]	SgrB2(OH)	NRAO 12 m	Sav02	Bog84a
U	108802.	unidentified		0.025	OriMC−1	FCRAO 14 m	Ziu88	
	108813.575*(52)	CH_2CHCN	20(1,19)−20(0,20)	0.02	OriMC−1	FCRAO 14 m	Ziu88	
	108834.27*(3)	CCCN	11−10 J=23/2−21/2	0.45	IRC+10216	OSO 20 m	Joh84	Got83
	108853.02*(3)	CCCN	11−10 J=21/2−19/2	0.45	IRC+10216	OSO 20 m	Joh84	Got83
U	108866.	unidentified		0.02	Ori−S	NRAO 12 m	Ziu91a	
	108883.548*(58)	CH_3OCHO	14(3,12)−14(2,13)A	0.02	OriMC−1	FCRAO 14 m	Ziu88	Oes99
	108893.929*(15)	CH_3OH	0(0,0)−1(−1,1)E	0.98	SgrB2(M)	BTL 7 m	Cum86	Xu_97
U	108909.	unidentified		0.01	Ori−S	NRAO 12 m	Ziu91a	
	108924.288*(8)	SiS	6−5	0.28	IRC+10216	NRAO 11 m	Mor75	
	108940.596*(9)	CH_3CH_2CN	12(2,10)−11(2,9)	0.24	OriMC−1	FCRAO 14 m	Ziu88	
	108955.895*(4)	SO_2	39(6,34)−38(7,31)	0.05	SgrB2(M)	NRAO 12 m	Ziu91a	
U	108987.	unidentified		0.01	Ori−S	NRAO 12 m	Ziu91a	
U	108998.	unidentified		0.02	OriMC−1	FCRAO 14 m	Ziu88	
	109008.67*(3)	DCOOH	9(1,8)−9(0,9)	0.04	OriMC−1	NRAO 11 m	Tur89	Wil80
U	109012.	unidentified		0.02	OriMC−1	FCRAO 14 m	Ziu88	
	U109018.	unidentified		0.15	SgrB2(M)	NRAO 11 m	Tur89	
	109023.3*(4)	HCCCN	12−11 v_4 =1	5.0[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	109092.761*(4)	CH_2CHCHO	12(1,11)−11(1,10)	0.02	OriMC−1	FCRAO 14 m	Ziu88	
	109110.844*(4)	O^{13}CS	9−8	0.08	SgrB2(M)	BTL 7 m	Cum86	
	109125.8*(10)	HC^{13}CCN	12−11 v_7 =1 ℓ=1 f	6.3[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	109137.57*(17)	CH_3OH	26(0,26)−26(−1,26) E	0.3	OriMC−1	FCRAO 14 m	Gol82	Xu_97
	109153.210*(28)	CH_3OH	16(−2,15)−16(1,15) E	0.3	OriMC−1	FCRAO 14 m	Gol82	Xu_97
	109160.983*(4)	HC_5N	41−40	0.018	IRC+10216	NRAO 11 m	Jew84	
	109173.638*(4)	HCCCN	12−11	2.57	SgrB2(M)	NRAO 11 m	Mor76	
	109182.946*(81)	HCCCN	12−11 v_5 =1ℓ=1e	2.0[f]	G10.47+0.03	IRAM 30 m	Wyr99	Laf78
	109244.339*(84)	HCCCN	12−11 v_5 =1ℓ=1f	2.4[f]	G10.47+0.03	IRAM 30 m	Wyr99	Laf78
	109252.212*(12)	SO	2(3)−1(2)	2.42[m]	OriMC−1	MMWO 4.9 m	Got78	
	109292.081*(32)	CH_3OCHO	10(1,9)−9(2,8)E	0.1	OriMC−1	NRAO 11 m	Tur89	Oes99
	109302.206*(34)	CH_3OCHO	10(1,9)−9(2,8)A	0.22	OriMC−1	NRAO 11 m	Tur89	Oes99
	109306.7*(4)	HCCCN	12−11 v_4 =1 v_7 =1ℓ=1e−	0.6[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109352.726*(38)	HCCCN	12−11 v_6 =1ℓ=1e	0.02	OriMC−1	FCRAO 14 m	Gol85	Laf78
	109383.4*(10)	HC^{13}CCN	12−11 v_7 =2	5.7[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	109401.9*(10)	HCC^{13}CN	12−11 v_7 =2	6.3[f]	G10.47+0.03	PdBI Array	Wyr99	Wyr99
	109438.572*(49)	HCCCN	12−11 v_6 =1ℓ=1f	0.02[b]	OriMC−1	FCRAO 14 m	Gol85	Laf78
	109441.944*(30)	HCCCN	12−11 v_7 =1ℓ=1e	0.13	OriMC−1	FCRAO 14 m	Gol82	Laf78
	109441.944*(30)	HCCCN	12−11 v_7 =1ℓ=1e	7.1[f]	G10.47+0.03	IRAM 30 m	Wyr99	Laf78
	109463.063*(1)	OCS	9−8	0.70	SgrB2(M)	NRAO 11 m	Jef71	
	109469.4*(4)	HCCCN	12−11 v_4 =1 v_7 =1ℓ=1f+	0.6[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109496.007*(4)	HNCO	5(1,5)−4(1,4)	0.16	OriMC−1	FCRAO 14 m	Gol82	
	109522.5*(10)	HCCCN	12−11 v_6 =2ℓ=0	0.7[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
U	109530.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
U	109538.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	109549.5*(3)	HCCCN	12−11 v_5 =1 v_7 =1ℓ=0f+	1.1[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109552.1*(3)	HCCCN	12−11 v_5 =1 v_7 =1ℓ=2f+	1.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109558.0*(40)	HCCCN	12−11 v_5 =1 v_7 =1ℓ=0e−	1.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109563.7*(30)	HCCCN	12−11 v_5 =1 v_7 =1ℓ=2e−	1.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109571.390*(6)	CH_3OCH_3	8(2,7)−8(1,8)EA	[b]	OriMC−1	FCRAO 14 m	Gol85	Gro98
	109571.398*(6)	CH_3OCH_3	8(2,7)−8(1,8)AE	0.10[b]	OriMC−1	FCRAO 14 m	Gol85	Gro98
	109574.119*(4)	CH_3OCH_3	8(2,7)−8(1,8)EE	0.16	OriMC−1	FCRAO 14 m	Gol85	Gro98
	109576.843*(8)	CH_3OCH_3	8(2,7)−8(1,8)AA	0.12	OriMC−1	FCRAO 14 m	Gol85	Gro98
	109598.751*(30)	HCCCN	12−11 v_7 =1ℓ=1f	0.19	OriMC−1	FCRAO 14 m	Gol85	Laf78
	109616.3*(2)	HCCCN	12−11 v_6 =2ℓ=2	1.1[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109650.301*(9)	CH_3CH_2CN	12(1,11)−11(1,10)	0.07	OriMC−1	NRAO 11 m	Joh77	
	109689.61(10)	C^{15}N	1−0 J=1/2−1/2 F=1−1	0.10	OriMC−1	KOSMA 3 m	Sal94a	Sal94a
U	109720.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
U	109738.5	unidentified		0.02	OriMC−1	FCRAO 14 m	Gol83	
	109753.499*(1)	NH_2CHO	5(1,4)−4(1,3)	0.3	SgrB2(M)	BTL 7 m	Lin81	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	109757.587*(2)	SO_2	17(5,13)−18(4,14)	0.30	OriMC−1	FCRAO 14 m	Gol82	
U	109770.5	unidentified		0.03	OriMC−1	FCRAO 14 m	Gol83	
	109771.918*(16)	HCCN	6,5−5,4	1.0[f]	IRC+10216	IRAM 30 m	Gue91	
	109782.173*(2)	$C^{18}O$	1−0	2.1	OriMC−1	NRAO 11 m	Uli76	
	109828.291*(5)	CCCS	19−18	2.7[f]	IRC+10216	IRAM 30 m	Cer87b	
	109833.489*(6)	HNCO	5(3,2)−4(3,1)	0.03[b]	OriMC−1	FCRAO 14 m	Gol82	
	109833.489*(6)	HNCO	5(3,3)−4(3,2)	[b]	OriMC−1	FCRAO 14 m	Gol82	
	109861.999*(20)	HCCN	5,5−4,4	0.4[f]	IRC+10216	IRAM 30 m	Gue91	
	109862.828*(46)	HCCCN	12−11 v_7 =2ℓ=0	0.02[b]	OriMC−1	FCRAO 14 m	Gol83	Laf78
	109865.854*(55)	HCCCN	12−11 v_7 =2ℓ=2e	[b]	OriMC−1	FCRAO 14 m	Gol83	Laf78
	109870.188*(48)	HCCCN	12−11 v_7 =2ℓ=2f	[b]	SgrB2(M)	NRAO 11 m	Tur89	Laf78
	109870.278	HNCO	5(1,5)−4(1,4) v_6 =1	[b]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	109872.366*(5)	HNCO	5(2,4)−4(2,3)	0.09[b]	OriMC−1	FCRAO 14 m	Gol82	
	109872.773*(5)	HNCO	5(2,3)−4(2,2)	[b]	OriMC−1	FCRAO 14 m	Gol82	
	109905.753*(5)	HNCO	5(0,5)−4(0,4)	1.1	SgrB2(M)	NRAO 11 m	Sol73	
	109990.0*(2)	HCCCN	12−11 v_6 =1 v_7 =2ℓ=1e−	1.4[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110024.59(10)	$C^{15}N$	1−0 J=1/2−1/2 F=2−1	0.18	OriMC−1	KOSMA 3 m	Sal94a	Sal94a
	110035.6*(2)	HCCCN	12−11 v_6 =1 v_7 =2ℓ =−1f+	1.8[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110046.249*(22)	HCCN	4,5−3,4	0.3[f]	IRC+10216	IRAM 30 m	Gue91	
	110050.77*(9)	HCCCN	12−11 v_7 =3ℓ=1e	0.10[h]	SgrB2(M)	NRAO 11 m	Tur89	Laf78
	110066.104	HNCO	5(4)−4(4) v_5 =1	0.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110080.464	HNCO	5(3)−4(3) v_6 =1	0.4[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110084.368	HNCO	5(0,5)−4(0,4) v_5 =1	0.8[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110086.440	HNCO	5(0,5)−4(0,4) v_6 =1	0.5[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110089.690	HNCO	5(3)−4(3) v_5 =1	0.5[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110097.6*(2)	HCCCN	12−11 v_6 =1 v_7 =2ℓ=3	1.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110104.112	HNCO	5(2,4)−4(2,3) v_5 =1	0.5[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110105.356	HNCO	5(2,3)−4(2,2) v_5 =1	0.7[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110105.4	CH_2DOH	9(1,8)−9(0,9)o1	0.05	IRAS16293−2422	IRAM 30 m	Par02	Par02
	110148.8*(2)	HCCCN	12−11 v_6 =1 v_7 =2ℓ =−1e−	1.2[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110152.084(20)	NH_2D	1(1,1)0−−1(0,1)0+ F=0−1	[b]	DR21(OH)	OSO 20 m	Olb85	Bes83
	110152.995(20)	NH_2D	1(1,1)0−−1(0,1)0+ F=2−1	[b]	DR21(OH)	OSO 20 m	Olb85	Bes83
	110153.599(10)	NH_2D	1(1,1)0−−1(0,1)0+	0.14	OriMC−1	NRAO 11 m	Kui78	Bes83
	110153.599(10)	NH_2D	1(1,1)0−−1(0,1)0+ F=1−1	[b]	DR21(OH)	OSO 20 m	Olb85	Bes83
	110153.599(10)	NH_2D	1(1,1)0−−1(0,1)0+ F=2−2	0.11[b]	DR21(OH)	OSO 20 m	Olb85	Bes83
	110154.222(20)	NH_2D	1(1,1)0−−1(0,1)0+ F=1−2	[b]	DR21(OH)	OSO 20 m	Olb85	Bes83
	110155.053(20)	NH_2D	1(1,1)0−−1(0,1)0+ F=1−0	[b]	DR21(OH)	OSO 20 m	Olb85	Bes83
	110164.245	HNCO	5(1,4)−4(1,3) v_6 =1	0.6[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110188.860(50)	CH_3OD	1(1,0)−1(0,1)E	0.5[f]	OriMC−1	IRAM 30 m	Mau88	And88
	110189.8*(2)	HCCCN	12−11 v_6 =1 v_7 =2ℓ=1f+	1.8[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	110201.353*(1)	^{13}CO	1−0	9.3	OriMC−1	NRAO 11 m	Uli76	
	110211.4*(2)	HCCCN	12−11 v_7 =3ℓ=3	2.2[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
U	110240.	unidentified		0.12	OriMC−1	NRAO 11 m	Tur91	
	110244.03*(21)	C_6H	2 $\Pi_{1/2}$ J=79/2−77/2f	0.76[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	110262.640(50)	CH_3OD	2(1,1)−2(0,2)E	2.0[f]	OriMC−1	IRAM 30 m	Mau88	And88
	110298.098*(4)	HNCO	5(1,4)−4(1,3)	0.23	SgrB2(M)	BTL 7 m	Cum86	
	110299.19*(23)	C_6H	2 $\Pi_{1/2}$ J=79/2−77/2e	0.74[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	110309.847*(5)	$CH_3{}^{13}CN$	6(3)−5(3)	0.05	OriMC−1	NRAO 11 m	Tur89	
	110320.438*(5)	$CH_3{}^{13}CN$	6(2)−5(2)	3.0[f]	G10.47	IRAM 30 m	Olm96	
	110326.795*(5)	$CH_3{}^{13}CN$	6(1)−5(1)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	110328.914*(5)	$CH_3{}^{13}CN$	6(0)−5(0)	0.14[b]	SgrB2(M)	BTL 7 m	Cum86	
	110330.627*(3)	CH_3CN	6(5)−5(5) F=7−6	0.2[bk]	SgrB2(M)	NRAO 11 m	Sol71	Bou80
	110330.872*(2)	CH_3CN	6(5)−5(5) F=5−4	[b]	SgrB2(M)	NRAO 11 m	Sol71	Bou80
	110349.659*(2)	CH_3CN	6(4)−5(4) F=7−6	0.45[b]	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110349.797*(2)	CH_3CN	6(4)−5(4) F=5−4	[b]	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110364.469*(1)	CH_3CN	6(3)−5(3) F=7−6	0.31[b]	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110364.524*(1)	CH_3CN	6(3)−5(3) F=5−4	[b]	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110375.052*(1)	CH_3CN	6(2)−5(2) F=7−6	0.81	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110381.404*(1)	CH_3CN	6(1)−5(1) F=7−6	1.09[b]	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110383.522*(1)	CH_3CN	6(0)−5(0) F=7−6	[b]	SgrB2(M)	NRAO 11 m	Sol73	Bou80
	110413.59*(2)	HCOOH	9(3,6)−10(2,9)	0.04	OriMC−1	NRAO 11 m	Tur89	Wil80
	110455.358*(29)	CH_3OCHO	9(8,1)−8(8,0)A	0.06[b]	SgrB2(M)	NRAO 11 m	Tur89	Oes99
	110455.358*(29)	CH_3OCHO	9(8,2)−8(8,1)A	0.06[b]	SgrB2(M)	NRAO 11 m	Tur89	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	110457.971*(28)	CH_3OCHO	9(8,2)−8(8,1)E	[b]	SgrB2(M)	NRAO 11 m	Tur89	Oes99
	110475.76(10)	CH_3OD	3(1,2)−3(0,3)E	0.10	SgrB2(M)	NRAO 11 m	Tur89	Kau80
U	110486.	unidentified		0.03	OriMC−1	NRAO 11 m	Tur89	
	110525.598*(32)	CH_3OCHO	9(7,2)−8(7,1)E	0.03	OriMC−1	NRAO 11 m	Tur89	Oes99
	110535.182*(28)	CH_3OCHO	9(7,3)−8(7,2)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110535.184*(28)	CH_3OCHO	9(7,2)−8(7,1)A	0.03[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110535.955*(25)	CH_3OCHO	9(7,3)−8(7,2)E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110550.217*(28)	CH_3OCHO	7(2,6)−6(1,5)E	0.05	SgrB2(M)	NRAO 11 m	Tur89	
	110560.053*(29)	CH_3OCHO	7(2,6)−6(1,5)A	0.05	SgrB2(M)	NRAO 11 m	Tur89	
U	110571.7	unidentified		0.36	OriMC−1	IRAM 30 m	Com96	
U	110575.9	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	110590.7	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	110599.	unidentified		0.05	SgrB2(M)	NRAO 11 m	Tur89	
	110609.554*(60)	CH_3CN	6(1)−5(1) $v_8=1\ell=1$	0.06	OriMC−1	FCRAO 14 m	Gol83	Bou80
	110637.370*(21)	CH_3CN	6(5)−5(5) $v_8=1\ell=-1$ $F=7-6$	2.0[f]	G10.47	IRAM 30 m	Olm96	Bou80
U	110642.9	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	110652.678*(29)	CH_3OCHO	9(6,3)−8(6,2)E	0.10	OriMC−1	FCRAO 14 m	Gol83	Oes99
	110660.869*(10)	CH_3CN	6(4)−5(4) $v_8=1\ell=-1$	7.0[e]	SgrB2(N)	BIMAArray	Mia98	Bou80
	110661.057*(15)	CH_3CN	6(4)−5(4) $v_8=1\ell=-1$ $F=7-6$	2.5[f]	G10.47	IRAM 30 m	Olm96	Bou80
	110662.261*(25)	CH_3OCHO	9(6,4)−8(6,3)E	[b]	OriMC−1	FCRAO 14 m	Gol83	Oes99
	110663.263*(28)	CH_3OCHO	9(6,4)−8(6,3)A	0.23[b]	OriMC−1	FCRAO 14 m	Gol83	Oes99
	110663.456*(28)	CH_3OCHO	9(6,3)−8(6,2)A	[b]	OriMC−1	FCRAO 14 m	Gol83	Oes99
U	110675.5	unidentified		0.11	OriMC−1	IRAM 30 m	Com96	
	110680.350*(10)	CH_3CN	6(3)−5(3) $v_8=1\ell=-1$	7.0[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110683.959*(10)	CH_3CN	6(5)−5(5) $v_8=1\ell=1$	5.0[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110695.506*(10)	CH_3CN	6(2)−5(2) $v_8=1\ell=-1$	10.0[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110698.701*(10)	CH_3CN	6(4)−5(4) $v_8=1\ell=1$	8.0[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110706.251*(60)	CH_3CN	6(1)−5(1) $v_8=1\ell=-1$	9.5[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110709.313*(11)	CH_3CN	6(3)−5(3) $v_8=1\ell=+1$	9.5[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110712.166*(11)	CH_3CN	6(0)−5(0) $v_8=1\ell=1$	10.3[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110716.212*(17)	CH_3CN	6(2)−5(2) $v_8=1\ell=1$	8.5[e]	SgrB2(N)	BIMA Array	Mia98	Bou80
	110732.51*(18)	$^{13}CH_3OH$	14(2,12)−13(1,13)A++ $v_t=1$	0.03	OriMC−1	IRAM 30 m	Com96	Xu_97
U	110765.0	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	110770.5	unidentified		0.04	OriMC−1	FCRAO 14 m	Gol83	
U	110776.4	unidentified		0.37	OriMC−1	IRAM 30 m	Com96	
	110788.590*(28)	CH_3OCHO	10(1,10)−9(1,9)E	0.23[b]	OriMC−1	FCRAO 14 m	Gol83	Oes99
	110790.533*(29)	CH_3OCHO	10(1,10)−9(1,9)A	[b]	OriMC−1	FCRAO 14 m	Gol83	Oes99
	110812.59(10)	NHD_2	1(1,0)−1(0,1)O−(s)	0.025	OriMC−1	NRAO 12 m	Tur90a	Rou00
	110823.095*(60)	CH_3CN	6(1)−5(1) $v_8=1\ell=+-1$	0.05	OriMC−1	FCRAO 14 m	Gol83	Bou80
	110839.988*(18)	CH_2CHCN	12(1,12)−11(1,11)	0.06	OriMC−1	FCRAO 14 m	Gol83	
U	110845.	unidentified		0.03[b]	SgrB2(M)	NRAO 11 m	Tur89	
U	110861.4	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	110873.828*(29)	CH_3OCHO	9(5,4)−8(5,3)E	0.06[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110879.684*(25)	CH_3OCHO	9(3,7)−8(3,6)E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110880.466*(25)	CH_3OCHO	9(5,5)−8(5,4)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110882.273*(24)	CH_3OCHO	9(5,5)−8(5,4)E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110887.127*(25)	CH_3OCHO	9(3,7)−8(3,6)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110890.275*(25)	CH_3OCHO	9(5,4)−9(5,3)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	110896.55(10)	NHD_2	1(1,0)−1(0,1)O−(s)	0.016	L134N	IRAM 30 m	Rou00	Rou00
U	110900.9	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	110906.	unidentified		0.13	OriMC−1	NRAO 11 m	Tur89	
U	110912.9	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	110918.765*(82)	CH_3OCHO	9(4,6)−8(4,4)E	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Oes99
	110923.54(10)	$C^{15}N$	1−0 $J=1/2-1/2$ $F=1-0$	0.07	OriMC−1	KOSMA3 m	Sal94a	Sal94a
U	110924.9	unidentified		0.17	OriMC−1	IRAM 30 m	Com96	
	110931.103*(30)	$t-CH_3CH_2OH$	15(8,8)−16(7,9)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	
	110931.153*(30)	$t-CH_3CH_2OH$	15(8,7)−16(7,10)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	
U	110938.3	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
	110950.75(10)	CH_3OD	4(1,4)−4(0,4)E	0.04	SgrB2(M)	NRAO 11 m	Tur89	Kau80
	U110954.5	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
	110962.074*(32)	CH_3OCHO	15(4,12)−15(3,13)A	0.17[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
U	110968.	unidentified		[b]	OriMC−1	NRAO 11 m	Tur89	
U	110977.3	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	110986.4	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	111006.6	unidentified		0.22	OriMC−1	IRAM 30 m	Com96	
U	111013.4	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	111021.8	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	111029.1	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
U	111034.6	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	111038.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
U	111047.5	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	111069.0	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	111094.9	unidentified		0.26	OriMC−1	IRAM 30 m	Com96	
U	111121.4	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	111127.9	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	111139.0	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
U	111161.9	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	111169.831*(28)	CH_3OCHO	10(0,10)−9(0,9)E	[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	111171.659*(29)	CH_3OCHO	10(0,10)−9(0,9)A	0.09[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	111195.990*(25)	CH_3OCHO	9(4,6)−8(4,5)A	0.17	OriMC−1	NRAO 11 m	Tur89	Oes99
U	111211.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
	111223.397*(28)	CH_3OCHO	9(4,6)−8(4,5)E	0.11	OriMC−1	NRAO 11 m	Tur89	Oes99
	111243.339*(21)	$(CH_3)_2CO$	10(1,9)−9(2,8)AE	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	111243.388*(21)	$(CH_3)_2CO$	10(2,9)−9(1,8)AE	0.10[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	111243.424*(20)	$(CH_3)_2CO$	10(1,9)−9(2,8)EA	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	111243.472*(20)	$(CH_3)_2CO$	10(2,9)−9(1,8)EA	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
U	111254.4	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
	111289.601*(19)	CH_3OH	7(2,5)−8(1,8)A+	0.58	OriMC−1	NRAO 11 m	Tur89	Xu_97
U	111312.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	111408.322*(37)	CH_3OCHO	9(4,5)−8(4,4)E	0.10	OriMC−1	NRAO 11 m	Tur89	Oes99
	111432.033*(58)	CH_3OCHO	13(1,12)−13(0,13)E	0.04	OriMC−1	NRAO 11 m	Tur89	Oes99
	111453.327*(25)	CH_3OCHO	9(4,5)−8(4,4)A	0.34	OriMC−1	NRAO 11 m	Tur89	Oes99
	111492.46*(10)	CH_3OCHO	13(1,12)−13(0,13)A	0.02	OriMC−1	NRAO 11 m	Tur89	Oes99
U	111502.	unidentified		0.18[e]	SgrB2(N)	BIMA Array	Rem02	
	111507.270*(20)	CH_3COOH	10(*,10)−9(*,9)E	0.13[e]	W51e2	BIMA Array	Rem02	Ily00
	111508.64*(2)	$H^{13}COOH$	5(0,5)−4(0,4)	0.08[e]	W51e2	BIMA Array	Rem02	Wil80
U	111511.	unidentified		0.09[e]	W51e2	BIMA Array	Rem02	
	U111522.	unidentified		0.54[e]	SgrB2(N)	BIMA Array	Rem02	
	111538.210*(14)	CH_3CCCN	27(2)−26(2)	0.02	OriMC−1	NRAO 11 m	Tur89	
	111541.432*(14)	CH_3CCCN	27(1)−26(1)	[b]	OriMC−1	NRAO 11 m	Tur89	
U	111542.	unidentified		0.32[e]	SgrB2(N)	BIMA Array	Rem02	
	111542.501*(15)	CH_3CCCN	27(0)−26(0)	0.05	OriMC−1	NRAO 11 m	Tur89	
U	111548.	unidentified		0.10[e]	W51e2	BIMA Array	Rem02	
	111548.533*(20)	CH_3COOH	10(*,10)−9(*,9)A	0.16[e]	W51e2	BIMA Array	Rem02	Ily00
	111574.617*(26)	CH_3CH_2CN	22(1,21)−22(0,22)	0.05	OriMC−1	NRAO 11 m	Tur89	
U	111580.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
U	111589.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
	111626.550*(35)	CH_3OH	17(−2,16)−17(1,16)E	0.22	OriMC−1	NRAO 11 m	Tur89	Xu_97
	111674.070*(25)	CH_3OCHO	9(1,8)−8(1,7)E	0.18	OriMC−1	NRAO 11 m	Tur89	Oes99
U	111678.	unidentified		0.14	OriMC−1	NRAO 11 m	Tur89	
	111682.224*(25)	CH_3OCHO	9(1,8)−8(1,7)A	0.18	OriMC−1	NRAO 11 m	Tur89	Oes99
	111733.936*(28)	CH_3OCHO	10(1,10)−9(0,9)E	0.05[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	111735.329*(29)	CH_3OCHO	10(1,10)−9(0,9)A	[b]	OriMC−1	NRAO 11 m	Tur89	Oes99
	111746.78*(1)	HCOOH	5(0,5)−4(0,4)	0.10	SgrB2(M)	BTL 7 m	Cum86	Wil80
	111755.028*(4)	SO_2	31(3,29)−30(4,26)	0.06	SgrB2(M)	NRAO 11 m	Tur91	
	111782.596*(4)	CH_3OCH_3	7(0,7)−6(1,6)AA	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	111783.112*(4)	CH_3OCH_3	7(0,7)−6(1,6)EE	0.12[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	111783.628*(4)	CH_3OCH_3	7(0,7)−6(1,6)EA+AE	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	111812.238*(8)	CH_3OCH_3	18(3,15)−18(2,16)AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	111813.810*(6)	CH_3OCH_3	18(3,15)−18(2,16)EE	0.12[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	111815.382*(10)	CH_3OCH_3	18(3,15)−18(2,16)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	111823.026*(4)	HC_5N	42−41	0.08	SgrB2(M)	NRAO 11 m	Tur91	
U	111827.6	unidentified		0.13	OriMC−1	FCRAO 14 m	Gol83	
	111943.569*(16)	CH_3CH_2CN	18(2,17)−18(1,18)	0.04	OriMC−1	NRAO 11 m	Tur89	
U	111967.	unidentified		0.008	IRC+10216	NRAO 12 m	Ziu95	
U	111967.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	112006.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
	112016.00*(14)	$K^{37}Cl$	15−14	0.005	IRC+10216	IRAM 30 m	Ziu95	
U	112035.	unidentified		0.016	IRC+10216	IRAM 30 m	Ziu95	
	112063.44(10)	MgCN	11−10 J=21/2−19/2	0.006	IRC+10216	IRAM 30 m	Ziu95	And94
	112078.44(10)	MgCN	11−10 J=23/2−21/2	0.006	IRC+10216	IRAM 30 m	Ziu95	And94
U	112114.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
U	112150.	unidentified		0.004	IRC+10216	IRAM 30 m	Ziu95	
	112166.938(10)	l−C_3H	$^2\Pi_{1/2}$ 5−4 J=11/2−9/2 v_4 =1	~0.03	IRC+10216	IRAM 30 m	Ziu95	Yam90a
	112248.722*(6)	CH_3CHO	6(1,6)−5(1,5)A++	0.25	SgrB2(M)	NRAO 11 m	Tur91	Kle96

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	112254.512*(6)	CH_3CHO	6(−1,6)−5(−1,5)E	0.24	SgrB2(M)	NRAO 11 m	Tur91	Kle96
	112254.512*(6)	CH_3CHO	6(−1,6)−5(−1,5)E	0.90[f]	NGC6334F	SEST 15 m	Num98a	Kle96
U	112348.	unidentified		0.08	SgrB2(M)	IRAM 30 m	Com87	
	112355.48*(43)	$^{30}SiC_2$	5(0,5)−4(0,4)	0.10[b]	IRC+10216	IRAM 30 m	Cer87b	
	112358.780(15)	$C^{17}O$	1−0 F=3/2−5/2	0.20	B335	BTL 7 m	Fre81	Fre81
	112358.988(8)	$C^{17}O$	1−0 F=7/2−5/2	0.43	B335	BTL 7 m	Fre81	Fre81
	112360.005(8)	$C^{17}O$	1−0 F=5/2−5/2	0.38	B335	BTL 7 m	Fre81	Fre81
	112373.548*(18)	$(CH_3)_2CO$	11(0,11)−10(1,10)EE	0.03[b]	TMC−1	IRAM 30 m	Com87	Gro02a
	112373.548*(18)	$(CH_3)_2CO$	11(1,11)−10(0,10)EE	0.03[b]	TMC−1	IRAM 30 m	Com87	Gro02a
	112381.029*(28)	$(CH_3)_2CO$	11(0,11)−10(1,10)AA	[b]	TMC−1	IRAM 30 m	Com87	Gro02a
	112381.029*(28)	$(CH_3)_2CO$	11(1,11)−10(0,10)AA	0.04[b]	TMC−1	IRAM 30 m	Com87	Gro02a
	112432.30*(1)	HCOOH	5(4,*)−4(4,*)	0.06	SgrB2(M)	NRAO 11 m	Tur89	Wil80
	112459.61*(1)	HCOOH	5(3,3)−4(3,2)	0.06[b]	SgrB2(M)	BTL 7 m	Cum86	Wil80
	112467.00*(1)	HCOOH	5(3,2)−4(3,1)	[b]	SgrB2(M)	BTL 7 m	Cum86	Wil80
U	112532.	unidentified		0.05	SgrB2(M)	NRAO 11 m	Tur91	
U	112585.	unidentified		0.02	SgrB2(M)	NRAO 11 m	Tur89	
	112593.44*(10)	$Si^{13}CC$	5(0,5)−4(0,4)	0.7[f]	IRC+10216	IRAM 30 m	Cer91b	
	112646.233*(9)	CH_3CH_2CN	13(1,13)−12(1,12)	0.10	SgrB2(M)	BTL 7 m	Cum86	
	112654.117*(13)	NH_2CHO	8(3,6)−9(2,7)	0.07	OriMC−1	NRAO 11 m	Tur89	
	112807.096*(15)	$t-CH_3CH_2OH$	2(2,1)−1(1,0)	0.12	SgrB2(M)	NRAO 11 m	Kut80	
	112840.655*(18)	CH_2CHCN	12(0,12)−11(0,11)	0.06	SgrB2(M)	NRAO 11 m	Kut80	
	112869.993*(59)	CH_3OCHO	14(3,11)−13(4,10)A	0.07	OriMC−1	NRAO 11 m	Tur89	Oes99
U	112874.	unidentified		0.08	OriMC−1	NRAO 11 m	Tur89	
	112891.43*(11)	HCOOH	5(2,3)−4(2,2)n,t	0.06	SgrB2(M)	NRAO 11 m	Kut80	Wil80
	112922.5(4)	C_4H	$^2\Pi_{1/2}$ J=23/2−21/2 v_7 =1e	3.01[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
U	112997.	unidentified		0.10	OriMC−1	NRAO 11 m	Tur89	
	112999.982*(8)	CH_3OCH_3	20(3,17)−20(2,18)AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113001.218*(6)	CH_3OCH_3	20(3,17)−20(2,18)EE	0.11[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113002.455*(10)	CH_3OCH_3	20(3,17)−20(2,18)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113032.124*(30)	CH_2CHCN	8(1,8)−7(0,7)	0.09	SgrB2(M)	NRAO 11 m	Tur89	
	113059.350*(6)	CH_3OCH_3	17(3,14)−17(2,15)EE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113061.121*(10)	CH_3OCH_3	17(3,14)−17(2,15)AA	0.11[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113123.337*(10)	CN	1−0 J=1/2−1/2 F=1/2−1/2	0.17	G34.3+0.15	TRAO 14 m	Kim00	Ska83
	113136.20*(10)	$N^{34}S$	$^2\Pi_{1/2}$ J=5/2−3/2 F=3/2−3/2e	0.10	SgrB2(M)	NRAO 11 m	Tur89	
	113144.192(9)	CN	1−0 J=1/2−1/2 F=1/2−3/2	1.14	OriMC−1	NRAO 11 m	Tur75	Dix77
U	113159.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
	113170.528(20)	CN	1−0 J=1/2−1/2 F=3/2−1/2	0.97	OriMC−1	NRAO 11 m	Tur75	Dix77
	113191.317(40)	CN	1−0 J=1/2−1/2 F=3/2−3/2	1.38	OriMC−1	NRAO 11 m	Tur75	Dix77
U	113246.	unidentified		0.20	SgrB2(M)	NRAO 11 m	Tur89	
U	113260.	unidentified		0.22	SgrB2(M)	NRAO 11 m	Tur87b	
	113265.9(3)	C_4H	$^2\Pi_{1/2}$ J=23/2−21/2 v_7 =1f	3.67[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	113266.74*(4)	CH_2CHCN	20(2,18)−20(1,19)	0.15	SgrB2(M)	NRAO 11 m	Tur89	
	113276.031*(28)	CH_3OCH_3	10(6,4)−11(5,7)EE	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113279.138*(28)	CH_3OCH_3	10(6,5)−11(5,6)EE	0.05[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113279.455*(28)	CH_3OCH_3	10(6,4)−11(5,7)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	113280.593*(28)	CH_3OCH_3	10(6,5)−11(5,6)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
U	113314.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	113350.80(10)	CH_3OD	6(1,5)−6(0,6)E	0.04	OriMC−1	NRAO 11 m	Tur89	Kau80
	113410.204*(14)	CCS	8,9−7,8	2.1[f]	IRC+10216	IRAM 30 m	Cer87b	
	113488.140(5)	CN	1−0 J=3/2−1/2 F=3/2−1/2	1.04	OriMC−1	NRAO 11 m	Pen74	Dix77
	113490.982(3)	CN	1−0 J=3/2−1/2 F=5/2−3/2	3.23	OriMC−1	NRAO 11 m	Jef70	Dix77
	113499.639(5)	CN	1−0 J=3/2−1/2 F=1/2−1/2	0.79	OriMC−1	NRAO 11 m	Jef70	Dix77
	113508.944(13)	CN	1−0 J=3/2−1/2 F=3/2−3/2	0.94	OriMC−1	NRAO 11 m	Tur75	Dix77
	113520.414*(10)	CN	1−0 J=3/2−1/2 F=1/2−3/2	<0.2	OriMC−1	NRAO 11 m	All78	
	113657.647*(17)	CH_2CHCN	12(2,11)−11(2,10)	0.12	OriMC−1	NRAO 11 m	Tur89	
U	113729.	unidentified		0.04	OriMC−1	NRAO 11 m	Tur89	
	113743.007*(28)	CH_3OCHO	9(3,6)−8(3,5)E	0.13	OriMC−1	NRAO 11 m	Tur89	Oes99
	113756.646*(28)	CH_3OCHO	9(3,6)−8(3,5)A	0.09	OriMC−1	NRAO 11 m	Tur89	Oes99
	113766.420*(20)	HCCCHO	12(1,11)−11(1,10)	0.04	SgrB2(M)	NRAO 11 m	Tur91	
U	113818.	unidentified		0.20	SgrB2(M)	NRAO 11 m	Tur89	
	113820.12*(32)	$^{29}SiC_2$	5(0,5)−4(0,4)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	113831.197*(41)	CH_2CHCN	18(2,16)−18(1,17)	0.08	OriMC−1	NRAO 11 m	Tur89	
U	113844.	unidentified		0.10	SgrB2(M)	NRAO 11 m	Tur89	
	113978.248*(10)	CH_3CH_2CN	13(0,13)−12(0,12)	0.12	OriMC−1	NRAO 11 m	Joh77	
	114003.831*(6)	CH_3OCH_3	18(2,16)−18(1,17)AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	114005.399*(6)	CH_3OCH_3	18(2,16)−18(1,17)EE	0.11[b]	OriMC−1	NRAO 11 m	Tur89	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	114006.968*(8)	CH_3OCH_3	18(2,16)−18(1,17)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	114064.848*(15)	$t-CH_3CH_2OH$	2(2,0)−1(1,1)	0.12	SgrB2(M)	NRAO 11 m	Tur89	
	114092.612*(5)	^{18}OCS	10−9	0.07	OriMC−1	NRAO 11 m	Tur89	
U	114113.	unidentified		0.07	OriMC−1	NRAO 11 m	Tur89	
	114182.51*(2)	C_4H	25/2−23/2	0.23	IRC+10216	NRAO 11 m	Sco78	Got83
	114221.04*(2)	C_4H	23/2−21/2	0.40	IRC+10216	NRAO 11 m	Sco78	Got83
U	114291.	unidentified		0.09	OriMC−1	NRAO 11 m	Tur89	
U	114313.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
U	114336.	unidentified		0.05	OriMC−1	NRAO 11 m	Tur89	
	114362.21*(33)	$^{30}SiC_2$	5(2,4)−4(2,3)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	114443.946*(32)	$t-CH_3CH_2OH$	17(2,16)−16(3,13)	0.06	OriMC−1	NRAO 11 m	Tur89	
	114485.039*(4)	HC_5N	43−42	0.11	SgrB2(M)	BTL 7 m	Cum86	
	114565.381*(4)	SO_2	29(3,27)−28(4,24)	0.17	OriMC−1	NRAO 11 m	Tur89	
	114574.438*(4)	$^{34}SO_2$	6(3,3)−7(2,6)	0.05	OriMC−1	NRAO 11 m	Tur89	
	114615.021*(11)	$H^{13}CCCN$	13−12	0.13[b]	SgrB2(M)	BTL 7 m	Cum86	Laf78
	114621.577*(16)	CH_2CHCN	12(2,10)−11(2,9)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	114650.932*(46)	CH_3OH	18(−2,17)−18(1,17)E	0.35	OriMC−1	NRAO 11 m	Tur89	Xu_97
	114737.17(20)	C_4H	2Σ J=12−11 v_7 =2L	0.15	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	114793.82(20)	C_4H	2Σ J=12−11 v_7 =2U	0.15	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	114831.084*(11)	$HC_3{}^{15}N$	13−12	0.03	SgrB2(M)	NRAO 11 m	Tur89	Laf78
U	114840.	unidentified		0.06	OriMC−1	NRAO 11 m	Tur89	
U	114861.	unidentified		0.03	SgrB2(M)	NRAO 11 m	Tur89	
	114888.234*(48)	CH_3OCHO	23(6,18)−22(7,15)A	0.10	SgrB2(OH)	IRAM 30 m	Gom86	Oes99
	114897.372*(17)	$c-H^{13}CCCH$	3(0,3)−2(1,2)	0.07	TMC−1	NRAO 12 m	Ger87	
	114940.177*(6)	CH_3CHO	6(0,6)−5(0,5)E	0.15	SgrB2(M)	BTL 7 m	Cum86	Kle96
	114959.909*(6)	CH_3CHO	6(0,6)−5(0,5)A++	0.38	SgrB2(M)	BTL 7 m	Cum86	Kle96
U	115021.	unidentified		n.r.	OriMC−1	NRAO 11 m	Tur89	
	115038.94*(9)	C_6H	$^2\Pi_{3/2}$ J=83/2−81/2e	0.52[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
	115072.307*(10)	CH_3OCH_3	9(2,8)−9(1,9)AE+EA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	115075.086*(4)	CH_3OCH_3	9(2,8)−9(1,9)EE	0.10[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	115077.864*(8)	CH_3OCH_3	9(2,8)−9(1,9)AA	[b]	OriMC−1	NRAO 11 m	Tur89	Gro98
	115083.30*(9)	C_6H	$^2\Pi_{3/2}$ J=83/2−81/2f	0.42[f]	IRC+10216	IRAM 30 m	Cer87a	JPL01
U	115141.	unidentified		n.r.	OriMC−1	NRAO 11 m	Tur89	
	115153.935(6)	NS	$^2\Pi_{1/2}$ J=5/2−3/2 F=7/2−5/2e	<0.3[b]	SgrB2(M)	MMWO 4.9m	Got75	Lee95
	115156.812(4)	NS	$^2\Pi_{1/2}$ J=5/2−3/2 F=5/2−3/2e	[b]	SgrB2(M)	MMWO 4.9m	Got75	Lee95
	115185.411(2)	NS	$^2\Pi_{1/2}$ J=5/2−3/2 F=3/2−3/2e	0.26	SgrB2(M)	BTL 7 m	Cum86	Lee95
U	115212.	unidentified		n.r.	OriMC−1	NRAO 11 m	Tur89	
	115216.8(3)	C_4H	$^2\Pi_{3/2}$ J=25/2−23/2 v_7 =1f	3.05[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	115271.202*(1)	CO	1−0	60.0	OriMC−1	NRAO 11 m	Uli76	
	115382.375*(52)	SiC_2	5(0,5)−4(0,4)	0.22	IRC+10216	NRAO 11 m	Kui77	
	115556.253(3)	NS	$^2\Pi_{1/2}$ J=5/2−3/2 F=7/2−5/2f	0.24	SgrB2(M)	NRAO 11 m	Got75	Lee95
	115570.763(5)	NS	$^2\Pi_{1/2}$ J=5/2−3/2 F=5/2−3/2f	0.28[b]	SgrB2(M)	NRAO 11 m	Got75	Lee95
	115571.954(3)	NS	$^2\Pi_{1/2}$ J=5/2−3/2 F=3/2−1/2f	[b]	SgrB2(M)	NRAO 11 m	Got75	Lee95
	115804.405(20)	SO^+	$^2\Pi_{1/2}$ J=5/2−3/2e	0.020	IC443G	NRAO 12 m	Tur92a	Ama91
	115894.365*(9)	CH_3CH_2CN	12(2,12)−12(2,11)	0.09	OriMC−1	NRAO 11 m	Joh77	
	115944.52*(30)	$^{29}SiC_2$	5(2,4)−4(2,3)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	116179.947(20)	SO^+	$^2\Pi_{1/2}$ J=5/2−3/2f	0.032	IC443G	NRAO 12 m	Tur92a	Ama91
	116688.442*(8)	D_2CO	2(0,2)−1(0,1)	0.07	OriMC−1	NRAO 12 m	Tur90a	
	120250.148*(37)	SiC_2	5(2,3)−4(2,2)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	122023.531*(8)	$c-C_3H_2$	2(2,1)−1(1,0)	1.0	TMC−1	FCRAO 14 m	Mad86a	
	124496.477*(6)	$^{34}SO_2$	12(2,10)−12(1,11)	0.12	SgrB2(M)	BTL 7 m	Cum86	
	124569.976*(10)	CH_3OH	6(0,6)−5(1,4)E	0.44	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	124614.087*(6)	$^{34}SO_2$	10(2,8)−10(1,9)	0.08	SgrB2(M)	BTL 7 m	Cum86	
	124729.067*(10)	CH_3CH_2CN	14(2,13)−13(2,12)	0.10	SgrB2(M)	BTL 7 m	Cum86	
	124789.84(12)	$^{13}CH_2NH$	2(0,2)−1(0,1)	0.07	SgrB2(M)	BTL 7 m	Cum86	Pea77
	124864.764*(3)	SO_2	11(4,8)−12(3,9)	0.07	SgrB2(M)	BTL 7 m	Cum86	
	125040.163*(18)	$^{13}CH_3CN$	7(3)−6(3)	0.04[b]	SgrB2(M)	BTL 7 m	Cum86	Bou80
	125051.926*(18)	$^{13}CH_3CN$	7(2)−6(2)	[b]	SgrB2(M)	BTL 7 m	Cum86	Bou80
	125058.986*(18)	$^{13}CH_3CN$	7(1)−6(1)	0.05[b]	SgrB2(M)	BTL 7 m	Cum86	Bou80
	125061.340*(19)	$^{13}CH_3CN$	7(0)−6(0)	[b]	SgrB2(M)	BTL 7 m	Cum86	Bou80
	125130.914(50)	CH_3SH	5(1)−4(1)A−	0.07	SgrB2(M)	BTL 7 m	Cum86	Sas86
	125132.773*(4)	HC_5N	47−46	[b]	SgrB2(M)	BTL 7 m	Cum86	
	125173.169*(15)	$t-CH_3CH_2OH$	8(3,5)−8(2,6)	0.07	SgrB2(M)	BTL 7 m	Cum86	
	125242.976*(10)	CH_3OCH_3	2(2,1)−1(1,0)EA	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	125244.835*(6)	CH_3OCH_3	2(2,1)−1(1,0)AE	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	125246.882*(6)	CH_3OCH_3	2(2,1)−1(1,0)EE	0.08[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	125249.894*(10)	CH_3OCH_3	2(2,1)−1(1,0)AA	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	125564.486*(9)	CH_3CH_2CN	14(3,12)−13(3,11)	0.07	SgrB2(M)	BTL 7 m	Cum86	
U	125603.	unidentified		0.05	SgrB2(M)	NRAO 12 m	Ziu94a	
	125613.694*(7)	N_2O	5−4	0.067	SgrB2(M)	NRAO 12 m	Ziu94a	
U	125621.	unidentified		0.05	SgrB2(M)	NRAO 12 m	Ziu94a	
U	125848.6(12)	unidentified		0.12	SgrB2(M)	BTL 7 m	Cum86	
	125921.667*(17)	CH_2CHCN	13(1,12)−12(1,11)	0.10	SgrB2(M)	BTL 7 m	Cum86	
	125947.336*(21)	$t-CH_3CH_2OH$	10(1,9)−9(2,8)	0.13	SgrB2(M)	BTL 7 m	Cum86	
	126980.698*(4)	SO_2	35(5,31)−34(6,28)	0.06	SgrB2(M)	BTL 7 m	Cum86	
	127076.162*(9)	SiS	7−6	0.8	IRC+10216	OVRO 10.4 m	Sah84	
	127112.669*(2)	NH_2CHO	6(2,5)−5(2,4)	0.16[b]	SgrB2(M)	BTL 7 m	Cum86	
	127117.364*(67)	^{30}SiO	3−2 v=0	[b]	SgrB2(M)	BTL 7 m	Cum86	
	127215.126*(16)	$t-CH_3CH_2OH$	7(3,4)−7(2,5)	0.05	SgrB2(M)	BTL 7 m	Cum86	
U	127288.1(11)	unidentified		0.04	SgrB2(M)	BTL 7 m	Cum86	
U	127307.5(12)	unidentified		0.03	SgrB2(M)	BTL 7 m	Cum86	
	127329.929*(6)	NH_2CHO	6(5,*)−5(5,*)	0.03	SgrB2(M)	BTL 7 m	Cum86	
	127348.292*(4)	NH_2CHO	6(4,3)−5(4,2)	0.08[b]	SgrB2(M)	BTL 7 m	Cum86	
	127348.407*(4)	NH_2CHO	6(4,2)−5(4,1)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	127367.660*(4)	HCCCN	14−13	1.85	OriMC−1	MMWO 4.9 m	Mor77	
	127393.518*(3)	NH_2CHO	6(3,4)−5(3,3)	0.10	SgrB2(M)	BTL 7 m	Cum86	
	127412.092*(3)	NH_2CHO	6(3,3)−5(3,2)	0.09	SgrB2(M)	BTL 7 m	Cum86	
	127428.228*(6)	SO_2	28(4,24)−27(5,23)	0.04	SgrB2(M)	BTL 7 m	Cum86	
	127748.594*(62)	^{29}SiO	3−2 v=1	4.0	VYCMa	IRAM 30 m	Cer91c	
	128020.526*(20)	HCS^+	3−2	0.28	OriMC−1	BTL 7 m	Tha81	Bog84
	128102.780*(2)	NH_2CHO	6(2,4)−5(2,3)	0.16	SgrB2(M)	BTL 7 m	Cum86	
	128295.019*(29)	$HOCO^+$	6(0,6)−5(0,5)	0.4	SgrB2(M)	BTL 7 m	Tha81	Tha81
	128458.875*(70)	SiO	3−2 v=2	83.[e]	OriMC−1	NRAO 11 m	Sch82	
	128605.099*(4)	SO_2	12(2,10)−12(1,11)	0.58	OriMC−1	MMWO 4.9 m	Lor84	
	128622.14*(3)	CCCN	13−12 J=27/2−25/2	0.097	IRC+10216	BTL 7 m	Hen85	Got83
	128636.968*(67)	^{29}SiO	3−2 v=0	0.11	OriMC−1	MMWO 4.9 m	Lor84	
	128640.90*(3)	CCCN	13−12 J=25/2−23/2	0.093	IRC+10216	BTL 7 m	Hen85	Got83
	128668.785*(5)	$^{34}SO_2$	8(2,6)−8(1,7)	0.06	OriMC−1	MMWO 4.9 m	Lor84	
	128689.620*(16)	$t-CH_3CH_2OH$	6(3,3)−6(2,4)	0.09[b]	SgrB2(M)	BTL 7 m	Cum86	
	128690.119*(3)	CH_3CN	7(6)−6(6)	0.07	OriMC−1	MMWO 4.9 m	Lor84	
	128705.792*(5)	$CH_3{}^{13}CN$	7(2)−6(2)	0.06y	OriMC−1	MMWO 4.9 m	Lor84	
	128713.207*(6)	$CH_3{}^{13}CN$	7(1)−6(1)	0.11[b]	SgrB2(M)	BTL 7 m	Cum86	Bou80
	128715.679*(6)	$CH_3{}^{13}CN$	7(0)−6(0)	[b]	SgrB2(M)	BTL 7 m	Cum86	Bou80
	128717.367*(2)	CH_3CN	7(5)−6(5)	0.09	OriMC−1	MMWO 4.9 m	Lor84	
	128739.675*(2)	CH_3CN	7(4)−6(4)	0.18	OriMC−1	MMWO 4.9 m	Lor84	
	128757.035*(2)	CH_3CN	7(3)−6(3)	0.39	OriMC−1	MMWO 4.9 m	Lor84	
	128769.439*(2)	CH_3CN	7(2)−6(2)	0.38	OriMC−1	MMWO 4.9 m	Lor84	
	128776.884*(2)	CH_3CN	7(1)−6(1)	0.52	OriMC−1	MMWO 4.9 m	Lor84	
	128779.366*(2)	CH_3CN	7(0)−6(0)	0.62	OriMC−1	MMWO4.9 m	Lor84	
	128812.865*(6)	HDCO	2(0,2)−1(0,1)	0.3	L134N	BTL 7 m	Lan79	
	129013.260*(4)	HNCS	11(0,11)−10(0,10)	0.06	SgrB2(M)	BTL 7 m	Fre79	Yam79
	129077.575*(16)	$t-CH_3CH_2OH$	3(2,2)−2(1,1)	0.13	SgrB2(M)	BTL 7 m	Cum86	
	129081.270*(67)	NaCN	8(1,7)−7(1,6)	2.73[f]	IRC+10216	IRAM 30 m	Cer00	
	129105.779*(3)	SO_2	12(1,11)−11(2,10)	0.20	SgrB2(M)	BTL 7 m	Cum86	
	129138.939*(7)	SO	3(3)−2(2)	1.5	rhoOphA	MMWO 4.9 m	Lor84b	
	129219.221*(16)	CH_2CHCN	14(1,14)−13(1,13)	0.05	SgrB2(M)	BTL 7 m	Cum86	
	129248.12*(23)	$Si^{13}CC$	6(1,6)−5(1,5)	0.5[f]	IRC+10216	IRAM 30 m	Cer91b	
	129296.274*(25)	CH_3OCHO	10(2,8)−9(2,7)E	0.03	SgrB2(M)	BTL 7 m	Cum86	Oes99
	129310.206*(25)	CH_3OCHO	10(2,8)−9(2,7)A	0.05	SgrB2(M)	BTL 7 m	Cum86	Oes99
	129363.366*(62)	SiO	3−2 v=1	0.9	OriMC−1	MMWO 4.9 m	Dav74	
	129433.406*(25)	CH_3OH	12(1,11)−11(2,10)A−	0.07	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	129548.452*(10)	CCS	10,10−9,9	1.59[f]	IRC+10216	IRAM 30 m	Cer00	
	129723.89*(24)	$c-C_3H$	4(1,4)−3(1,3)9/2−9/2 F=4−4	0.66[fb]	IRC+10216	IRAM 30 m	Cer00	JPL01
	129726.576*(18)	$CCC^{34}S$	23−22	0.20[f]	IRC+10216	IRAM 30 m	Cer00	
	129727.43*(24)	$c-C_3H$	4(1,4)−3(1,3)9/2−9/2 F=5−5	[b]	IRC+10216	IRAM 30 m	Cer00	JPL01
	129770.973*(61)	C_6H	$^2\Pi_{1/2}$ J=93/2−91/2e	0.48[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
U	129773.0(8)	unidentified		0.27[f]	IRC+10216	IRAM 30 m	Cer00	
	129836.134*(70)	C_6H	$^2\Pi_{1/2}$ J=93/2−91/2f	0.49[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	130010.040*(25)	CH_3OCHO	11(2,10)−10(2,9)E	0.04[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	130016.826*(28)	CH_3OCHO	11(2,10)−10(2,9)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	130171.477*(69)	$H_2{}^{13}CS$	4(1,4)−3(1,3)	0.04	SgrB2(M)	BTL 7 m	Cum86	
	130223.681*(67)	$Na^{35}Cl$	10−9	1.93[f]	IRC+10216	IRAM 30 m	Cer87c	
	130268.722*(67)	SiO	3−2	173.[f]	IRC+10216	IRAM 30 m	Cer00	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	130268.722*(67)	SiO	3−2 v=0	1.34	OriMC−1	MMWO 4.9 m	Dic76	
	130456.439*(4)	HC_5N	49−48	0.94[f]	IRC+10216	IRAM 30 m	Cer00	
	130515.734*(3)	$OC^{34}S$	11−10	[b]	NGC6334I	IRAM 30 m	Bac90	
	130516.350*(8)	CH_3OCH_3	10(1,9)−9(2,8)AA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	130517.881*(6)	CH_3OCH_3	10(1,9)−9(2,8)EE	1.5[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	130519.412*(12)	CH_3OCH_3	10(1,9)−9(2,8)AE+EA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	130650.53*(15)	$K^{35}Cl$	17−16	0.51[f]	IRC+10216	IRAM 30 m	Cer87c	
	130707.096*(13)	SiN	3−2 J=5/2−3/2 F=7/2−5/2	0.88[f]	IRC+10216	IRAM 30 m	Cer00	Sai83
	130713.185*(9)	SiN	3−2 J=5/2−3/2 F=5/2−3/2	0.66[f]	IRC+10216	IRAM 30 m	Cer00	Sai83
	130716.834*(11)	SiN	3−2 J=5/2−3/2 F=3/2−1/2	0.31[f]	IRC+10216	IRAM 30 m	Cer00	Sai83
U	130765.5(3)	unidentified		0.44[f]	IRC+10216	IRAM 30 m	Cer00	
	131014.835*(3)	SO_2	12(1,11)−12(0,12)	0.25	SgrB2(M)	BTL 7 m	Cum86	
	131102.984*(17)	$t-CH_3CH_2OH$	5(3,3)−5(2,4)	0.04	SgrB2(M)	BTL 7 m	Cum86	
U	131134.0(7)	unidentified		0.06	SgrB2(M)	BTL 7 m	Cum86	
	131241.612*(20)	$^{24}MgNC$	21/2,11−19/2,10	0.005	CRL2688	NRAO 12 m	Hig01	Kaw93
	131256.832*(20)	$^{24}MgNC$	23/2,11−21/2,10	0.005	CRL2688	NRAO 12 m	Hig01	Kaw93
	131267.478*(17)	CH_2CHCN	14(0,14)−13(0,13)	0.09[b]	SgrB2(M)	BTL 7 m	Cum86	
	131274.864*(3)	SO_2	16(5,11)−17(4,14)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	131394.241*(5)	HNCO	6(1,6)−5(1,5)	0.18	OriMC−1	MMWO 4.9 m	Lor84	
	131405.032*(4)	CH_3OCH_3	6(1,6)−5(0,5)AE+EA	[b]	OriMC−1	MMWO 4.9 m	Lor84	Gro98
	131405.788*(4)	CH_3OCH_3	6(1,6)−5(0,5)EE	0.17[b]	OriMC−1	MMWO 4.9 m	Lor84	Gro98
	131406.543*(6)	CH_3OCH_3	6(1,6)−5(0,5)AA	[b]	OriMC−1	MMWO 4.9 m	Lor84	Gro98
	131502.694*(16)	$t-CH_3CH_2OH$	6(3,4)−6(2,5)	0.05	SgrB2(M)	BTL 7 m	Cum86	
	131551.972*(15)	CCS	11,10−10,9	0.09	SgrB2(M)	BTL 7 m	Cum86	
U	131590.	unidentified		0.005	IRC+10216	IRAM 30 m	Ziu02	
	131612.1	$C^{13}CCS$	23−22	0.004	IRC+10216	IRAM 30 m	Ziu02	
	131617.898*(2)	NH_2CHO	6(1,5)−5(1,4)	0.23	SgrB2(M)	BTL 7 m	Cum86	
U	131620.	unidentified		0.003	IRC+10216	IRAM 30 m	Ziu02	
	131642.204*(5)	AlNC	11−10	0.005	IRC+10216	IRAM 30 m	Ziu02	
	131668.80*(4)	C_6H	$^2\Pi_{3/2}$ J=95/2−93/2e	0.019	IRC+10216	IRAM 30 m	Ziu02	JPL01
	131725.44*(4)	C_6H	$^2\Pi_{3/2}$ J=95/2−93/2f	0.016	IRC+10216	IRAM 30 m	Ziu02	JPL01
	131762.841*(17)	HCCN	7,6−6,5	0.6[f]	IRC+10216	IRAM 30 m	Gue91	
	131799.292*(7)	HNCO	6(3,3)−5(3,2)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	131799.292*(7)	HNCO	6(3,4)−5(3,3)	0.05[b]	SgrB2(M)	BTL 7 m	Cum86	
	131833.306*(20)	HCCN	6,6−5,5	0.8[f]	IRC+10216	IRAM 30 m	Gue91	
	131845.880*(5)	HNCO	6(2,5)−5(2,4)	0.06[b]	SgrB2(M)	BTL 7 m	Cum86	
	131846.590*(6)	HNCO	6(2,4)−5(2,3)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	131885.740*(6)	HNCO	6(0,6)−5(0,5)	3.41	SgrB2(M)	BTL 7 m	Cum86	
	131898.786*(21)	AlF	4−3	0.80[f]	IRC+10216	IRAM 30 m	Cer87c	
	131956.217*(21)	HCCN	6,5−5,4	0.71[f]	IRC+10216	IRAM 30 m	Cer00	
	132089.900*(81)	$H_2{}^{13}CS$	4(0,4)−3(0,3)	0.08	SgrB2(M)	BTL 7 m	Cum86	
	132105.427*(25)	CH_3OCHO	12(1,12)−11(1,11)E	0.10[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	132107.228*(29)	CH_3OCHO	12(1,12)−11(1,11)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	132114.050*(5)	$^{34}SO_2$	12(1,11)−12(0,12)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	132158.692*(35)	C_5H	$^2\Pi_{3/2}$ J=55/2−53/2a	0.25[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	132163.136*(33)	C_5H	$^2\Pi_{3/2}$ J=55/2−53/2b	0.28[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	132178.9(5)	C_4H	$^2\Pi_{1/2}$ J=27/2−25/2 v_7 =1e	5.90[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	132219.704*(18)	H_2COH^+	2(1,1)−1(1,0)	0.055	SgrB2(M)	NRO 45 m	Ohi96	
	132245.048*(25)	CH_3OCHO	12(0,12)−11(0,11)E	0.18[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	132246.385*(13)	$H^{13}CCCN$	15−14	[b]	SgrB2(M)	BTL 7 m	Cum86	Laf78
	132246.752*(29)	CH_3OCHO	12(0,12)−11(0,11)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	132356.711*(5)	HNCO	6(1,5)−5(1,4)	0.19	SgrB2(M)	BTL 7 m	Cum86	
	132524.590*(15)	CH_2CHCN	14(2,13)−13(2,12)	0.15[b]	SgrB2(M)	BTL 7 m	Cum86	
	132524.820*(4)	CH_3OCH_3	8(0,8)−7(1,7)AA	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	132525.252*(4)	CH_3OCH_3	8(0,8)−7(1,7)EE	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	132525.683*(4)	CH_3OCH_3	8(0,8)−7(1,7)EA+AE	[b]	SgrB2(M)	BTL 7 m	Cum86	Gro98
	132546.54*(14)	C_4H	$^2\Pi_{3/2}$ J=27/2−25/2 v_7 =2ℓ=2	1.42[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	132560.137*(55)	C_6H	$^2\Pi_{1/2}$ J=95/2−93/2e	0.34[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	132579.251(58)	$C^{13}CCCH$	13.5−12.5	0.43[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	132586.8(3)	C_4H	$^2\Pi_{1/2}$ J=27/2−25/2 v_7 =1f	5.30[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	132621.859*(18)	CH_3OH	6(2,5)−7(1,6)A−	0.12	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	132626.807*(64)	C_6H	$^2\Pi_{1/2}$ J=95/2−93/2f	0.54[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
U	132691.2(4)	unidentified		0.21[f]	IRC+10216	IRAM 30 m	Cer00	
	132743.681(43)	$CC^{13}CCH$	14.5−13.5	0.85[f]	IRC+10216	IRAM 30 m	Cer00	COL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	132744.820*(5)	SO_2	14(2,12)−14(1,13)	0.57	OriMC−1	NRAO 11 m	Pic79	
U	132782.0(10)	unidentified		2.00[f]	IRC+10216	IRAM 30 m	Cer00	
	132782.090(38)	$CC^{13}CCH$	13.5−12.5	2.00[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	132890.800*(14)	CH_3OH	6(−1,6)−5(0,5)E	2.07	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	132917.762*(12)	CH_2CHCN	14(4,11)−13(4,10)	0.11[b]	SgrB2(M)	BTL 7 m	Cum86	
	132919.017*(12)	CH_2CHCN	14(4,10)−13(4,9)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	132921.889*(25)	CH_3OCHO	11(1,10)−10(1,9)E	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	132928.769*(28)	CH_3OCHO	11(1,10)−10(1,9)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	132935.088*(16)	$t-CH_3CH_2OH$	3(2,1)−2(1,2)	[b]	SgrB2(M)	BTL 7 m	Cum86	
	132946.571*(6)	CCCS	23−22	1.4[f]	IRC+10216	IRAM 30 m	Cer87b	
	132993.978(50)	$c-C_3H$	3(1,3)−2(1,2)7/2−5/2 F=4−3	1.47[fb]	IRC+10216	IRAM 30 m	Cer00	JPL01
	132994.679(50)	$c-C_3H$	3(1,3)−2(1,2)7/2−5/2 F=3−2	[b]	IRC+10216	IRAM 30 m	Cer00	JPL01
	133118.220*(4)	HC_5N	50−49	0.72[f]	IRC+10216	IRAM 30 m	Cer00	
	133186.451(50)	$c-C_3H$	3(1,3)−2(1,2)5/2−3/2 F=2−1	1.27[fb]	IRC+10216	IRAM 30 m	Cer00	JPL01
	133187.717(50)	$c-C_3H$	3(1,3)−2(1,2)5/2−3/2 F=3−2	[b]	IRC+10216	IRAM 30 m	Cer00	JPL01
	133213.648*(8)	C_4H	14.5−13.5	24.3[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	133252.147*(8)	C_4H	13.5−12.5	25.4[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	133405.264*(24)	H_2CCCC	15(1,15)−14(1,14)	0.063	IRC+10216	IRAM 30 m	Cer91a	Kil90
	133605.385*(13)	CH_3OH	5(−2,4)−6(−1,6)E	0.19	SgrB2(M)	BTL 7 m	Cum86	Xu_97
	133672.86(40)	$^{30}SiC_2$	6(0,6)−5(0,5)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	133785.897*(1)	OCS	11−10	1.49	OriMC−1	BTL 7 m	Gol81	
	133813.85*(14)	$Si^{13}CC$	6(0,6)−5(0,5)	0.9[f]	IRC+10216	IRAM 30 m	Cer91b	
	133830.494*(7)	CH_3CHO	7(0,7)−6(0,6)E	0.16	SgrB2(M)	BTL 7 m	Cum86	Kle96
	133847.3	CH_2DOH	3(0,3)−2(0,2)e1	0.60[f]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	133854.105*(7)	CH_3CHO	7(0,7)−6(0,6)A++	0.15	SgrB2(M)	BTL 7 m	Cum86	Kle96
	133862.50(20)	C_4H	$^2\Sigma$ J=14−13 v_7 =2L	0.2	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	133872.9	CH_2DOH	3(0,3)−2(0,2)o1	0.60[f]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	133881.8	CH_2DOH	3(2,2)−2(2,1)o1	0.07	IRAS16293−2422	IRAM 30 m	Par02	Par02
	133892.9	CH_2DOH	3(2,2)−2(2,1)e1	0.05	IRAS16293−2422	IRAM 30 m	Par02	Par02
	133897.4	CH_2DOH	3(2,1)−2(2,0)o1	0.08	IRAS16293−2422	IRAM 30 m	Par02	Par02
	133918.54(20)	C_4H	$^2\Sigma$ J=14−13 v_7 =2U	0.2	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	133925.4(5)	CH_3OD	1(1,0)−1(0,1)A	0.06	IRAS16293−2422	IRAM 30 m	Par02	And88
	133930.2	CH_2DOH	3(2,1)−2(2,0)e1	0.07	IRAS16293−2422	IRAM 30 m	Par02	Par02
	133931.283*(25)	H_2CCCC	15(3,13)−14(3,12)	[b]	IRC+10216	IRAM 30 m	Cer00	
	133931.294*(25)	H_2CCCC	15(3,12)−14(3,11)	0.83[fb]	IRC+10216	IRAM 30 m	Cer00	
	133952.921*(22)	H_2CCCC	15(2,14)−14(2,13)	0.26[f]	IRC+10216	IRAM 30 m	Cer00	
	133961.139*(22)	H_2CCCC	15(2,13)−14(2,12)	0.27[f]	IRC+10216	IRAM 30 m	Cer00	
	133963.133*(23)	H_2CCCC	15(0,15)−14(0,14)	0.25[f]	IRC+10216	IRAM 30 m	Cer00	
	134004.803*(4)	SO_2	8(2,6)−8(1,7)	0.65	OriMC−1	MMWO 4.9 m	Pic79	
	134023.71*(12)	C_4H	$^2\Pi_{3/2}$ J=29/2−27/2e v_7 =1	7.58[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	134065.60(5)	CH_2DOH	3(0,3)−2(0,2)	0.4[f]	OriMC−1	IRAM 30 m	Jac92	Jac93
	134112.4	CH_2DOH	3(2,2)−2(2,1)e0	0.06	IRAS16293−2422	IRAM 30 m	Par02	Par02
	134185.4	CH_2DOH	3(2,1)−2(2,0)e0	0.06	IRAS16293−2422	IRAM 30 m	Par02	Par02
	134231.013*(20)	CH_3OH	12(−3,10)−13(−2,12)E	0.24	OriMC−1	MMWO 4.9 m	Lor85	Xu_97
	134284.909*(6)	HDCO	2(1,1)−1(1,0)	0.19	OriMC−1	MMWO 4.9 m	Lor85	
	134415.5(3)	C_4H	$^2\Pi_{3/2}$ J=29/2−27/2 v_7 =1f	4.50[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	134440.406*(35)	C_6H	$^2\Pi_{3/2}$ J=97/2−95/2e	0.64[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	134499.192*(37)	C_6H	$^2\Pi_{3/2}$ J=97/2−95/2f	0.69[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	134525.237*(27)	H_2CCCC	15(1,14)−14(1,13)	0.070	IRC+10216	IRAM 30 m	Cer91a	Kil90
	134603.073(30)	$l-C_3H$	N=6−5 v_4=1a	1.40[f]	IRC+10216	IRAM 30 m	Cer00	Yam90a
	134628.089(30)	$l-C_3H$	N=6−5 v_4=1b	1.83[f]	IRC+10216	IRAM 30 m	Cer00	Yam90a
	134921.19*(14)	C_4H	$^2\Pi_{5/2}$ J=29/2−27/2 v_7 =2ℓ=2	1.59[f]	IRC+10216	IRAM 30 m	Cer00	COL01
U	135237.8(7)	unidentified		0.28[f]	IRC+10216	IRAM 30 m	Cer00	
	135298.151*(49)	H_2CS	4(1,4)−3(1,3)	0.64	OriMC−1	MMWO 4.9 m	Van84	
	135303.313*(94)	NaCN	9(1,9)−8(1,8)	1.16[f]	IRC+10216	IRAM 30 m	Cer00	
U	135307.7(8)	unidentified		0.62[f]	IRC+10216	IRAM 30 m	Cer00	
	135349.197*(50)	C_6H	$^2\Pi_{1/2}$ J=97/2−95/2e	0.69[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	135371.19(30)	$^{29}SiC_2$	6(0,6)−5(0,5)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	135417.393*(59)	C_6H	$^2\Pi_{1/2}$ J=97/2−91/2f	0.80[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	135696.004*(4)	SO_2	5(1,5)−4(0,4)	1.5	rhoOph	MMWO 4.9 m	Got78	
	135775.648*(18)	^{34}SO	4(3)−3(2)	0.62	rhoOphA	MMWO 4.9 m	Lor85	
U	135811.3	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	135824.6	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
	135830.612*(23)	$t-CH_3CH_2OH$	13(2,12)−13(1,13)	n.r.	OriMC−1	IRAM 30 m	Com96	
	135839.240*(29)	$t-CH_3CH_2OH$	24(3,21)−24(2,22)	n.r.	OriMC−1	IRAM 30 m	Com96	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	135852.9	unidentified		0.012	OriMC−1	IRAM 30 m	Com96	
	135885.514*(20)	$HC^{13}CCN$	15−14	n.r.	OriMC−1	IRAM 30 m	Com96	
	135898.630*(13)	$HCC^{13}CN$	15−14	n.r.	OriMC−1	IRAM 30 m	Com96	
U	135915.9	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
	135921.969*(25)	CH_3OCHO	11(5,7)−10(5,6)A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
U	135931.9	unidentified		0.32	OriMC−1	IRAM 30 m	Com96	
	135942.911*(25)	CH_3OCHO	11(5,7)−10(5,6)E	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	135948.857*(32)	CH_3OCHO	11(5,6)−10(5,5)E	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	135958.38(5)	CH_3OD	3(0,3)−2(0,2)E	0.7[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
	135963.039*(7)	SO_2	34(5,29)−33(6,28)	n.r.	OriMC−1	IRAM 30 m	Com96	
	135972.50(5)	CH_3OD	3(−1,2)−2(−1,1)E	0.6[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
	135979.676*(13)	CH_3CH_2CN	23(3,21)−23(2,22)	n.r.	OriMC−1	IRAM 30 m	Com96	
	135988.511*(25)	CH_3OCHO	11(5,6)−10(5,5)A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	U135999.0	unidentified		0.15	OriMC−1	IRAM 30 m	Com96	
U	136005.3	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	136026.40(5)	CH_3OD	3(0,3)−2(0,2) A++	1.2[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
	136051.195*(33)	C_5H	$^2\Pi_{1/2}$ J=57/2−55/2 a	0.88[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	136055.46(5)	CH_3OD	3(2,)−2(2,) A−−	n.r.	OriMC−1	IRAM 30 m	Com96	Kau80
U	136085.9	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	136094.8	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
	136098.96(5)	CH_3OD	3(2,1)−2(2,0)E	0.6[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
	136102.82(5)	CH_3OD	3(2,1)−2(2,0)A++	0.5[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
	136107.60(5)	CH_3OD	3(−2,2)−2(−2,1)E	0.8[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
U	136118.0	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
U	136121.9	unidentified		0.11	OriMC−1	IRAM 30 m	Com96	
U	136142.7	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
	136151.26(5)	CH_2 DOH	3(2,1)−2(1,1)	0.6[f]	OriMC−1−6″	IRAM 30 m	Jac92	Jac93
	136171.61(5)	CH_3OD	3(1,2)−2(1,1)E	0.8[f]	OriMC−1	IRAM 30 m	Jac93	Jac93
U	136188.2	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	136198.2	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	136208.3	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	136219.373*(26)	CH_3CCCN	33(9)−32(9)	n.r	OriMC−1	IRAM 30 m	Com96	
U	136230.8	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	136246.5	unidentified		0.09	OriMC−1	IRAM 30 m	Com96	
U	136250.7(11)	unidentified		0.04	SgrB2(M)	BTL 7 m	Cum86	
	136279.960*(25)	CH_3OCHO	11(4,8)−10(4,7)E	0.12[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	136282.626*(25)	CH_3OCHO	11(4,8)−10(4,7)A	[b]	SgrB2(M)	BTL 7 m	Cum86	Oes99
	136292.559*(12)	CH_3CCCN	33(5)−32(5)	n.r	OriMC−1	IRAM 30 m	Com96	
U	136298.7	unidentified		0.11	OriMC−1	IRAM 30 m	Com96	
	136304.335*(13)	CH_3CCCN	33(4)−32(4)	n.r.	OriMC−1	IRAM 30 m	Com96	
	136313.496*(14)	CH_3CCCN	33(3)−32(3)	n.r.	OriMC−1	IRAM 30 m	Com96	
	136320.042*(15)	CH_3CCCN	33(2)−32(2)	n.r.	OriMC−1	IRAM 30 m	Com96	
	136323.970*(15)	CH_3CCCN	33(1)−32(1)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	
	136325.279*(15)	CH_3CCCN	33(0)−32(0)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	
	136343.656*(5)	$^{34}SO_2$	20(6,14)−21(5,17)	n.r.	OriMC−1	IRAM 30 m	Com96	
U	136346.7(8)	unidentified		0.49[f]	IRC+10216	IRAM 30 m	Cer00	
	136386.984*(30)	$^{13}C^{34}S$	3−2	0.63[f]	IRC+10216	IRAM 30 m	Cer00	
	136464.403*(4)	HCCCN	15−14	1.5	Sgr B2(M)	MMWO 4.9 m	Mor77	
	136475.32*(19)	HCCCN	15−14 v_5 =1 ℓ=1 e	0.88	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	136541.298*(10)	CH_3CH_2CN	15(1,14)−14(1,13)	0.10	Sgr B2(M)	BTL 7 m	Cum86	
	136551.67*(19)	HCCCN	15−14 v_5 =1 ℓ=1 f	0.48	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	136634.673*(39)	SO	5(6)−5(5)	0.4	OriMC−1	MMWO 4.9 m	Mun84	
	136704.502*(1)	CH_3CCH	8(3)−7(3)	0.17	OriMC−1	MMWO 4.9 m	Mun84	
	136717.560*(1)	CH_3CCH	8(2)−7(2)	0.20	OriMC−1	MMWO 4.9 m	Mun84	
	136725.398*(1)	CH_3CCH	8(1)−7(1)	0.41	OriMC−1	MMWO 4.9 m	Mun84	
	136728.010*(1)	CH_3CCH	8(0)−7(0)	0.42	OriMC−1	MMWO 4.9 m	Mun84	
	136799.703*(30)	HCCCN	15−14 v_7 =1 ℓ=1 e	0.09	Sgr B2(M)	BTL 7 m	Cum86	Laf78
U	136917.7(20)	unidentified		0.72[f]	IRC+10216	IRAM 30 m	Cer00	
	136963.005*(36)	C_5H	$^2\Pi_{3/2}$ J=57/2−55/2 a	0.65[fb]	IRC+10216	IRAM 30 m	Cer00	JPL01
	136967.767*(35)	C_5H	$^2\Pi_{3/2}$ J=57/2−55/2 b	[b]	IRC+10216	IRAM 30 m	Cer00	JPL01
	136995.636*(31)	HCCCN	15−14 v_7 =1 ℓ=1 f	1.65[f]	IRC+10216	IRAM 30 m	Cer00	Laf78
	137016.23* (60)	$^{30}SiC_2$	6(2,5)−5(2,4)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	137180.777*(68)	SiC_2	6(0,6)−5(0,5)	0.138	IRC+10216	BTL 7 m	Tha84	
	137369.316*(58)	H_2CS	4(3,2)−3(3,1)	0.12[b]	OriMC−1	MMWO 4.9 m	Van84	
	137369.348*(58)	H_2CS	4(3,1)−3(3,0)	[b]	OriMC−1	MMWO 4.9 m	Van84	
	137371.072*(56)	H_2CS	4(0,4)−3(0,3)	0.37	OriMC−1	MMWO 4.9 m	Van84	
	137381.962*(39)	H_2CS	4(2,3)−3(2,2)	0.10	OriMC−1	MMWO 4.9 m	Van84	
	137411.810*(39)	H_2CS	4(2,2)−3(2,1)	0.09	OriMC−1	MMWO 4.9 m	Van84	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	137449.957*(5)	$H_2\ ^{13}CO$	2(1,2)−1(1,1)	0.2	OriMC−1	MMWO 4.9 m	Kut76	
	137637.10*(8)	$Si^{13}CC$	6(2,5)−5(2,4)	0.8[f]	IRC+10216	IRAM 30 m	Cer91b	
	137739.28* (47)	$^{30}SiC_2$	6(4,3)−5(4,2)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	137742.30* (47)	$^{30}SiC_2$	6(4,2)−5(4,1)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	137763.2(3)	$C^{13}CCN$	14−13 a	1.17[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	137778.3(5)	$C^{13}CCN$	14−13 b	0.55[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	137806.92*(3)	$^{13}CCCCH$	15.5−14.5	0.70[fb]	IRC+10216	IRAM 30 m	Cer00	COL01
	137810.85*(4)	$^{13}CCCCH$	15.5−14.5	[b]	IRC+10216	IRAM 30 m	Cer00	COL01
	137839.78* (10)	$^{13}CCCCH$	14.5−13.5	0.40[fb]	IRC+10216	IRAM 30 m	Cer00	COL01
	137843.61* (10)	$^{13}CCCCH$	14.5−13.5	[b]	IRC+10216	IRAM 30 m	Cer00	COL01
	137902.997*(18)	CH_3OH	7(−4,4)−8(−3,6) E	0.8	OriMC−1	BTL 7 m	Woo84	Xu_97
U	137935.7(8)	unidentified		0.75[f]	IRC+10216	IRAM 30 m	Cer00	
	137996.2(2)	$CC^{13}CN$	14−13 a	1.30[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	138014.7(3)	$CC^{13}CN$	14−13 b	1.17[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	138023.5(15)	$^{26}MgNC$	23/2,12−21/2,11	0.42[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	138038.0(15)	$^{26}MgNC$	25/2,12−23/2,11	0.31[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	138138.153*(45)	C_6H	$^2\Pi_{1/2}$ J=99/2−97/2 e	0.23[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	138178.682*(16)	SO	4(3)−3(2)	2.0	OriMC−1	MMWO 4.9 m	Got73b	
	138207.892*(53)	C_6H	$^2\Pi_{1/2}$ J=99/2−97/2 f	0.15[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	138220.49*(14)	$Si^{13}CC$	6(5,2)−5(5,1)	0.87[bf]	IRC+10216	IRAM 30 m	Cer00	
	138220.51*(14)	$Si^{13}CC$	6(5,2)−5(5,1)	[b]	IRC+10216	IRAM 30 m	Cer00	
U	138259.9	unidentified		0.9[f]	OriMC−1	TRAO 14 m	Lee01	
	138284.995*(7)	CH_3CHO	7(1,6)−6(1,5) E	0.15	Sgr B2(M)	BTL 7 m	Cum86	Kle96
	138319.636*(7)	CH_3CHO	7(1,6)−6(1,5) A−−	0.14	Sgr B2(M)	BTL 7 m	Cum86	Kle96
U	138343.2	unidentified		0.8[f]	OriMC−1	TRAO 14 m	Lee01	
	138351.052*(10)	CH_3CH_2CN	16(1,16)−15(1,15)	0.15	Sgr B2(M)	BTL 7 m	Cum86	
	138395.145*(2)	CH_2CHCN	15(1,15)−14(1,14)	1.3[f]	OriMC−1	TRAO 14 m	Lee01	
	138419.531*(32)	$CCC^{13}CH$	15.5−14.5	0.67[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	138441.671*(4)	HC_5N	52−51	0.41[f]	IRC+10216	IRAM 30 m	Cer00	
	138456.937*(37)	$CCC^{13}CH$	14.5−13.5	0.38[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	138509.19*(10)	$Si^{13}CC$	6(4,3)−5(4,2)	0.65[bf]	IRC+10216	IRAM 30 m	Cer00	
	138513.45*(10)	$Si^{13}CC$	6(4,2)−5(4,1)	[b]	IRC+10216	IRAM 30 m	Cer00	
	138515.73*(4)	CCCN	14−13 a	26.3[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	138534.49*(4)	CCCN	14−13 b	27.9[f]	IRC+10216	IRAM 30 m	Cer00	Got83
U	138567.0	unidentified		0.006	IRC+10216	NRAO 12 m	Tur94	
	138581.895*(36)	$^{29}Si^{34}S$	8−7	0.78[f]	IRC+10216	IRAM 30 m	Cer00	
	138652.053*(85)	NaCN	9(0,9)−8(0,8)	0.010	IRC+10216	NRAO 12 m	Tur94	Tur94
	138652.053*(85)	NaCN	9(0,9)−8(0,8)	1.80[f]	IRC+10216	IRAM 30 m	Cer00	
	138725.846*(6)	CCCS	24−23	1.6[f]	IRC+10216	IRAM 30 m	Cer87b	
	138739.313*(29)	^{13}CS	3−2	0.5	OriMC−1	MMWO 4.9 m	Wil71	
	138901.86*(47)	$^{29}SiC_2$	6(2,5)−5(2,4)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
U	139256.7	unidentified		0.9[f]	OriMC−1	TRAO 14 m	Lee01	
	139315.191*(32)	$a-CH_2CHOH$	5(1,5)−4(0,4)	0.119	Sgr B2(N)	NRAO 12 m	Tur01	
	139335.995*(10)	CH_3CH_2CN	16(0,16)−15(0,15)	2.5[f]	OriMC−1	TRAO 14 m	Lee01	
	139355.033*(3)	SO_2	5(3,3)−6(2,4)	3.8[f]	OriMC−1	TRAO 14 m	Lee01	
U	139371.7(3)	unidentified		1.52[f]	IRC+10216	IRAM 30 m	Cer00	
U	139416.9	unidentified		0.8[f]	OriMC−1	TRAO 14 m	Lee01	
U	139432.5	unidentified		1.8[f]	OriMC−1	TRAO 14 m	Lee01	
U	139436.0	unidentified		1.1[f]	OriMC−1	TRAO 14 m	Lee01	
	139474.480*(4)	SO_2	26(7,19)−27(6,22)	0.9[f]	OriMC−1	TRAO 14 m	Lee01	
	139483.486*(49)	H_2CS	4(1,3)−3(1,2)	0.17	rhoOphB1	MMWO 4.9 m	Lor84a	
	139500.411*(6)	CH_3OCH_3	9(3,6)−9(2,7) AE	0.7[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	139503.666*(4)	CH_3OCH_3	9(3,6)−9(2,7) EE	0.9[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	139506.852*(8)	CH_3OCH_3	9(3,6)−9(2,7) AA	0.9[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
U	139561.9	unidentified		1.7[f]	OriMC−1	TRAO 14 m	Lee01	
U	139582.1	unidentified		0.7[f]	OriMC−1	TRAO 14 m	Lee01	
	139676.81*(96)	$^{29}SiC_2$	6(4,3)−5(4,2)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	139680.21*(96)	$^{29}SiC_2$	6(4,2)−5(4,1)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
U	139862.3	unidentified		1.5[f]	OriMC−1	TRAO 14 m	Lee01	
U	139864.8	unidentified		>0.3	OriMC−1	IRAM 30 m	Mau88a	
U	139873.4	unidentified		0.18	OriMC−1	IRAM 30 m	Mau88a	
U	139878.0	unidentified		0.58	OriMC−1	IRAM 30 m	Mau88a	
U	139880.9	unidentified		0.20	OriMC−1	IRAM 30 m	Mau88a	
U	139896.5	unidentified		0.08	OriMC−1	IRAM 30 m	Mau88a	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	139902.5	unidentified		0.10	OriMC−1	IRAM 30 m	Mau88a	
U	139907.2	unidentified		0.09	OriMC−1	IRAM 30 m	Mau88a	
U	139918.6	unidentified		0.16	OriMC−1	IRAM 30 m	Mau88a	
U	139934.5	unidentified		0.12	OriMC−1	IRAM 30 m	Mau88a	
U	139944.7	unidentified		0.15	OriMC−1	IRAM 30 m	Mau88a	
	139954.453(20)	NH_2CN	7(0,7)−6(0,6)	0.08	Sgr B2(M)	BTL 7 m	Cum86	Rea86
U	139960.3	unidentified		0.18	OriMC−1	IRAM 30 m	Mau88a	
U	139967.4	unidentified		0.16	OriMC−1	IRAM 30 m	Mau88a	
	139983.590*(31)	C_6H	$^2\Pi_{3/2}$ J=101/2−99/2 e	0.45[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
U	139999.9	unidentified		0.17	OriMC−1	IRAM 30 m	Mau88a	
U	140013.6	unidentified		0.08	OriMC−1	IRAM 30 m	Mau88a	
U	140019.7	unidentified		0.76	OriMC−1	IRAM 30 m	Mau88a	
	140033.14*(16)	CH_3OH	23(−2,22)−23(1,22)E	0.03	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
U	140042.1	unidentified		0.06	OriMC−1	IRAM 30 m	Mau88a	
	140046.727*(33)	C_6H	$^2\Pi_{3/2}$ J=101/2−99/2 f	0.65[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	140047.327*(43)	CH_3OCHO	18(2,16)−18(1,17) E	0.20	OriMC−1	IRAM 30 m	Mau88a	Oes99
	140058.000*(22)	CH_3CH_2CN	32(2,30)−32(1,31)	0.21	OriMC−1	IRAM 30 m	Mau88a	
	140073.959*(27)	^{30}SiS	8−7	11.7[f]	IRC+10216	IRAM 30 m	Cer00	
U	U140077.3	unidentified		0.07	OriMC−1	IRAM 30 m	Mau88a	
U	U140083.2	unidentified		0.05	OriMC−1	IRAM 30 m	Mau88a	
	140097.142*(14)	CH_3CH_2CN	27(4,23)−27(3,24)	0.47	OriMC−1	IRAM 30 m	Mau88a	
	140101.17*(45)	NaCN	9(7,2)−8(7,1)	[b]	IRC+10216	IRAM 30 m	Cer00	
	140101.17*(45)	NaCN	9(7,3)−8(7,2)	1.39[fb]	IRC+10216	IRAM 30 m	Cer00	
	140118.571*(84)	CH_3OCHO	18(2,16)−18(1,17) A	0.30	OriMC−1	IRAM 30 m	Mau88a	Oes99
	140127.438*(32)	CH_2CO	7(1,7)−6(1,6)	0.15	Sgr B2(M)	BTL 7 m	Cum86	
U	140133.6(10)	unidentified		0.23[f]	IRC+10216	IRAM 30 m	Cer00	
U	140137.2	unidentified		0.02	OriMC−1	IRAM 30 m	Mau88a	
	140141.6(6)	NH_3	2(1)−1(1) v_2 =1	0.11	OriMC−1	IRAM 30 m	Mau88a	Sch90
U	140147.4(10)	unidentified		0.21[f]	IRC+10216	IRAM 30 m	Cer00	
	140151.188*(37)	CH_3OH	18(0,18)−18(−1,18) E	0.05	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
U	140160.6	unidentified		0.20	OriMC−1	IRAM 30 m	Mau88a	
U	140166.0	unidentified		0.53	OriMC−1	IRAM 30 m	Mau88a	
U	140174.6	unidentified		0.5[f]	OriMC−1	TRAO 14 m	Lee01	
	140174.636*(70)	$Na^{37}Cl$	11−10	0.84[f]	IRC+10216	IRAM 30 m	Cer00	
	140175.200 (50)	CH_3OD	4(1,3)−4(0,4) A−	5.1[f]	OriMC−1	IRAM 30 m	Mau88	And88
U	140180.2	unidentified		0.10	OriMC−1	IRAM 30 m	Mau88a	
	140180.747*(16)	CCS	10,11−9,10	1.8[f]	IRC+10216	IRAM 30 m	Cer87b	
	140194.094*(68)	CH_3OCHO	24(4,20)−24(4,21) A	0.15	OriMC−1	IRAM 30 m	Mau88a	Oes99
	140211.37*(24)	SiC_3	12(6,6)−11(6,5)	[b]	IRC+10216	IRAM 30 m	Cer00	
	140211.37*(24)	SiC_3	12(6,7)−11(6,6)	0.24[fb]	IRC+10216	IRAM 30 m	Cer00	
U	140236.6	unidentified		0.12	OriMC−1	IRAM 30 m	Mau88a	
U	140253.6	unidentified		0.16	OriMC−1	IRAM 30 m	Mau88a	
U	140283.0	unidentified		0.05	OriMC−1	IRAM 30 m	Mau88a	
	140300.10*(37)	NaCN	9(6,3)−8(6,2)	[b]	IRC+10216	IRAM 30 m	Cer00	
	140300.10*(37)	NaCN	9(6,4)−8(6,3)	0.66[fb]	IRC+10216	IRAM 30 m	Cer00	
	140306.157*(4)	SO_2	6(2,4)−6(1,5)	0.75	OriMC−1	MMWO 4.9 m	Pic79	
	140340.6*	SiC_2	14(2,12)−14(2,13) v_3 =1	0.51[f]	IRC+10216	IRAM 30 m	Cer00	Cer00
	140347.30*(12)	NaCN	9(2,8)−8(2,7)	1.73[f]	IRC+10216	IRAM 30 m	Cer00	
	140348.748*(12)	$^{33}SO_2$	10(4,6)−11(3,9)	0.13	OriMC−1	IRAM 30 m	Mau88a	
U	140371.5	unidentified		0.29	OriMC−1	IRAM 30 m	Mau88a	
	140423.850*(6)	$^{13}CH_3OH$	3(1,3)−2(1,2) A+	0.05[b]	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
	140429.438*(17)	CH_2CHCN	15(0,15)−14(0,14)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	140484.239*(30)	NaCN	9(5,5)−8(5,4)	0.61[fb]	IRC+10216	IRAM 30 m	Cer00	
	140484.247*(30)	NaCN	9(5,4)−8(5,3)	[b]	IRC+10216	IRAM 30 m	Cer00	
U	140486.0(20)	unidentified		0.44[f]	IRC+10216	IRAM 30 m	Cer00	
	140504.1(15)	$^{35}MgNC$	12−11	0.48[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	140666.62*(23)	NaCN	9(4,6)−8(4,5)	1.47[f]	IRC+10216	IRAM 30 m	Cer00	
	140667.481*(23)	NaCN	9(4,5)−8(4,4)	1.50[f]	IRC+10216	IRAM 30 m	Cer00	
U	140687.3(16)	unidentified		0.07	Sgr B2(M)	BTL 7 m	Cum86	
	140733.941*(22)	CH_3NC	7−6	1.9[f]	Sgr B2(M)	IRAM 30 m	Cer88	
	140740.379*(4)	HNCS	12(0,12)−11(0,11)	0.05	Sgr B2(M)	BTL 7 m	Fre79	Yam79
	140839.515*(7)	H_2CO	2(1,2)−1(1,1)	4.5	OriMC−1	MMWO 4.9 m	Kut76	
	40854.18*(17)	NaCN	9(3,7)−8(3,6)	0.50[f]	IRC+10216	IRAM 30 m	Cer00	
	140877.729(20)	NH_2CN	7(1,6)−6(1,5)	0.05	Sgr B2(M)	BTL 7 m	Cum86	Rea86
U	140902.2(14)	unidentified		0.07	Sgr B2(M)	BTL 7 m	Cum86	
	140920.168*(29)	SiC_2	6(2,5)−5(2,4)	0.123	IRC+10216	BTL 7 m	Tha84	
	140937.75*(17)	NaCN	9(3,6)−8(3,5)	1.40[f]	IRC+10216	IRAM 30 m	Cer00	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	140956.20(50)	$^{30}SiC_2$	6(2,4)−5(2,3)	0.03	IRC+10216	IRAM 30 m	Mik89	Cer91b
	140967.75(10)	PN	3−2	0.032	OriMC−1	BTL 7 m	Tur87b	Wys72
	141037.639*(25)	CH_3OCHO	12(2,11)−11(2,10) E	0.07	OriMC−1	NRAO 12 m	Tur87b	Oes99
	141044.385*(28)	CH_3OCHO	12(2,11)−11(2,10) A	0.07	OriMC−1	NRAO 12 m	Tur87b	Oes99
	141061.797*(15)	$H^{13}CCCN$	16−15	0.07	Sgr B2(M)	BTL 7 m	Cum86	Laf78
	141061.797*(15)	$H^{13}CCCN$	16−15	0.10	IRC+10216	IRAM 30 m	Mik89	Laf78
	141103.341*(4)	HC_5N	53−52	0.50[f]	IRC+10216	IRAM 30 m	Cer00	
	141243.921*(28)	CH_3OCHO	11(3,8)−10(3,7) E	0.5	OriMC−1	NRAO 11 m	Wil81	Oes99
	141250.277*(32)	$Si^{34}S$	8−7	20.0[f]	IRC+10216	IRAM 30 m	Cer00	
	141260.454*(28)	CH_3OCHO	11(3,8)−10(3,7) A	0.4	OriMC−1	NRAO 11 m	Wil81	Oes99
	141441.249*(12)	CH_3OH	0(0,0)−1(1,1) E v_t =1	1.4[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	141595.449*(5)	$^{13}CH_3OH$	3(0,3)−2(0,2) E	0.44[b]	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
	141597.135*(5)	$^{13}CH_3OH$	3(−1,3)−2(−1,2) E	[b]	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
	141602.486*(6)	$^{13}CH_3OH$	3(0,3)−2(0,2) A+	[b]	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
	141623.413*(5)	$^{13}CH_3OH$	3(−2,2)−2(−2,1)	[b]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	141623.548*(5)	$^{13}CH_3OH$	3(2,1)−2(2,0) E	2.0[fb]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	141629.277(6)	CH_3OH	3(1,2)−2(1,1) E	2.0[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	141635.836*(20)	l−C_3H	$^2\Pi_{1/2}$ J=13/2−11/2 F=7−6 e	0.042[b]	IRC+10216	BTL 7 m	Tha85	Yam90a
	141636.395*(20)	l−C_3H	$^2\Pi_{1/2}$ J=13/2−11/2 F=6−5 e	[b]	IRC+10216	BTL 7 m	Tha85	Yam90a
U	141646.5	unidentified		0.9[f]	OriMC−1	TRAO 14 m	Lee01	
	141652.921*(25)	CH_3OCHO	11(2,9)−10(2,8) E	4.4[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	141667.046*(26)	CH_3OCHO	11(2,9)−10(2,8) A	1.7[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	141708.733*(20)	l−C_3H	$^2\Pi_{1/2}$ J=13/2−11/2 F=7−6 f	0.062[b]	IRC+10216	BTL 7 m	Tha85	Yam90a
	141709.446*(20)	l−C_3H	$^2\Pi_{1/2}$ J=13/2−11/2 F=6−5 f	[b]	IRC+10216	BTL 7 m	Tha85	Yam90a
	141751.54*(3)	SiC_2	6(4,3)−5(4,2)	0.064	IRC+10216	BTL 7 m	Tha84	
	141755.41*(3)	SiC_2	6(4,2)−5(4,1)	0.064	IRC+10216	BTL 7 m	Tha84	
	141783.3(4)	C_4H	$^2\Pi_{1/2}$ J=29/2−27/2 v_7 =1 e	4.60[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	141829.146*(6)	CH_3OCH_3	8(3,5)−8(2,6) EA	0.7[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	141832.251*(4)	CH_3OCH_3	8(3,5)−8(2,6) EE	1.4[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	141835.501*(8)	CH_3OCH_3	8(3,5)−8(2,6) AA	0.8[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	141983.748*(6)	$H_2{}^{13}CO$	2(0,2)−1(0,1)	0.21	OriMC−1	BTL 7 m	Kah84	
U	142054.4	unidentified		0.8[f]	OriMC−1	TRAO 14 m	Lee01	
	142138.76* (12)	$Si^{13}CC$	6(2,4)−5(2,3)	1.0[f]	IRC+10216	IRAM 30 m	Cer91b	
	142214.24* (13)	C_4H	$^2\Pi_{3/2}$ J=29/2−27/2 v_7 =2 ℓ=2	0.93[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	142223.7(3)	C_4H	$^2\Pi_{1/2}$ J=29/2−27/2 v_7 =1 f	4.70[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	142285.096*(17)	$t-CH_3CH_2OH$	9(0,9)−8(1,8)	0.14	Sgr B2(M)	BTL 7 m	Cum86	
	142321.60*(5)	$Al^{37}Cl$	10−9	1.10[f]	IRC+10216	IRAM 30 m	Cer87c	
	142346.313*(10)	CH_3CH_2CN	16(2,15)−15(2,14)	0.07	Sgr B2(M)	BTL 7 m	Cum86	
	142379.431*(3)	$OC^{34}S$	12−11	0.08	Sgr B2(M)	BTL 7 m	Cum86	
	142399.489*(14)	CH_2CHCN	15(5,11)−14(5,10)	0.07[b]	Sgr B2(M)	BTL 7 m	Cum86	
	142399.510*(14)	CH_2CHCN	15(5,10)−14(5,9)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	142401.867*(16)	CH_2CHCN	15(6,*)−14(6,*)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	142410.48* (12)	NaCN	9(2,7)−8(2,6)	1.33[f]	IRC+10216	IRAM 30 m	Cer00	
	142419.704*(19)	CH_2CHCN	15(7,*)−14(7,*)	0.06[b]	Sgr B2(M)	BTL 7 m	Cum86	
	142424.454*(13)	CH_2CHCN	15(4,12)−14(4,11)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	142426.506*(13)	CH_2CHCN	15(4,11)−14(4,10)	[b]	Sgr B2(M)	BTL 7 m	Cum86	
	142447.936*(21)	CH_2CHCN	15(8,*)−14(8,*)	0.07	Sgr B2(M)	BTL 7 m	Cum86	
	142501.701*(11)	CCS	11,11−10,10	1.50[f]	IRC+10216	IRAM 30 m	Cer00	
	142522.759*(21)	$C^{36}S$	3−2	0.06	NGC6334A	SEST 15m	Mau96	
	142558.809*(14)	^{29}SiS	8−7	21.8[f]	IRC+10216	IRAM 30 m	Cer00	
U	142611.3(20)	unidentified		0.30[f]	IRC+10216	IRAM 30 m	Cer00	
U	142621.9(20)	unidentified		0.16[f]	IRC+10216	IRAM 30 m	Cer00	
U	142676.8(8)	unidentified		0.38[f]	IRC+10216	IRAM 30 m	Cer00	
U	142688.4(8)	unidentified		0.65[f]	IRC+10216	IRAM 30 m	Cer00	
U	142697.6(15)	unidentified		0.20[f]	IRC+10216	IRAM 30 m	Cer00	
	142701.320*(2)	NH_2CHO	7(1,7)−6(1,6)	0.11	Sgr B2(M)	BTL 7 m	Cum86	
	142728.773*(36)	C_4H	15.5−14.5	23.4[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	142733.443*(25)	CH_3OCHO	13(1,13)−12(1,12) E	0.05[b]	Sgr B2(M)	BTL 7 m	Cum86	Oes99
	142735.161*(29)	CH_3OCHO	13(1,13)−12(1,12) A	[b]	Sgr B2(M)	BTL 7 m	Cum86	Oes99
	142755.167*(29)	C_6H	$^2\Pi_{3/2}$ J=103/2−101/2 e	0.50[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	142767.280*(32)	C_4H	14.5−13.5	25.8[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	142768.913*(32)	CH_2CO	7(1,6)−6(1,5)	0.11	Sgr B2(M)	BTL 7 m	Cum86	
	142807.681*(6)	$^{13}CH_3OH$	3(1,2)−2(1,1) A−	[b]	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
	142815.395*(25)	CH_3OCHO	13(0,13)−12(0,12) E	0.04[b]	Sgr B2(M)	BTL 7 m	Cum86	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	142817.042*(29)	CH_3OCHO	13(0,13)−12(0,12) A	[b]	Sgr B2(M)	BTL 7 m	Cum86	Oes99
	142820.512*(31)	C_6H	$^2\Pi_{3/2}$ J=103/2−101/2 f	0.43[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
U	142831.1(10)	unidentified		0.22[f]	IRC+10216	IRAM 30 m	Cer00	
	142858.325*(20)	$^{13}CH_3CN$	8(5)−7(5)	0.9[f]	G10.47	IRAM 30 m	Olm96	
	142859.133*(26)	H_2CCCC	16(3,14)−15(3,13)	0.68[fb]	IRC+10216	IRAM 30 m	Cer00	
	142859.148*(26)	H_2CCCC	16(3,13)−15(3,12)	[b]	IRC+10216	IRAM 30 m	Cer00	
	142878.641 (16)	CP	3−2 J=5/2−3/2 F=3−2	0.30[f]	IRC+10216	IRAM 30 m	Cer00	Sai89
	142882.498*(19)	$^{13}CH_3CN$	8(4)−7(4)	3.8[f]	G10.47	IRAM 30 m	Olm96	
	142891.707*(24)	H_2CCCC	16(0,16)−15(0,15)	0.40[fb]	IRC+10216	IRAM 30 m	Cer00	
	142891.831*(23)	H_2CCCC	16(2,14)−15(2,13)	[b]	IRC+10216	IRAM 30 m	Cer00	
	142891.958 (25)	CP	3−2 J=5/2−3/2 F=2−1	0.40[f]	IRC+10216	IRAM 30 m	Cer00	Sai89
	142892.174*(28)	H_2CCCC	16(1,15)−15(1,14)	0.98[f]	IRC+10216	IRAM 30 m	Cer00	
	142901.308*(19)	$^{13}CH_3CN$	8(3)−7(3)	5.5[f]	G10.47	IRAM 30 m	Olm96	
	142914.750*(20)	$^{13}CH_3CN$	8(2)−7(2)	4.2[f]	G10.47	IRAM 30 m	Olm96	
	142922.817*(20)	$^{13}CH_3CN$	8(1)−7(1)	[b]	G10.47	IRAM 30 m	Olm96	
	142924.429*(25)	CH_3OCHO	13(1,13)−12(0,12) E	1.5[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	142925.506*(20)	$^{13}CH_3CN$	8(0)−7(0)	[b]	G10.47	IRAM 30 m	Olm96	
U	143006.7	unidentified		0.7[f]	OriMC−1	TRAO 14 m	Lee01	
	143057.069*(6)	SO_2	16(2,14)−16(1,15)	0.57	OriMC−1	MMWO 4.9 m	Pic79	
	143061.65(40)	$^{29}SiC_2$	6(2,4)−5(2,3)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	143104.0(20)	$^{13}CCCN$	15−14 a	0.71[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	143108.339*(31)	CH_3OH	17(0,17)−17(−1,17) E	1.7[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	143124.0(20)	$^{13}CCCN$	15−14 b	0.92[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	143168.699*(10)	$^{24}MgNC$	23/2,12−21/2,11	2.9	IRC+10216	IRAM 30 m	Gue93	Kaw93
	143169.536*(18)	CH_3OH	7(3,4)−8(2,6) E	2.4[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	143175.538*(17)	$Si^{33}S$	8−7	3.50[f]	IRC+10216	IRAM 30 m	Cer00	
	143183.919*(10)	$^{24}MgNC$	25/2,12−23/2,11	3.2	IRC+10216	IRAM 30 m	Gue93	Kaw93
	143237.414*(70)	$Na^{35}Cl$	11−10	1.47[f]	IRC+10216	IRAM 30 m	Cer87c	
	143240.535*(28)	CH_3OCHO	12(1,11)−11(1,10) A	1.4[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
U	143263.3	unidentified		0.8[f]	OriMC−1	TRAO 14 m	Lee01	
	143337.706*(8)	CH_3CH_2CN	16(7,*)−15(7,*)	4.1[f]	OriMC−1	TRAO 14 m	Lee01	
	143343.885*(8)	CH_3CH_2CN	16(9,*)−15(9,*)	2.3[f]	OriMC−1	TRAO 14 m	Lee01	
	143357.179*(10)	CH_3CH_2CN	16(6,*)−15(6,*)	2.8[f]	OriMC−1	TRAO 14 m	Lee01	
	143357.808*(5)	SO_2	31(8,24)−32(7,25)	n.r.	OriMC−1	IRAM 30 m	Com96	
	143360.374*(8)	CH_3CH_2CN	16(10,*)−15(10,*)	2.5[f]	OriMC−1	TRAO 14 m	Lee01	
	143377.367*(61)	CH_3OCHO	24(4,20)−24(3,21) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	143383.017*(8)	CH_3CH_2CN	16(11,*)−15(10,*)	n.r.	OriMC−1	IRAM 30 m	Com96	
U	143390.2	unidentified		0.19	OriMC−1	IRAM 30 m	Com96	
U	143393.6	unidentified		0.17	OriMC−1	IRAM 30 m	Com96	
	143407.248*(9)	CH_3CH_2CN	16(5,*)−15(5,*)	2.9[f]	OriMC−1	TRAO 14 m	Lee01	
	143410.770*(8)	CH_3CH_2CN	16(12,*)−15(12,*)	n.r.	OriMC−1	IRAM 30 m	Com96	
	143424.39(20)	C_4H	$^2\Sigma$ J=15−14 v_7 =2 L	0.2	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	143429.958 (12)	CP	3−2 J=7/2−5/2 F=4−3	0.040	IRC+10216	IRAM 30 m	Gue90	Sai89
	143431.758 (21)	CP	3−2 J=7/2−5/2 F=3−2	0.040	IRC+10216	IRAM 30 m	Gue90	Sai89
	143442.976*(9)	CH_3CH_2CN	16(13,*)−15(13,*)	n.r.	OriMC−1	IRAM 30 m	Com96	
	143446.3(3)	C_4H	$^2\Pi_{3/2}$ J=31/2−29/2 v_7 =1 e	0.25	IRC+10216	IRAM 30 m	Gue87a	Yam87b
U	143456.2	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	143461.0	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
	143472.29*(7)	HCOOH	32(3,30)−31(4,27)	n.r.	OriMC−1	IRAM 30 m	Com96	Wil80
U	143474.0	unidentified		1.2	OMC−IRc2	IRAM 30 m	Jac90	
	143479.200*(9)	CH_3CH_2CN	16(14,*)−15(14,*)	0.7[b]	OMC−IRc2	IRAM 30 m	Jac90	
	143480.41(20)	C_4H	$^2\Sigma$ J=15−14 v_7 =2 U	0.2	IRC+10216	IRAM 30 m	Gue87a	Gue87a
U	143490.3	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	143506.978*(9)	CH_3CH_2CN	16(4,13)−15(4,12)	4.3	OMC−IRc2	IRAM 30 m	Jac90	
	143519.142*(10)	CH_3CH_2CN	16(15,*)−15(15,*)	0.6[b]	OMC−IRc2	IRAM 30 m	Jac90	
	143524.885*(9)	DCCCN	17−16	1.5	OMC−IRc2	IRAM 30 m	Jac90	Laf78
	143529.201*(10)	CH_3CH_2CN	16(3,14)−15(3,13)	4.1	OMC−IRc2	IRAM 30 m	Jac90	
	143535.292*(9)	CH_3CH_2CN	16(4,12)−15(4,11)	4.4	OMC−IRc2	IRAM 30 m	Jac90	
U	143555.2	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	143559.4	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
	143565.018*(55)	NH_2CHO	24(6,19)−25(5,20)	1.0	OMC−IRc2	IRAM 30 m	Jac90	
	143570.318*(4)	DNCO	7(1,6)−6(1,5)	0.7	OMC−IRc2	IRAM 30 m	Jac90	
U	143575.8(15)	unidentified		0.20[f]	IRC+10216	IRAM 30 m	Cer00	
	143577.724*(19)	$C^{34}S$	3−2 v=1	n.r.	OriMC−1	IRAM 30 m	Com96	
U	143583.4	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	143589.9	unidentified		0.6	OMC−IRc2	IRAM 30 m	Jac90	
	143599.414*(6)	CH_3OCH_3	7(3,4)−7(2,5) AE	0.9	OriMC−1	IRAM 30 m	Jac90	Gro98
	143600.080*(6)	CH_3OCH_3	7(3,4)−7(2,5) EA	1.3	OriMC−1	IRAM 30 m	Jac90	Gro98
	143602.988*(4)	CH_3OCH_3	7(3,4)−7(2,5) EE	2.9	OriMC−1	IRAM 30 m	Jac90	Gro98
	143605.394*(5)	AlNC	12−11	0.006	IRC+10216	IRAM 30 m	Ziu02	
U	143606.1(15)	unidentified		0.25[f]	IRC+10216	IRAM 30 m	Cer00	
	143606.229*(8)	CH_3OCH_3	7(3,4)−7(2,5) AA	2.1	OriMC−1	IRAM 30 m	Jac90	Gro98
U	143617.5	unidentified		1.7	OMC−IRc2	IRAM 30 m	Jac90	
U	143627.7	unidentified		0.8	OMC−IRc2	IRAM 30 m	Jac90	
U	143642.2	unidentified		0.5	OMC−IRc2	IRAM 30 m	Jac90	
	143645.378*(34)	SiC_3	12(2,10)−11(2,9)	0.008	IRC+10216	IRAM 30 m	Ziu02	
U	143646.6	unidentified		0.4	OMC−IRc2	IRAM 30 m	Jac90	
U	143652.4	unidentified		0.3	OMC−IRc2	IRAM 30 m	Jac90	
U	143659.7	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	143663.838*(5)	SO_2	6(2,4)−6(1,5) v_2 =1	0.4	OMC−IRc2	IRAM 30 m	Jac90	
U	143682.5	unidentified		0.7	OMC−IRc2	IRAM 30 m	Jac90	
U	143699.7	unidentified		0.12	OriMC−1	IRAM 30 m	Com96	
U	143707.	unidentified		0.3	OMC−IRc2	IRAM 30 m	Jac90	
	143715.746*(36)	C_6H	$^2\Pi_{1/2}$ J=103/2−101/2 f	0.22[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	143727.210 (37)	HDO	4(2,2)−4(2,3)	2.6	OMC−IRc2	IRAM 30 m	Jac90	DeL71
	143741.650 (50)	CH_3OD	5(1,4)−5(0,5) A−	6.6[f]	OriMC−1	IRAM 30 m	Mau88	And88
	143759.252*(16)	CH_2CHCN	15(2,13)−14(2,12)	1.2	OMC−IRc2	IRAM 30 m	Jac90	
	143764.973*(4)	HC_5N	54−53	0.3	OMC−IRc2	IRAM 30 m	Jac90	
U	143768.4(15)	unidentified		0.07[z]	Sgr B2(M)	BTL 7 m	Cum86	
U	143772.3	unidentified		0.8	OMC−IRc2	IRAM 30 m	Jac90	
	143784.079*(40)	CH_3OCHO	18(3,16)−18(2,17) E	0.3	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	143788.619*(43)	C_6H	$^2\Pi_{1/2}$ J=103/2−101/2 e	0.27[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	143793.881*(10)	$^{33}SO_2$	4(2,2)−4(1,3) F=5.5−5.5	n.r.	OriMC−1	IRAM 30 m	Com96	
	143795.863*(8)	$^{33}SO_2$	4(2,2)−4(1,3)	0.5	OMC−IRc2	IRAM 30 m	Jac90	
	143799.338*(12)	$^{33}SO_2$	4(2,2)−4(1,3) F=4.5−5.5	0.20	OriMC−1	IRAM 30 m	Com96	
U	143810.0	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	143813.625*(12)	SiS	8−7 v=2	0.34[f]	IRC+10216	IRAM 30 m	Cer00	
U	143814.3	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	143821.6	unidentified		0.8[f]	OriMC−1	TRAO 14 m	Lee01	
U	143829.2	unidentified		0.8	OMC−IRc2	IRAM 30 m	Jac90	
U	143841.7	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
	143850.434*(77)	CH_3OCHO	18(3,16)−18(2,17) A	0.3	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	143865.795*(4)	CH_3OH	3(1,3)−2(1,2) A+	1.27	Sgr B2(M)	BTL 7 m	Cum86	Xu_97
	143870.0(3)	C_4H	$^2\Pi_{3/2}$ J=31/2−29/2 v_7 =1 f	5.10[f]	IRC+10216	IRAM 30 m	Yam87b	Yam87b
	143880.12* (54)	$H^{13}COOH$	7(3,4)−8(2,7)	0.7	OMC−IRc2	IRAM 30 m	Jac90	Wil80
U	144007.0(5)	unidentified		0.75[f]	IRC+10216	IRAM 30 m	Cer00	
U	144031.6(10)	unidentified		0.70[f]	IRC+10216	IRAM 30 m	Cer00	
	144077.321*(24)	DCO^+	2−1	0.3	OriMC−1	MMWO 4.9 m	Gue77a	
	144241.96(3)	C_2D	2−1 J=5/2−3/2 F=7/2−5/2	0.13[b]	OriMC−1	BTL 7 m	Vrt85	Vrt85
	144243.05(3)	C_2D	2−1 J=5/2−3/2 F=3/2−1/2	[b]	OriMC−1	BTL 7 m	Vrt85	Vrt85
	144243.05(3)	C_2D	2−1 J=5/2−3/2 F=5/2−3/2	[b]	OriMC−1	BTL 7 m	Vrt85	Vrt85
	144244.835*(16)	CCS	12,11−11,10	0.13	Sgr B2(M)	NRAO 11 m	Hol81	
U	144267.0	unidentified		2.4[f]	OriMC−1	TRAO 14 m	Lee01	
	144296.72(8)	C_2D	2−1 J=3/2−1/2 F=5/2−3/2	0.09	OriMC−1	BTL 7 m	Vrt85	Vrt85
U	144351.4	unidentified		1.3[f]	OriMC−1	TRAO 14 m	Lee01	
U	144370.2	unidentified		2.0[f]	OriMC−1	TRAO 14 m	Lee01	
	144375.97* (13)	C_4H	$^2\Pi_{5/2}$ J=31/2−29/2 v_7 =2 ℓ=2	0.72[f]	IRC+10216	IRAM 30 m	Cer00	COL01
U	144388.7	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	144428.067*(32)	CH_3OCHO	16(6,10)−16(5,11) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	144449.123*(35)	CH_3OCHO	16(6,10)−16(5,11) E	0.08	OriMC−1	IRAM 30 m	Com96	Oes99
U	144456.1(10)	unidentified		0.59[f]	IRC+10216	IRAM 30 m	Cer00	
U	144480.8	unidentified		0.12	OriMC−1	IRAM 30 m	Com96	
	144504.991*(6)	CCCS	25−24	1.4[f]	IRC+10216	IRAM 30 m	Cer87b	
	144520.383*(9)	SiS	8−7 v=1	1.64[f]	IRC+10216	IRAM 30 m	Cer00	
U	144529.7	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
	144571.97(5)	CH_3OH	3(0,3)−2(0,2) A v_t =2	0.6[f]	OriMC−1	TRAO 14 m	Lee01	Her84
	144573.145*(19)	CH_3CCCN	35(3)−34(3)	n.r.	OriMC−1	IRAM 30 m	Com96	
	144583.91(5)	CH_3OH	3(−1,2)−2(−1,1) E v_t =2	0.7[f]	OriMC−1	TRAO 14 m	Lee01	Her84
	144584.247*(16)	CH_3CCCN	35(1)−34(1)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	
	144585.635*(16)	CH_3CCCN	35(0)−34(0)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	
	144589.856*(6)	CH_3OH	3(1,3)−2(1,2) A++ v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
	144617.114*(11)	$C^{34}S$	3−2	1.2	OriMC−1	MMWO 4.9 m	Wil76a	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	144650.1	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	144683.1	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
	144728.356*(6)	CH_3OH	3(2,1)−2(2,0) A++ v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
	144728.775*(6)	CH_3OH	3(−2,1)−2(−2,0) E v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
	144729.071*(6)	CH_3OH	3(2,2)−2(2,1) A−− v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
	144733.243*(7)	CH_3OH	3(2,2)−2(2,1) E v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
	144750.242*(9)	CH_3OH	3(−1,2)−2(−1,1) E v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
U	144762.2	unidentified		0.5[f]	OriMC−1	TRAO 14 m	Lee01	
	144768.170*(12)	CH_3OH	3(0,3)−2(0,2) A++ v_t =1	n.r.	OriMC−1	IRAM 30 m	Com96	
	144826.574*(2)	DCN	2−1 F_1=2−2	[b]	OriMC−1	MMWO 4.9 m	Pen77	DeL69
	144826.8097(10)	DCN	2−1 F_1=1−0 F=2−1	[b]	OriMC−1	MMWO 4.9 m	Pen77	DeL69
	144826.8414(10)	DCN	2−1 F_1=1−0 F=1−1	[b]	OriMC−1	MMWO 4.9 m	Pen77	DeL69
	144828.002*(2)	DCN	2−1 F_1=2−1	0.9[b]	OriMC−1	MMWO 4.9 m	Pen77	DeL69
	144828.111*(2)	DCN	2−1 F_1=3−2	[b]	OriMC−1	MMWO 4.9 m	Pen77	DeL69
	144830.338*(2)	DCN	2−1 F_1=1−1	[b]	OriMC−1	MMWO 4.9 m	Pen77	DeL69
	144855.074*(6)	CH_3OCH_3	6(3,3)−6(2,4) AE	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	144856.766*(8)	CH_3OCH_3	6(3,3)−6(2,4) EA	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	144858.987*(6)	CH_3OCH_3	6(3,3)−6(2,4) EE	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	144862.032*(8)	CH_3OCH_3	6(3,3)−6(2,4) AA	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	144878.572*(7)	CH_3OH	3(1,2)−2(1,1) A v_t =1	0.9[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
U	144896.6(10)	unidentified		1.42[f]	IRC+10216	IRAM 30 m	Cer00	
	144943.469*(21)	$HC^{13}CCN$	16−15	2.86[f]	IRC+10216	IRAM 30 m	Cer00	Laf78
	144957.466*(13)	$HCC^{13}CN$	16−15	2.66[f]	IRC+10216	IRAM 30 m	Cer00	Laf78
U	144968.0(10)	unidentified		1.35[f]	IRC+10216	IRAM 30 m	Cer00	
U	144971.0	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	145075.53*(10)	NaCN	9(1,8)−8(1,7)	1.50[f]	IRC+10216	IRAM 30 m	Cer00	
U	145075.9(5)	unidentified		0.25	OriMC−1	NRAO 11 m	Hol81	
	145089.620*(7)	$c-C_3H_2$	3(1,2)−2(2,1)	0.54	Cha−MMS1	SEST 15m	Kon00	
	145093.760*(4)	CH_3OH	3(0,3)−2(0,2) E	1.25	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145097.443*(4)	CH_3OH	3(−1,3)−2(−1,2) E	1.45	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145103.194*(4)	CH_3OH	3(0,3)−2(0,2) A+	1.35	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145124.334*(4)	CH_3OH	3(2,2)−2(2,1) A−	1.45[b]	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145126.190*(4)	CH_3OH	3(2,1)−2(2,0) E	[b]	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145126.392*(4)	CH_3OH	3(−2,2)−2(−2,1) E	[b]	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145127.534*(31)	HCCCN	16−15 v_7 =1 ℓ=1 f	1.29[f]	IRC+10216	IRAM 30 m	Cer00	Laf78
	145131.872*(4)	CH_3OH	3(1,2)−2(1,1) E	1.25[b]	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145133.418*(4)	CH_3OH	3(2,1)−2(2,0) A+	[b]	OriMC−1	NRAO 11 m	Kut73	Xu_97
	145136.95*(17)	$Si^{13}CC$	6(1,5)−5(1,4)	0.9[f]	IRC+10216	IRAM 30 m	Cer91b	
	145227.034*(11)	SiS	8−7	0.25	IRC+10216	BTL 7 m	Hen85	
	145325.849*(45)	SiC_2	6(2,4)−5(2,3)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	145418.033*(10)	CH_3CH_2CN	16(1,15)−15(1,14)	0.1	OriMC−1	BTL 7 m	Woo84	
	145526.735*(27)	C_6H	$^2\Pi_{3/2}$ J=103/2−101/2 e	0.40[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	145560.950*(4)	HCCCN	16−15	0.8	Sgr B2(M)	MMWO 4.9 m	Mor77	
	145594.309*(29)	C_6H	$^2\Pi_{3/2}$ J=103/2−101/2 f	0.65[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	145602.949*(7)	H_2CO	2(0,2)−1(0,1)	1.9	OriMC−1	NRAO 11 m	Tha71	
	145675.601*(6)	CH_3OCH_3	5(3,2)−5(2,3) AE	[b]	OriMC−1	BTL 7 m	Woo84	Gro98
	145679.943*(14)	CH_3OCH_3	5(3,2)−5(2,3) EA	[b]	OriMC−1	BTL 7 m	Woo84	Gro98
	145680.395*(6)	CH_3OCH_3	5(3,2)−5(2,3) EE	0.1[b]	OriMC−1	BTL 7 m	Woo84	Gro98
	145682.667*(8)	CH_3OCH_3	5(3,2)−5(2,3) AA	[b]	OriMC−1	BTL 7 m	Woo84	Gro98
	145744.62*(5)	$Al^{35}Cl$	10−9	2.42[f]	IRC+10216	IRAM 30 m	Cer87c	
	145755.620 (50)	$C^{33}S$	3−2 F=7/2−5/2	[b]	OriMC−1	MMWO 4.9 m	Wil76a	Bog81
	145755.620 (50)	$C^{33}S$	3−2 F=9/2−7/2	0.2[b]	OriMC−1	MMWO 4.9 m	Wil76a	Bog81
	145756.500 (50)	$C^{33}S$	3−2 F=3/2−1/2	[b]	OriMC−1	MMWO 4.9 m	Wil76a	Bog81
	145756.500 (50)	$C^{33}S$	3−2 F=5/2−3/2	[b]	OriMC−1	MMWO 4.9 m	Wil76a	Bog81
	145766.163*(27)	CH_3OH	16(0,16)−16(−1,16) E	0.4	OriMC−1	BTL 7 m	Woo84	Xu_97
U	145876.2	unidentified		1.9[f]	OriMC−1	TRAO 14 m	Lee01	
	145904.123*(17)	CS	3−2 v=1	0.054	IRC+10216	NRAO 12 m	Hig00	
	145918.572*(31)	HCCCN	16−15 v_7 =1	0.006	IRC+10216	NRAO 12 m	Hig00	Laf78
	145946.815*(1)	OCS	12−11	0.45	Sgr B2(M)	NRAO 11 m	Sol73	
	146003.33* (15)	$K^{35}Cl$	19−18	0.39[f]	IRC+10216	IRAM 30 m	Cer87c	
	146120.074*(10)	CH_3CH_2CN	16(2,14)−15(2,13)	3.7[f]	OriMC−1	TRAO 14 m	Lee01	
U	146129.6	unidentified		1.6[f]	OriMC−1	TRAO 14 m	Lee01	
	146300.96* (28)	SiC_2	6(1,5)−5(1,4) v_3 =1	0.007	IRC+10216	NRAO 12 m	Gen97	Bog91
	146368.342*(4)	CH_3OH	3(1,2)−2(1,2) A−−	0.37	G34.3+0.15	TRAO 14 m	Kim00	Xu_97
U	146372.4	unidentified		2.4[f]	OriMC−1	TRAO 14 m	Lee01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	146428.4(5)	unidentified		0.62[f]	IRC+10216	IRAM 30 m	Cer00	
U	146435.6(5)	unidentified		0.65[f]	IRC+10216	IRAM 30 m	Cer00	
U	146506.1(10)	unidentified		0.65[f]	IRC+10216	IRAM 30 m	Cer00	
	146550.052*(3)	SO_2	10(4,6)−11(3,9)	10.2[f]	OriMC−1	TRAO 14 m	Lee01	
	146605.511*(4)	SO_2	4(2,2)−4(1,3)	25.2[f]	OriMC−1	TRAO 14 m	Lee01	
	146617.419*(33)	CH_3OH	14(1,14)−13(2,11) A++	[b]	G34.3+0.15	TRAO 14 m	Kim00	Xu_97
	146618.838*(18)	CH_3OH	9(0,9)−8(1,8) A++	0.29[b]	G34.3+0.15	TRAO 14 m	Kim00	Xu_97
U	146622.4	unidentified		5.7[f]	OriMC−1	TRAO 14 m	Lee01	
	146635.672*(5)	$H_2{}^{13}CO$	2(1,1)−1(1,0)	n.r.	OriMC−1	MMWO 4.9 m	Wan76	
	146672.825*(20)	CH_2N	2(0,2)−1(0,1) 7/2−5/25/2−3/	2[b]	TMC−1	NRAO 12 m	Ohi94	Yam92
	146674.203*(20)	CH_2N	2(0,2)−1(0,1) 7/2−5/27/2−5/	20.055[b]	TMC−1	NRAO 12 m	Ohi94	Yam92
	146675.065*(20)	CH_2N	2(0,2)−1(0,1) 7/2−5/29/2−7/	2[b]	TMC−1	NRAO 12 m	Ohi94	Yam92
	146730.27* (26)	HCCCN	16−15 v_7 =3 ℓ=1 e	0.65	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	146876.032*(33)	H_2CCC	7(1,6)−6(1,5)	0.082	TMC−1	IRAM 30 m	Cer91	
	146894.498*(10)	CH_3CH_2CN	17(1,17)−16(1,16)	4.1[f]	OriMC−1	TRAO 14 m	Lee01	
U	146932.5(10)	unidentified		0.6	OriMC−1	NRAO 11 m	Hol81	
	146969.026*(6)	CS	3−2	8.1	OriMC−1	MMWO 4.9 m	Lis75	
	146977.608*(25)	CH_3OCHO	12(3,10)−11(3,9) E	<0.08	OriMC−1	MMWO 4.9 m	Lor84	Oes99
U	146984.5	unidentified		0.8[f]	OriMC−1	TRAO 14 m	Lee01	
	146988.082*(25)	CH_3OCHO	12(3,10)−11(3,9) A	0.11	OriMC−1	MMWO 4.9 m	Lor84	Oes99
	147024.197*(6)	CH_3OCH_3	7(1,6)−6(0,6) EE+AE	[b]	OriMC−1	MMWO 4.9 m	Lor84	Gro98
	147024.891*(4)	CH_3OCH_3	7(1,6)−6(0,6) EE	0.20[b]	OriMC−1	MMWO 4.9 m	Lor84	Gro98
	147025.585*(6)	CH_3OCH_3	7(1,6)−6(0,6) AA	[b]	OriMC−1	MMWO 4.9 m	Lor84	Gro98
	147035.846*(5)	CH_3CN	8(7)−7(7)	6.1[f]	G10.47	IRAM 30 m	Olm96	
	147056.633*(7)	$CH_3{}^{13}CN$	8(4)−7(4)	4.0[f]	G10.47	IRAM 30 m	Olm96	
	147072.612*(3)	CH_3CN	8(6)−7(6)	0.08	OriMC−1	MMWO 4.9 m	Lor84	
	147076.389*(6)	$CH_3{}^{13}CN$	8(3)−7(3)	4.1[f]	G10.47	IRAM 30 m	Olm96	
	147090.507*(6)	$CH_3{}^{13}CN$	8(2)−7(2)	6.7[f]	G10.47	IRAM 30 m	Olm96	
	147098.980*(7)	$CH_3{}^{13}CN$	8(1)−7(1)	4.1[f]	G10.47	IRAM 30 m	Olm96	
	147101.804*(7)	$CH_3{}^{13}CN$	8(0)−7(0)	[b]	G10.47	IRAM 30 m	Olm96	
	147103.747*(3)	CH_3CN	8(5)−7(5)	0.12	OriMC−1	MMWO 4.9 m	Lor84	
U	147112.9	unidentified		2.2[f]	OriMC−1	TRAO 14 m	Lee01	
	147129.237*(2)	CH_3CN	8(4)−7(4)	0.16	OriMC−1	MMWO 4.9 m	Lor84	
	147149.073*(2)	CH_3CN	8(3)−7(3)	0.32	OriMC−1	MMWO 4.9 m	Lor84	
	147163.248*(2)	CH_3CN	8(2)−7(2)	0.34	OriMC−1	MMWO 4.9 m	Lor84	
	147171.755*(2)	CH_3CN	8(1)−7(1)	0.50	OriMC−1	MMWO 4.9 m	Lor84	
	147174.591*(2)	CH_3CN	8(0)−7(0)	0.54	OriMC−1	MMWO 4.9 m	Lor84	
	147202.064*(10)	CH_3OCH_3	6(3,4)−6(2,5) EA	[b]	W51e2	NMA Array	Zha98	Gro98
	147203.751*(6)	CH_3OCH_3	6(3,4)−6(2,5) AE	[b]	W51e2	NMA Array	Zha98	Gro98
	147206.810*(6)	CH_3OCH_3	6(3,4)−6(2,5) EE	6.0[b]	W51e2	NMA Array	Zha98	Gro98
	147210.732*(8)	CH_3OCH_3	6(3,4)−6(2,5) AA	[b]	W51e2	NMA Array	Zha98	Gro98
U	147243.	unidentified		0.12	OriMC−1	MMWO 4.9 m	Lor84	
	147432.101*(48)	CH_3CN	8(7)−7(7) v_8 =1 ℓ=−1 F=9−8	0.3[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147475.143*(37)	CH_3CN	8(6)−7(6) v_8 =1 ℓ=−1 F=9−8	0.4[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147475.924*(28)	CH_3CN	8(1)−7(1) v_8 =1 ℓ=+1	8.2[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147512.473*(28)	CH_3CN	8(5)−7(5) v_8 =1 ℓ=−1 F=9−8	4.9[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147519.455*(43)	CH_3CN	8(7)−7(7) v_8 =1 ℓ=+1 F=9−8	3.1[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147544.082*(24)	CH_3CN	8(4)−7(4) v_8 =1 ℓ=−1 F=9−8	3.9[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147550.385*(32)	CH_3CN	8(6)−7(6) v_8 =1 ℓ=+1 F=9−8	3.1[f]	G10.47	IRAM 30 m	Olm96	Bou80
U	147561.7(5)	unidentified		0.37[f]	IRC+10216	IRAM 30 m	Cer00	
	147569.937*(21)	CH_3CN	8(3)−7(3) v_8 =1 ℓ=−1 F=9−8	4.9[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147575.239*(24)	CH_3CN	8(5)−7(5) v_8 =1 ℓ=+1 F=9−8	4.2[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147589.948*(90)	CH_3CN	8(2)−7(2) v_8 =1 ℓ=−1	6.5[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147595.453*(21)	CH_3CN	8(4)−7(4) v_8 =1 ℓ=+1 F=9−8	6.4[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147602.2(5)	$C^{13}CCN$	15−14 a	0.45[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	147603.983*(30)	CH_3CN	8(1)−7(1) v_8 =1 ℓ=−1	6.2[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147609.804*(25)	CH_3CN	8(3)−7(3) v_8 =1 ℓ=+1	3.2[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147611.000*(40)	CH_3CN	8(0)−7(0) v_8 =1 ℓ=+1	4.8[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147617.6(5)	$C^{13}CCN$	15−14 b	0.38[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	147619.872*(80)	CH_3CN	8(2)−7(2) v_8 =1 ℓ=+1	6.6[f]	G10.47	IRAM 30 m	Olm96	Bou80
	147647.149*(33)	$CCC^{13}CH$	16.5−15.5	0.39[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	147684.547*(37)	$CCC^{13}CH$	15.5−14.5	0.47[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	147760.644*(30)	CH_3CN	8(1)−7(1) v_8 =1 ℓ=+1	5.7[f]	G10.47	IRAM 30 m	Olm96	Bou80
U	147943.7	unidentified		1.7[f]	OriMC−1	TRAO 14 m	Lee01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	147979.7	unidentified		0.9[f]	OriMC−1	TRAO 14 m	Lee01	
	148027.954*(29)	CH_3OCHO	12(6,6)−11(6,5) E	1.1[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	148039.439*(25)	CH_3OCHO	12(6,7)−11(6,6) A	[b]	OriMC−1	TRAO 14 m	Lee01	Oes99
	148040.635*(25)	CH_3OCHO	12(6,7)−11(6,6) E	1.8[fb]	OriMC−1	TRAO 14 m	Lee01	Oes99
	148045.834*(25)	CH_3OCHO	12(6,6)−11(6,5) A	0.9[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	148111.919*(24)	CH_3OH	15(0,15)−15(−1,15) E	4.9[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	148221.466*(12)	$HCNH^+$	2−1	0.09[b]	Sgr B2(M)	MMWO 4.9 m	Ziu86a	
	148223.131*(2)	NH_2CHO	7(2,6)−6(2,5)	[b]	Sgr B2(M)	MMWO 4.9 m	Ziu86a	
U	148249.2	unidentified		1.0[f]	OriMC−1	TRAO 14 m	Lee01	
	148359.772 (50)	CH_3OD	6(0,6)−5(1,5) A+	3.3[f]	OriMC−1	IRAM 30 m	Mau88	And88
	148409.07*(4)	CCCN	15−14 a	26.4[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	148427.82*(4)	CCCN	15−14 b	28.0[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	148500.393*(4)	CH_3OCH_3	8(3,6)−8(2,7) EE	1.0[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	148503.837*(8)	CH_3OCH_3	8(3,6)−8(2,7) AA	0.7[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	148797.700*(25)	CH_3OCHO	12(4,9)−11(4,8) E	0.7[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	148805.973*(25)	CH_3OCHO	12(4,9)−11(4,8) A	0.8[f]	OriMC−1	TRAO 14 m	Lee01	Oes99
	149106.972 (50)	l−C_3H	$^2\Pi_{3/2}$ J=13/2−11/2 a	4.68[f]	IRC+10216	IRAM 30 m	Cer00	Got85
	149212.667 (50)	l−C_3H	$^2\Pi_{3/2}$ J=13/2−11/2 b	6.13[f]	IRC+10216	IRAM 30 m	Cer00	Got85
	149311.57* (14)	$K^{37}Cl$	20−19	0.25[f]	IRC+10216	IRAM 30 m	Cer00	
	149439.578*(8)	CH_3OCH_3	19(3,17)−18(4,14) EE	1.0[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
U	149524.0(10)	unidentified		0.30[f]	IRC+10216	IRAM 30 m	Cer00	
	149532.527*(26)	CH_3OH	14(2,12)−13(3,10) E	4.0[f]	OriMC−1	TRAO 14 m	Lee01	Xu_97
	149569.776*(4)	CH_3OCH_3	9(3,7)−9(2,8) EE	0.9[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	149877.010*(30)	$H^{13}CCCN$	17−16	1.76[f]	IRC+10216	IRAM 30 m	Cer00	Laf78
	150141.593*(22)	CH_3OH	14(0,14)−14(−1,14) E	0.86	OriMC−1	FCRAO 14 m	Ziu91	Xu_97
U	150155.3	unidentified		1.1[f]	OriMC−1	TRAO 14 m	Lee01	
	150162.944*(14)	CH_3OCH_3	25(4,21)−25(3,22) AE+EA	[b]	OriMC−1	FCRAO 14 m	Ziu91	Gro98
	150163.408*(12)	CH_3OCH_3	25(4,21)−25(3,22) AE+EA	0.12[b]	OriMC−1	FCRAO 14 m	Ziu91	Gro98
	150163.871*(16)	CH_3OCH_3	25(4,21)−25(1,24) AA	1.0[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	150163.871*(17)	CH_3OCH_3	25(4,21)−25(3,22) AE+EA	[b]	OriMC−1	FCRAO 14 m	Ziu91	Gro98
	150176.459(2)	NO	$^2\Pi_{1/2}$ J=3/2−1/2 F=5/2−3/2(−+)	0.25	Sgr B2(M)	NRAO 11 m	Lis78a	Win94
U	150186.7	unidentified		1.0[f]	OriMC−1	TRAO 14 m	Lee01	
	150198.759(3)	NO	$^2\Pi_{1/2}$ J=3/2−1/2 F=3/2−1/2(−+)	0.03	OriMC−1	FCRAO 14 m	Ziu91	Win94
	150218.744(3)	NO	$^2\Pi_{1/2}$ J=3/2−1/2 F=3/2−3/2(−+)	0.03[b]	OriMC−1	FCRAO 14 m	Ziu91	Win94
	150225.652(3)	NO	$^2\Pi_{1/2}$ J=3/2−1/2 F=1/2−1/2(−+)	[b]	OriMC−1	FCRAO 14 m	Ziu91	Win94
	150327.79* (15)	CH_3OCHO	44(9,35)−44(9,36) E	0.14	Sgr B2	NRAO 11 m	Hol81	Oes99
	150381.075*(3)	SO_2	15(5,11)−16(4,12)	0.25	Sgr B2(M)	NRAO 11 m	Hol80a	
	150415.358*(34)	CH_3CH_2CN	27(1,26)−27(0,27)	0.03	OriMC−1	FCRAO 14 m	Ziu93	
	150439.096(3)	NO	$^2\Pi_{1/2}$ J=3/2−1/2F=3/2−3/2(+−)	0.15	OriMC−1	NRAO 11 m	Hol80a	Win94
	150449.345*(32)	CH_3OCHO	12(6,6)−12(5,7) E	0.03	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	150466.828*(12)	CH_3OCH_3	22(2,21)−21(3,18) EE	0.9[f]	OriMC−1	TRAO 14 m	Lee01	Gro98
	150498.336*(7)	H_2CO	2(1,1)−1(1,0)	2.7	OriMC−1	NRAO 11 m	Tha71	
	150546.462(2)	NO	$^2\Pi_{1/2}$ J=3/2−1/2F=5/2−3/2(+−)	0.25	Sgr B2(M)	NRAO 11 m	Lis78a	Win94
	150592.304*(8)	CH_3OCH_3	21(2,19)−21(1,20) AE+EA	[b]	OriMC−1	FCRAO 14 m	Ziu91	Gro98
	150594.202*(6)	CH_3OCH_3	21(2,19)−21(1,20) EE	0.12[b]	OriMC−1	FCRAO 14 m	Ziu91	Gro98
	150596.104*(10)	CH_3OCH_3	21(2,19)−21(1,20) AA	[b]	OriMC−1	FCRAO 14 m	Ziu91	Gro98
	150600.675*(28)	CH_3OCHO	12(4,8)−11(4,7) E	0.2	OriMC−1	BTL 7 m	Woo84	Oes99
	150618.313*(28)	CH_3OCHO	12(4,8)−11(4,7) A	0.2	OriMC−1	BTL 7 m	Woo84	Oes99
	150636.666*(29)	CH_3OCHO	12(6,7)−12(5,8) A	0.04[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	150644.351(3)	NO	$^2\Pi_{1/2}$ J=3/2−1/2 F=3/2−1/2(+−)	[b]	OriMC−1	FCRAO 14 m	Ziu91	Win94
U	150689.	unidentified		0.7	Sgr B2(N)	NRAO 12 m	Hal01	
U	150702.	unidentified		0.3	Sgr B2(N)	NRAO 12 m	Hal01	
U	150724.0	unidentified		0.09	OriMC−1	FCRAO 14 m	Ziu93	
	150735.040*(8)	N_2O	6−5	0.065	Sgr B2(M)	NRAO 12 m	Ziu94a	
U	150736.0	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu93	
U	150749.	unidentified		0.5	Sgr B2(N)	NRAO 12 m	Hal01	
	150820.666*(5)	$c-C_3H_2$	4(0,4)−3(1,3)	0.3	Sgr B2(M)	NRAO 11 m	Hol83a	
	150851.899*(5)	$c-C_3H_2$	4(1,4)−3(0,3)	0.3	Sgr B2(M)	NRAO 11 m	Hol83a	
	150884.597*(17)	CH_3OH	12(−1,12)−11(−2,10) E	1.5	Sgr B2(M)	NRAO 11 m	Sny80	Xu_97
	150980.658*(37)	CH_3OCHO	22(6,17)−22(5,18) A	0.05	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	150992.105*(6)	CH_3OCH_3	10(3,8)−10(2,9) EA	0.24[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	150992.175*(6)	CH_3OCH_3	10(3,8)−10(2,9) AE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	150995.388*(4)	CH_3OCH_3	10(3,8)−10(2,9) EE	0.32	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	150998.636*(6)	CH_3OCH_3	10(3,8)−10(2,9) AA	0.30	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151008.932*(29)	CH_3OCHO	11(6,6)−11(5,7) E	0.07	OriMC−1	FCRAO 14 m	Ziu93	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	151009.110*(29)	CH_3OCHO	11(6,5)−11(5,6) A	0.12	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	151036.133*(29)	CH_3OCHO	11(6,5)−11(5,6) E	0.07	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	151127.251*(10)	CH_3CH_2CN	17(2,16)−16(2,15)	0.22	OriMC−1	FCRAO 14 m	Ziu93	
	151154.62* (30)	SiC_2	7(1,7)−6(1,6) v_3 =1	0.008	IRC+10216	NRAO 12 m	Gen97	Bog91
U	151283.5	unidentified		0.1	OriMC−1	FCRAO 14 m	Ziu93	
U	151305.5	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
	151356.955*(17)	CH_2CHCN	16(2,15)−15(2,14)	0.03	OriMC−1	FCRAO 14 m	Ziu93	
	151375.79* (11)	C_4H	$^2\Pi_{1/2}$ J=31/2−29/2 e v_7 =1	4.47[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	151378.655*(4)	SO_2	2(2,0)−2(1,1)	0.32	rhoOphA	MMWO 4.9 m	Lor85	
	151496.041*(32)	CH_3OCHO	10(6,5)−10(5,6) A	0.035	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	151511.215*(10)	CH_3OCH_3	14(2,12)−13(3,11) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151513.535*(8)	CH_3OCH_3	14(2,12)−13(3,11) EE	0.15[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151515.848*(8)	CH_3OCH_3	14(2,12)−13(3,11) AE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151515.861*(8)	CH_3OCH_3	14(2,12)−13(3,11) EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151589.984*(9)	CH_3CHO	6(−1,6)−5(0,5) E	[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	151590.741*(6)	CH_3OCH_3	14(2,13)−14(1,14) AE+EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151593.921*(6)	CH_3OCH_3	14(2,13)−14(1,14) EE	0.18[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151597.101*(8)	CH_3OCH_3	14(2,13)−14(1,14) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	151616.190 (26)	HDO	7(3,4)−7(3,5)	0.2	OMC−IRc2	IRAM 30 m	Jac90	DeL71
	151847.22* (11)	C_4H	$^2\Pi_{1/2}$ J=31/2−29/2 f v_7 =1	6.41[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	151860.170*(20)	CH_3OH	13(0,13)−13(−1,13) E	0.48	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	151899.098*(10)	CH_2CHCN	16(6,*)−15(6,*)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	151900.311*(8)	CH_2CHCN	16(5,12)−15(5,11)	0.08[b]	OriMC−1	FCRAO 14 m	Ziu93	
	151900.349*(8)	CH_2CHCN	16(5,11)−15(5,10)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	151915.903*(11)	CH_2CHCN	16(7,*)−15(7,*)	0.07	OriMC−1	FCRAO 14 m	Ziu93	
	151933.627*(7)	CH_2CHCN	16(4,13)−15(4,12)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	151936.870*(7)	CH_2CHCN	16(4,12)−15(4,11)	0.05[b]	OriMC−1	FCRAO 14 m	Ziu93	
	151949.998*(25)	CH_3OCHO	13(2,12)−12(2,11) E	0.25	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	151956.643*(25)	CH_3OCHO	13(2,12)−12(2,11) A	0.21	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	151986.775*(8)	CH_2CHCN	16(3,14)−15(3,13)	0.04	OriMC−1	FCRAO 14 m	Ziu93	
U	151993.	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
U	152200.9(10)	unidentified		2.20[f]	IRC+10216	IRAM 30 m	Cer00	
	152243.618*(10)	C_4H	16.5−15.5	22.1[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	152243.735*(3)	HNCS	13(1,13)−12(1,12)	0.05[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152282.089*(9)	C_4H	15.5−14.5	25.0[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	152297.852*(8)	CH_3CH_2CN	17(8,*)−16(8,*)	0.19	OriMC−1	FCRAO 14 m	Ziu93	
	152303.840*(8)	CH_3CH_2CN	17(7,*)−16(7,*)	0.3[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152304.658*(8)	CH_3CH_2CN	17(9,*)−16(9,*)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152320.523*(8)	CH_3CH_2CN	17(10,*)−16(10,*)	0.1	OriMC−1	FCRAO 14 m	Ziu93	
	152329.875*(9)	CH_3CH_2CN	17(6,12)−16(6,11)	0.16[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152329.895*(9)	CH_3CH_2CN	17(6,11)−16(6,10)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152332.614*(36)	CH_2CHCN	24(1,23)−23(2,22)	0.06	OriMC−1	FCRAO 14 m	Ziu93	
	152343.361*(8)	CH_3CH_2CN	17(11,*)−16(11,*)	0.09	OriMC−1	FCRAO 14 m	Ziu93	
U	152366.0	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
	152371.921*(8)	CH_3CH_2CN	17(12,*)−16(12,*)	0.08	OriMC−1	FCRAO 14 m	Ziu93	
U	152380.6(10)	unidentified		3.51[f]	IRC+10216	IRAM 30 m	Cer00	
	152382.974*(17)	$t-CH_3CH_2OH$	15(3,13)−15(2,14)	0.03	OriMC−1	FCRAO 14 m	Ziu93	
	152391.261*(9)	CH_3CH_2CN	17(5,13)−16(5,12)	0.24[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152392.466*(9)	CH_3CH_2CN	17(5,12)−16(5,11)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	152405.419*(9)	CH_3CH_2CN	17(13,*)−16(13,*)	0.07	OriMC−1	FCRAO 14 m	Ziu93	
	152435.713*(28)	$t-CH_3CH_2OH$	20(3,18)−19(4,15)	0.06	OriMC−1	FCRAO 14 m	Ziu93	
	152443.177*(20)	CH_3OH	14(−3,12)−13(−4,10) E	0.3	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	152485.309*(11)	CH_3CH_2CN	17(15,*)−16(15,*)	0.05	OriMC−1	FCRAO 14 m	Ziu93	
	152505.408*(10)	CH_3CH_2CN	17(3,15)−16(3,14)	0.18	OriMC−1	FCRAO 14 m	Ziu93	
	152509.622*(9)	CH_3CH_2CN	17(3,14)−16(3,13)	0.19	OriMC−1	FCRAO 14 m	Ziu93	
U	152514.5	unidentified		0.1	OriMC−1	FCRAO 14 m	Ziu93	
U	152525.0	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu93	
	152552.917*(9)	CH_3CH_2CN	17(4,13)−16(4,12)	0.24	OriMC−1	FCRAO 14 m	Ziu93	
U	152579.5	unidentified		0.07	OriMC−1	FCRAO 14 m	Ziu93	
	152598.25* (12)	CH_3OCHO	17(2,16)−17(1,17) A	0.07[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	152607.615*(7)	CH_3CHO	8(0,8)−7(0,7) E	[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	152609.770*(8)	DNC	2−1	0.5[b]	L134	MMWO 4.9 m	Sne77	
U	152621.5	unidentified		0.08	OriMC−1	FCRAO 14 m	Ziu93	
	152635.202*(7)	CH_3CHO	8(0,8)−7(0,7) A++	0.06	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	152640.0(10)	$^{13}CCCN$	16−15 a	0.62[f]	IRC+10216	IRAM 30 m	Cer00	Got83
U	152651.5	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu93	
	152656.820*(17)	$t-CH_3CH_2OH$	4(2,2)−3(1,3)	0.05	OriMC−1	FCRAO 14 m	Ziu93	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	152659.7(6)	^{13}CCCN	16−15 b	1.26[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	152669.538*(13)	CH_3CH_2CN	22(4,18)−22(3,19)	0.04[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	152678.	unidentified		[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	152681.6(6)	unidentified		0.82[f]	IRC+10216	IRAM 30 m	Cer00	
	152708.486*(17)	CH_3OH	9(4,6)−10(3,7) A−	0.35	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	152740.249*(17)	CH_3OH	9(4,5)−10(3,8) A+	0.26	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	152828.183*(6)	CH_3OCH_3	11(3,9)−11(2,10) EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152828.220*(6)	CH_3OCH_3	11(3,9)−11(2,10) AE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152831.364*(4)	CH_3OCH_3	11(3,9)−11(2,10) EE	0.1[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152834.528*(6)	CH_3OCH_3	11(3,9)−11(2,10) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
U	152841.6(15)	unidentified		0.87[f]	IRC+10216	IRAM 30 m	Cer00	
	152879.96* (10)	C_4H	$^2\Pi_{3/2}$ J=33/2−31/2 e v_7 =1	4.90[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	152889.341*(76)	CH_3OCH_3	11(7,5)−12(6,6) EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152892.321*(76)	CH_3OCH_3	11(7,5)−12(6,6) EE	0.07[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152893.160*(74)	CH_3OCH_3	11(7,5)−12(6,6) AE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152893.195*(74)	CH_3OCH_3	11(7,4)−12(6,7) AE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152895.283*(72)	CH_3OCH_3	11(7,4)−12(6,7) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152895.283*(72)	CH_3OCH_3	11(7,5)−12(6,6) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152895.318*(72)	CH_3OCH_3	11(7,4)−12(6,7) EE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152896.158*(74)	CH_3OCH_3	11(7,4)−12(6,7) EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	152898.202*(78)	CH_2CHCN	16(4,13)−17(3,14)	0.02	OriMC−1	FCRAO 14 m	Ziu93	
	152907.906*(72)	$Na^{37}Cl$	12−11	0.72[f]	IRC+10216	IRAM 30 m	Cer00	
	152953.651*(5)	$^{34}SO_2$	9(4,6)−10(3,7)	0.06	OriMC−1	FCRAO 14 m	Ziu93	
	152986.00(20)	C_4H	$^2\Sigma$ J=16−15 v_7 =2 L	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
U	152989.5	unidentified		0.095	OriMC−1	FCRAO 14 m	Ziu93	
	153015.048*(5)	$^{34}SO_2$	3(2,2)−3(1,3)	0.08	OriMC−1	FCRAO 14 m	Ziu93	
	153025.421*(12)	CH_3OCH_3	26(3,23)−26(2,24) AE+EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	153026.423*(10)	CH_3OCH_3	26(3,23)−26(2,24)EE	0.06[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	153027.425*(12)	CH_3OCH_3	26(3,23)−26(2,24)AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	153041.88(20)	C_4H	$^2\Sigma$ J=16−15 v_7 =2 U	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	153054.489*(6)	CH_3OCH_3	9(0,9)−8(1,8) AA	[b]	Sgr B2(M)	NRAO 11 m	Mer82	Gro98
	153054.837*(4)	CH_3OCH_3	9(0,9)−8(1,8) EE	0.39[b]	Sgr B2(M)	NRAO 11 m	Mer82	Gro98
	153055.185*(4)	CH_3OCH_3	9(0,9)−8(1,8) EA+AE	[b]	Sgr B2(M)	NRAO 11 m	Mer82	Gro98
U	153064.5	unidentified		0.045	OriMC−1	FCRAO 14 m	Ziu93	
U	153070.5	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu93	
	153105.802*(50)	$^{30}Si^{34}S$	9−8	0.87[f]	IRC+10216	IRAM 30 m	Cer00	
U	153106.1	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu93	
U	153129.1	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
	153135.193(5)	FeO	$^5\Delta_I$ 5−4 Ω=4	−0.10	Sgr B2(M)	IRAM 30 m	Wao02	Kro87
U	153162.	unidentified		0.10	Sgr B2(M)	IRAM 30 m	Wal02	
	153179.33* (13)	HDS	2(1,1)−2(1,2)	0.39	OriMC−1	FCRAO 14 m	Min90	Hel73
U	153226.	unidentified		0.15	Sgr B2(M)	IRAM 30 m	Wal02	
	153272.214*(10)	CH_3CH_2CN	17(3,14)−16(3,13)	0.17	OriMC−1	FCRAO 14 m	Ziu93	
	153281.207*(19)	CH_3OH	12(0,12)−12(−1,12) E	0.78	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	153288.745*(24)	CH_3OCHO	14(0,14)−13(1,13) E	[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	153290.476*(29)	CH_3OCHO	14(0,14)−13(1,13)A	0.19[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	153291.946*(6)	HNCO	7(1,7)−6(1,6)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	153323.998 (50)	CH_3OD	7(1,6)−7(0,7) A−	7.6[f]	OriMC−1	IRAM 30 m	Mau88	And88
	153335.05* (11)	C_4H	$^2\Pi_{3/2}$ J=33/2−31/2 f v_7 =1	5.33[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	153350.384*(24)	CH_3OCHO	14(1,14)−13(1,13) E	0.26[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	153352.020*(29)	CH_3OCHO	14(1,14)−13(1,13) A	[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	153353.606*(82)	CH_3OCHO	19(3,17)−19(2,18) A	[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	153385.598*(14)	CH_3OCH_3	24(4,20)−24(3,21) AE+EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	153386.290*(10)	CH_3OCH_3	24(4,20)−24(3,21) EE	0.14[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	153386.991*(16)	CH_3OCH_3	24(4,20)−24(3,21) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	153399.367*(29)	CH_3OCHO	14(0,14)−13(0,13) A	0.32	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	153432.171*(2)	NH_2CHO	7(1,6)−6(1,5)	0.15	Sgr B2(M)	NRAO 11 m	Hol83a	
	153449.778*(17)	CCS	11,12−10,11	1.22[f]	IRC+10216	IRAM 30 m	Cer00	
	153460.911*(29)	CH_3OCHO	14(1,14)−13(0,13) A	0.1	OriMC−1	FCRAO 14 m	Ziu93	Oes99
U	153487.5(5)	unidentified		0.13	Sgr B2(M)	NRAO 11 m	Hol81	
U	153487.6	unidentified		0.08	OriMC−1	FCRAO 14 m	Ziu93	
	153512.661*(25)	CH_3OCHO	13(1,12)−12(1,11) E	0.1	OriMC−1	NRAO 11 m	Hol83a	Oes99
	153518.736*(28)	CH_3OCHO	13(1,12)−12(1,11) A	0.13	OriMC−1	NRAO 11 m	Hol83a	Oes99
	153553.151*(25)	CH_3OCHO	12(2,10)−11(2,9) E	0.13	OriMC−1	NRAO 11 m	Hol83a	Oes99
	153557.87*(12)	NaCN	10(0,10)−9(0,9)	1.77[f]	IRC+10216	IRAM 30 m	Cer00	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	153566.956*(25)	CH_3OCHO	12(2,10)−11(2,9) A	0.11	OriMC−1	NRAO 11 m	Hol83a	Oes99
U	153668.3(10)	unidentified		0.08	Sgr B2(M)	NRAO 11 m	Hol81	
	153677.54* (15)	$K^{35}Cl$	20−19	0.71[f]	IRC+10216	IRAM 30 m	Cer87c	
	153746.218*(17)	HCCN	8,7−7,6	0.45[f]	IRC+10216	IRAM 30 m	Gue91	
	153764.606*(8)	HNCO	7(3,4)−6(3,3)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	153764.606*(8)	HNCO	7(3,5)−6(3,4)	0.09[b]	OriMC−1	FCRAO 14 m	Ziu93	
	153770.215*(3)	CH_3CCH	9(4)−8(4)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	153782.5(12)	unidentified		0.55[f]	IRC+10216	IRAM 30 m	Cer00	
	153790.771*(2)	CH_3CCH	9(3)−8(3)	0.23	Sgr B2(M)	NRAO 11 m	Hol81	
	153804.018*(18)	HCCN	7,7−6,6	0.67[f]	IRC+10216	IRAM 30 m	Cer00	
	153805.459*(1)	CH_3CCH	9(2)−8(2)	0.18	Sgr B2(M)	NRAO 11 m	Hol81	
	153814.274*(1)	CH_3CCH	9(1)−8(1)	[b]	Sgr B2(M)	NRAO 11 m	Hol81	
	153817.213*(1)	CH_3CCH	9(0)−8(0)	0.59[b]	Sgr B2(M)	NRAO 11 m	Hol81	
	153818.869*(6)	HNCO	7(2,6)−6(2,5)	0.3[b]	OriMC−1	FCRAO 14 m	Ziu93	
	153820.007*(7)	HNCO	7(2,5)−6(2,4)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
	153841.57* (11)	C_4H	$^2\Pi_{5/2}$ J=33/2−31/2 v_7 =2 ℓ=2	1.27[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	153865.092*(6)	HNCO	7(0,7)−6(0,6)	2.03	Sgr B2(M)	NRAO 11 m	Chu86	
	153872.687*(6)	CH_3CHO	8(2,7)−7(2,6) A−−	0.06[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	153894.121*(19)	HCCN	6,7−5,6	0.5[f]	IRC+10216	IRAM 30 m	Gue91	
	154001.216*(24)	$HC^{13}CCN$	17−16	1.36f	IRC+10216	IRAM 30 m	Cer00	Laf78
	154016.096*(11)	$HCC^{13}CN$	17−16	0.05	OriMC−1	FCRAO 14 m	Ziu93	Laf78
U	154076.5(10)	unidentified		0.78[f]	IRC+10216	IRAM 30 m	Cer00	
U	154088.2(10)	unidentified		0.63[f]	IRC+10216	IRAM 30 m	Cer00	
	154090.197	HNCO	7(4)−6(4) v_5 =1	0.9[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154110.119	HNCO	7(3)−6(3) v_6 =1	2.1[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154114.411	HNCO	7(0,7)−6(0,6) v_5 =1	3.7[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154119.019	HNCO	7(0,7)−6(0,6) v_6 =1	2.1[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154123.323	HNCO	7(3)−6(3) v_5 =1	2.9[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154142.560	HNCO	7(2,6)−6(2,5) v_5 =1	3.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154146.055	HNCO	7(2,5)−6(2,4) v_5 =1	3.8[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
U	154149.2(8)	unidentified		1.33[f]	IRC+10216	IRAM 30 m	Cer00	
	154200.919*(6)	CH_3CHO	8(4,5)−7(4,4) A−−	0.03[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	154201.474*(6)	CH_3CHO	8(4,4)−7(4,3) A++	[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	154215.100*(50)	N_2D^+	2−1 F_1=2−2 F=1−1	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154215.224*(50)	N_2D^+	2−1 F_1=2−2 F=2−3	0.4[b]	L134N	IRAM 30 m	Ger01	Ger01
	154215.266*(50)	N_2D^+	2−1 F_1=2−2 F=2−2	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154215.358*(50)	N_2D^+	2−1 F_1=1−0 F=1−1	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154215.569*(50)	N_2D^+	2−1 F_1=1−0 F=2−1	0.4[b]	L134N	IRAM 30 m	Ger01	Ger01
	154215.825*(50)	N_2D^+	2−1 F_1=1−0 F=0−1	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154216.692*(50)	N_2D^+	2−1 F_1=2−0 F=2−1	0.5[b]	L134N	IRAM 30 m	Ger01	Ger01
	154216.756*(50)	N_2D^+	2−1 F_1=3−2 F=3−3	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154216.828*(50)	N_2D^+	2−1 F_1=2−1 F=2−2	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154217.053*(50)	N_2D^+	2−1 F_1=3−2 F=3−2	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154217.074*(50)	N_2D^+	2−1 F_1=3−2 F=2−1	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154217.084*(50)	N_2D^+	2−1 F_1=2−1 F=3−2	1.8[b]	L134N	IRAM 30 m	Ger01	Ger01
	154217.154*(50)	N_2D^+	2−1 F_1=3−2 F=4−3	[b]	L134N	IRAM 30 m	Ger01	Ger01
	154217.450*(50)	N_2D^+	2−1 F_1=2−1 F=1−0	0.2[b]	L134N	IRAM 30 m	Ger01	Ger01
	154217.565*(50)	N_2D^+	2−1 F_1=3−2 F=2−2	[b]	L134N	IRAM 30 m	Ger01	Ger01
U	154222.3(9)	unidentified		0.79[f]	IRC+10216	IRAM 30 m	Cer00	
	154227.515	HNCO	7(1,6)−6(1,5) v_6 =1	4.0[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154242.770*(3)	$OC^{34}S$	13−12	1.[b]	OriMC−1	FCRAO 14 m	Ziu93	
	154244.345*(10)	CH_3CH_2CN	17(1,16)−16(1,15)	0.14[b]	OriMC−1	FCRAO 14 m	Ziu93	
	154259.6*(20)	$HCC^{13}CN$	17−16 v_6 =1 ℓ=1 e	1.9[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154365.8*(20)	$HCC^{13}CN$	17−16 v_7 =1 ℓ=1 e	3.8[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154370.6*(20)	$HCC^{13}CN$	17−16 v_6 =1 ℓ=1 f	2.4[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154383.2*(20)	$HC^{13}CCN$	17−16 v_6 =1 ℓ=1 f	2.0[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154387.2*(20)	$HC^{13}CCN$	17−16 v_7 =1 ℓ=1 e	4.1[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
U	154391.1	unidentified		0.07	OriMC−1	FCRAO 14 m	Ziu93	
	154414.776*(6)	HNCO	7(1,6)−6(1,5)	0.18	OriMC−1	FCRAO 14 m	Ziu93	
	154425.765*(17)	CH_3OH	11(0,11)−11(−1,11) E	1.42	OriMC−1	NRAO 11 m	Hol81	Xu_97
	154453.756*(8)	CH_3OCH_3	11(1,10)−10(2,9) AA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	154455.118*(6)	CH_3OCH_3	11(1,10)−10(2,9) EE	1.5[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	154456.480*(12)	CH_3OCH_3	11(1,10)−10(2,9) EA+AE	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
U	154512.5	unidentified		0.04	OriMC−1	FCRAO 14 m	Ziu93	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	154609.47* (10)	$OS^{17}O$	15(5,10)−16(4,13)	0.05	OriMC−1	FCRAO 14 m	Ziu93	
	154640.508*(41)	$a-CH_2CHOH$	6(1,6)−5(0,5)	0.050	Sgr B2(N)	NRAO 12 m	Tur01	
	154657.289*(5)	HCCCN	17−16	1.54	OriMC−1	NRAO 11 m	Hol81	
U	154663.	unidentified		0.5	NGC6334I	IRAM 30 m	Bac90	
	154669.02* (30)	HCCCN	17−16 v_5 =1 ℓ=1 f	1.24	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	154724.533*(10)	CH_2CHCN	16(1,15)−15(1,14)	0.07	OriMC−1	FCRAO 14 m	Ziu93	
	154828.282	HNCO	7(1,6)−6(1,5) v_4 =1	0.7[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154911.24* (16)	HCCCN	17−16 v_6 =1 ℓ=1 e	6.6[f]	G10.47+0.03	IRAM 30 m	Wyr99	Laf78
	154943.8*(30)	$HC^{13}CCN$	17−16 v_7 =2 ℓ=0	1.3[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154954.5*(30)	$HC^{13}CCN$	17−16 v_7 =2 ℓ=2 e	1.2[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154966.8*(30)	$HC^{13}CCN$	17−16 v_7 =2 ℓ=2 f	1.6[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154969.9*(30)	$HCC^{13}CN$	17−16 v_7 =2 ℓ=0	1.2[f]	G10.47+0.03	IRAM 30 m	Wyr99	Wyr99
	154984.439*(25)	CH_3OCHO	12(3,9)−11(3,8) E	0.135	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	155002.327*(28)	CH_3OCHO	12(3,9)−11(3,8) A	0.15	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	155032.45* (19)	HCCCN	17−16 v_6 =1 ℓ=1 f	23.2[f]	G10.47+0.03	IRAM 30 m	Wyr99	Laf78
	155037.225*(30)	HCCCN	17−16 v_7 =1 ℓ=1 e	0.15	OriMC−1	FCRAO 14 m	Ziu93	Laf78
U	155075.0	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
	155088.126*(35)	CH_3CHO	8(−4,5)−9(−3,7) E	0.04	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	155094.573*(10)	$^{24}MgNC$	25/2,13−23/2,12	1.2	IRC+10216	IRAM 30 m	Gue93	Kaw93
	155109.792*(10)	$^{24}MgNC$	27/2,13−25/2,12	1.2	IRC+10216	IRAM 30 m	Gue93	Kaw93
	155125.329*(6)	CH_3OCH_3	12(3,10)−12(2,11) EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	155125.350*(6)	CH_3OCH_3	12(3,10)−12(2,11) AE	0.22[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	155128.420*(4)	CH_3OCH_3	12(3,10)−12(2,11) EE	0.3	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	155131.501*(6)	CH_3OCH_3	12(3,10)−12(2,11) AA	0.21	OriMC−1	FCRAO 14 m	Ziu93	Gro98
U	155147.0	unidentified		0.06	OriMC−1	FCRAO 14 m	Ziu93	
U	155154.0	unidentified		0.09	OriMC−1	FCRAO 14 m	Ziu93	
U	155233.3(12)	unidentified		0.73[f]	IRC+10216	IRAM 30 m	Cer00	
	155259.211*(30)	HCCCN	17−16 v_7 =1 ℓ=1 f	[b]	OriMC−1	FCRAO 14 m	Ziu93	Laf78
	155262.003*(20)	$^{13}CH_3OH$	9(0,9)−9(−1,9) E	0.23[b]	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	155320.834*(15)	CH_3OH	10(0,10)−10(−1,10) E	1.3	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	155342.095*(6)	CH_3CHO	8(2,6)−7(2,5) A++	0.08	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	155389.615*(4)	SO_2	20(6,14)−21(5,17)	0.21	OriMC−1	FCRAO 14 m	Ziu93	
	155404.496*(10)	CH_3CH_2CN	17(2,15)−16(2,14)	0.20	OriMC−1	FCRAO 14 m	Ziu93	
	155426.769*(10)	CH_3CH_2CN	18(1,18)−17(1,17)	0.22	OriMC−1	FCRAO 14 m	Ziu93	
	155454.493*(11)	CCS	12,12−11,11	1.3[f]	IRC+10216	IRAM 30 m	Cer87b	
	155506.813*(24)	^{34}SO	3(4)−2(3)	0.37	OriMC−1	FCRAO 14 m	Ziu93	
	155518.313*(7)	$c-C_3H_2$	3(2,2)−2(1,1)	1.72[f]	IRC+10216	IRAM 30 m	Cer00	Cer00
	155533.080 (50)	CH_3OD	1(1,0)−0(0,0) E	0.85[f]	OriMC−1	IRAM 30 m	Mau88	And88
	155539.680*(33)	CH_3CHO	8(4,4)−9(3,7) A++	0.07[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	155540.380*(64)	CH_3OCHO	22(3,19)−22(3,20) A	[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
U	155549.7	unidentified		0.13	OriMC−1	FCRAO 14 m	Ziu93	
	155567.470*(6)	AlNC	13−12	0.005	IRC+10216	IRAM 30 m	Ziu02	
U	155601.	unidentified		0.014	IRC+10216	IRAM 30 m	Ziu02	
	155614.895*(6)	CH_2 DCN	9(1,9)−8(1,8)	2.0[f]	OriMC−1	IRAM 30 m	Ger92a	
	155617.84*(1)	HCOOH	7(0,7)−6(0,6)	0.04	OriMC−1	FCRAO 14 m	Ziu93	Wil80
	155626.881*(51)	HCCCN	17−16 v_7 =2 ℓ=0	1.56	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	155637.393*(61)	HCCCN	17−16 v_7 =2 ℓ=2 e	1.56	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	155649.759*(53)	HCCCN	17−16 v_7 =2 ℓ=2 f	1.56	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	155695.740*(18)	$^{13}CH_3OH$	8(0,8)−8(−1,8) E	0.07	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	155837.88* (16)	NaCN	10(2,9)−9(2,8)	1.65[f]	IRC+10216	IRAM 30 m	Cer00	
	155899.64* (32)	HCCCN	17−16 v_7 =3 ℓ=1 e	1.00	Sgr B2(N)	IRAM 30 m	Vic00	Laf78
	155901.305*(40)	$^{29}Si^{34}$ S	9−8	2.17[f]	IRC+10216	IRAM 30 m	Cer00	
	155994.210*(17)	$^{13}CH_3OH$	7(0,7)−7(−1,7) E	0.53[b]	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	155997.472*(14)	CH_3OH	9(0,9)−9(−1,9) E	2.3[b]	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	156062.872*(6)	CCCS	27−26	1.0[f]	IRC+10216	IRAM 30 m	Cer87b	
	156091.249*(9)	$^{33}SO_2$	4(3,1)−5(2,4)	0.14	OriMC−1	FCRAO 14 m	Ziu93	
	156112.936*(17)	CH_3CH_2CN	25(2,23)−24(3,22)	0.18	OriMC−1	FCRAO 14 m	Ziu93	
	156127.695*(18)	CH_3OH	6(2,4)−7(17) A+	1.45	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	156164.905*(61)	CH_3OCHO	22(3,19)−22(2,20) A	0.07[b]	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	156171.663*(10)	CH_3CH_2CN	18(0,18)−17(0,17)	0.23	OriMC−1	FCRAO 14 m	Ziu93	
	156186.515*(17)	$^{13}CH_3OH$	6(0,6)−6(−1,6) E	0.23	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	156207.554*(14)	CH_2DCN	9(6,*)−8(6,3*	0.4[f]	OriMC−1	IRAM 30 m	Ger92a	
	156236.135*(10)	CH_2DCN	9(5,*)−8(5,*)	0.6[f]	OriMC−1	IRAM 30 m	Ger92a	
	156248.681*(72)	$Na^{35}Cl$	12−11	1.52[f]	IRC+10216	IRAM 30 m	Cer87c	Clo64
	156259.779*(7)	CH_2DCN	9(4,*)−8(4,*)	0.7[f]	OriMC−1	IRAM 30 m	Ger92a	
	156278.861*(6)	CH_2DCN	9(3,7)−8(3,6)	1.7[bf]	OriMC−1	IRAM 30 m	Ger92a	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	156278.905*(6)	CH_2DCN	9(3,6)−8(3,5)	[b]	OriMC−1	IRAM 30 m	Ger92a	
	156281.370*(5)	CH_2DCN	9(0,9)−8(0,8)	3.2[f]	OriMC−1	IRAM 30 m	Ger92a	
	156286.524*(5)	CH_2DCN	9(2,8)−8(2,7)	5.4[f]	OriMC−1	IRAM 30 m	Ger92a	
	156304.660*(5)	CH_2DCN	9(2,7)−8(2,6)	2.8[f]	OriMC−1	IRAM 30 m	Ger92a	
	156323.27*(28)	NaCN	10(4,7)−9(4,6)	2.32[fb]	IRC+10216	IRAM 30 m	Cer00	
	156325.87*(28)	NaCN	10(4,6)−9(4,5)	[b]	IRC+10216	IRAM 30 m	Cer00	
	156456.48(30)	$^{29}SiC_2$	7(0,7)−6(0,6)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	156488.858*(13)	CH_3OH	8(0,8)−8(−1,8) E	1.1	OriMC−1	NRAO 11 m	Hol81	Xu_97
	156541.50* (22)	NaCN	10(3,8)−9(3,7)	1.02[f]	IRC+10216	IRAM 30 m	Cer00	
	156547.15*(5)	$Al^{37}Cl$	11−10	1.52[f]	IRC+10216	IRAM 30 m	Cer87c	
U	156559.8(15)	unidentified		0.85[f]	IRC+10216	IRAM 30 m	Cer00	
	156602.346*(13)	CH_3OH	2(1,2)−3(0,3) A+	1.5	OriMC−1	NRAO 11 m	Hol81	Xu_97
	156684.30* (22)	NaCN	10(3,7)−9(3,6)	1.28[f]	IRC+10216	IRAM 30 m	Cer00	
	156828.480*(13)	CH_3OH	7(0,7)−7(−1,7) E	1.75	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
U	156842.2	unidentified		0.07	OriMC−1	FCRAO 14 m	Ziu93	
	156970.282*(6)	CH_2 DCN	9(1,8)−8(1,7)	1.7[f]	OriMC−1	IRAM 30 m	Ger92a	
	156981.664*(16)	CCS	13,12−12,11	1.7[f]	IRC+10216	IRAM 30 m	Cer87b	
U	157000.7	unidentified		0.07	OriMC−1	FCRAO 14 m	Ziu93	
	157038.926(30)	l−C_3H	$N=7-6$ $v_4=1$ a	1.46[f]	IRC+10216	IRAM 30 m	Cer00	Yam90a
	157048.586*(13)	CH_3OH	6(0,6)−6(−1,6) E	2.20	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	157061.172 (30)	l−C_3H	$N=7-6$ $v_4=1$ b	1.54[f]	IRC+10216	IRAM 30 m	Cer00	Yam90a
	157135.265*(5)	SO_2	33(4,30)−32(5,27)	0.095	OriMC−1	FCRAO 14 m	Ziu93	
	157178.962*(13)	CH_3OH	5(0,5)−5(−1,5) E	2.25	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	157246.041*(14)	CH_3OH	4(0,4)−4(−1,4) E	2.25	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	157270.818*(15)	CH_3OH	1(0,1)−1(−1,1) E	2.32[b]	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	157272.320*(14)	CH_3OH	3(0,3)−3(−1,3) E	[b]	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	157276.004*(15)	CH_3OH	2(0,2)−2(−1,2) E	2.0	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
U	157286.7	unidentified		0.08	OriMC−1	FCRAO 14 m	Ziu93	
U	157304.7	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
U	157337.2	unidentified		0.04[b]	OriMC−1	FCRAO 14 m	Ziu93	
	157342.818*(15)	CH_3CHO	3(−3,1)−4(−2,3) E	[b]	OriMC−1	FCRAO 14 m	Ziu93	Kle96
	157344.202*(12)	CH_3CH_2CN	19(4,15)−19(3,16)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	157354.7	unidentified		0.04[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	157388.3(8)	unidentified		0.60[f]	IRC+10216	IRAM 30 m	Cer00	
	157494.101 (18)	SiC	$^3\Pi_2$ 4−3 e, f	0.29	IRC+10216	IRAM 30 m	Cer89	Cer89
U	157525.67*(9)	$t-CH_3CH_2OH$	9(8,1)−8(8,0)	0.08[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	157525.67*(9)	$t-CH_3CH_2OH$	9(8,2)−8(8,1)	[b]	OriMC−1	FCRAO 14 m	Ziu93	
U	157557.7	unidentified		0.18	OriMC−1	FCRAO 14 m	Ziu93	
	157574.849*(24)	CH_3OH	13(5,9)−14(4,10) E	0.33	OriMC−1	FCRAO 14 m	Ziu93	Xu_97
	157579.805*(30)	^{30}SiS	9−8	18.3[f]	IRC+10216	IRAM 30 m	Cer00	
	157598.615*(5)	$O^{13}CS$	13−12	0.07	OriMC−1	FCRAO 14 m	Ziu93	
	157929.337*(6)	CH_3OCH_3	13(3,11)−13(2,12) EA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	157929.349*(4)	CH_3OCH_3	13(3,11)−13(2,12) AE	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	157932.342*(4)	CH_3OCH_3	13(3,11)−13(2,12) EE	0.23[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
U	157935.2(6)	unidentified		0.91[f]	IRC+10216	IRAM 30 m	Cer00	
	157935.341*(6)	CH_3OCH_3	13(3,11)−13(2,12) AA	[b]	OriMC−1	FCRAO 14 m	Ziu93	Gro98
	157937.695*(7)	CH_3CHO	8(1,7)−7(1,6) E	0.08	OriMC−1	FCRAO 14 m	Ziu93	Kle96
U	157960.0(8)	unidentified		1.42[f]	IRC+10216	IRAM 30 m	Cer00	
	157974.598*(7)	CH_3CHO	8(1,7)−7(1,6) A−−	0.06	OriMC−1	FCRAO 14 m	Ziu93	Kle96
U	157980.7(8)	unidentified		0.74[f]	IRC+10216	IRAM 30 m	Cer00	
	158107.357*(1)	OCS	13−12	0.76	OriMC−1	FCRAO 14 m	Ziu93	
	158199.773*(4)	SO_2	3(2,2)−3(1,3)	0.71	OriMC−1	FCRAO 14 m	Ziu93	
	158297.219*(29)	CH_3OCHO	5(4,1)−4(3,2) A	0.06	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	158302.14*(4)	CCCN	16−15 a	22.5[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	158499.23*(8)	SiC_2	7(0,7)−6(0,6)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
U	158522.0	unidentified		0.16	OriMC−1	FCRAO 14 m	Ziu93	
	158616.72* (16)	NaCN	10(2,8)−9(2,7)	1.66[f]	IRC+10216	IRAM 30 m	Cer00	
	158657.435*(10)	CH_2CHCN	17(0,17)−16(0,16)	0.06	OriMC−1	FCRAO 14 m	Ziu93	
	158692.020*(19)	$H^{13}CCCN$	18−17	0.32	OriMC−1	FCRAO 14 m	Ziu93	Laf78
	158704.431*(25)	CH_3OCHO	13(3,11)−12(3,10) A	0.30	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	158903.105*(36)	$Si^{34}S$	9−8	25.8[f]	IRC+10216	IRAM 30 m	Cer00	
	158971.853*(14)	SO	3(4)−2(3)	3.5	OriMC−1	NRAO 11 m	Hol81	
U	159007.0	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
U	159030.0	unidentified		0.05	OriMC−1	FCRAO 14 m	Ziu93	
U	159318.0	unidentified		0.07	OriMC−1	FCRAO 14 m	Ziu93	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	159437.464 (50)	CH_3OD	8(1,7)−8(0,8) A−	3.7[f]	OriMC−1	IRAM 30 m	Mau88	And88
	159552.64(60)	$^{30}SiC_2$	7(2,6)−6(2,5)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	159571.086 (50)	CH_3OD	6(0,6)−5(1,5) E	2.4[f]	OriMC−1	IRAM 30 m	Mau88	And88
	159582.070*(35)	CH_3OCHO	13(11,*)−12(11,*) A	0.06	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	159654.733*(35)	CH_3OCHO	13(10,3)−12(11,2) E	0.07	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	159662.739*(34)	CH_3OCHO	13(10,*)−12(10,*) A	0.12	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	159670.820*(32)	CH_3OCHO	13(10,4)−12(10,3) E	0.13	OriMC−1	FCRAO 14 m	Ziu93	Oes99
	159888.873*(10)	CH_3CH_2CN	18(2,17)−17(2,16)	0.15	Sgr B2(M)	NRAO 11 m	Hol81	
U	159915.6(10)	unidentified		0.07	Sgr B2(M)	NRAO 11 m	Hol81	
	160229.99*(9)	$Si^{13}CC$	7(2,6)−6(2,5)	1.1[f]	IRC+10216	IRAM 30 m	Cer91b	
	160312.16*(5)	$Al^{35}Cl$	11−10	3.56[f]	IRC+10216	IRAM 30 m	Cer87c	
	160375.140*(16)	^{29}SiS	9−8	30.0[f]	IRC+10216	IRAM 30 m	Cer00	
	160815.53(40)	$^{30}SiC_2$	7(4,4)−6(4,3)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	160825.62(40)	$^{30}SiC_2$	7(4,3)−6(4,2)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	160827.828*(4)	SO_2	10(0,10)−9(1,9)	2.4	OriMC−1	NRAO 11 m	Hol81	
	160941.90*(3)	$C^{13}CCCH$	17.5−16.5	0.87[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	160957.07* (10)	C_4H	$^2\Pi_{1/2}$ J=33/2−31/2 e v_7 =1	8.85[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	160979.63*(3)	$C^{13}CCCH$	16.5−15.5	0.42[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	160991.442*(19)	SiS	9−8 v=3	0.33[f]	IRC+10216	IRAM 30 m	Cer00	
	161014.75* (13)	NaCN	10(1,9)−9(1,8)	1.35[f]	IRC+10216	IRAM 30 m	Cer00	
	161068.929*(20)	$Si^{33}S$	9−8	4.75[f]	IRC+10216	IRAM 30 m	Cer00	
U	161276.0(4)	unidentified		1.19[f]	IRC+10216	IRAM 30 m	Cer00	
	161345.32* (14)	$Si^{13}CC$	7(5,3)−6(5,2)	0.83[bf]	IRC+10216	IRAM 30 m	Cer00	
	161345.48* (14)	$Si^{13}CC$	7(5,2)−6(5,1)	[b]	IRC+10216	IRAM 30 m	Cer00	
	161350.19* (15)	$K^{35}Cl$	21−20	1.00[f]	IRC+10216	IRAM 30 m	Cer87c	
U	161451.8(8)	unidentified		1.18[f]	IRC+10216	IRAM 30 m	Cer00	
	161459.75* (10)	C_4H	$^2\Pi_{1/2}$ J=33/2−31/2 f v_7 =1	8.67[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	161512.05* (11)	C_4H	$^2\Pi_{3/2}$ J=33/2−31/2 v_7 =2 ℓ=2	1.53[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	161758.116*(11)	C_4H	17.5−16.5	29.4[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	161786.667*(13)	SiS	9−8 v=2	1.63[f]	IRC+10216	IRAM 30 m	Cer00	
	161796.573*(10)	C_4H	16.5−15.5	35.2[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	161841.596*(6)	CCCS	28−27	1.85[f]	IRC+10216	IRAM 30 m	Cer00	
	161977.186 (20)	SiC	$^3\Pi_1$ 4−3 e	0.08	IRC+10216	IRAM 30 m	Cer89	Cer89
	162121.467 (34)	SiC	$^3\Pi_1$ 4−3 f	0.12	IRC+10216	IRAM 30 m	Cer89	Cer89
	162322.19*(9)	C_4H	$^2\Pi_{3/2}$ J=35/2−33/2 e v_7 =1	8.47[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	162372.1*	$^{29}SiC_2$	7(6,1)−7(6,0)	[b]	IRC+10216	IRAM 30 m	Cer00	Cer00
	162372.1*	$^{29}SiC_2$	7(6,2)−7(6,1)	1.40[bf]	IRC+10216	IRAM 30 m	Cer00	Cer00
	162409.479*(12)	CH_3OCH_3	22(4,18)−22(3,19) AE+EA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	162410.721*(8)	CH_3OCH_3	22(4,18)−22(3,19) EE	0.5[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	162411.962*(14)	CH_3OCH_3	22(4,18)−22(3,19) AA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	162528.946*(6)	CH_3OCH_3	8(1,8)−7(0,7) AE+EA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	162529.571*(6)	CH_3OCH_3	8(1,8)−7(0,7) EE	0.1[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	162530.198*(6)	CH_3OCH_3	8(1,8)−7(0,7) AA	[b]	NGC6334I	IRAM 30 m	Bac90	Gro98
	162547.54*(8)	C_4H	$^2\Sigma$ N=17−16 v_7 =2 ℓ=0	3.89[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	162581.773*(10)	SiS	9−8 v=1	0.1	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	162603.18(15)	C_4H	$^2\Sigma$ J=17−16 v_7 =2U	0.2	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	162640.94*(8)	$Si^{13}CC$	7(3,4)−6(3,3)	0.65[bf]	IRC+10216	IRAM 30 m	Cer00	
	162775.872*(7)	$^{34}SO_2$	7(1,7)−6(0,6)	n.r.	Sgr B2(M)	FCRAO 14 m	Hol91	
	162808.32* (10)	C_4H	$^2\Pi_{3/2}$ J=35/2−33/2 f v_7 =1	8.33[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	162937.95*(5)	HNO	2(0,2)−1(0,1)	0.06	Sgr B2(M)	FCRAO 14 m	Hol91	
	162958.651*(3)	NH_2CHO	8(1,8)−7(1,7)	0.10	Sgr B2(M)	FCRAO 14 m	Hol91	
	162965.13* (21)	SiC_2	7(3,5)−6(3,4) v_3 =1	0.004	IRC+10216	NRAO 12 m	Gen97	Bog91
	163081.9(10)	$^{29}SiC_2$	7(4,4)−6(4,3)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	163093.1(10)	$^{29}SiC_2$	7(4,3)−6(4,2)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	163119.390*(5)	SO_2	18(2,16)−17(3,15)	0.20	Sgr B2(M)	NRAO 11 m	Hol83a	
U	163120.4(10)	unidentified		0.75[f]	IRC+10216	IRAM 30 m	Cer00	
	163160.836*(38)	CH_2CO	8(1,7)−7(1,6)	0.20	Sgr B2(M)	NRAO 11 m	Hol83a	
U	163178.8(15)	unidentified		0.27[f]	IRC+10216	IRAM 30 m	Cer00	
U	163202.7(15)	unidentified		0.33[f]	IRC+10216	IRAM 30 m	Cer00	
U	163264.4(15)	unidentified		0.33[f]	IRC+10216	IRAM 30 m	Cer00	
	163316.61* (10)	C_4H	$^2\Pi_{5/2}$ J=35/2−33/2 v_7 =2 ℓ=2	0.76[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	163376.759*(12)	SiS	9−8	283.[f]	IRC+10216	IRAM 30 m	Cer00	
	163491.296 (50)	l−C_3H	$^2\Pi_{1/2}$ J=15/2−13/2 a	4.83[f]	IRC+10216	IRAM 30 m	Cer00	Got85
	163508.740*(29)	$HC^{13}CCN$	18−17	1.08[f]	IRC+10216	IRAM 30 m	Cer00	Laf78

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	163597.566 (50)	$l-C_3H$	$^2\Pi_{1/2}$ $J=15/2-13/2$ b	5.12[f]	IRC+10216	IRAM 30 m	Cer00	Got85
	163704.501*(15)	$HCC^{13}CN$	18−17	2.66[f]	IRC+10216	IRAM 30 m	Cer00	Laf78
	163753.405*(5)	HCCCN	18−17	2.0	IRC+10216	IRAM 30 m	Aud94	
	163829.609*(24)	CH_3OCHO	14(1,13)−13(1,12) E	0.35	OriMC−1	NRAO 11 m	Sny85a	Oes99
	163835.522*(25)	CH_3OCHO	14(1,13)−13(1,12) A	0.40	OriMC−1	NRAO 11 m	Sny85a	Oes99
	163872.904*(16)	$^{13}CH_3OH$	7(0,7)−6(1,5) E	0.15	OriMC−1	NRAO 11 m	Sny85a	Xu_97
U	163902.(1)	unidentified		0.10	OriMC−1	NRAO 11 m	Sny85a	
	163925.745*(24)	CH_3OCHO	15(0,15)−14(1,14) E	[b]	OriMC−1	NRAO 11 m	Sny85a	Oes99
	163927.362*(29)	CH_3OCHO	15(0,15)−14(1,14) A	0.15[b]	OriMC−1	NRAO 11 m	Sny85a	Oes99
	164069.081*(32)	SiC_2	7(2,6)−6(2,5)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	164498.36* (44)	SiC_2	4(2,3)−4(0,4)	1.86[f]	IRC+10216	IRAM 30 m	Cer00	
	164770.534*(47)	SiC_2	7(6,1)−6(6,0)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	164770.535*(47)	SiC_2	7(6,2)−6(6,1)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	164867.840*(25)	AlF	5−4	1.90[f]	IRC+10216	IRAM 30 m	Cer87c	
	164955.654*(24)	CH_3OCHO	13(2,11)−12(2,10) E	n.r.	W51e1/e2	IRAM 30 m	Kal02	Oes99
	164968.659*(25)	CH_3OCHO	13(2,11)−12(2,10) A	n.r.	W51e1/e2	IRAM 30 m	Kal02	Oes99
	165050.229*(7)	CH_3OH	1(1,0)−1(0,1) E	13.4[f]	W3(OH)	IRAM 30 m	Kal02	Xu_97
	165061.187*(7)	CH_3OH	2(1,1)−2(0,2) E	11.7[f]	W3(OH)	IRAM 30 m	Kal02	Xu_97
	165083.30* (17)	NaCN	10(1,11)−10(1,10)	1.27[f]	IRC+10216	IRAM 30 m	Cer00	
	165099.300*(7)	CH_3OH	3(1,2)−3(0,3) E	12.5[f]	W3(OH)	IRAM 30 m	Kal02	Xu_97
	165123.642*(4)	SO_2	9(4,6)−10(3,7)	84.[f]	OriMC−1	IRAM 30 m	Kal02	
	165144.642*(4)	SO_2	5(2,4)−5(1,5)	196.[f]	OriMC−1	IRAM 30 m	Kal02	
	165190.539*(7)	CH_3OH	4(1,3)−4(0,4) E	12.3[f]	W3(OH)	IRAM 30 m	Kal02	Xu_97
	165225.436*(5)	SO_2	7(1,7)−6(0,6)	288.[f]	OriMC−1	IRAM 30 m	Kal02	
	165369.410*(7)	CH_3OH	5(1,4)−5(0,5) E	6.9[f]	W3(OH)	IRAM 30 m	Kal02	Xu_97
	165454.381*(4)	CH_3CN	9(6)−8(6)	14.5[f]	NGC6334F	IRAM 30 m	Kal02	
	165489.400*(3)	CH_3CN	9(5)−8(5)	14.5[f]	NGC6334F	IRAM 30 m	Kal02	
	165510.992*(28)	SiC_2	7(4,4)−6(4,3)	14.2[f]	IRC+10216	IRAM 30 m	Cer00	
	165518.071*(3)	CH_3CN	9(4)−8(4)	16.2[f]	NGC6334F	IRAM 30 m	Kal02	
	165523.865*(28)	SiC_2	7(4,3)−6(4,2)	13.9[f]	IRC+10216	IRAM 30 m	Cer00	
	165540.383*(2)	CH_3CN	9(3)−8(3)	3.98[f]	IRC+10216	IRAM 30 m	Cer00	
	165540.383*(2)	CH_3CN	9(3)−8(3)	21.8[f]	NGC6334F	IRAM 30 m	Kal02	
	165556.326*(3)	CH_3CN	9(2)−8(2)	18.5[f]	NGC6334F	IRAM 30 m	Kal02	
	165565.895*(3)	CH_3CN	9(1)−8(1)	2.20[f]	IRC+10216	IRAM 30 m	Cer00	
	165565.895*(3)	CH_3CN	9(1)−8(1)	26.4[f]	NGC6334F	IRAM 30 m	Kal02	
	165569.085*(3)	CH_3CN	9(0)−8(0)	4.55[f]	IRC+10216	IRAM 30 m	Cer00	
	165569.085*(3)	CH_3CN	9(0)−8(0)	15.3[f]	NGC6334F	IRAM 30 m	Kal02	
U	165835.0(8)	unidentified		0.89[f]	IRC+10216	IRAM 30 m	Cer00	
U	165861.3(8)	unidentified		1.12[f]	IRC+10216	IRAM 30 m	Cer00	
	166101.432*(34)	$CCC^{13}CH$	18.5−17.5	0.92[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	166138.817*(37)	$CCC^{13}CH$	17.5−16.5	0.83[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	166234.	CHD_2OH	4(0)−3(0)e1	0.39[f]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	166271.	CHD_2OH	4(2−)−3(2−) e1	0.04	IRAS16293−2422	IRAM 30 m	Par02	Par02
	166297.	CHD_2OH	4(3+)−3(3−) e1	[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	166298.	CHD_2OH	4(3−)−3(3−) e1	0.03[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	166304.	CHD_2OH	4(2+)−3(2+) e1	0.06	IRAS16293−2422	IRAM 30 m	Par02	Par02
	166327.	CHD_2OH	4(0)−3(0) o1	0.17[f]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	166435.	CHD_2OH	4(0)−3(0) e0	0.05	IRAS16293−2422	IRAM 30 m	Par02	Par02
U	166837.9(8)	unidentified		1.58[f]	IRC+10216	IRAM 30 m	Cer00	
	167019.134*(10)	$^{24}MgNC$	27/2,14−25/2,13	1.3	IRC+10216	IRAM 30 m	Gue93	Kaw93
	167025.09* (16)	$Si^{13}CC$	7(2,5)−6(2,4)	1.35[f]	IRC+10216	IRAM 30 m	Gue95	
	167034.354*(10)	$^{24}MgNC$	29/2,14−27/2,13	1.4	IRC+10216	IRAM 30 m	Gue93	Kaw93
	167160.642*(94)	^{30}SiO	4−3 v=2	0.3	VYCMa	IRAM 30 m	Cer92	
	167620.173*(6)	CCCS	29−28	1.0[f]	IRC+10216	IRAM 30 m	Cer87b	
	167910.516(2)	$H_2{}^{34}S$	1(1,0)−1(0,1)	0.1	W49	FCRAO 14 m	Min91	Hui71
	167931.149*(14)	CH_3OH	9(1,8)−9(0,9) E	0.13	Sgr B2(M)	FCRAO 14 m	Min91	Xu_97
	168051.47* (80)	$^{29}SiC_2$	7(2,5)−6(2,4)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	168194.94*(4)	CCCN	17−16 a	10.1[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	168213.68*(4)	CCCN	17−16 b	10.9[f]	IRC+10216	IRAM 30 m	Cer00	Got83
	168274.456 (16)	^{13}CCH	2−15/2−3/2 $F=3,3.5-2,1.5$	0.25[f]	OriMC−1	IRAM 30 m	Sal94	McC95
	168276.599 (16)	^{13}CCH	2−15/2−3/2 $F=3,2.5-2,1.5$	0.20[f]	OriMC−1	IRAM 30 m	Sal94	McC95
	168303.624 (16)	^{13}CCH	2−15/2−3/2 $F=2,2.5-1,1.5$	0.19[f]	OriMC−1	IRAM 30 m	Sal94	McC95
	168307.667 (16)	^{13}CCH	2−13/2−1/2 $F=2,2.5-1,1.5$	0.12[f]	OriMC−1	IRAM 30 m	Sal94	McC95
	168323.089*(83)	^{30}SiO	4−3 v=1	12.0	VYCMa	IRAM 30 m	Cer92	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	168401.148*(34)	H_2COH^+	1(1,0)−1(0,1)	−0.191	Sgr B2(M)	NRO45 m	Ohi96	
	168406.788*(11)	CCS	13,13−12,12	0.05	Sgr B2(M)	NRO45 m	Ohi96	
	168657.72* (18)	$Si^{13}CC$	7(1,6)−6(1,5)	1.1[f]	IRC+10216	IRAM 30 m	Cer91b	
	168762.76237(2)	H_2S	1(1,0)−1(0,1)	2.3	OriMC−1	NRAO 11 m	Tha72	Cup68
	168815.124*(10)	^{34}SO	4(3)−3(3)	0.9	OriMC−1	NRAO 11 m	Hol81	
U	168967.7(10)	unidentified		0.56[f]	IRC+10216	IRAM 30 m	Cer00	
U	169155.0(12)	unidentified		1.53[f]	IRC+10216	IRAM 30 m	Cer00	
	169257.256*(73)	$Na^{35}Cl$	13−12	1.54[f]	IRC+10216	IRAM 30 m	Cer87c	
	169335.315*(17)	CH_3OH	10(1,9)−10(0,10) E	0.7	OriMC−1	NRAO 11 m	Wil72	Xu_97
	169486.632*(90)	^{30}SiO	4−3	10.2[f]	IRC+10216	IRAM 30 m	Cer00	
U	169742.3(8)	unidentified		1.05[f]	IRC+10216	IRAM 30 m	Cer00	
U	170025.1(20)	unidentified		1.96[f]	IRC+10216	IRAM 30 m	Cer00	
U	170025.1(20)	unidentified		1.96[f]	IRC+10216	IRAM 30 m	Cer00	
	170070.31* (11)	SiO	4−3 v=3	40.0	VYCMa	IRAM 30 m	Cer93	
U	170144.3(10)	unidentified		1.74[f]	IRC+10216	IRAM 30 m	Cer00	
U	170161.4(10)	unidentified		1.54[f]	IRC+10216	IRAM 30 m	Cer00	
	170322.749 (80)	$HC^{18}O^+$	2−1	0.028	Oribar	NRAO 12 m	App99a	Bog81a
	170328.194*(83)	^{29}SiO	4−3 v=1	4.0	VYCMa	IRAM 30 m	Cer91c	
	170490.665 (16)	$C^{13}CH$	2−15/2−3/2 F=3,3.5−2,2.5	0.38[f]	OriMC−1	KOSMA 3m	Sal94	McC95
	170492.383 (16)	$C^{13}CH$	2−15/2−3/2 F=3,2.5−2,1.5	0.29[f]	OriMC−1	KOSMA 3m	Sal94	McC95
	170505.040 (16)	$C^{13}CH$	2−15/2−3/2 F=2,1.5−1,0.5	0.14[f]	OriMC−1	KOSMA 3m	Sal94	McC95
	170509.286 (16)	$C^{13}CH$	2−15/2−3/2 F=2,2.5−1,1.5	0.30[f]	OriMC−1	KOSMA 3m	Sal94	McC95
	170529.03*(8)	C_4H	$^2\Pi_{1/2}$ J=35/2−33/2 e v_7 =1	2.82[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	170533.594 (16)	$C^{13}CH$	2−13/2−1/2 F=2,2.5−1,1.5	0.17[f]	OriMC−1	KOSMA 3m	Sal94	McC95
	170740.916(9)	SiC_2	7(2,5)−6(2,4)	0.16	IRC+10216	NRAO 11 m	Tha84	Got89
	170770.85* (10)	$Al^{37}Cl$	12−11	1.16[f]	IRC+10216	IRAM 30 m	Cer00	
	170876.407*(2)	CH_3CCH	10(3)−9(3)	0.2	OriMC−1	MMWO 4.9 m	Mun84	
	170892.723*(1)	CH_3CCH	10(2)−9(2)	0.31	OriMC−1	MMWO 4.9 m	Mun84	
	170902.516*(1)	CH_3CCH	10(1)−9(1)	0.51	OriMC−1	MMWO 4.9 m	Mun84	
	170905.781*(1)	CH_3CCH	10(0)−9(0)	0.58	OriMC−1	MMWO 4.9 m	Mun84	
	171062.70*(9)	C_4H	$^2\Pi_{1/2}$ J=35/2−33/2 f v_7 =1	4.83[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	171272.249*(28)	C_4H	18.5−17.5	25.3[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	171275.150*(94)	SiO	4−3 v=2	87.[e]	X−Cyg	NRAO 11 m	Sch82	
	171310.707*(26)	C_4H	17.5−16.5	29.8[f]	IRC+10216	IRAM 30 m	Cer00	JPL01
	171490.65* (50)	NaCN	11(6,5)−10(6,4)	[b]	IRC+10216	IRAM 30 m	Cer00	
	171490.65* (50)	NaCN	11(6,6)−10(6,5)	0.86[fb]	IRC+10216	IRAM 30 m	Cer00	
	171512.694*(90)	^{29}SiO	4−3 v=0	0.5	VYCMa	IRAM 30 m	Cer92	
	171671.77* (14)	$K^{37}Cl$	23−22	0.46[f]	IRC+10216	IRAM 30 m	Cer00	
	171733.47* (42)	NaCN	11(5,7)−10(5,6)	1.08[fb]	IRC+10216	IRAM 30 m	Cer00	
	171733.52* (42)	NaCN	11(5,6)−10(5,5)	[b]	IRC+10216	IRAM 30 m	Cer00	
	171771.94*(8)	C_4H	$^2\Pi_{3/2}$ J=37/2−35/2 e v_7 =1	4.66[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	171958.650 (50)	l−C_3H	$^2\Pi_{3/2}$ J=15/2−13/2 a	3.52[f]	IRC+10216	IRAM 30 m	Cer00	Got85
	172094.778 (50)	l−C_3H	$^2\Pi_{3/2}$ J=15/2−13/2 b	3.43[f]	IRC+10216	IRAM 30 m	Cer00	Got85
	172107.962*(10)	$HC^{15}N$	2−1	0.45	OriMC−1	NRAO 11 m	Wil72	
	172108.36(50)	C_4H	$^2\Sigma$ J=18−17 v_7 =2 L	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	172164.12(80)	C_4H	$^2\Sigma$ J=18−17 v_7 =2 U	n.r.	IRC+10216	IRAM 30 m	Gue87a	Gue87a
	172266.2*	SiC_2	8(1,8)−7(1,7)v_3 =1	1.51[f]	IRC+10216	IRAM 30 m	Cer00	Cer00
	172267.01* (10)	CH_2NH	2(1,1)−2(0,2)	0.24	OriMC−1	NRAO 12 m	Dic97a	
	172288.87*(9)	C_4H	$^2\Pi_{3/2}$ J=37/2−35/2 f v_7 =1	6.16[f]	IRC+10216	IRAM 30 m	Cer00	COL01
	172463.355*(53)	c−C_3H	4(1,4)−3(1,3)9/2−7/2 F=5−4	2.89[fb]	IRC+10216	IRAM 30 m	Cer00	JPL01
	172463.719*(53)	c−C_3H	4(1,4)−3(1,3)9/2−7/2 F=4−3	[b]	IRC+10216	IRAM 30 m	Cer00	JPL01
	172481.140*(83)	SiO	4−3 v=1	50.[e]	X−Cyg	NRAO 11 m	Sch82	
	172676.573 (50)	$H^{13}CN$	2−1 F=1−0,2−2	[b]	OriMC−1	NRAO 11 m	Wil72	Pea76
	172677.959 (50)	$H^{13}CN$	2−1 F=2−1,3−2	0.91[b]	OriMC−1	NRAO 11 m	Wil72	Pea76
	172680.209 (50)	$H^{13}CN$	2−1 F=1−1	[b]	OriMC−1	NRAO 11 m	Wil72	Pea76
	172692.162*(25)	CH_3OCHO	14(7,8)−13(7,7) A	[bf]	W51e1/e2	IRAM 30 m	Kal02	Oes99
	172693.142*(24)	CH_3OCHO	14(7,8)−13(7,7) E	26.4[bf]	W51e1/e2	IRAM 30 m	Kal02	Oes99
	172693.624*(25)	CH_3OCHO	14(7,7)−13(7,6) A	[bf]	W51e1/e2	IRAM 30 m	Kal02	Oes99
	172849.287*(5)	HCCCN	19−18	87.0[f]	W51e1/e2	IRAM 30 m	Kal02	
	173377.38* (10)	HCO	2(0,2)−1(0,1)5/2−3/2 F=3−2	0.12	OriMC−2	NRAO 11 m	Sny85a	Sny85a
	173391.272*(19)	t−CH_3CH_2OH	5(2,3)−4(1,4)	[b]	OriMC−2	NRAO 11 m	Sny85a	
	173391.704*(15)	CH_3CH_2CN	10(2,8)−9(1,9)	0.05[b]	OriMC−2	NRAO 11 m	Sny85a	
	173406.08* (10)	HCO	2(0,2)−1(0,1)5/2−3/2 F=2−1	0.05	OriMC−2	NRAO 11 m	Sny85a	Sny85a
	173443.06* (10)	HCO	2(0,2)−1(0,1)3/2−1/2 F=2−1	0.06	OriMC−2	NRAO 11 m	Sny85a	Sny85a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	173506.782 (80)	$H^{13}CO^+$	2−1	0.28	Oribar	NRAO 12 m	App99a	Bog81a
	173688.283*(90)	SiO	4−3 v=0	65[e]	OriMC−1	NRAO 11 m	Sch82	
	173766.893*(47)	H_2COH^+	5(0,5)−4(1,4)	0.192	Sgr B2(M)	NRO 45 m	Ohi96	
	177238.655*(7)	HCN	2−1 $v_{2\ell}$ =1 e	80.	IRC+10216	IRAM 30 m	Luc89	Mak02
	178136.477*(7)	HCN	2−1 $v_{2\ell}$ =1 f	1.	IRC+10216	IRAM 30 m	Luc89	Mak02
	178170.373*(3)	HCN	2−12 $v_{2\ell}$ =0	0.8	IRC+10216	IRAM 30 m	Luc89	Mak02
	178972.05(5)	HOC^+	2−1	0.083	Sgr B2(OH)	NRAO 12 m	Ziu95a	Bla83
	183310.0906(15)	H_2O	3(1,3)−2(2,0)	10.	OriMC−1	KAO 1 m	Wat77	Hui71
	191040.293*(6)	HCCCN	21−20	3.0	W49N	IRAM 30 m	Cer90	
	195954.217*(8)	CS	4−3	3.3	NGC2024	MMWO 4.9 m	Mun84a	
	200809.316*(5)	SO_2	16(1,15)−16(0,16)	4.87	OriMC−1	NRAO 12 m	Jew89	
	200888.351*(9)	SO_2	13(5,9)−14(4,10) v_2 =1	0.28	OriMC−1	NRAO 12 m	Jew89	
	200913.79*(4)	HCCCN	22−21 v_7 =1 ℓ=1 f	0.73	OriMC−1	NRAO 12 m	Jew89	Laf78
	200936.080*(21)	CH_3OCHO	16(5,11)−15(5,10) E	0.5	OriMC−1	NRAO 12 m	Jew89	Oes99
	200956.380*(21)	CH_3OCHO	16(5,11)−15(5,10) A	0.45	OriMC−1	NRAO 12 m	Jew89	Oes99
U	201088.	unidentified	(U203918.)	1.48	OriMC−1	NRAO 12 m	Jew89	
U	201200.	unidentified	(U203806.)	0.27	OriMC−1	NRAO 12 m	Jew89	
U	201323.	unidentified	(U204707.)	0.19	OriMC−1	NRAO 12 m	Jew89	
	201341.377*(8)	HDCO	3(1,2)−2(1,1)	0.79	OriMC−1	NRAO 12 m	Jew89	
	201376.478*(7)	$^{34}SO_2$	11(2,10)−11(1,11)	0.62	OriMC−1	NRAO 12 m	Jew89	
	201429.63(10)	HCCCN	22−21 v_7 =2 ℓ=2 f	0.12	OriMC−1	NRAO 12 m	Jew89	Laf78
	201445.644*(17)	CH_3OH	5(2,3)−6(1,6) A+	2.52	OriMC−1	NRAO 12 m	Jew89	Xu_97
	201536.208*(8)	CH_3OCH_3	12(4,8)−12(3,9) AE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	201536.738*(8)	CH_3OCH_3	12(4,8)−12(3,9) EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	201539.699*(6)	CH_3OCH_3	12(4,8)−12(3,9) EE	0.51[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	201542.925*(8)	CH_3OCH_3	12(4,8)−12(3,9) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	201614.269*(8)	$H_2C^{18}O$	3(1,3)−2(1,2)	0.12	OriMC−1	NRAO 12 m	Jew89	
	201691.955*(5)	$OC^{34}S$	17−16	0.30	OriMC−1	NRAO 12 m	Jew89	
	201846.667*(28)	^{34}SO	4(5)−3(4)	2.33	OriMC−1	NRAO 12 m	Jew89	
	202040.693*(10)	CH_3CN	11(9)−10(9)	0.81	OriMC−1	NRAO 12 m	Jew89	
	202106.626*(8)	CH_3CN	11(8)−10(8)	0.68	OriMC−1	NRAO 12 m	Jew89	
	202164.864*(6)	CH_3CN	11(7)−10(7)	0.77	OriMC−1	NRAO 12 m	Jew89	
	202215.384*(5)	CH_3CN	11(6)−10(6)	1.55	OriMC−1	NRAO 12 m	Jew89	
	202258.166*(4)	CH_3CN	11(5)−10(5)	2.11	OriMC−1	NRAO 12 m	Jew89	
U	202673.	unidentified		0.32	Sgr B2(M)	NRAO 12 m	Tur85	
	202690.619*(7)	NH_2CHO	6(2,5)−6(1,6)	0.65	OriMC−1	NRAO 12 m	Tur85	
	202708.6*(1)	CH_3CN	11(7)−10(7) v_8 =1 ℓ=−1	0.09	OriMC−1	NRAO 12 m	Tur85	Bou80
	202721.4*(1)	CH_3CN	11(9)−10(9) v_8 =1 ℓ=+1	0.18	W51	NRAO 12 m	Tur85	Bou80
	202767.7*(1)	CH_3CN	11(6)−10(6) v_8 =1 ℓ=−1	[b]	W51	NRAO 12 m	Tur85	Bou80
	202769.65*(7)	CH_3CN	11(1)−10(1) v_8 =1 ℓ=+1	0.18[b]	W51	NRAO 12 m	Tur85	Bou80
	202818.966*(66)	CH_3CN	11(5)−10(5) v_8 =1 ℓ=−1	0.18	W51	NRAO 12 m	Tur85	Bou80
	203391.469*(6)	SO_2	12(0,12)−11(1,11)	2.0	OriMC−1	MMWO 4.9 m	Eri84	
	203407.52(2)	$H_2{}^{18}O$	3(1,3)−2(2,0)	0.10[b]	W51d	NRAO 12 m	Jac88	DeL72
	203411.398*(8)	CH_3OCH_3	3(3,0)−2(2,1) AE	0.036	W51d	NRAO 12 m	Jac88	Gro98
U	203412.7	unidentified		0.056	W51d	NRAO 12 m	Jac88	
	203418.702*(10)	CH_3OCH_3	3(3,0)−2(2,1) AA	0.10[b]	W51e1/e2	NRAO 12 m	Jac90	Gro98
	203420.315*(12)	CH_3OCH_3	3(3,0)−2(2,1) EE	[b]	W51e1/e2	NRAO 12 m	Jac90	Gro98
	203423.124*(24)	CH_3OCH_3	3(3,0)−2(2,1) EA	[b]	W51e1/e2	NRAO 12 m	Jac90	Gro98
U	203806.	unidentified	(U201200.)	0.27	OriMC−1	NRAO 12 m	Jew89	
	203853.696*(20)	CH_3OCHO	17(3,15)−16(3,14) E	0.82	OriMC−1	NRAO 12 m	Jew89	Oes99
	203864.194*(21)	CH_3OCHO	17(3,15)−16(3,14) A	0.68	OriMC−1	NRAO 12 m	Jew89	Oes99
U	203918.	unidentified	(U201088.)	1.48	OriMC−1	NRAO 12 m	Jew89	
	203936.77*(7)	^{33}SO	4(5)−3(4) F=9/2−7/2	[b]	OriMC−1	NRAO 12 m	Jew89	
	203937.37*(8)	^{33}SO	4(5)−3(4) F=7/2−5/2	1.73[b]	OriMC−1	NRAO 12 m	Jew89	
	203939.24* (16)	^{33}SO	4(5)−3(4) F=11/2−9/2	[b]	OriMC−1	NRAO 12 m	Jew89	
	203941.50* (16)	^{33}SO	4(5)−3(4) F=5/2−3/2	[b]	OriMC−1	NRAO 12 m	Jew89	
U	204070.	unidentified	(U200936.)	0.50	OriMC−1	NRAO 12 m	Jew89	
	204136.224*(8)	$^{34}SO_2$	12(0,12)−11(1,11)	1.02	OriMC−1	NRAO 12 m	Jew89	
	204158.441*(16)	CH_3OCH_3	9(4,5)−9(3,6) EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204158.883*(8)	CH_3OCH_3	9(4,5)−9(3,6) EE	0.50[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204160.111*(10)	CH_3OCH_3	9(4,5)−9(3,6) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204246.739*(11)	SO_2	18(3,15)−18(2,16)	3.88	OriMC−1	NRAO 12 m	Jew89	
	204384.197*(5)	SO_2	7(4,4)−8(3,5)	1.77	OriMC−1	NRAO 12 m	Jew89	
	204525.175*(16)	$^{34}SO_2$	16(3,13)−16(2,14)	0.94	OriMC−1	NRAO 12 m	Jew89	
	204552.039*(10)	CH_3OCH_3	8(4,4)−8(3,5) EE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204552.507*(20)	CH_3OCH_3	8(4,4)−8(3,5) EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204552.601*(6)	CH_3OCH_3	11(4,8)−11(3,9) EE	0.81[b]	OriMC−1	NRAO 12 m	Jew89	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	204553.012*(10)	CH_3OCH_3	8(4,4)−(83,5) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204628.452*(12)	CH_3OCH_3	10(4,7)−10(3,8) EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204630.869*(6)	CH_3OCH_3	10(4,7)−10(3,8) AE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204633.802*(6)	CH_3OCH_3	10(4,7)−10(3,8) EE	1.03[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204638.018*(8)	CH_3OCH_3	10(4,7)−10(3,8) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
U	204707.	unidentified	(U201323.)	0.19	OriMC−1	NRAO 12 m	Jew89	
	204736.683*(8)	CH_3OCH_3	9(4,6)−9(3,7) EE	0.33[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204741.805*(10)	CH_3OCH_3	9(4,6)−9(3,7) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204758.613*(4)	CH_3OCH_3	14(4,11)−14(3,12) EE	0.43[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204761.721*(8)	CH_3OCH_3	14(4,11)−14(3,12) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204933.013*(10)	CH_3OCH_3	7(4,4)−7(3,5) EE	0.62[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204933.087*(10)	CH_3OCH_3	7(4,4)−7(3,5) AE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204960.964*(10)	CH_3OCH_3	6(4,2)−6(3,3) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204961.081*(20)	CH_3OCH_3	6(4,2)−6(3,3) EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	204961.331*(12)	CH_3OCH_3	6(4,2)−6(3,3) EE	0.73[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205018.110*(4)	CH_3CCH	12(4)−11(4)	0.69	OriMC−1	NRAO 12 m	Jew89	
	205045.498*(2)	CH_3CCH	12(3)−11(3)	0.67	OriMC−1	NRAO 12 m	Jew89	
	205048.150*(16)	CH_3OCH_3	5(4,1)−5(3,2) EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205050.228*(10)	CH_3OCH_3	5(4,1)−5(3,2) EE	1.54[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205050.504*(12)	CH_3OCH_3	5(4,1)−5(3,2) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205060.792*(10)	CH_3OCH_3	5(4,2)−5(3,3) AE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205061.068*(10)	CH_3OCH_3	5(4,2)−5(3,3) EE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205065.068*(1)	CH_3CCH	12(2)−11(2)	0.87	OriMC−1	NRAO 12 m	Jew89	
	205076.814*(1)	CH_3CCH	12(1)−11(1)	0.91[b]	OriMC−1	NRAO 12 m	Jew89	
	205080.729*(1)	CH_3CCH	12(0)−11(0)	[b]	OriMC−1	NRAO 12 m	Jew89	
	205095.818*(10)	CH_3OCH_3	4(4,0)−4(3,1) EE	0.60[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205096.790*(10)	CH_3OCH_3	4(4,1)−4(3,2) EE	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	205118.265*(4)	CH_3OCH_3	15(4,12)−15(3,13) EE	0.61	OriMC−1	NRAO 12 m	Jew89	Gro98
	205736.535*(13)	CH_3CH_2CN	23(5,18)−23(4,19)	0.07	OriMC−1	NRAO 12 m	Tur85	
	206131.625*(5)	$H_2{}^{13}CO$	3(1,2)−2(1,2)	3.00	OriMC−1	FCRAO 14 m	Eri84c	
	206176.062*(15)	SO	4(5)−3(4)	9.00	OriMC−1	FCRAO 14 m	Eri84c	
	207771.	CHD_2OH	5(0)−4(0) e1	0.09	IRAS16293−2422	IRAM 30 m	Par02	Par02
	207780.8	CH_2 DOH	2(1,2)−3(0,3) e0	0.11	IRAS16293−2422	IRAM 30 m	Par02	Par02
	207827.	CHD_2OH	5(2−)−4(2−) e1	0.07	IRAS16293−2422	IRAM 30 m	Par02	Par02
	207864.	CHD_2OH	5(4−)−4(4−) e1	0.07	IRAS16293−2422	IRAM 30 m	Par02	Par02
	207868.	CHD_2OH	5(3−)−4(3−) e1	[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	207869.	CHD_2OH	5(3+)−4(3+) e1	0.05[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	208590.021*(30)	SO^+	$2\Pi_{1/2}$ J=9/2−7/2 e	0.018	IC443G	NRAO 12 m	Tur92a	Ama91
	208700.323*(6)	SO_2	3(2,2)−2(1,1)	0.5	rho Oph A	MMWO 4.9 m	Lor84a	
	208965.425*(30)	SO^+	$2\Pi_{1/2}$ J=9/2−7/2 f	0.012	IC443G	NRAO 12 m	Tur92a	Ama91
	209230.201*(6)	HCCCN	23−22	0.7	OriMC−1	MMWO 4.9 m	Lor81	
	211013.036*(14)	^{34}SO	5(5)−4(4)	0.45	OriMC−1	MMWO 4.9 m	Tha84a	
	211077.90* (25)	SiO	5−4 v=4	0.7	VY CMa	IRAM 30 m	Cer93	
	211211.448*(10)	H_2CO	3(1,3)−2(1,2)	1.9	rho Oph B	MMWO 4.9 m	Lor83	
	211803.245*(98)	CH_3OH	16(2,15)−15(1,14)A−	0.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	211853.17* (11)	^{30}SiO	5−4 v=0	4.0	VY CMa	IRAM 30 m	Cer92	
	212582.51* (13)	SiO	5−4 v=3	0.5	VY CMa	IRAM 30 m	Cer93	
	213068.415*(18)	SO_2	26(3,23)−26(2,24)	0.15	IRAS16293−2422	JCMT 15 m	Bla94	
	213159.369*(47)	CH_3OH	20(−4,17)−19(−5,14) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	213293.580*(13)	$H_2{}^{13}CO$	3(2,1)−2(2,0)	<0.5	OriMC−1	BTL 7 m	Tha81	
	213360.659*(24)	HCS^+	5−4	0.6	OriMC−1	BTL7 m	Tha81	Bog84
U	213376.	unidentified		0.7	OriMC−1	BTL7 m	Tha81	
	213377.521*(27)	CH_3OH	13(6,8)−14(5,10) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	213427.118*(7)	CH_3OH	1(1,0)−0(0,0) E	5.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	213553.060*(6)	$OC^{34}S$	18−17	0.15	IRAS16293−2422	JCMT 15 m	Bla94	
	214088.56* (12)	SiO	5−4 v=2	110.[e]	VXSgr	MMWO 4.9 m	Cle83	
	214229.414*(27)	$^{13}CH_3CN$	12(5)−11(0)	2.0[f]	G10.47	IRAM 30 m	Olm96	
	214309.889*(21)	$^{13}CH_3CN$	12(4)−11(0)	5.7[f]	G10.47	IRAM 30 m	Olm96	
	214338.081*(21)	$^{13}CH_3CN$	12(3)−11(0)	9.7[f]	G10.47	IRAM 30 m	Olm96	
	214357.051*(64)	SO	7(8)−7(7)	0.24	IRAS16293−2422	JCMT 15 m	Bla94	
	214358.226*(22)	$^{13}CH_3CN$	12(2)−11(0)	[b]	G10.47	IRAM 30 m	Olm96	
	214370.317*(22)	$^{13}CH_3CN$	12(1)−11(0)	6.7[f]	G10.47	IRAM 30m	Olm96	
	214374.347*(23)	$^{13}CH_3CN$	12(0)−11(0)	6.6[f]	G10.47	IRAM 30 m	Olm96	
	214385.62*(11)	^{29}SiO	5−4 v=0	4.0	VY CMa	IRAM 30 m	Cer92	
	214509.66* (16)	$Si^{13}CC$	9(1,8)−8(1,7)	0.7[f]	IRC+10216	IRAM 30 m	Cer91b	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	214574.084*(8)	$13C^{17}O$	2−1	0.055	rho Oph C	SEST 15 m	Ben01	
	214778.432*(8)	$H_2C^{18}O$	3(1,2)−2(1,1)	0.19	OriMC−1	MMWO 4.9 m	Man90	
	214782.311*(17)	CH_3OCHO	18(3,16)−17(3,15) E	0.10	OMC−IRc2	MMWO 4.9 m	Man90	Oes99
	214790.761 (18)	HNCO	47(0,47)−46(1,46)	[b]	OriMC−1	MMWO 4.9 m	Man90	Hoc75
	214792.534*(20)	CH_3OCHO	18(3,16−17(3,15) A	0.20[b]	OriMC−1	MMWO 4.9 m	Man90	Oes99
	215039.727*(9)	CH_3CH_2CN	24(9,*)−23(9,*)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	215041.902*(9)	CH_3CH_2CN	24(10,*)−23(10,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	215058.027*(9)	CH_3CH_2CN	24(3,22)−23(3,21)	1.4[b]	OriMC−1	OVRO 10.4 m	Sut85	
	215058.588*(9)	CH_3CH_2CN	24(8,*)−23(8,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	215059.236*(10)	CH_3CH_2CN	24(11,*)−23(11,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	215088.240*(11)	CH_3CH_2CN	24(12,*)−23(12,*)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	215109.062*(20)	CH_3CH_2CN	24(7,*)−23(7,*)	1.2	OriMC−1	OVRO 10.4 m	Sut85	
	215119.223*(10)	CH_3CH_2CN	25(0,25)−24(0.24)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	215126.724*(11)	CH_3CH_2CN	24(13,*)−23(13,*)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	215173.254*(12)	CH_3CH_2CN	24(14,*)−23(14,*)	0.3	OriMC−1	OVRO 10.4m	Sut85	
	215211.533*(9)	CH_3CH_2CN	24(6,19)−23(6,18)	[b]	OriMC−1	OVRO 10.4m	Sut85	
	215212.474*(9)	CH_3CH_2CN	24(6,18)−23(6,17)	[b]	OriMC−1	OVRO 10.4m	Sut85	
	215220.708*(11)	SO	5(5)−4(4)	3.0	OriMC−1	MMWO 4.9 m	Cle84	
	215247.2*(18)	$^{30}SiC_2$	9(2,7)−8(2,6)	0.069	IRC+10216	IRAM 30 m	Ziu02	
	215302.205*(25)	CH_3OH	6(1,6)−7(2,5) A+ v_t =1	1.3	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	215357.918*(8)	AlNC	18−17	0.006	IRC+10216	IRAM 30 m	Ziu02	
	215400.819*(9)	CH_3CH_2CN	24(5,20)−23(5,19)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	215418.9*(75)	$^{30}SiC_2$	10(0,10)−9(0,9)	0.068	IRC+10216	IRAM 30 m	Ziu02	
	215427.984*(9)	CH_3CH_2CN	24(5,19)−23(5,18)	1.0	OriMC−1	OVRO 10.4 m	Sut85	
	215596.05* (10)	SiO	5−4 v=1	150.[e]	VXSgr	MMWO 4.9 m	Cle83	
	215620.199*(9)	CH_3CH_2CN	24(4,21)−23(4,20)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	215839.917*(24)	^{34}SO	6(5)−5(4)	0.50	OriMC−1	MMWO 4.9 m	Sne84a	
	215886.979*(22)	$^{13}CH_3OH$	4(2,2)−3(1,2) E	0.9	OriMC−1	OVRO 10.4 m	Sut85	And87
	215965.591*(11)	CH_3CH_2CN	25(1,25)−24(0,24)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	215999.724*(14)	$^{34}SO_2$	14(3,11)−14(2,12)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	216077.207*(9)	CH_3CH_2CN	24(4,20)−23(4,19)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	216109.716*(17)	CH_3OCHO	19(2,18)−18(2,17) E	0.9	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216112.628*(29)	DCO^+	3−2	2.5	ρ−Oph	MMWO 4.9 m	Lor82	
	216115.541*(20)	CH_3OCHO	19(2,18)−18(2,17) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216210.844*(17)	CH_3OCHO	19(1,18)−18(1,17) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216216.510*(20)	CH_3OCHO	19(1,18)−18(1,17) A	0.9	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216278.749*(9)	$c-C_3H_2$	3(3,0)−2(2,1)	3.4	TMC−1	FCRAO 14 m	Mad86a	
U	216325.0	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
U	216345.0	unidentified		0.20	OriMC−1	IRAM 30 m	Com96	
	216360.002*(20)	CH_3OCHO	19(2,18)−18(1,17) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	216373.32(2)	C_2D	1−0 J=7/2−5/2 F=7/2−5/2	[b]	OriMC−1	MMWO 4.9 m	Com85	Vrt85
	216373.32(2)	C_2D	1−0 J=7/2−5/2 F=9/2−7/2	0.27[b]	OriMC−1	MMWO 4.9 m	Com85	Vrt85
U	216383.9	unidentified		0.11	OriMC−1	IRAM 30 m	Com96	
U	216402.3	unidentified		0.22	OriMC−1	IRAM 30 m	Com96	
U	216428.8	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	216458.9	unidentified		0.15	OriMC−1	IRAM 30 m	Com96	
U	216501.2	unidentified		0.16	OriMC−1	IRAM 30 m	Com96	
U	216522.7	unidentified		0.15	OriMC−1	IRAM 30 m	Com96	
U	216546.4	unidentified		0.16	OriMC−1	IRAM 30 m	Com96	
	216568.652*(15)	H_2CO	9(1,8)−9(1,9)	1.3	OriMC−1	OVRO 10.4 m	Sut85	
	216581.924*(7)	CH_3CHO	11(1,10)−10(1,9) E	n.r.	OriMC−1	IRAM 30 m	Com96	
	216588.613*(43)	CH_3OCHO	33(9,25)−33(8,26) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
	216643.303*(10)	SO_2	22(2,20)−22(1,21)	0.3	OriMC−1	MMWO 4.9 m	Lor84a	
	216710.437*(2)	H_2S	2(2,0)−2(1,1)	0.32	OriMC−1	MMWO 4.9 m	Lor84a	Hui71
	216752.552*(11)	CH_3CH_2CN	26(1,25)−25(2,24)	0.17	OriMC−1	MMWO 4.9 m	Lor84a	
	216757.623*(14)	SiS	12−11 v=1	0.046	IRC+10216	NRAO 12 m	Tur87a	
U	216774.9	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	216830.151*(20)	CH_3OCHO	18(2,16)−17(2,15) E	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216838.880*(20)	CH_3OCHO	18(2,16)−17(2,15) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216936.68*(4)	CH_2CHCN	23(2,22)−22(2,21)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	216945.559*(14)	CH_3OH	5(1,4)−4(2,2) E	3.1	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	216964.763*(20)	CH_3OCHO	20(1,20)−19(1,19) E	2.0[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216965.938*(24)	CH_3OCHO	20(1,20)−19(1,19) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216966.220*(20)	CH_3OCHO	20(0,20)−19(0,19) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	216967.392*(24)	CH_3OCHO	20(0,20)−19(0,19) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	217104.98* (11)	SiO	5−4 v=0	1.6	OriMC−1	MMWO 4.9 m	Lor84a	
U	217151.3	unidentified		0.15	OriMC−1	IRAM 30 m	Com96	
U	217165.2	unidentified		0.20	OriMC−1	IRAM 30 m	Com96	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	217176.599*(28)	CH_3OCH_3	36(4,32)−36(3,33) AE+EA	[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	217177.084*(28)	CH_3OCH_3	36(4,32)−36(3,33) EE	0.07[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	217177.609*(29)	CH_3OCH_3	36(4,32)−36(3,33) AA	[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	217189.663*(8)	CH_3OCH_3	22(4,19)−22(3,20) EA	[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	217189.664*(8)	CH_3OCH_3	22(4,19)−22(3,20) AE	[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	217191.408*(6)	CH_3OCH_3	22(4,19)−22(3,20) EE	1.16[b]	OriMC−1	IRAM 30 m	Com96	Gro98
	217193.153*(8)	CH_3OCH_3	22(4,19)−22(3,20) AA	[b]	OriMC−1	IRAM 30 m	Com96	Gro98
U	217209.1	unidentified		0.09	OriMC−1	IRAM 30 m	Com96	
U	217216.1	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	217238.539*(2)	DCN	3−2	0.7	OriMC−1	NRAO 11 m	Phi74	
	217262.955*(51)	CH_3OCHO	37(10,27)−37(9,28) A	0.33	OriMC−1	IRAM 30 m	Com96	Oes99
	217266.473*(50)	CH_3OCHO	30(4,26)−30(3,27) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
U	217278.9	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
	217299.162*(24)	CH_3OH	6(1,5)−7(2,6) A− $v_t=1$	1.2	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	217313.0	unidentified		0.69	OriMC−1	IRAM 30 m	Com96	
	217338.054*(53)	CH_3OCHO	37(10,27)−37(9,28) E	0.04	OriMC−1	IRAM 30 m	Com96	Oes99
U	217364.0	unidentified		0.12	OriMC−1	IRAM 30 m	Com96	
U	217375.0	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	217391.0	unidentified		0.12	OriMC−1	IRAM 30 m	Com96	
	217398.499*(28)	$HC^{13}CCN$	24−23	n.r.	OriMC−1	IRAM 30 m	Com96	
	217419.584*(40)	$HCC^{13}CN$	24−23	n.r.	OriMC−1	IRAM 30 m	Com96	
U	217429.0	unidentified		0.33	OriMC−1	IRAM 30 m	Com96	
U	217451.2	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
U	217458.5	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
U	217468.3	unidentified		0.08	OriMC−1	IRAM 30 m	Com96	
U	217497.8	unidentified		0.37	OriMC−1	IRAM 30 m	Com96	
U	217513.0	unidentified		0.12	OriMC−1	IRAM 30 m	Com96	
U	217524.9	unidentified		0.24	OriMC−1	IRAM 30 m	Com96	
	217541.41*(7)	HCOOD	10(9,*)−9(9,*)	n.r.	OriMC−1	IRAM 30 m	Com96	Wil80
	217546.56*(4)	HCOOD	10(8,*)−9(8,*)	n.r.	OriMC−1	IRAM 30 m	Com96	Wil80
U	217558.7	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	217568.5	unidentified		0.64	OriMC−1	IRAM 30 m	Com96	
U	217582.3	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	217588.3	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	217595.6	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	217609.0	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
U	217615.7	unidentified		0.22	OriMC−1	IRAM 30 m	Com96	
U	217636.4	unidentified		0.27	OriMC−1	IRAM 30 m	Com96	
	217642.86* (14)	CH_3OH	15(6,10)−16(5,11) A−− $v_t=1$	1.06[b]	OriMC−1	IRAM 30 m	Com96	Xu_97
	217642.86* (14)	CH_3OH	15(6,9)−16(5,12) A++ $v_t=1$	[b]	OriMC−1	IRAM 30 m	Com96	Xu_97
	217653.84*(8)	CCCN	22−21 $J=45/2-43/2$	n.r.	OriMC−1	IRAM 30 m	Com96	
U	217656.2	unidentified		0.19	OriMC−1	IRAM 30 m	Com96	
U	217668.7	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	217678.4	unidentified		0.13	OriMC−1	IRAM 30 m	Com96	
	217689.34*(3)	HCOOD	10(5,6)−9(5,5)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Wil80
	217689.53*(3)	HCOOD	10(5,5)−9(5,4)	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Wil80
	217817.624*(16)	SiS	12−11	0.66	IRC+10216	MMWO 4.9 m	Sah84	
	217822.045*(15)	$c-C_3H_2$	6(0,6)−5(1,5)	0.23[b]	OriMC−1	MMWO 4.9 m	Lor84	
	217822.168*(15)	$c-C_3H_2$	6(1,6)−5(0,5)	[b]	OriMC−1	MMWO 4.9 m	Lor84	
	217827.14* (11)	^{33}SO	6(5)−5(4) $F=9/2-7/2$	[b]	OriMC−1	MMWO 4.9 m	Lor84	
	217829.806*(54)	^{33}SO	6(5)−5(4) $F=11/2-9/2$	[b]	OriMC−1	MMWO 4.9 m	Lor84	
	217831.762*(54)	^{33}SO	6(5)−5(4) $F=13/2-11/2$	0.15[b]	OriMC−1	MMWO 4.9 m	Lor84	
	217832.67* (11)	^{33}SO	6(5)−5(4) $F=15/2-13/2$	[b]	OriMC−1	MMWO 4.9 m	Lor84	
	217886.39* (11)	CH_3OH	20(1,19)−20(0,20) E	0.9	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	218006.38* (10)	SiN	5−4 $J=9/2-9/2$ $F=11/2-9/2$	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	218007.84* (10)	SiN	5−4 $J=9/2-9/2$ $F=9/2-7/2$	0.031[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	218009.08* (10)	SiN	5−4 $J=9/2-9/2$ $F=7/2-5/2$	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	218198.984*(8)	$O^{13}CS$	18−17	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	218222.186*(10)	H_2CO	3(0,3)−2(0,2)	4.0	OriMC−1	MMWO 4.9 m	Lor84b	
	218280.830*(20)	CH_3OCHO	17(3,14)−16(3,13) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	218289.	unidentified		0.08	IRC+10216	NRAO 12 m	Tur92	
	218297.866*(21)	CH_3OCHO	17(3,14)−16(3,13) A	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	218324.712*(7)	HCCCN	24−23	0.9	OriMC−1	MMWO 4.9 m	Lor81	
	218337.2*(10)	HCCCN	24−23 $v_5=1$ $\ell=1$ e	8.8f	SgrB2(N)	SEST 15 m	Num98	Laf78
	218390.017*(10)	CH_3CH_2CN	24(3,21)−23(3,20)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	218398.50*(9)	CH_2CHCN	23(7,*)−22(7,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	218402.40*(7)	CH_2CHCN	23(6,*)−22(6,*)	0.4[b]	OriMC−1	OVRO 10.4 m	Sut85	
	218421.73* (11)	CH_2CHCN	23(8,*)−22(8,*)	0.3	OriMC−1	OVRO 10.4 m	Sut85	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	218440.050*(15)	CH_3OH	4(2,2)−3(1,2) E	1.7	OriMC−1	MMWO 4.9 m	Lor84b	Xu_97
	218451.25*(6)	CH_2CHCN	23(5,19)−22(5,18)	0.2[b]	OriMC−1	OVRO 10.4 m	Sut85	
	218452.31*(6)	CH_2CHCN	23(5,18)−22(5,17)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	218459.203*(5)	NH_2CHO	10(1,9)−9(1,8)	19.4[f]	SgrB2(N)	SEST 15 m	Num98	
	218475.637*(10)	H_2CO	3(2,2)−2(2,1)	1.8	OriMC−1	MMWO 4.9 m	Lor84b	
	218489.428*(10)	CH_3OCH_3	23(3,21)−23(2,22) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	218491.919*(8)	CH_3OCH_3	23(3,21)−23)2,22) EE	11.2[fb]	SgrB2(N)	SEST15 m	Num98	Gro98
	218494.410*(12)	CH_3OCH_3	23(3,21)−23(2,22) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	218507.1(10)	$^{29}SiC_2$	9(2,7)−8(2,6)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	218511.98* (10)	SiN	5−4 J=11/2−9/2 F=13/2−11/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	218513.14* (10)	SiN	5−4 J=11/2−9/2 F=11/2−9/2	0.018[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	218513.89* (10)	SiN	5−4 J=11/2−9/2 F=9/2−7/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	218520.025*(4)	CH_2CHCN	23(10,*)−22(10,*)	10.2[f]	SgrB2(N)	SEST 15 m	Num98	
	218554.382*(24)	$t-CH_3CH_2OH$	21(5,16)−21(4,17)	4.8[f]	SgrB2(N)	SEST 15 m	Num98	
	218573.60*(5)	CH_2CHCN	23(4,20)−22(4,19)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	218585.03*(5)	CH_2CHCN	23(3,21)−22(3,20)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	218588.132*(5)	CH_2CHCN	23(11,*)−22(11,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	218615.05*(5)	CH_2CHCN	23(4,19)−22(4,18)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	218654.008*(32)	$t-CH_3CH_2OH$	7(2,5)−6(1,6)	2.8[f]	SgrB2(N)	SEST 15 m	Num98	
	218666.578*(6)	CH_2CHCN	23(12,*)−22(12,*)	6.1[f]	SgrB2(N)	SEST 15 m	Num98	
	218683.90*(55)	HCCCN	24−23 v_6 =1 ℓ=1 e	11.7[f]	SgrB2(N)	SEST15 m	Num98	Laf78
	218719.83*(9)	CH_2CHCN	23(8,*)−22(8,*) v_{15} =1	3.0[f]	SgrB2(N)	SEST15 m	Num98	
	218732.679*(10)	$c-C_3H_2$	7(1,6)−7(0,7)	5.4[fb]	SgrB2(N)	SEST15 m	Num98	
	218732.762*(10)	$c-C_3H_2$	7(2,6)−7(1,7)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	218760.066*(10)	H_2CO	3(2,1)−2(2,0)	1.5	OriMC−1	MMWO 4.9 m	Lor84a	
	218830.76* (12)	CH_2CHCN	23(10,*)−22(10,*) v_{15} =1	6.2[f]	SgrB2(N)	SEST 15 m	Num98	
	218837.00*(6)	C_4H	47/2−45/2	0.06	IRC+10216	MMWO 4.9 m	Lor84a	
	218853.91* (63)	HCCCN	24−23 v_6 =1 ℓ=1 f	12.8[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	218860.629*(58)	HCCCN	24−23 v_7 =1 ℓ=1 e	0.6	OriMC−1	OVRO 10.4 m	Sut85	Laf78
	218875.36*(6)	C_4H	45/2−43/2	0.06	IRC+10216	MMWO 4.9 m	Lor84a	
	218903.353*(1)	OCS	18−17	2.8	OriMC−1	BTL 7 m	Gol81	
	218981.019*(12)	HNCO	10(1,10)−9(1,9)	0.24	OriMC−1	MMWO 4.9 m	Arm84a	
U	219002.	unidentified		0.1[u]	OriMC−1	MMWO 4.9 m	Arm84a	
	219027.097*(16)	CH_2CHCN	23(7,*)−22(7,*) v_{11} =1	7.4[f]	SgrB2(N)	SEST15 m	Num98	
	219039.405*(15)	CH_2CHCN	23(6,18)−22(6,17) v_{11} =1	9.7[fb]	SgrB2(N)	SEST15 m	Num98	
	219039.425*(15)	CH_2CHCN	23(6,17)−22(6,16) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	219042.615*(17)	CH_2CHCN	23(8,*)−22(8,*) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	219068.22*(5)	CH_2CHCN	23(16,*)−22(16,*)	4.4[f]	SgrB2(N)	SEST 15 m	Num98	
	219077.008*(18)	CH_2CHCN	23(9,*)−22(9,*) v_{11} =1	4.6[f]	SgrB2(N)	SEST 15 m	Num98	
	219085.43*(16)	CH_2CHCN	23(13,*)−22(13,*) v_{15} =1	5.4[f]	SgrB2(N)	SEST 15 m	Num98	
	219098.502*(15)	CH_2CHCN	23(5,*)−22(5,*) v_{11} =1	8.0[f]	SgrB2(N)	SEST 15 m	Num98	
	219125.675*(21)	CH_2CHCN	23(10,*)−22(10,*) v_{11} =1	11.4[f]	SgrB2(N)	SEST 15 m	Num98	
	219125.675*(21)	CH_2CHCN	23(10,*)−22(10,*) v_{11} =1	11.4[f]	SgrB2(N)	SEST 15 m	Num98	
	219151.5*(5)	CH_3NH_2	8(−2)−8(1) Ea	6.5[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	219173.582*(58)	HCCCN	24−23 v_7 =1 ℓ=1 f	0.6	OriMC−1	OVRO 10.4 m	Sut85	Laf78
U	219216.	unidentified		18.4[f]	SgrB2(N)	SEST 15 m	Num98	
	219233.341*(15)	CH_2CHCN	23(4,20)−22(4,19) v_{11} =1	12.4[fb]	Sgr B2(N)	SEST 15 m	Num98	
	219237.251*(15)	CH_2CHCN	23(3,21)−22(3,20) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	219256.582*(31)	CH_2CHCN	23(12,*)−22(12,*) v_{11} =1	13.5[f]	SgrB2(N)	SEST 15 m	Num98	
	219275.939*(7)	SO_2	22(7,15)−23(6,16)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	219275.939*(7)	SO_2	22(7,15)−23(6,18)	21.8[f]	SgrB2(M)	SEST 15 m	Num98	
U	219318.	unidentified		26.0[f]	SgrB2(N)	SEST 15 m	Num98	
	219336.331*(41)	CH_2CHCN	23(13,*)−22(13,*) v_{11} =1	3.9[f]	SgrB2(N)	SEST 15 m	Num98	
U	219346.	unidentified		4.5[f]	SgrB2(N)	SEST 15 m	Num98	
	219355.001*(11)	$^{34}SO_2$	11(1,11)−10(0,10)	1.3	OriMC−1	OVRO 10.4 m	Sut85	
	219400.54*(5)	CH_2CHCN	23(3,20)−22(3,19)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	219407.69*(6)	$CH_3{}^{18}OH$	4(2,2)−3(1,2) E	11.3[f]	SgrB2(N)	SEST 15 m	Num98	Hos96
	219424.659*(54)	CH_2CHCN	23(14,*)−22(14,*) v_{11} =1	3.8[f]	SgrB2(N)	SEST 15 m	Num98	
	219441.599(20)	NH_2CN	11(2,10)−10(2,9) v=1	8.0[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
	219463.641*(15)	CH_3CH_2CN	22(2,21)−21(1,20)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	219465.555*(19)	SO_2	22(2,20)−22(1,21) v_2 =1	10.4[f]	SgrB2(M)	SEST 15 m	Num98	
	219505.595*(10)	CH_3CH_2CN	24(2,22)−23(2,21)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	219513.274*(21)	$c-C_2H_4O$	6(3,4)−5(2,3)	0.38	Sgr B2(N)	SEST 15 m	Dic97	
	219547.105*(11)	HNCO	10(4,6)−9(4,5)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	219547.105*(11)	HNCO	10(4,7)−9(4,6)	0.4[b]	OriMC−1	OVRO 10.4 m	Sut85	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	219560.353*(4)	$C^{18}O$	2−1	3.5	DR21	NRAO 11 m	Phi77	
	219656.805*(11)	HNCO	10(3,7)−9(3,6)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	219656.805*(11)	HNCO	10(3,8)−9(3,7)	0.4[b]	OriMC−1	OVRO 10.4 m	Sut85	
	219674.65* (13)	HCCCN	24−23 v_7 =2 ℓ=0	22.9[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	219706.89*(10)	HCCCN	24−23 v_7 =2 ℓ=2 e	20.0[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	219709.2(10)	$C^{15}N$	2−1 J=3/2−1/2 F=1−0	0.10	OriMC−1	KOSMA 3 m	Sal94a	Sal94a
	219722.5(10)	$C^{15}N$	2−1 J=3/2−1/2 F=2−1	0.15	OriMC−1	KOSMA 3m	Sal94a	Sal94a
	219733.824*(11)	HNCO	10(2,9)−9(2,8)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	219737.175*(13)	HNCO	10(2,8)−9(2,7)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
U	219767.8	unidentified		0.15	IRC+10216	NRAO 12 m	Tur87a	
	219798.282*(8)	HNCO	10(0,10)−9(0,9)	0.3	OriMC−1	MMWO 4.9 m	Arm84	
	219820.392*(14)	CH_3CHO	4(−2,3)−3(−1,3) E	3.3[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	219908.487*(5)	$H_2\,^{13}CO$	3(1,2)−2(1,1)	0.5	OriMC−1	MMWO 4.9 m	Arm84a	
	219934.04(10)	$C^{15}N$	2−1 J=5/2−3/2 F=2−1	0.50	OriMC−1	KOSMA 3 m	Sal94a	Sal94a
	219934.82(10)	$C^{15}N$	2−1 J=5/2−3/2 F=3−2	0.60	OriMC−1	KOSMA 3 m	Sal94a	Sal94a
	219949.433*(17)	SO	6(5)−5(4)	4.3	OriMC−1	MMWO 4.9 m	Lor84a	
	220037.96*(1)	HCOOH	10(0,10)−9(0,9)	0.3	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	220078.490*(13)	CH_3OH	8(0,8)−7(1,6)E	6.1	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	220165.239*(17)	SO_2	16(3,13)−16(2,14) v_2 =1	10.4[f]	SgrB2(M)	SEST 15 m	Num98	
	220166.809*(20)	CH_3OCHO	17(4,13)−16(4,12) E	1.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	220177.416*(75)	CH_2CO	11(1,11)−10(1,10)	1.0	OriMC−1	OVRO 10.4 m	Sut85	
	220190.268*(21)	CH_3OCHO	17(4,13)−16(4,12) A	1.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	220200.	unidentified		13.9[f]	SgrB2(N)	SEST 15 m	Num98	
	220323.645*(14)	CH_3CN	12(10)−11(10)	4.7f	SgrB2(N)	SEST 15 m	Num98	
	220398.681*(3)	^{13}CO	2−1	17.	OriMC−1	NRAO 11 m	Phi77	
	220475.824*(8)	CH_3CN	12(8)−11(8)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	220532.333*(15)	$CH_3{}^{13}CN$	12(5)−11(5)	4.5[f]	G10.47	IRAM 30 m	Olm96	
	220539.340*(6)	CH_3CN	12(7)−11(7)	0.10	OriMC−1	MMWO 4.9 m	Lor84	
	220561.33*(7)	CH_2CHCN	24(1,24)−23(1,23)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	220570.379*(10)	$CH_3{}^{13}CN$	12(4)−11(4)	7.1[f]	G10.47	IRAM30 m	Olm96	
	220584.762*(12)	HNCO	10(1,9)−9(1,8)	0.13	OriMC−1	MMWO 4.9 m	Lor84	
	220594.438*(5)	CH_3CN	12(6)−11(6)	0.23	OriMC−1	MMWO 4.9 m	Lor84	
	220599.987*(8)	$CH_3\,^{13}CN$	12(3)−11(3)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	220601.941*(16)	$t-CH_3CH_2OH$	13(1,13)−12(0,12)	10.8[f]	SgrB2(N)	SEST 15 m	Num98	
	220621.143*(8)	$CH_3{}^{13}CN$	12(2)−11(2)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	220633.841*(9)	$CH_3{}^{13}CN$	12(1)−11(1)	0.5[b]	OriMC−1	OVRO 10.4 m	Sut85	
	220638.074*(10)	$CH_3{}^{13}CN$	12(0)−11(0)	3.3[f]	G10.47	IRAM 30 m	Olm96	
	220641.096*(4)	CH_3CN	12(5)−11(5)	0.29	OriMC−1	MMWO 4.9 m	Lor84	
	220660.918*(10)	CH_3CH_2CN	25(2,24)−24(2,23)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
U	220664.5	unidentified		0.14	OriMC−1	MMWO 4.9 m	Lor84	
	220679.297*(3)	CH_3CN	12(4)−11(4)	0.37	OriMC−1	MMWO 4.9 m	Lor84	
	220709.024*(3)	CH_3CN	12(3)−11(3)	0.80	OriMC−1	MMWO 4.9 m	Lor84	
	220730.266*(3)	CH_3CN	12(2)−11(2)	0.67	OriMC−1	MMWO 4.9 m	Lor84	
	220743.015*(3)	CH_3CN	12(1)−11(1)	0.84	OriMC−1	MMWO 4.9 m	Lor84	
	220747.265*(3)	CH_3CN	12(0)−11(0)	0.99	OriMC−1	MMWO 4.9 m	Lor84	
	220773.699 (77)	SiC_2	10(0,10)−9(0,9)	0.87	IRC+10216	JCMT 15 m	Bel93b	
U	220792.5	unidentified		0.17[u]	OriMC−1	MMWO 4.9 m	Lor84	
	220811.828*(21)	CH_3OCHO	18(3,16)−17(2,15) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	220815.204*(24)	CH_3OCHO	18(3,16)−17(2,15) A	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	220826.8*(5)	CH_3NH_2	7(0)−6(1)Aa++	5.7[f]	SgrB2(N)	SEST 15 m	Num98	Num98
U	220827.	unidentified		1.6[f]	SgrB2(M)	SEST 15 m	Num98	
	220846.585*(16)	CH_3OCH_3	24(4,20)−23(5,19) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	220847.666*(12)	CH_3OCH_3	24(4,20)−23(5,19) EE	4.0[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	220848.745*(14)	CH_3OCH_3	24(4,20)−23(5,19) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	220848.749*(14)	CH_3OCH_3	24(4,20)−23(5,19) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	220865.47* (29)	CH_3CHO	19(2,18)−19(1,19) A−+ v_t =1	3.6[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	220888.8*(5)	CH_3NH_2	9(2)−9(1) Es	3.1[fb]	SgrB2(N)	SEST 15 m	Num98	Num98
	220889.185*(42)	CH_3OCHO	18(17,*)−17(17,*) A	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	220891.832*(10)	CH_3OCH_3	24(4,20)−23(3,21) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	220893.415*(8)	CH_3OCH_3	24(4,20)−23(3,21) EE	3.1[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	220894.997*(12)	CH_3OCH_3	24(4,20)−23(3,21) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	220926.353*(35)	CH_3OCHO	18(16,*)−17(16,*) A	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	220961.583*(4)	CH_3CH_2CN	46(6,40)−46(5,41)	3.3[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
	220977.949*(32)	CH_3OCHO	18(15,*)−17(15,*) A	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	220983.607*(37)	CH_3OCHO	18(15,3)−17(15,2) E	5.9[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	220998.296*(35)	CH_3OCHO	18(15,4)−17(15,3) E	5.8[f]	SgrB2(N)	SEST 15 m	Num98	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	221005.221*(16)	CH_2CHCNr	24(1,24)−23(1,23) v_{11} =1	5.8[f]	SgrB2(N)	SEST 15 m	Num98	
	221047.747*(29)	CH_3OCHO	18(14,*)−17(14,*) A	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221049.884*(34)	CH_3OCHO	18(14,4)−17(14,3) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221059.81* (10)	CH_3CN	12(8)−11(8) v_8 =1 ℓ=−1	7.2[f]	SgrB2(N)	SEST 15 m	Num98	
	221066.878*(32)	CH_3OCHO	18(14,5)−17(14,4) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221086.094*(34)	CH_3OCHO	29(9,21)−29(8,21) E	5.3[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	221114.910*(16)	$^{34}SO_2$	22(2,20)−22(1,21)	13.3[f]	SgrB2(M)	SEST 15 m	Num98	
	221123.82*(4)	CH_2CHCN	23(1,22)−22(1,21)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	221131.924*(91)	CH_3CN	12(7)−11(7) v_8 =1 ℓ=−1	6.3[f]	SgrB2(N)	SEST 15 m	Num98	
	221139.628*(32)	CH_3OCHO	18(13,5)−17(13,4) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221141.071*(28)	CH_3OCHO	18(13,*)−17(13,*) A	0.7	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221158.472*(28)	CH_3OCHO	18(13,6)−17(13,5) E	0.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221196.447*(51)	CH_3CN	12(6)−11(6) v_8 =1 ℓ=−1	3.0[f]	G10.47	IRAM 30 m	Olm96	Bou80
	221198.962*(90)	CH_3CN	12(1)−11(1) v_8 =1 ℓ=1	0.7	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221209.973*(90)	CH_3CN	12(8)−11(8) v_8 =1 ℓ=+1	3.6[f]	G10.47	IRAM 30 m	Olm96	Bou80
	221241.5	CH_2CN	11(0,11)−10(0,10) 25/2−23/2	6.4[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	221252.388*(83)	CH_3CN	12(5)−11(5) v_8 =1 ℓ=−1	0.3	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221255.248*(4)	CH_2CHCN	14(3,11)−14(2,12)	9.2[f]	SgrB2(N)	SEST 15 m	Num98	
	221260.630*(28)	CH_3OCHO	18(12,6)−17(12,5) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221265.127*(81)	CH_3CN	12(7)−11(7) v_8 =1 ℓ=+1	11.0[f]	G10.47	IRAM 30 m	Olm96	Bou80
	221265.636*(25)	CH_3OCHO	18(12,*)−17(12,*) A	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221280.834*(24)	CH_3OCHO	18(12,7)−17(12,6) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221285.265*(20)	$^{13}CH_3OH$	8(−1,8)−7(0,7) E	15.6[f]	SgrB2(N)	SEST 15 m	Num98	Xu_97
	221299.576*(80)	CH_3CN	12(4)−11(4) v_8 =1 ℓ=−1	0.2	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221311.925*(78)	CH_3CN	12(6)−11(6) v_8 =1 ℓ=1	0.2	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221312.635*(8)	NH_2CHO	12(0,12)−11(1,11)	4.7[f]	SgrB2(N)	SEST 15 m	Num98	
	221338.038*(90)	CH_3CN	12(3)−11(3) v_8 =1 ℓ=−1	0.3	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221350.329*(81)	CH_3CN	12(5)−11(5) v_8 =1 ℓ=1	0.2	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221361.161 (20)	NH_2CN	11(1,10)−10(1,9)	7.1[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
	221367.512*(90)	CH_3CN	12(2)−11(2) v_8 =1 ℓ=−1	0.6	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221380.61* (10)	CH_3CN	12(4)−11(4) v_8 =1 ℓ=1	0.6	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221387.33* (10)	CH_3CN	12(1)−11(1) v_8 =1 ℓ=−1	0.4	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221394.13* (15)	CH_3CN	12(0)−11(0) v_8 =1 ℓ=1	0.5	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221403.51* (11)	CH_3CN	12(3)−11(3) v_8 =1 ℓ=1	0.3	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221422.34* (16)	CH_3CN	12(2)−11(2) v_8 =1 ℓ=1	0.3[b]	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221424.503*(25)	CH_3OCHO	18(11,7)−17(11,6) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221432.987*(24)	CH_3OCHO	18(11,*)−17(11,*) A	0.9	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221445.561*(21)	CH_3OCHO	18(11,8)−17(11,7) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	221480.	unidentified		2.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	221524.	unidentified		1.3[f]	SgrB2(NW)	SEST 15 m	Num98	
	221527.464(50)	CH_3NH_2	5(0)−4(0) Es	[b]	Sgr B2(N)	SEST 15 m	Num98	Kre92
	221530.527 (50)	CH_3NH_2	5(0)−4(0) Aa++	[b]	Sgr B2(N)	SEST 15 m	Num98	Kre92
	221530.527 (50)	CH_3NH_2	5(0)−4(0) Ea	3.7[fb]	SgrB2(N)	SEST 15 m	Num98	Kre92
	221536.284 (50)	CH_3NH_2	5(0)−4(0) As++	[b]	Sgr B2(N)	SEST 15 m	Num98	Kre92
U	221546.	unidentified		1.8[f]	SgrB2(M)	SEST 15 m	Num98	
	221581.020*(31)	NH_2CHO	9(4,5)−10(3,8)	3.0[f]	SgrB2(N)	SEST 15 m	Num98	
	221626.04*(9)	CH_3CN	12(1)−11(1) v_8 =1 ℓ=1	0.4	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	221649.273*(24)	CH_3OCHO	18(10,8)−17(10,7) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221660.460*(17)	CH_3OCHO	18(4,15)−17(4,14) E	1.5[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221661.093*(21)	CH_3OCHO	18(10,*)−17(10,*) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221670.675*(21)	CH_3OCHO	18(10,9)−17(10,8) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221674.675*(20)	CH_3OCHO	18(4,15)−17(4,14) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	221693.027*(25)	CH_3OCHO	10(4,6)−9(3,7) E	3.1[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	221717.5*(5)	CH_3NH_2	5(2)−4(2) Es	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	221718.076*(8)	NH_2CHO	9(2,8)−9(1,9)	3.2[f]	SgrB2(N)	SEST 15 m	Num98	
	221722.3*(5)	CH_3NH_2	5(2)−4(2) Ea	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	221724.3*(5)	CH_3NH_2	5(−2)−4(−2) Ea	4.3[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	221728.9*(5)	CH_3NH_2	5(−2)−4(−2) Es	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	221728.966*(16)	CH_2CHCN	23(1,22)−23(1,21) v_{11} =1	4.3[f]	SgrB2(N)	SEST 15 m	Num98	
	221735.710*(9)	$^{34}SO_2$	13(2,12)−13(1,13)	1.0	OriMC−1	OVRO 10.4 m	Sut85	
	221765.98*(6)	CH_2CHCN	24(0,24)−23(0,23)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
U	221860.	unidentified		2.7[f]	SgrB2(N)	SEST 15 m	Num98	
U	221899.	unidentified		3.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	221914.	unidentified		3.5[f]	SgrB2(N)	SEST 15 m	Num98	
	221965.200*(7)	SO_2	11(1,11)−10(0,10)	13.9	OriMC−1	OVRO 10.4 m	Sut85	
	221979.328*(20)	CH_3OCHO	18(9,*)−17(9,*) A	24.8[f]	SgrB2(N)	SEST 15 m	Num98	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	222005.	unidentified		6.4[f]	SgrB2(N)	SEST 15 m	Num98	
	222009.366*(48)	SiC_2	9(2,7)−8(2,6)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	222014.474*(10)	CH_3CCH	13(6)−12(6)	5.0[f]	SgrB2(N)	SEST 15 m	Num98	
	222028.848*(12)	CH_3OCH_3	21(2,20)−21(1,21) AE+EA	5.0[f]	SgrB2(N)	SEST 15 m	Num98	Gro98
	222032.946*(10)	CH_3OCH_3	21(2,20)−21(1,21) EE	4.5[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	222037.044*(16)	CH_3OCH_3	21(2,20)−21(1,21) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	222061.032*(7)	CH_3CCH	13(5)−12(5)	6.4[f]	SgrB2(N)	SEST 15 m	Num98	
U	222077.	unidentified		9.2[f]	SgrB2(N)	SEST 15 m	Num98	
	222099.150*(4)	CH_3CCH	13(4)−12(4)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	222128.812*(3)	CH_3CCH	13(3)−12(3)	0.13	OriMC−1	MMWO 4.9 m	Lor84d	
	222150.008*(2)	CH_3CCH	13(2)−12(2)	0.30	OriMC−1	MMWO 4.9 m	Lor84d	
	222153.45*(5)	CH_2CHCN	23(2,21)−22(2,20)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	222162.729*(2)	CH_3CCH	13(1)−12(1)	0.27	OriMC−1	MMWO 4.9 m	Lor84d	
	222166.969*(2)	CH_3CCH	13(0)−12(0)	0.41	OriMC−1	MMWO 4.9 m	Lor84d	
U	222177.	unidentified		0.4	OriMC−1	OVRO 10.4 m	Sut85	
	222197.34* (17)	CH_2CO	11(0,11)−10(0,10)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	222199.887*(37)	CH_2CO	11(3,9)−10(3,8)	15.2[fb]	SgrB2(N)	SEST 15 m	Num98	
	222200.207*(37)	CH_2CO	11(3,8)−10(3,7)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	222228.587*(42)	CH_2CO	11(2,10)−10(2,9)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	222238.877*(20)	CH_3OCH_3	4(3,2)−3(2,1) EA	0.02	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222242.39*(7)	CH_2CHCN	24(0,24)−23(0,23) $v_{15}=1$	6.1[f]	SgrB2(N)	SEST 15 m	Num98	
	222246.402*(4)	CH_2CHCN	13(3,10)−13(2,11)	6.1[f]	SgrB2(N)	SEST 15 m	Num98	
	222247.335*(8)	CH_3OCH_3	4(3,2)−3(2,1) AE	1.3[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222247.611*(10)	CH_3OCH_3	4(3,2)−3(2,1) EE	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222254.597*(10)	CH_3OCH_3	4(3,2)−3(2,1) AA	1.0	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222258.711*(10)	CH_3OCH_3	4(3,1)−3(2,1) EE	4.0[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	222259.610*(10)	CH_3OCH_3	4(3,1)−3(2,1) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	222314.457*(42)	CH_2CO	11(2,9)−10(2,8)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	222321.31*(6)	CH_2CHCN	23(2,21)−22(2,20) $v_{15}=1$	11.6[f]	SgrB2(N)	SEST 15 m	Num98	
	222323.853*(17)	CH_3OCH_3	25(3,23)−24(4,20) AA	[b]	OriMC−1	IRAM 30 m	Sch91a	Gro98
	222325.122*(16)	CH_3OCH_3	25(3,23)−24(4,20) EE	0.4[b]	OriMC−1	IRAM 30 m	Sch91a	Gro98
	222326.391*(16)	CH_3OCH_3	25(3,23)−24(4,20) AE+EA	[b]	OriMC−1	IRAM 30 m	Sch91a	Gro98
	222329.305*(15)	$HCNH^+$	3−2	0.11	SgrB2(M)	MMWO 4.9 m	Ziu86a	
	222421.356*(21)	CH_3OCHO	18(8,10)−17(8,9) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	222424.442*(9)	SO_2	11(1,11)−10(0,10) $v_2=1$	12.1[f]	SgrB2(M)	SEST 15 m	Num98	
	222426.666*(8)	CH_3OCH_3	4(3,1)−3(2,2) AE	0.3	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222433.653*(10)	CH_3OCH_3	4(3,1)−3(2,2) EE	1.5[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222433.931*(10)	CH_3OCH_3	4(3,1)−3(2,2) AA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222435.123*(20)	CH_3OCH_3	4(3,1)−3(2,2) EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	222438.262*(20)	CH_3OCHO	18(8,10)−17(8,9) A	1.2[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	222440.374*(20)	CH_3OCHO	18(8,11)−17(8,10) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	222441.990*(20)	CH_3OCHO	18(8,10)−17(8,9) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	222707.218*(10)	CH_3CH_2CN	26(0,26)−25(1,25)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	222722.796*(97)	CH_3OH	16(2,14)−15(1,15) A+	0.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	222869.105*(18)	SO_2	36(3,33)−37(2,36)	5.7	W3(H2O)	JCMT 15 m	Hel97	
	222918.177*(10)	CH_3CH_2CN	25(1,24)−24(1,23)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	222963.570*(16)	CH_2CHCN	23(2,21)−22(2,20) $v_{11}=1$	13.4[f]	SgrB2(N)	SEST 15 m	Num98	
U	223013.	unidentified		3.1[f]	SgrB2(N)	SEST 15 m	Num98	
	223037.838*(17)	CH_3OCHO	19(2,17)−18(3,16) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	223071.3	CH_2DOH	5(2,3)−4(1,4) e1	0.17	IRAS16293−2422	IRAM 30 m	Par02	Par02
U	223073.	unidentified		5.5[f]	SgrB2(N)	SEST 15 m	Num98	
U	223088.	unidentified		5.2[f]	SgrB2(N)	SEST 15 m	Num98	
U	223097.	unidentified		7.0[f]	SgrB2(N)	SEST 15 m	Num98	
	223107.3	CH_2DOH	5(0,5)−4(0,4) o1	0.15	IRAS16293−2422	IRAM 30 m	Par02	Par02
	223119.249*(20)	CH_3OCHO	18(7,12)−17(7,11) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	223124.988*(20)	CH_3OCHO	18(7,11)−17(7,10) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	223128.3	CH_2DOH	5(2,4)−4(2,3) e1	0.22	IRAS16293−2422	IRAM 30 m	Par02	Par02
	223131.1	CH_2DOH	5(4,1)−4(4,0) o1	[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	223131.1	CH_2DOH	5(4,2)−4(4,1) o1	0.08[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	223132.770*(17)	CH_3CH_2CN	30(2,28)−29(3,27)	7.5[f]	SgrB2(N)	SEST 15 m	Num98	
	223132.970*(20)	CH_3OCH_3	31(3,28)−31(2,29) EA+AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	223134.417*(20)	CH_3OCH_3	31(3,28)−31(2,29) EE	7.5[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	223134.933*(17)	CH_3OCHO	18(7,12)−17(7,11) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	223135.863*(20)	CH_3OCH_3	31(3,28)−31(2,29) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	223153.7	CH_2DOH	5(3,2)−4(3,1) o1	0.58[bf]	IRAS16293−2422	IRAM 30 m	Par02	Par02
	223153.7	CH_2DOH	5(3,3)−4(3,2) o1	[b]	IRAS16293−2422	IRAM 30 m	Par02	Par02

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	223162.722*(20)	CH_3OCHO	18(7,11)−17(7,10) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	223183.	unidentified		6.8[f]	SgrB2(N)	SEST 15 m	Num98	
	223200.063*(8)	CH_3OCH_3	8(2,7)−7(1,6) AE	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	223200.072*(8)	CH_3OCH_3	8(2,7)−7(1,6) EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	223202.243*(6)	CH_3OCH_3	8(2,7)−7(1,6) EA	1.1[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	223204.418*(10)	CH_3OCH_3	8(2,7)−7(1,6) EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	223233.524*(13)	$g-CH_3CH_2OH$	12(2,11)−11(1,11) v_t =0−1	5.3[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
U	223289.	unidentified		3.3[f]	SgrB2(N)	SEST 15 m	Num98	
U	223296.	unidentified		4.1[f]	SgrB2(N)	SEST 15 m	Num98	
	223308.57(5)	CH_3OD	5(1,5)−4(1,4) A++	3.5[f]	SgrB2(N)	SEST 15 m	Num98	And88
	223315.4	CH_2 DOH	5(2,3)−4(2,2) e1	0.16	IRAS16293−2422	IRAM 30 m	Par02	Par02
	223326.0	CH_2CN	11(1,10)−10(1,9) 25/2−23/2	5.0[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	223332.021*(30)	$^{13}CH_3OH$	6(1,5)−7(2,6) A−− v_t =1	6.1[f]	SgrB2(N)	SEST 15 m	Num98	Xu_97
	223378.583*(32)	$^{33}SO_2$	13(2,12)−13(1,13)	5.7[f]	SgrB2(M)	SEST 15 m	Num98	
	223385.326*(11)	CH_3CH_2CN	26(1,26)−25(1,25)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	223406.886*(14)	CH_3OCH_3	26(2,24)−26(1,25) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	223409.478*(12)	CH_3OCH_3	26(2,24)−26(1,25) EE	8.6[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	223412.069*(16)	CH_3OCH_3	26(2,24)−26(1,25) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	223422.3	CH_2DOH	5(2,4)−4(2,3) e0	0.10	IRAS16293−2422	IRAM 30 m	Par02	Par02
U	223422.5	unidentified		0.10	OriMC−1	IRAM 30 m	Com96	
	223434.468*(9)	SO_2	27(6,20)−28(7,21)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	223452.500*(6)	NH_2CHO	11(1,11)−10(1,10)	0.20	OriMC−1	IRAM 30 m	Com96	
	223465.322*(34)	CH_3OCHO	11(4,8)−10(3,7) E	0.15	OriMC−1	IRAM 30 m	Com96	Oes99
	223472.23*(3)	$H^{13}COOH$	10(2,9)−9(2,8)	0.03	OriMC−1	IRAM 30 m	Com96	Wil80
U	223483.0	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	223490.7	unidentified		0.02	OriMC−1	IRAM 30 m	Com96	
U	223512.6	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	223534.4	unidentified		0.22	OriMC−1	IRAM 30 m	Com96	
	223553.585*(11)	CH_3CH_2CN	26(0,26)−25(0,25)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
U	223584.8	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
	223591.869*(80)	CH_3OCHO	43(8,35)−43(7,36) A	3.2[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
U	223617.3	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	223624.577*(50)	CH_3OCHO	37(8,30)−37(7,31) E	0.04	OriMC−1	IRAM 30 m	Com96	Oes99
	223634.748*(50)	CH_3OCHO	37(8,30)−37(7,31) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
U	223642.2	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	223650.097*(8)	CH_3CHO	12(−1,12)−11(−1,11) E	0.2	OriMC−1	OVRO 10.4 m	Sut85	Kle96
	223660.610*(8)	CH_3CHO	12(1,12)−11(1,11) A++	0.3	OriMC−1	OVRO 10.4 m	Sut85	Kle96
U	223672.	unidentified		6.3[f]	SgrB2(N)	SEST 15 m	Num98	
U	223675.5	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	223680.	unidentified		7.4[f]	SgrB2(N)	SEST 15 m	Num98	
	223684.608*(24)	$(CH_3)_2CO$	17(6,11)−16(7,10) AE	n.r.[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	223684.608*(24)	$(CH_3)_2CO$	17(6,11)−16(7,10) EA	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	223692.003*(24)	$(CH_3)_2CO$	17(7,11)−16(6,10) EA	0.09[b]	OriMC−1	IRAM 30 m	Com96	Vac86
	223692.103*(24)	$(CH_3)_2CO$	17(7,11)−16(6,10) AE	[b]	OriMC−1	IRAM 30 m	Com96	Vac86
U	223694.8	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
	223707.120*(4)	CH_2CHCN	11(3,8)−11(2,9)	n.r.	OriMC−1	IRAM 30 m	Com96	
U	223716.	unidentified		3.7[f]	SgrB2(N)	SEST 15 m	Num98	
U	223718.0	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	223722.4	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	223733.8	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	223747.3	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	223753.944*(15)	$OS^{18}O$	14(3,11)−14(2,12)	5.9[f]	SgrB2(M)	SEST 15 m	Num98	
U	223755.8	unidentified		0.07	OriMC−1	IRAM 30 m	Com96	
	223767.585*(20)	$(CH_3)_2CO$	17(6,11)−16(7,10) EE	0.10	OriMC−1	IRAM 30 m	Com96	Vac86
	223775.252*(20)	$(CH_3)_2CO$	17(7,11)−16(6,10) EE	0.06	OriMC−1	IRAM 30 m	Com96	Vac86
U	223796.0	unidentified		n.r.	OriMC−1	IRAM 30 m	Com96	
	223800.46*(8)	$H^{13}COOH$	8(2,7)−8(1,8)	n.r.	OriMC−1	IRAM 30 m	Com96	Wil80
U	223812.4	unidentified		0.12	OriMC−1	IRAM 30 m	Com96	
	223821.594*(42)	CH_3OCHO	35(7,29)−35(6,30) E	0.06	OriMC−1	IRAM 30 m	Com96	Oes99
U	223838.8	unidentified		0.03	OriMC−1	IRAM 30 m	Com96	
U	223845.3	unidentified		0.04	OriMC−1	IRAM 30 m	Com96	
	223854.123*(43)	CH_3OCHO	35(7,29)−35(6,30) A	n.r.	OriMC−1	IRAM 30 m	Com96	Oes99
U	223858.	unidentified		4.1[f]	SgrB2(M)	SEST 15 m	Num98	
U	223866.	unidentified		9.8[f]	SgrB2(N)	SEST 15 m	Num98	
	223883.573*(6)	SO_2	6(4,2)−7(3,5)	1.4	OriMC−1	OVRO 10.4 m	Sut85	
	223915.56*(1)	HCOOH	10(2,9)−9(2,8)	0.3	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	223933.734*(10)	CH_3CH_2CN	25(3,23)−24(3,22)	0.6	OriMC−1	OVRO 10.4 m	Sut85	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	223955.6	unidentified		0.05	OriMC−1	IRAM 30 m	Com96	
U	223964.2	unidentified		0.06	OriMC−1	IRAM 30 m	Com96	
U	223967.	unidentified		11.9[f]	SgrB2(N)	SEST 15 m	Num98	
U	223970.6	unidentified		0.11	OriMC−1	IRAM 30 m	Com96	
U	223976.	unidentified		7.6[f]	SgrB2(N)	SEST 15 m	Num98	
	224002.121*(10)	CH_3CH_2CN	25(10,*)−24(10,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224003.440*(9)	CH_3CH_2CN	25(9,*)−24(9,*)	0.9[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224017.539*(10)	CH_3CH_2CNr	25(11,*)−24(11,*)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	224021.766*(20)	CH_3OCHO	18(6,13)−17(6,12) E	1.0[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	224024.091*(20)	CH_3OCHO	18(6,13)−17(6,12) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	224028.141*(9)	CH_3CH_2CN	25(6,*)−24(6,*)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	224045.749*(11)	CH_3CH_2CN	25(12,*)−24(12,*)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	224084.280*(12)	CH_3CH_2CN	25(13,*)−24(13,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224088.193*(9)	CH_3CH_2CN	25(7,19)−24(7,18)	0.8[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224088.229*(9)	CH_3CH_2CN	25(7,18)−24(7,17)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224131.512*(12)	CH_3CH_2CN	25(14,*)−24(14,*)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	224144.510*(21)	$g-CH_3CH_2OH$	8(7,*)−8(6,*) v_t =0−1	5.3f	SgrB2(N)	SEST 15 m	Num98	JPL01
	224167.899*(37)	CH_3OCHO	27(9,19)−27(8,20) E	14.8[fb]	SgrB2(N)	SEST 15 m	Num98	Oes99
	224173.380*(34)	CH_3OCHO	27(9,19)−27(8,20) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	224186.346*(13)	CH_3CH_2CN	25(15,*)−24(15,*)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	224206.606*(9)	CH_3CH_2CN	25(6,20)−24(6,19)	0.7[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224208.082*(9)	CH_3CH_2CN	25(6,19)−24(6,18)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224231.694*(11)	CH_3CH_2CN	26(1,26)−25(0,25)	6.4[f]	SgrB2(N)	SEST 15 m	Num98	
	224248.007*(14)	CH_3CH_2CN	25(16,*)−24(16,*)	12.7[f]	SgrB2(N)	SEST 15 m	Num98	
	224264.833*(7)	SO_2	20(2,16)−19(3,17)	2.6	OriMC−1	OVRO 10.4 m	Sut85	
	224313.084*(17)	CH_3OCHO	18(5,14)−17(5,13) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	224315.934*(15)	CH_3CH_2CN	25(17,*)−24(17,*)	17.0[f]	SgrB2(N)	SEST 15 m	Num98	
	224327.109*(75)	CH_2CO	11(1,10)−10(1,9)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224328.310*(20)	CH_3OCHO	18(5,14)−17(5,13) A	0.8[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	224377.	unidentified		8.2[f]	SgrB2(N)	SEST 15 m	Num98	
	224389.709*(16)	CH_3CH_2CN	25(18,*)−24(18,*)	9.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	224398.	unidentified		5.4[f]	SgrB2(N)	SEST 15 m	Num98	
U	224409.	unidentified		9.3[f]	SgrB2(N)	SEST 15 m	Num98	
	224419.821*(9)	CH_3CH_2CN	25(5,21)−24(5,20)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	224458.856*(9)	CH_3CH_2CN	25(5,20)−24(5,19)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	224469.011*(18)	CH_3CH_2CN	25(19,*)−24(19,*)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
U	224481.	unidentified		10.2[f]	SgrB2(N)	SEST 15 m	Num98	
U	224490.	unidentified		9.2[f]	SgrB2(N)	SEST 15 m	Num98	
U	224493.	unidentified		0.5	OriMC−1	OVRO 10.4 m	Sut85	
U	224502.	unidentified		15.5[f]	SgrB2(N)	SEST 15 m	Num98	
	224553.589*(21)	CH_3CH_2CN	25(20,*)−24(20,*)	18.8[f]	SgrB2(N)	SEST 15 m	Num98	
	224563.333*(68)	CH_3CHO	17(−2,16)−17(−1,17) E	6.3[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	224582.293*(21)	CH_3OCHO	18(6,12)−17(6,11) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	224609.365*(20)	CH_3OCHO	18(6,12)−17(6,11) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	224638.704*(9)	CH_3CH_2CN	25(4,22)−24(4,21)	0.6[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224643.239*(25)	CH_3CH_2CN	25(21,*)−24(21,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	224656.971*(12)	CH_3CHO	12(3,9)−12(2,10) A−+	5.0[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	224699.714*(68)	CH_3OH	20(−2,19)−19(−3,17) E	0.7	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	224714.389*(3)	$C^{17}O$	2−1	1.5	OriMC−1	OVRO 10.4 m	Sut85	
U	224771.	unidentified		4.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	224878.486*(4)	CH_2CHCN	8(3,5)−8(2,6)	7.2[f]	SgrB2(N)	SEST 15 m	Num98	
	224888.371*(17)	CH_3CH_2CN	7(4,4)−6(3,3)	7.3[fb]	SgrB2(N)	SEST 15 m	Num98	
	224894.492*(17)	CH_3CH_2CN	7(4,3)−6(3,4)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	224946.040 (50)	$g-CH_3CH_2OH$	13(8,*)−12(8,*) v_t =1−1	5.0[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	224951.610*(10)	CH_3CHO	16(−3,13)−16(−2,14) E v_t =1	5.0[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	225085.44*(1)	HCOOH	10(4,7)−9(4,6)	4.3[e]	OriMC−1	BIMAArray	Liu02	Wil80
	225091.21*(1)	HCOOH	10(4,6)−9(4,5)	5.2[e]	OriMC−1	BIMAArray	Liu02	Wil80
U	225101.	unidentified		9.5[f]	SgrB2(N)	SEST 15 m	Num98	
	225109.881(50)	$g-CH_3CH_2OH$	13(6,*)−12(6,*) v_t =1−1	6.9[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	225130.505(50)	$g-CH_3CH_2OH$	13(8,*)−12(8,*) v_t =0−0	10.1[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	225139.	unidentified		9.6[f]	SgrB2(N)	SEST 15 m	Num98	
	225153.689*(6)	SO_2	13(2,12)−13(1,13)	6.3	OriMC−1	OVRO 10.4 m	Sut85	
	225170.614 (50)	$g-CH_3CH_2OH$	13(7,*)−12(7,*) v_t =0−0	6.9[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	225202.572*(10)	CH_3OCH_3	24(4,21)−24(3,22) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	225204.001*(8)	CH_3OCH_3	24(4,21)−24(3,22) EE	12.1[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	225205.429*(10)	CH_3OCH_3	24(4,21)−24(3,22) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	225206.505*(5)	CH_2CHCN	6(3,3)−6(2,4)	2.1[f]	SgrB2(M)	SEST 15 m	Num98	
	225220.246*(90)	CH_3CHO	15(3,13)−15(2,14) A−− v_t =1	6.6[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	225227.	unidentified		2.8[f]	SgrB2(M)	SEST 15 m	Num98	
	225229.253*(25)	$t-CH_3CH_2OH$	17(2,15)−16(3,14)	6.7[f]	SgrB2(N)	SEST 15 m	Num98	
	225236.120*(9)	CH_3CH_2CN	25(4,21)−24(4,20)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	225248.812 (50)	$g-CH_3CH_2OH$	13(6,*)−12(6,*) v_t =0−0	7.5[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
U	225258.	unidentified		4.7[f]	SgrB2(N)	SEST 15 m	Num98	
U	225267.	unidentified		3.1[f]	SgrB2(N)	SEST 15 m	Num98	
	225278.851(50)	$g-CH_3CH_2OH$	13(5,*)−12(5,*) v_t =1−1	9.2[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
U	225297.	unidentified		10.3[f]	SgrB2(N)	SEST 15 m	Num98	
	225307.834*(16)	CH_3CH_2CN	12(3,9)−11(2,10)	5.6[f]	SgrB2(N)	SEST 15 m	Num98	
	225317.145*(14)	CH_3CH_2CN	23(2,22)−22(1,21)	5.8[f]	SgrB2(N)	SEST 15 m	Num98	
	225354.566*(5)	CH_2CHCN	3(3,0)−3(2,1)	3.4[f]	SgrB2(N)	SEST 15 m	Num98	
	225371.927*(5)	CH_2CHCN	3(3,1)−3(2,2)	4.9[f]	SgrB2(N)	SEST 15 m	Num98	
	225399.733(50)	$g-CH_3CH_2OH$	13(5,9)−12(5,8) v_t =0−0	4.2[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	225404.089(50)	$g-CH_3CH_2OH$	13(5,8)−12(5,7) v_t =0−0	8.3[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	225408.671*(5)	CH_2CHCN	5(3,3)−5(2,4)	8.3[f]	SgrB2(N)	SEST 15 m	Num98	
	225413.628(7)	$OC^{34}S$	19−18	0.7	OriMC−1	OVRO 10.4 m	Sut85	Dub80
	225448.096*(4)	CH_2CHCN	6(3,4)−6(2,5)	4.3[f]	SgrB2(N)	SEST 15 m	Num98	
	225468.366*(22)	$c-C_2H_4O$	5(4,2)−4(3,1)	0.49[f]	NGC6334F	SEST 15 m	Num98a	
	225476.638*(17)	$OS^{18}O$	12(1,12)−11(0,11)	2.3[f]	SgrB2(M)	SEST 15 m	Num98	
	225508.841*(4)	CH_2CHCN	7(3,5)−7(2,6)	4.0[f]	SgrB2(N)	SEST 15 m	Num98	
	225511.27*(20)	CH_3CHO	12(3,9)−11(3,8) E v_t =2	4.1[fb]	SgrB2(N)	SEST 15 m	Num98	Kle96
	225512.54*(1)	HCOOH	10(3,7)−9(3,6)	0.4	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	225513.43*(16)	CH_3CHO	12(1,12)−11(1,11) A++ v_t =2	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	225554.55* (14)	CH_2NH	1(1,1)−0(0,0)	0.22	OriMC−1	NRAO 12 m	Dic97a	
U	225583.	unidentified		4.0[f]	SgrB2(N)	SEST 15 m	Num98	
U	225591.	unidentified		3.1[f]	SgrB2(N)	SEST 15 m	Num98	
	225598.770*(6)	CH_3OCH_3	12(1,12)−11(0,11) EA+AE	[b]	OriMC−1	MMWO 4.9 m	Woo84	Gro98
	225599.120*(6)	CH_3OCH_3	12(1,12)−11(0,11) EE	0.7[b]	OriMC−1	MMWO 4.9 m	Woo84	Gro98
	225599.469*(6)	CH_3OCH_3	12(1,12)−11(0,11) AA	[b]	OriMC−1	MMWO 4.9 m	Woo84	Gro98
	225608.778*(17)	CH_3OCHO	19(3,17)−18(3,16) E	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	225618.712*(17)	CH_3OCHO	19(3,17)−18(3,16) A	1.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	225625.063*(48)	CH_3OCHO	26(9,18)−26(8,19) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	225648.715*(32)	CH_3OCHO	26(9,18)−26(8,19) A	2.3	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	225659.841*(14)	CH_2DCN	13(5,*)−12(5,*)	0.5[f]	G34.3	IRAM 30 m	Ger92a	
	225697.773*(10)	H_2CO	3(1,2)−2(1,1)	5.0	OriMC−1	MMWO 4.9 m	Eva79	
	225723.787*(8)	CH_2DCN	13(3,11)−12(3,10)	0.2[f]	G34.3	IRAM 30 m	Ger92a	
	225724.071*(8)	CH_2DCN	13(3,10)−12(3,9)	0.2[f]	G34.3	IRAM 30 m	Ger92a	
	225726.557*(9)	CH_2DCN	13(2,12)−12(2,11)	0.5[f]	G34.3	IRAM 30 m	Ger92a	
U	225744.8	unidentified		1.9	OMC−IRc2	IRAM 30 m	Jac90	
U	225751.	unidentified		5.6[f]	SgrB2(N)	SEST 15 m	Num98	
U	225756.3	unidentified		2.3	OMC−IRc2	IRAM 30 m	Jac90	
U	225767.4	unidentified		0.8	OMC−IRc2	IRAM 30 m	Jac90	
	225781.517*(9)	CH_2DCN	13(2,11)−12(2,10)	0.7[f]	G34.3	IRAM 30 m	Ger92a	
U	225784.6	unidentified		0.6	OMC−IRc2	IRAM 30 m	Jac90	
U	225803.1	unidentified		1.3	OMC−IRc2	IRAM 30 m	Jac90	
	225824.33*(6)	HCOOH	31(3,28)−31(3,29)	1.8	OMC−IRc2	IRAM 30 m	Jac90	Wil80
	225835.938*(8)	$g-CH_3CH_2OH$	5(3,3)−5(2,3) v_t =1−0	5.7[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
U	225840.8	unidentified		0.7	OMC−IRc2	IRAM 30 m	Jac90	
U	225850.8	unidentified		1.4	OMC−IRc2	IRAM 30 m	Jac90	
U	225851.	unidentified		3.9[f]	SgrB2(M)	SEST 15 m	Num98	
	225853.841(60)	$D^{15}NC$	3−2	1.9	OMC−IRc2	IRAM 30 m	Jac90	Pea76
	225896.720 (38)	HDO	3(1,2)−2(2,1)	2.3	OriMC−1	OVRO 10.4 m	Sut85	DeL71
	225900.736*(34)	CH_3OCHO	6(6,0)−5(5,0) E	0.14	W3(H2O)	JCMT 15 m	Hel97	Oes99
U	225915.8	unidentified		0.7	OMC−IRc2	IRAM 30 m	Jac90	
	225928.598*(35)	CH_3OCHO	6(6,1)−5(5,0) A	0.4[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	225928.613*(35)	CH_3OCHO	6(6,0)−5(5,1) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	225934.6	unidentified		0.9	OMC−IRc2	IRAM 30 m	Jac90	
	225937.239*(24)	$OS^{18}O$	14(2,13)−14(1,14)	4.8[f]	SgrB2(M)	SEST 15 m	Num98	
U	225944.6	unidentified		0.6	OMC−IRc2	IRAM 30 m	Jac90	
U	226035.6	unidentified		1.0	OMC−IRc2	IRAM 30 m	Jac90	
	226043.182*(23)	$c-C_2H_4O$	7(1,6)−6(2,5)	0.62[f]	NGC6334F	SEST 15 m	Num98a	
	226043.182*(23)	$c-C_2H_4O$	7(1,6)−6(2,5)	1.1	OMC−IRc2	IRAM 30 m	Jac90	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	226058.4	unidentified		0.7	OMC−IRc2	IRAM 30 m	Jac90	
	226072.144*(23)	$c-C_2H_4O$	7(2,6)−6(1,5)	0.90[f]	NGC6334F	SEST 15 m	Num98a	
	226072.144*(23)	$c-C_2H_4O$	7(2,6)−6(1,5)	1.7	OMC−IRc2	IRAM 30 m	Jac90	
	226077.705*(60)	CH_3OCHO	10(3,7)−9(1,8) E	0.6	OMC−IRc2	IRAM 30 m	Jac90	JPL01
U	226090.2	unidentified		2.0	OMC−IRc2	IRAM 30 m	Jac90	
U	226094.	unidentified		0.9	OMC−IRc2	IRAM 30 m	Jac90	
	226094.011*(9)	N_2O	9−8	6.6[f]	SgrB2(N)	SEST 15 m	Num98	
	226125.616*(56)	CH_3OCHO	10(3,7)−9(1,8) A	0.9	OMC−IRc2	IRAM 30 m	Jac90	JPL01
U	226217.	unidentified		4.2[f]	SgrB2(N)	SEST 15 m	Num98	
U	226233.4	unidentified		0.06	SgrB2(N)	SEST 15 m	Dic01	
	226256.83*(5)	CH_2CHCN	24(2,23)−23(2,22)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	226264.653*(23)	$g-CH_3CH_2OH$	21(4,18)−21(3,18) $v_t=1-0$	4.7[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
	226300.010*(8)	SO_2	14(3,11)−14(2,12)	5.8	OriMC−1	OVRO 10.4 m	Sut85	
	226332.519*(20)	CN	2−1 $J=3/2-3/2$ $F=3/2-5/2$	0.3	OriMC−1	OVRO 10.4 m	Sut85	Woo82
	226341.919*(20)	CN	2−1 $J=3/2-3/2$ $F=5/2-3/2$	0.3	OriMC−1	OVRO 10.4 m	Sut85	Woo82
	226346.124*(8)	CH_3OCH_3	14(1,13)−13(2,12) AA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	226346.948*(6)	CH_3OCH_3	14(1,13)−13(2,12) EE	1.6[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	226347.772*(8)	CH_3OCH_3	14(1,13)−13(2,12) AE+EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	226359.987*(20)	CN	2−1 $J=3/2-3/2$ $F=5/2-5/2$	1.2	OriMC−1	OVRO 10.4 m	Sut85	Woo82
U	226384.	unidentified		0.5	OriMC−1	OVRO 10.4 m	Sut85	
	226435.502*(32)	CH_3OCHO	25(9,16)−25(8,17) A	3.5[fb]	SgrB2(N)	SEST 15 m	Num98	Oes99
	226454.11*(12)	$HC^{13}CCN$	25−24	16.6[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	226467.745*(43)	CH_3OCHO	25(9,16)−25(8,17) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	226476.082*(49)	$HCC^{13}CN$	25−24	10.7[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	226487.236*(11)	CH_3CHO	13(0,13)−12(−1,12)E	5.5[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	226491.335*(14)	CH_3OCH_3	22(1,21)−22(0,22) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	226495.523*(12)	CH_3OCH_3	22(1,21)−22(0,22) EE	3.2[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	226499.711*(16)	CH_3OCH_3	22(1,21)−22(0,22) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	226508.274*(11)	SO_2	41(5,37)−40(6,34)	7.5[f]	SgrB2(M)	SEST 15 m	Num98	
	226538.674(50)	CH_3OD	5(0,5)−4(0,4) A	4.6[f]	OriMC−1	IRAM 30 m	Mau88	And88
	226548.65*(23)	CH_2NH	6(1,5)−6(0,6)	32.6[f]	SgrB2(N)	SEST 15 m	Num98	
	226551.624*(8)	CH_3CHO	12(0,12)−11(0,11) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Kle96
	226592.732*(8)	CH_3CHO	12(0,12)−11(0,11) A++	0.2	OriMC−1	OVRO 10.4 m	Sut85	Kle96
	226616.520*(20)	CN	2−1 $J=3/2-1/2$ $F=1/2-3/2$	0.2	OriMC−1	OVRO 10.4 m	Sut85	Ska83
	226632.176*(20)	CN	2−1 $J=3/2-1/2$ $F=3/2-3/2$	1.4	OriMC−1	OVRO 10.4 m	Sut85	Ska83
	226659.543*(20)	CN	2−1 $J=3/2-1/2$ $F=5/2-3/2$	4.3	OriMC−1	OVRO 10.4 m	Sut85	Ska83
	226663.685*(20)	CN	2−1 $J=3/2-1/2$ $F=1/2-1/2$	1.5	OriMC−1	OVRO 10.4 m	Sut85	Ska83
	226679.341*(20)	CN	2−1 $J=3/2-1/2$ $F=3/2-1/2$	1.9	OriMC−1	OVRO 10.4 m	Sut85	Ska83
	226706.601 (50)	CH_3OD	5(2,4)−4(2,3) A−	3.7[f]	OriMC−1	IRAM 30 m	Mau88	And88
	226713.028*(17)	CH_3OCHO	20(2,19)−19(2,18) E	0.9	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	226718.748*(20)	CH_3OCHO	20(2,19)−19(2,18) A	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	226738.864 (50)	CH_3OD	5(−4,2)−4(−4,1)E	1.4[f]	OriMC−1	IRAM 30 m	Mau88	And88
	226773.152*(17)	CH_3OCHO	20(1,19)−19(1,18)E	0.9	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	226778.764*(20)	CH_3OCHO	20(1,19)−19(1,18)A	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	226818.36(5)	CH_2DOH	5(1,4)−4(1,3)	1.6[f]	OriMC−1−6″	IRAM 30 m	Jac92	Jac93
	226856.825*(17)	CH_3OCHO	20(2,19)−19(1,18) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	226862.239*(20)	CH_3OCHO	20(2,19)−19(1,18) A	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	226874.183*(20)	CN	2−1 $J=5/2-3/2$ $F=5/2-3/2$	[b]	OriMC−1	OVRO 10.4 m	Woo82	Ska83
	226874.764*(20)	CN	2−1 $J=5/2-3/2$ $F=7/2-5/2$	8.0[b]	OriMC−1	OVRO 10.4 m	Woo82	Ska83
	226875.896*(20)	CN	2−1 $J=5/2-3/2$ $F=3/2-1/2$	[b]	OriMC−1	OVRO 10.4 m	Woo82	Ska83
	226887.399*(20)	CN	2−1 $J=5/2-3/2$ $F=3/2-3/2$	1.0	OriMC−1	OVRO 10.4 m	Woo82	Ska83
	226892.151*(20)	CN	2−1 $J=5/2-3/2$ $F=5/2-5/2$	1.0	OriMC−1	OVRO 10.4 m	Woo82	Ska83
	226922.584 (50)	CH_3OD	5(−2,4)−4(−2,3) E	1.0[f]	OriMC−1	IRAM 30 m	Mau88	And88
	226942.830(50)	CH_3OD	5(3,3)4(3,2) A+	1.2[f]	OriMC−1	IRAM 30 m	Mau88	And88
	227004.78*(13)	$Si^{13}CC$	10(2,9)−9(2,8)	0.7[f]	IRC+10216	IRAM 30 m	Cer91b	
	227019.516*(17)	CH_3OCHO	19(2,17)−18(2,16) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	227028.100*(20)	CH_3OCHO	19(2,17)−18(2,16) A	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	227031.878*(12)	$^{34}SO_2$	12(3,9)−12(2,10)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
U	227078.	unidentified		3.3[f]	SgrB2(N)	SEST 15 m	Num98	
	227094.60*(15)	CH_3OH	21(1,20)−21(0,21) E	0.9	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	227169.142*(5)	$c-C_3H_2$	4(3,2)−3(2,1)	7.9[f]	SgrB2(N)	SEST 15 m	Num98	
	227258.988*(14)	CH_3CHO	12(0,12)−11(0,11) E $v_t=1$	2.4[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	227295.629(50)	CH_3SH	9(0)−8(0) E	12.2[f]	SgrB2(N)	SEST 15 m	Num98	Sas86
	227300.606*(50)	$13C^{34}S$	5−4	12.2[fb]	SgrB2(N)	SEST 15 m	Num98	
U	227318.	unidentified		0.1	CRL618	IRAM 30 m	Cer89a	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	227326.392(50)	CH_3SH	9(0)−8(0) A++	9.3[f]	SgrB2(N)	SEST 15 m	Num98	Sas86
U	227344.	unidentified		7.5[f]	SgrB2(N)	SEST 15 m	Num98	
	227418.909*(7)	HCCCN	25−24	3.5	OriMC−1	OVRO10.4m	Sut85	
	227531.445(50)	CH_3SH	9(2)−8(2) A−−	8.5[f]	SgrB2(N)	SEST 15 m	Num98	Sas86
	227539.453(50)	CH_3SH	9(5)−8(5) A++	4.9[fb]	SgrB2(N)	SEST 15 m	Num98	Sas86
	227539.453(50)	CH_3SH	9(5)−8(5) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227543.5*(5)	CH_3NH_2	10(−2)−10(1) Aa−+	4.9[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	227543.749(50)	CH_3SH	9(−5)−8(−5) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227548.144 (50)	CH_3SH	9(5)−8(5) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227560.932*(20)	CH_3OCHO	21(1,21)−20(1,20) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	227561.731*(20)	CH_3OCHO	21(0,21)−20(0,20) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	227562.032*(21)	CH_3OCHO	21(1,21)−20(1,20) A	2.1[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	227562.828*(21)	CH_3OCHO	21(0,21)−20(0,20) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	227594.789 (50)	CH_3SH	9(3)−8(3) E	6.3[fb]	SgrB2(N)	SEST 15 m	Num98	Sas86
	227595.057(50)	CH_3SH	9(3)−8(3) A++	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227597.280 (50)	CH_3SH	9(−3)−8(−3) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227598.158 (50)	CH_3SH	9(3)−8(3) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227605.645*(6)	NH_2CHO	11(0,11)−10(0,10)	16.4[f]	SgrB2(N)	SEST 15 m	Num98	
U	227625.	unidentified		13.6[f]	SgrB2(N)	SEST 15 m	Num98	
	227663.745(50)	CH_3SH	9(−2)−8(−2) E	13.7[fb]	SgrB2(N)	SEST 15 m	Num98	Sas86
	227669.824(50)	CH_3SH	9(2)−8(2) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	227706.657*(4)	CH_2CHCN	15(3,13)−15(2,14)	2.7[f]	SgrB2(N)	SEST 15 m	Num98	
U	227729.	unidentified		1.8[f]	SgrB2(N)	SEST 15 m	Num98	
	227760.743*(7)	$g-CH_3CH_2OH$	3(2,2)−2(1,2) v_t =1−0	3.4[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
	227780.978*(10)	CH_3CH_2CN	25(3,22)−24(3,21)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	227793.19* (63)	HCCCN	25−24 v_6 =1 ℓ=1 e	14.9[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	227814.651*(47)	CH_3OH	16(1,16)−15(2,13) A+	1.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	227897.52* (11)	CH_2CHCN	24(7,*)−23(7,*)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	227906.61*(9)	CH_2CHCN	24(6,19)−23(6,18)	0.5[b]	OriMC−1	OVRO 10.4 m	Sut85	
	227906.64*(9)	CH_2CHCN	24(6,18)−23(6,17)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	227918.54* (13)	CH_2CHCN	24(8,*)−23(8,*)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
U	227938.	unidentified		4.0[f]	SgrB2(N)	SEST 15 m	Num98	
	227960.07*(15)	CH_2CHCN	24(9,*)−23(9,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	227965.97*(7)	CH_2CHCN	24(5,20)−23(5,19)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	227967.52*(7)	CH_2CHCN	24(5,19)−23(5,18)	0.5[b]	OriMC−1	OVRO 10.4 m	Sut85	
	227977.074*(68)	HCCCN	25−24 v_7 =1 ℓ=1 e	0.7	OriMC−1	OVRO 10.4 m	Sut85	Laf78
	227994.509*(40)	CH_3OCHO	24(9,15)−24(8,16) E	7.4[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	227998.2*(5)	CH_3NH_2	8(2)−8(1) Ea	7.4[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	228017.369*(5)	CH_2CHCN	24(10,*)−23(10,*)	14.9[f]	SgrB2(N)	SEST 15 m	Num98	
	228029.050(50)	$g-CH_3CH_2OH$	13(3,10)−12(3,9) v_t =0−0	6.8[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	228057.846*(48)	CH_3OCHO	31(4,27)−31(3,28) A	19.4[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	228087.272*(5)	CH_2CHCN	24(11,*)−23(11,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	228090.48*(5)	CH_2CHCN	24(3,22)−23(3,21)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	228104.55*(6)	CH_2CHCN	24(4,21)−23(4,20)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
U	228114.	unidentified		21.9[f]	SgrB2(N)	SEST 15 m	Num98	
U	228148.	unidentified		15.9[f]	SgrB2(N)	SEST 15 m	Num98	
	228160.312*(3)	CH_2CHCN	24(4,20)−23(4,19)	20.7[f]	SgrB2(N)	SEST 15 m	Num98	
	228168.235*(7)	CH_2CHCN	24(12,*)−23(12,*)	12.0[f]	SgrB2(N)	SEST 15 m	Num98	
	228201.34*(9)	CH_2CHCN	24(7,*)−23(7,*) v_{15} =1	10.4[fb]	SgrB2(N)	SEST 15 m	Num98	
	228203.20*(8)	CH_2CHCN	24(6,*)−23(6,*) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	228210.	unidentified		7.8[f]	SgrB2(N)	SEST 15 m	Num98	
	228229.12*(11)	CH_2CHCN	24(8,*)−23(8,*) v_{15} =1	7.7[f]	SgrB2(N)	SEST 15 m	Num98	
	228254.01*(7)	CH_2CHCN	24(5,20)−23(5,19) v_{15} =1	8.7[fb]	SgrB2(N)	SEST 15 m	Num98	
	228255.35*(7)	CH_2CHCN	24(5,19)−23(5,18) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	228259.152*(8)	CH_2CHCN	24(13,*)−23(13,*)	9.3[f]	SgrB2(N)	SEST 15 m	Num98	
	228277.35*(13)	CH_2CHCNr	24(9,*)−23(9,*) v_{15} =1	11.7[f]	SgrB2(N)	SEST 15 m	Num98	
	228302.988*(68)	HCCCN	25−24 v_7 =1 ℓ=1 f	0.8	OriMC−1	OVRO 10.4 m	Sut85	Laf78
	228336.474*(4)	CH_2CHCN	16(3,14)−16(2,15)	14.4[f]	SgrB2(N)	SEST 15 m	Num98	
	228341.26*(15)	CH_2CHCN	24(10,*)−23(10,*) v_{15} =1	14.5[f]	SgrB2(N)	SEST 15 m	Num98	
	228359.264*(11)	CH_2CHCN	24(14,*)−23(14,*)	13.7[f]	SgrB2(N)	SEST 15 m	Num98	
	228376.92*(6)	CH_2CHCN	24(3,22)−23(3,21) v_{15} =1	11.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	228382.77*(6)	CH_2CHCN	24(4,21)−23(4,20) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	228418.10* (17)	CH_2CHCN	24(11,*)−23(11,*) v_{15} =1	8.1[f]	SgrB2(N)	SEST 15 m	Num98	
	228432.46*(6)	CH_2CHCN	24(4,20)−23(4,19) v_{15} =1	9.9[f]	SgrB2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	228483.144*(10)	CH_3CH_2CN	25(2,23)−24(2,22)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	228506.17* (19)	CH_2CHCN	24(12,*)−23(12,*) v_{15} =1	9.3[f]	SgrB2(N)	SEST 15 m	Num98	
	228544.07*(1)	HCOOH	10(2,8)−9(2,7)	0.4	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	228554.323*(16)	CH_2CHCN	24(7,*)−23(7,*) v_{11} =1	9.9[f]	SgrB2(N)	SEST 15 m	Num98	
	228567.080*(16)	CH_2CHCN	24(8,*)−23(8,*) v_{11} =1	11.9[f]	SgrB2(N)	SEST 15 m	Num98	
	228572.530*(15)	CH_2CHCN	24(6,19)−23(6,18) v_{11} =1	11.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	228572.562*(15)	CH_2CHCN	24(6,18)−23(6,17) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	228585.100*(2)	CH_2CHCN	24(16,8)−23(16,7)	6.2[fb]	SgrB2(N)	SEST 15 m	Num98	
	228585.100*(2)	CH_2CHCNr	24(16,9)−23(16,8)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	228600.629*(19)	CH_2CHCN	24(9,*)−23(9,*) v_{11} =1	9.9[f]	SgrB2(N)	SEST 15 m	Num98	
	228617.52*(11)	CH_3CHO	16(3,14)−16(2,15) A+− v_t =1	7.3[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	228628.792*(20)	CH_3OCHO	18(5,13)−17(5,12) E	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	228639.	unidentified		0.79[e]	W51e2	BIMA Array	Rem02	
	228643.101*(15)	CH_2CHCN	24(5,20)−23(5,19) v_{11} =1	10.8[fb]	Sgr B2(N)	SEST 15 m	Num98	
	228644.871*(15)	CH_2CHCN	24(5,19)−23(5,18) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	228651.391*(21)	CH_3OCHO	18(5,13)−17(5,12) A	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	228658.140*(50)	CH_3COOH	21(*,21)−20(*,20) E	1.29[e]	W51e2	BIMA Array	Rem02	Ily00
	228664.910*(51)	CH_3OCHO	39(9,31)−39(8,32) A	8.2[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
U	228690.	unidentified		0.60[e]	W51e2	BIMA Array	Rem02	
	228691.770*(50)	CH_3COOH	21(*,21)−20(*,20) A	1.18[e]	W51e2	BIMA Array	Rem02	Ily00
	228711.497*(25)	CH_2CHCN	24(11,*)−23(11,*) v_{11} =1	7.7[f]	SgrB2(N)	SEST 15 m	Num98	
	228729.780(50)	CH_3SH	9(1)−8(1)E	6.4[f]	SgrB2(N)	SEST 15 m	Num98	Sas86
	228769.585*(15)	CH_2CHCN	24(3,22)−23(3,21) v_{11} =1	6.8[f]	SgrB2(N)	SEST 15 m	Num98	
	228784.156*(32)	CH_2CHCN	24(12,*)−23(12,*) v_{11} =1	5.8[f]	SgrB2(N)	SEST 15 m	Num98	
	228795.024*(15)	CH_2CHCN	24(4,21)−23(4,20) v_{11} =1	11.1[f]	SgrB2(N)	SEST 15 m	Num98	
	228797.449*(24)	CH_3CH_2CN	14(2,12)−13(1,13)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	228821.74* (15)	HCCCN	25−24 v_7 =0 ℓ=0	16.8[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	228858.41*(11)	HCCCN	25−24 v_7 =2 ℓ=2 e	31.6[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	228897.81*(16)	HCCCN	25−24 v_7 =2 ℓ=2 f	23.1[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	228910.492*(7)	DNC	3−2	0.23	OriMC−1	MMWO 4.9 m	Lor84b	
U	228921.	unidentified		2.2[f]	SgrB2(N)	SEST 15 m	Num98	
	228958.200*(56)	CH_2CHCN	24(14,*)−23(14,*) v_{11} =1	4.9[f]	SgrB2(N)	SEST 15 m	Num98	
U	228975.	unidentified		8.6[f]	SgrB2(N)	SEST 15 m	Num98	
	229058.385*(75)	CH_2CHCN	24(15,*)−23(15,*) v_{11} =1	9.1[f]	SgrB2(N)	SEST 15 m	Num98	
	229079.981*(4)	CH_2CHCN	17(3,15)−17(2,16)	8.8[f]	SgrB2(N)	SEST 15 m	Num98	
	229086.99*(5)	CH_2CHCN	24(3,21)−23(3,20)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	229128.901*(43)	NH_2CHO	24(2,22)−24(2,23)	5.8[f]	SgrB2(N)	SEST 15 m	Num98	
	229203.10*(16)	$H^{13}CCCN$	26−25	20.7[f]	SgrB2(N)	SEST 15 m	Num98	Laf78
	229224.133*(29)	CH_3OCHO	23(9,14)−23(8,15) A	5.9[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
U	229235.	unidentified		5.0[f]	SgrB2(N)	SEST 15 m	Num98	
	229259.200*(32)	CH_3OCHO	23(9,14)−23(8,15) E	2.8[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	229265.168*(10)	CH_3CH_2CN	26(2,25)−25(2,24)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	229300.18*(6)	CH_2CHCN	24(3,21)−23(3,20) v_{15} =1	5.1[f]	SgrB2(N)	SEST 15 m	Num98	
	229304.7(10)	$^{29}SiC_2$	10(2,9)−9(2,8)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	229310.8*(5)	CH_3NH_2	4(−2)−4(1) Ea	6.8[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	229320.057*(35)	CH_3OCHO	23(9,15)−23(8,16) E	1.5[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	229347.629*(6)	SO_2	11(5,7)−12(4,8)	1.9	OriMC−1	OVRO 10.4 m	Sut85	
	229388.813*(29)	CH_3OCHO	23(9,15)−23(8,16) A	0.8	OriMC−1	JCMT 15 m	Gre91	Oes99
	229405.001*(20)	CH_3OCHO	18(3,15)−17(3,14) E	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	229420.343*(20)	CH_3OCHO	18(3,15)−17(3,14) A	1.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	229429.075*(36)	CH_3CHO	16(1,15)−15(2,14) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	229432.106*(10)	CH_3CHO	11(−1,11)−12(0,10) E	6.5[fb]	SgrB2(N)	SEST 15 m	Num98	Kle96
	229453.5*(5)	CH_3NH_2	7(−2)−7(1) Es	2.2[f]	SgrB2(N)	SEST 15 m	Num98	Num98
U	229468.	unidentified		6.5[f]	SgrB2(N)	SEST 15 m	Num98	
	229474.005*(28)	CH_3OCHO	20(3,17)−19(4,16) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	229491.130*(18)	$t-CH_3CH_2OH$	17(5,12)−17(4,13)	8.9[f]	SgrB2(N)	SEST 15 m	Num98	
	229504.723*(32)	CH_3OCHO	20(3,17)−19(4,16) A	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	229533.060*(7)	NH_2CHO	2(2,0)−1(1,1)	2.1[f]	SgrB2(N)	SEST 15 m	Num98	
	229545.283*(10)	SO_2	13(2,12)−13(1,13) v_2 =1	11.7[f]	SgrB2(M)	SEST 15 m	Num98	
	229589.073*(24)	CH_3OH	15(4,11)−16(3,13) E	1.3	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	229590.456*(17)	CH_3OCHO	19(3,17)−18(2,16) E	5.0[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	229595.036*(21)	CH_3OCHO	19(3,17)−18(2,16) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	229647.75*(9)	CH_2CHCN	25(1,25)−24(1,24)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	229647.843*(4)	CH_2CHCN	25(1,25)−24(1,24)	19.3[fb]	SgrB2(N)	SEST 15 m	Num98	
	229711.260*(9)	NH_2CHO	10(2,9)−10(1,10)	4.1[f]	SgrB2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	229758.811*(15)	CH_3OH	8(−1,8)−7(0,7) E	10.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	229775.029*(10)	CH_3CHO	11(1,11)−10(0,10) A++	10.0[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	229802.	unidentified		3.4[f]	SgrB2(N)	SEST 15 m	Num98	
	229857.618*(8)	$^{34}SO_2$	4(2,2)−3(1,3)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	229864.221*(46)	CH_3OH	19(5,15)−20(4,16) A+	0.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	229893.	unidentified		8.7[f]	SgrB2(N)	SEST 15 m	Num98	
	229939.180*(46)	CH_3OH	19(5,14)−20(4,17) A−	0.5	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	229991.	Unidentified		2.4[f]	SgrB2(N)	SEST 15 m	Num98	
	230027.002*(13)	CH_3OH	3(−2,2)−4(−1,4) E	5.1	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	230074.	unidentified		3.2[f]	SgrB2(N)	SEST 15 m	Num98	
	230092.78*(7)	CH_2CHCN	25(1,25)−24(1,24) v_{15} =1	8.5[f]	SgrB2(N)	SEST 15 m	Num98	
U	230093.	unidentified		3.2[f]	SgrB2(N)	SEST 15 m	Num98	
	230106.215*(16)	CH_2CHCN	25(1,25)−24(1,24) v_{11} =1	12.0[f]	SgrB2(N)	SEST 15 m	Num98	
	230140.140*(10)	CH_3OCH_3	25(4,22)−25(3,23) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	230141.425*(8)	CH_3OCH_3	25(4,22)−25(3,23) EE	6.2[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	230142.710*(14)	CH_3OCH_3	25(4,22)−25(3,23) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
U	230159.	unidentified		4.4[f]	SgrB2(N)	SEST 15 m	Num98	
U	230175.	unidentified		3.2[f]	SgrB2(N)	SEST 15 m	Num98	
	230232.166*(14)	CH_3OCH_3	17(2,15)−16(3,14) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	230233.749*(8)	CH_3OCH_3	17(2,15)−16(3,14) EE	20.4[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	230235.333*(10)	CH_3OCH_3	17(2,15)−16(3,14) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	230293.862*(29)	CH_3OCHO	22(9,13)−22(8,14) A	3.8[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	230301.924*(7)	CH_3CHO	12(2,11)−11(2,10) A−−	11.7[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	230315.788*(7)	CH_3CHO	12(−2,11)−11(−2,10) E	15.7[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	230317.500*(10)	$O^{13}CS$	19−18	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	230368.199*(89)	CH_3OH	22(4,18)−21(5,17) E	0.2	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	230395.155*(14)	CH_3CHO	12(2,11)−11(2,10) A−− v_t =1	4.1[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	230468.	unidentified		0.4	OriMC−1	OVRO10.4m	Sut85	
	230512.7*(11)	$^{30}SiC_2$	10(4,6)−9(4,5)	n.r.	IRC+10216	IRAM 30 m	Cer91b	
	230538.000(1)	CO	2−1	70.	OriMC−1	NRAO 11 m	Phi77	
	230738.48*(8)	CH_2CHCN	25(0,25)−24(0,24)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	230793.506*(13)	$g-CH_3CH_2OH$	6(5,1)−5(4,1) v_t =0−1	3.3[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	230793.506*(13)	$g-CH_3CH_2OH$	6(5,2)−5(4,2) v_t =0−1	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	230793.905*(30)	AlF	7−6	7.20[f]	IRC+10216	IRAM 30 m	Gue95	
	230808.374*(4)	CH_2CHCN	24(1,24)−23(0,23)	2.9[f]	SgrB2(N)	SEST 15 m	Num98	
	230841.38*(6)	CH_2CHCN	24(1,23)−23(1,22) v_{15} =1	3.0[f]	SgrB2(N)	SEST 15 m	Num98	
U	230879.	unidentified		3.2[f]	SgrB2(N)	SEST 15 m	Num98	
U	230894.	unidentified		3.2[f]	SgrB2(N)	SEST 15 m	Num98	
	230953.787*(17)	$t-CH_3CH_2OH$	16(5,11)−16(4,12)	4.3[f]	SgrB2(N)	SEST 15 m	Num98	
	230965.245*(5)	SO_2	37(10,28)−38(9,29)	2.5[f]	SgrB2(M)	SEST 15 m	Num98	JPL01
	230991.377*(15)	$t-CH_3CH_2OH$	14(0,14)−13(1,13)	4.4[f]	SgrB2(N)	SEST 15 m	Num98	
	231060.991*(2)	OCS	19−18	0.80	OriMC−1	FCRAO 14 m	Sch84	
	231101.164*(16)	CH_2CHCN	24(1,23)−23(1,22) v_{11} =1	7.8[f]	SgrB2(N)	SEST 15 m	Num98	
	231145.708*(16)	CH_2CHCN	25(0,25)−24(0,24) v_{11} =1	7.1[f]	SgrB2(N)	SEST 15 m	Num98	
	231187.598*(25)	CH_3OCHO	21(9,13)−21(8,14) E	3.7[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	231199.267*(28)	CH_3OCHO	21(9,12)−21(8,13) A	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	231199.267*(28)	CH_3OCHO	21(9,12)−21(8,13) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	231220.768*(48)	^{13}CS	5−4	0.7	OriMC−1	MMWO 4.9 m	Mun84a	
	231231.996*(37)	CH_3OCHO	29(4,26)−29(3,27) A	6.5[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	231231.996*(37)	CH_3OCHO	29(4,26)−29(3,27) E	2.0[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	231239.071*(28)	CH_3OCHO	21(9,13)−21(8,14) A	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	231266.0	unidentified		1.2	OriMC−1	JCMT 15 m	Gre91	
	231281.150*(15)	CH_3OH	10(2,9)−9(3,6) A−	0.4	OriMC−1	MMWO 4.9 m	Mun84a	Xu_97
	231310.439*(10)	CH_3CH_2CN	26(1,25)−25(1,24)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	231312.305*(11)	CH_3CH_2CN	27(0,27)−26(1,26)	0.9[b]	OriMC−1	OVRO 10.4 m	Sut85	
	231313.238*(14)	CH_3CH_2CN	24(2,23)−23(1,22)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	231321.635 (50)	N_2D^+	3−2	0.17	rhoOphB2	MMWO 4.9 m	Lor85	Sas81
	231329.636*(7)	CH_3CHO	12(5,8)−11(5,7) A++	2.1[fb]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231329.790*(7)	CH_3CHO	12(5,7)−11(5,6) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	231342.0	unidentified		1.0	OriMC−1	JCMT 15 m	Gre91	
	231363.289*(7)	CH_3CHO	12(−5,7)−11(−5,6) E	3.0[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231369.834*(8)	CH_3CHO	12(5,8)−11(5,7) E	2.1[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231410.259*(15)	D_2CO	4(0,4)−3(0,3)	0.12	OriMC−1	NRAO 12 m	Tur90a	
	231414.485*(42)	CH_3OCHO	35(10,25)−35(9,26) A	0.5	OriMC−1	JCMT 15 m	Gre91	Oes99
	231456.738*(7)	CH_3CHO	12(4,9)−11(4,8) A−−	3.1[f]	SgrB2(N)	SEST 15 m	Num98	Kle96

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	231467.499*(7)	CH_3CHO	12(4,8)−11(4,7) A++	2.4[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231484.373*(7)	CH_3CHO	12(4,8)−11(4,7) E	2.2[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231505.59*(1)	HCOOH	10(1,9)−9(1,8)	0.8	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	231506.297*(7)	CH_3CHO	12(−4,9)−11(−4,8) E	3.3[f]	SgrB2(M)	SEST 15 m	Num98	Kle96
	231558.513*(22)	$t-CH_3CH_2OH$	21(5,17)−21(4,18)	1.5[fb]	SgrB2(N)	SEST 15 m	Num98	
	231560.877*(21)	$t-CH_3CH_2OH$	20(5,16)−20(4,17)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	231595.269*(7)	CH_3CHO	12(3,10)−11(3,9) A++	6.0[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231657.892*(82)	CH_3OCHO	27(3,25)−27(2,26) A	2.4[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	231668.733(50)	$g-CH_3CH_2OH$	14(1,14)−13(1,13) v_t =0−0	2.6[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	231735.994*(34)	$CH_3{}^{18}OH$	5(−1,5)−4(−1,4) E	4.9[f]	SgrB2(N)	SEST 15 m	Num98	Hos96
	231737.593*(20)	$t-CH_3CH_2OH$	19(5,15)−19(4,16)	4.9[f]	SgrB2(N)	SEST 15 m	Num98	
	231748.722*(7)	CH_3CHO	12(−3,10)−11(−3,9) E	6.2[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	231756.783*(4)	CH_2CHCN	26(0,26)−25(1,25)	4.1[f]	SgrB2(N)	SEST 15 m	Num98	
	231758.66*(4)	$CH_3{}^{18}OH$	5(0,5)−4(0,4) A++	4.2[f]	SgrB2(N)	SEST 15 m	Num98	Hos96
U	231765.	unidentified		3.0[f]	SgrB2(N)	SEST 15 m	Num98	
	231790.000*(23)	$t-CH_3CH_2OH$	22(5,18)−22(4,19)	10.0[f]	SgrB2(N)	SEST 15 m	Num98	
	231801.15*(5)	$CH_3{}^{18}OH$	5(2,4)−4(2,3) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Hos96
	231802.70*(7)	$CH_3{}^{18}OH$	5(3,2)−4(3,1) E	4.4[fb]	SgrB2(N)	SEST 15 m	Num98	Hos96
U	231815.	unidentified		5.1[f]	SgrB2(N)	SEST 15 m	Num98	
	231826.68*(4)	$CH_3{}^{18}OH$	5(1,4)−4(1,3) E	8.5[f]	SgrB2(N)	SEST 15 m	Num98	Hos96
	231828.544*(27)	NH_2CHO	17(1,16)−17(0,17)	8.5[f]	SgrB2(N)	SEST 15 m	Num98	
	231843.6*(5)	CH_3NH_2	9(−2)−9(1) Aa−+	17.5[f]	SgrB2(N)	SEST 15 m	Num98	Num98
	231847.575*(7)	CH_3CHO	12(3,9)−11(3,8) E	4.8[f]	SgrB2(M)	SEST 15 m	Num98	Kle96
	231854.217*(11)	CH_3CH_2CN	27(1,27)−26(1,26)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	231864.68*(4)	$CH_3{}^{18}OH$	5(2,3)−4(2,2) E	6.3[f]	SgrB2(N)	SEST 15 m	Num98	Hos96
U	231884.	unidentified		4.1[f]	SgrB2(N)	SEST 15 m	Num98	
	231924.246*(14)	$CH_3C^{15}N$	13(2)−12(2)	4.1[f]	SgrB2(N)	SEST 15 m	Num98	
	231937.396*(15)	$CH_3C^{15}N$	13(1)−12(1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	231938.592*(25)	CH_3OCHO	20(9,12)−20(8,13) E	4.2[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	231941.783*(15)	$CH_3C^{15}N$	13(0)−12(0)	4.2[fb]	SgrB2(N)	SEST 15 m	Num98	
	231952.27*(5)	CH_2CHCN	24(2,22)−23(2,21)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	231966.913*(28)	CH_3OCHO	20(9,11)−20(8,12) A	0.4[b]	OriMC−1	NRAO 12 m	Tur88b	Oes99
	231968.385*(7)	CH_3CHO	12(3,9)−11(3,8) A−−	[b]	OriMC−1	OVRO 10.4 m	Tur87b	Kle96
U	231975.	unidentified		1.0	OriMC−1	NRAO 12 m	Tur87b	
	231980.516*(14)	SO_2	14(3,11)−14(2,12) v_2 =1	13.2[f]	SgrB2(M)	SEST 15 m	Num98	
	231987.779*(6)	CH_3OCH_3	13(0,13)−12(1,12) AA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	231987.856*(6)	CH_3OCH_3	13(0,13)−12(1,12) EE	3.2[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	231987.933*(6)	CH_3OCH_3	13(0,13)−12(1,12) AE+EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	231990.414*(11)	CH_3CH_2CN	27(0,27)−26(0,26)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	232004.2*(5)	CH_3NH_2	5(2)−5(1) Es	5.0[f]	SgrB2(N)	SEST 15 m	Num98	Num98
U	232008.	unidentified		0.2	OriMC−1	NRAO12 m	Tur87b	
	232034.630*(19)	$t-CH_3CH_2OH$	18(5,14)−18(4,15)	6.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	232041.	unidentified	(U234831)	0.2	OriMC−1	NRAO12m	Tur87b	
	232075.864*(16)	$t-CH_3CH_2OH$	15(5,10)−15(4,11)	8.8[f]	SgrB2(N)	SEST 15 m	Num98	
	232077.197*(27)	$^{13}CH_3CN$	13(6)−12(6)	8.8[f]	SgrB2(N)	SEST 15 m	Num98	
U	232107.	unidentified		8.9[f]	SgrB2(N)	SEST 15 m	Num98	
	232125.120*(23)	$^{13}CH_3CN$	13(5)−12(5)	7.3[f]	SgrB2(N)	SEST 15 m	Num98	
	232131.86*(7)	CH_2CHCN	24(2,22)−23(2,21) v_{15} =1	5.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	232157.	unidentified		13.5[f]	SgrB2(N)	SEST 15 m	Num98	
U	232163.	unidentified		0.8	OriMC−1	OVRO 10.4 m	Sut85	
	232164.355*(21)	$^{13}CH_3CN$	13(4)−12(4)	8.9[f]	SgrB2(N)	SEST 15 m	Num98	
	232194.888*(21)	$^{13}CH_3CN$	13(3)−12(3)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	232216.706*(21)	$^{13}CH_3CN$	13(2)−12(2)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	232229.801*(22)	$^{13}CH_3CN$	13(1)−12(1)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	232234.166*(22)	$^{13}CH_3CN$	13(0)−12(0)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
U	232262.	unidentified		14.4[f]	SgrB2(N)	SEST 15 m	Num98	
	232265.878*(56)	$S^{18}O$	5(6)−4(5)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	232273.628*(7)	NH_2CHO	11(2,10)−10(2,9)	16.4[f]	SgrB2(N)	SEST 15 m	Num98	
U	232305.	unidentified		4.3[f]	SgrB2(N)	SEST 15 m	Num98	
	232318.469*(27)	$t-CH_3CH_2OH$	23(5,19)−23(4,20)	4.4[f]	SgrB2(N)	SEST 15 m	Num98	
	232328.051*(56)	HCCCHO	22(2,21)−22(1,22)	2.8[f]	SgrB2(N)	SEST 15 m	Num98	
	232343.860*(71)	CH_3CHO	12(3,10)−11(3,9) A++ v_t =2	3.1[fb]	SgrB2(N)	SEST 15 m	Num98	Kle96
	232347.41*(24)	CH_3CHO	12(1,11)−11(1,10) E v_t =2	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	232364.	unidentified		5.9[f]	SgrB2(N)	SEST 15 m	Num98	
	232418.571*(16)	CH_3OH	10(2,8)−9(3,7) A+	3.9	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	232478.	unidentified		3.0[f]	SgrB2(N)	SEST 15 m	Num98	
	232491.366(50)	$g-CH_3CH_2OH$	14(0,14)−13(0,13) v_t =0−0	5.9[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	232532.326*(11)	CH_3CH_2CN	27(1,27)−26(0,26)	9.0[f]	SgrB2(N)	SEST 15 m	Num98	
	232534.078*(43)	SiC_2	10(2,9)−9(2,8)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
U	232566.	unidentified		2.3[f]	SgrB2(N)	SEST 15 m	Num98	
	232576.449*(13)	CH_3CHO	12(3,9)−11(3,8) A−− v_t =1	3.3[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
	232579.320*(24)	CH_3OCHO	19(9,11)−19(8,12) E	3.3[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
U	232588.	unidentified		2.7[f]	SgrB2(N)	SEST 15 m	Num98	
	232596.554(50)	$g-CH_3CH_2OH$	14(1,14)−13(0,13) v_t =1−1	2.9[f]	SgrB2(N)	SEST 15 m	Num98	Pea96
	232617.144*(25)	CH_3OCHO	19(9,10)−19(8,11) A	3.9[fb]	SgrB2(N)	SEST 15 m	Num98	Oes99
	232625.203*(25)	CH_3OCHO	19(9,11)−19(8,12) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	232635.	unidentified		3.0[f]	SgrB2(N)	SEST 15 m	Num98	
	232653.277*(74)	NH_2CHO	20(6,15)−21(5,16)	2.7[f]	SgrB2(N)	SEST 15 m	Num98	
U	232672.	unidentified		1.5[f]	SgrB2(N)	SEST 15 m	Num98	
U	232679.	unidentified		1.5[f]	SgrB2(N)	SEST 15 m	Num98	
	232686.70(5)	H_2O	5(5,0)−6(4,3) v_2 =1	2.8[f]	VYCMa	IRAM 30 m	Men89	Bel87a
U	232714.	unidentified		3.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	232728.	unidentified		1.6[f]	SgrB2(N)	SEST 15 m	Num98	
	232735.750*(34)	$^{13}CH_3CCH$	14(1)−13(1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	232740.086*(36)	$^{13}CH_3CCH$	14(0)−13(0)	1.6[fb]	SgrB2(N)	SEST 15 m	Num98	
U	232751.	unidentified		3.7[f]	SgrB2(N)	SEST 15 m	Num98	
	232783.591*(33)	CH_3OH	18(3,16)−17(4,13) A+	1.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	232790.038*(10)	CH_3CH_2CN	26(3,24)−25(3,23)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
U	232836.	unidentified		1.3[f]	SgrB2(N)	SEST 15 m	Num98	
U	232866.	unidentified		2.5[f]	SgrB2(N)	SEST 15 m	Num98	
U	232883.	unidentified		2.0[f]	SgrB2(N)	SEST 15 m	Num98	
	232928.552*(15)	$t-CH_3CH_2OH$	14(5,9)−14(4,10)	12.0[f]	SgrB2(N)	SEST 15 m	Num98	
	232945.835*(19)	CH_3OH	10(−3,8)−11(−2,10) E	3.0	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	232962.337*(10)	CH_3CH_2CN	26(10,*)−25(10,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	232967.585*(10)	CH_3CH_2CN	26(9,*)−25(9,*)	1.2[b]	OriMC−1	OVRO 10.4 m	Sut85	
	232975.519*(11)	CH_3CH_2CN	26(11,*)−25(11,*)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	232998.747*(10)	CH_3CH_2CN	26(8,*)−25(8,*)	1.1[b]	OriMC−1	OVRO 10.4 m	Sut85	
	233002.694*(12)	CH_3CH_2CN	26(12,*)−25(12,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	233041.083*(12)	CH_3CH_2CN	26(13,*)−25(13,*)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	233069.310*(9)	CH_3CH_2CN	26(7,20)−25(7,19)	1.0	OriMC−1	OVRO 10.4 m	Sut85	
	233069.371*(9)	CH_3CH_2CN	26(7,19)−25(7,18)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	233082.338*(53)	CH_3OCHO	22(4,18)−21(5,17) A	12.0[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233088.868*(13)	CH_3CH_2CN	26(14,*)−25(14,*)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
U	233104.	unidentified		1.6[f]	SgrB2(N)	SEST 15 m	Num98	
	233122.063*(24)	CH_3OCHO	18(9,10)−18(8,11) E	0.9[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233140.770*(28)	CH_3OCHO	18(9,9)−18(8,10) E	6.6[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233144.815*(13)	CH_3CH_2CN	26(15,*)−25(15,*)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
U	233155.	unidentified		5.3[f]	SgrB2(N)	SEST 15 m	Num98	
	233182.649*(43)	CH_3OCHO	19(18,*)−18(18,*) E	3.4[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233205.049*(9)	CH_3CH_2CN	26(6,21)−25(6,20)	1.5[b]	OriMC−1	OVRO 10.4 m	Sut85	
	233207.322*(9)	CH_3CH_2CN	26(6,20)−25(6,19)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	233208.054*(14)	CH_3CH_2CN	26(16,*)−25(16,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	233212.742*(17)	CH_3OCHO	19(4,15)−18(4,14) E	18.6[fb]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233222.161*(45)	CH_3OCHO	19(17,3)−18(17,2) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	233226.782*(17)	CH_3OCHO	19(4,16)−18(4,15) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233246.776*(32)	CH_3OCHO	19(16,*)−18(16,*) A	5.1[fb]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233255.951*(35)	CH_3OCHO	19(16,3)−18(16,2) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	233268.593*(37)	CH_3OCHO	19(16,4)−18(16,3) E	1.2[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233277.959*(15)	CH_3CH_2CN	26(17,*)−25(17,*)	3.7[f]	SgrB2(N)	SEST 15 m	Num98	
	233296.403*(9)	$^{34}SO_2$	10(5,5)−11(4,8)	3.6[f]	SgrB2(M)	SEST 15 m	Num98	
U	233300.	unidentified		3.0[f]	SgrB2(N)	SEST 15 m	Num98	
	233310.095*(28)	CH_3OCHO	19(15,*)−18(15,*) A	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233331.186*(32)	CH_3OCHO	19(15,5)−18(15,4) E	1.8[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233341.700*(15)	CH_3CHO	7(3,4)−7(2,5) E	3.8[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	233348.	unidentified		1.9[f]	SgrB2(M)	SEST 15 m	Num98	
	233354.062*(16)	CH_3CH_2CN	26(18,*)−25(18,*)	13.3[f]	SgrB2(N)	SEST 15 m	Num98	
	233367.2*(5)	CH_3NH_2	7(−2)−7(1) As−+	4.6[f]	SgrB2(N)	SEST 15 m	Num98	Num98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	233384.	unidentified		6.9[f]	SgrB2(N)	SEST 15 m	Num98	
	233394.627*(25)	CH_3CCHO	19(14,*)−18(14,*) A	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233396.592*(29)	CH_3OCHO	19(14,5)−18(14,4) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	233406.633*(4)	CH_2CHCN	21(3,19)−21(2,20)	5.4[f]	SgrB2(N)	SEST 15 m	Num98	
	233414.421*(28)	CH_3OCHO	19(14,6)−18(14,5) E	4.1[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	233443.092*(9)	CH_3CH_2CN	26(5,22)−25(5,21)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
U	233456.	unidentified		13.1[f]	SgrB2(N)	SEST 15 m	Num98	
U	233472.	unidentified		6.8[f]	SgrB2(N)	SEST 15 m	Num98	
	233488.839*(24)	NH_2CHO	11(8,3)−10(8,2)	17.4[fb]	SgrB2(N)	SEST 15 m	Num98	
	233488.839*(24)	NH_2CHO	11(8,4)−10(8,3)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	233492.634*(30)	NH_2CHO	11(9,2)−10(9,1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	233492.634*(30)	NH_2CHO	11(9,3)−10(9,2)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	233498.016*(19)	NH_2CHO	11(7,4)−10(7,3)	27.1[fb]	SgrB2(N)	SEST 15 m	Num98	
	233498.016*(19)	NH_2CHO	11(7,5)−10(7,4)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	233498.299*(9)	CH_3CH_2CN	26(5,21)−25(5,20)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	233504.883*(28)	CH_3OCHO	19(13,6)−18(13,5) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233505.489*(37)	NH_2CHO	11(10,1)−10(10,0)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	233505.489*(37)	NH_2CHO	11(10,2)−10(10,1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	233506.658*(24)	CH_3OCHO	19(13,*)−18(13,*) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233523.507*(20)	CH_3CH_2CN	26(20,*)−25(20,*)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	233524.618*(24)	CH_3OCHO	19(13,7)−18(13,6) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233527.747*(15)	NH_2CHO	11(6,6)−10(6,5)	35.0[fb]	SgrB2(N)	SEST 15 m	Num98	
	233527.748*(15)	NH_2CHO	11(6,5)−10(6,4)	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	233542.	unidentified		17.5[f]	SgrB2(N)	SEST 15 m	Num98	
U	233552.	unidentified		12.6[f]	SgrB2(N)	SEST 15 m	Num98	
U	233561.	unidentified		6.6[f]	SgrB2(N)	SEST 15 m	Num98	
	233571.082*(14)	$t-CH_3CH_2OH$	13(5,8)−13(4,9)	10.6[f]	SgrB2(N)	SEST 15 m	Num98	
	233594.395*(11)	NH_2CHO	11(5,7)−10(5,6)	40.1[fb]	SgrB2(N)	SEST 15 m	Num98	
	233594.533*(11)	NH_2CHO	11(5,6)−10(5,5)	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	233612.	unidentified		10.0[f]	SgrB2(N)	SEST 15 m	Num98	
U	233622.	unidentified		14.0[f]	SgrB2(N)	SEST 15 m	Num98	
	233627.079*(24)	CH_3OCHO	17(9,8)−17(8,9) A	0.4[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233628.394*(24)	CH_3OCHO	17(9,9)−17(8,10) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233631.654*(14)	CH_3OCH_3	25(5,20)−25(4,21) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	233632.284*(10)	CH_3OCH_3	25(5,20)−25(4,21) EE	7.2[fb]	SgrB2(N)	SEST 15 m	Num98	Gro98
	233632.912*(16)	CH_3OCH_3	25(5,20)−25(4,21) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	233649.811*(25)	CH_3OCHO	19(12,7)−18(12,6) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233654.072*(10)	CH_3CH_2CN	26(4,23)−25(4,22)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	233655.310*(21)	CH_3OCHO	19(12,*)−18(12,*) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233670.944*(21)	CH_3OCHO	19(12,8)−18(12,7) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	233698.	unidentified		7.6[f]	SgrB2(N)	SEST 15 m	Num98	
	233724.934*(9)	SO_2	16(1,15)−15(2,14) $v_2=1$	7.9[f]	SgrB2(M)	SEST 15 m	Num98	
	233734.694*(9)	NH_2CHO	11(4,8)−10(4,7)	26.5[f]	SgrB2(N)	SEST 15 m	Num98	
	233745.594*(9)	NH_2CHO	11(4,7)−10(4,6)	20.2[f]	SgrB2(N)	SEST 15 m	Num98	
	233753.910*(20)	CH_3OCHO	18(4,14)−17(4,13) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233777.515*(21)	CH_3OCHO	18(4,14)−17(4,13) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233795.799*(32)	CH_3OH	18(3,15)−17(4,14) A−	1.0	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	233827.515*(18)	CH_3CH_2CN	8(4,5)−7(3,4)	9.9[fb]	SgrB2(N)	SEST 15 m	Num98	
	233842.851*(18)	CH_3CH_2CN	8(4,4)−7(3,5)	13.7[fb]	SgrB2(N)	SEST 15 m	Num98	
	233845.126*(24)	CH_3OCHO	19(11,8)−18(11,7) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233854.263*(21)	CH_3OCHO	19(11,*)−18(11,*) A	0.7	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233867.128*(20)	CH_3OCHO	19(11,9)−18(11,8) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	233896.552*(8)	NH_2CHO	11(3,9)−10(3,8)	22.9[f]	SgrB2(N)	SEST 15 m	Num98	
U	233916.	unidentified		6.6[f]	SgrB2(N)	SEST 15 m	Num98	
U	233945.	unidentified		19.4[f]	SgrB2(N)	SEST 15 m	Num98	
	233949.985*(34)	$OS^{18}O$	24(2,22)−24(1,23)	5.5[f]	SgrB2(M)	SEST 15 m	Num98	
	233951.264*(14)	$t-CH_3CH_2OH$	13(5,9)−13(4,10)	2.5[f]	SgrB2(M)	SEST 15 m	Num98	
	233958.904*(24)	CH_3OCHO	16(9,8)−16(8,9) E	3.4[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
U	233968.	unidentified		8.0[f]	SgrB2(N)	SEST 15 m	Num98	
	234011.357*(24)	CH_3OCHO	16(9,7)−16(8,8) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234011.614*(8)	$^{13}CH_3OH$	5(1,5)−4(1,4) A+	0.76[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	234011.838*(24)	CH_3OCHO	16(9,8)−16(8,9) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	234033.	unidentified		4.6[f]	SgrB2(N)	SEST 15 m	Num98	
	234051.178*(13)	$t-CH_3CH_2OH$	12(5,7)−12(4,8)	4.1[f]	SgrB2(N)	SEST 15 m	Num98	
	234112.250*(21)	CH_3OCHO	19(10,9)−18(10,8) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	234124.880*(20)	CH_3OCHO	19(10,10)−18(10,9) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234124.885*(20)	CH_3OCHO	19(10,9)−18(10,8) A	0.6[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234134.590*(20)	CH_3OCHO	19(10,10)−18(10,9) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234187.054*(19)	SO_2	28(3,25)−28(2,26)	1.6	OriMC−1	OVRO 10.4 m	Sut85	
	234198.322*(16)	CH_3CHO	4(3,1)−4(2,2)E	5.4[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	234220.	unidentified		1.8[f]	SgrB2(N)	SEST 15 m	Num98	
	234231.584*(4)	CH_3CH_2CN	42(6,36)−42(5,37)	2.1[f]	SgrB2(N)	SEST 15 m	Num98	JPL01
	234255.270*(13)	$t-CH_3CH_2OH$	12(5,8)−12(4,9)	7.8[f]	SgrB2(N)	SEST 15 m	Num98	
	234273.001*(24)	CH_3OCHO	15(9,7)−15(8,9) E	4.5[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	234281.184*(21)	CH_3OCH_3	28(3,26)−27(4,23) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	234282.346*(20)	CH_3OCH_3	28(3,26)−27(4,23) EE	9.7[bf]	SgrB2(N)	SEST 15 m	Num98	Gro98
	234283.508*(20)	CH_3OCH_3	28(3,26)−27(4,23) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
U	234291.	unidentified		0.6	OriMC−1	OVRO 10.4 m	Sut85	
	234315.482*(8)	NH_2CHO	11(3,8)−10(3,7)	17.1[f]	SgrB2(N)	SEST 15 m	Num98	
	234328.779*(24)	CH_3OCHO	15(9,*)−15(8,*) A	8.3[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	234338.2*(23)	CH_3CHO	19(2,17)−19(1,18) A+− $v_t=2$	3.9[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	234357.	unidentified		16.2[f]	SgrB2(N)	SEST 15 m	Num98	
U	234380.	unidentified		2.5[f]	SgrB2(M)	SEST 15 m	Num98	
	234385.736*(14)	CH_3CHO	6(−3,4)−6(−2,5) E	12.0	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	234390.	unidentified		2.5[f]	SgrB2(M)	SEST 15 m	Num98	
	234401.335*(87)	CH_3CHO	18(−2,17)−18(−1,18) E	12.0	Sgr B2(N)	SEST 15 m	Num98	Kle96
	234406.456*(13)	$t-CH_3CH_2OH$	11(5,6)−11(4,7)	8.1[f]	SgrB2(N)	SEST 15 m	Num98	
	234421.567*(6)	SO_2	16(6,10)−17(5,13)	1.5	OriMC−1	OVRO 10.4 m	Sut85	
	234423.951*(10)	CH_3CH_2CN	26(4,22)−25(4,21)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	234433.1*(5)	AlF	7−6	0.29[f]	IRC+10216	IRAM 30 m	Gue95	Gue95
	234486.196*(14)	CH_3CHO	7(−3,5)−7(−2,6) E	12.0	Sgr B2(N)	SEST 15 m	Num98	Kle96
	234486.388*(20)	CH_3OCHO	19(9,10)−18(9,9) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234502.250*(20)	CH_3OCHO	19(9,11)−18(9,10) A	1.1[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234502.441*(20)	CH_3OCHO	19(9,10)−18(9,9) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234508.552*(17)	CH_3OCHO	19(9,11)−18(9,10) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	234512.0(15)	unidentified		0.2[f]	IRC+10216	IRAM 30 m	Gue95	
	234529.290*(24)	CH_3OCHO	14(9,6)−14(8,7) E	9.9[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	234533.9*(1)	SiC_2	10(8,*)−9(8,*)	16.0[f]	IRC+10216	IRAM 30 m	Gue95	
	234550.208*(14)	CH_3OCHO	14(9,5)−14(8,6) E	2.8[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	234560.936*(27)	$^{13}CH_3OH$	9(1,9)−8(0,8) E $v_t=1$	1.8[f]	SgrB2(N)	SEST 15 m	Num98	Xu_97
U	234578.	unidentified		2.0[f]	SgrB2(N)	SEST 15 m	Num98	
U	234592.	unidentified		4.1[f]	SgrB2(N)	SEST 15 m	Num98	
	234631.323*(27)	CH_3CH_2CN	36(3,33)−35(4,32)	1.4[f]	SgrB2(N)	SEST 15 m	Num98	
	234666.157*(14)	$t-CH_3CH_2OH$	10(5,5)−10(4,6)	4.3[f]	SgrB2(N)	SEST 15 m	Num98	
	234683.451*(17)	CH_3OH	4(2,3)−5(1,4)A−	2.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	234698.467*(21)	CH_3OH	5(−4,2)−6(−3,4) E	1.2	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	234714.797*(14)	$t-CH_3CH_2OH$	10(5,6)−10(4,7)	5.2[f]	SgrB2(N)	SEST 15 m	Num98	
	234726.538*(16)	CH_3OCHO	20(4,17)−19(3,16) E	2.7[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
	234735.557*(25)	CH_3OCHO	13(9,5)−13(8,6) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	234737.458*(29)	CH_3OCHO	9(5,5)−8(4,4) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	234739.082*(17)	CH_3OCHO	20(2,18)−19(3,17) A	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	234758.793*(23)	$t-CH_3CH_2OH$	6(3,4)−5(2,3)	1.8	OriMC−1	NRAO 12 m	Tur87b	
	234781.701*(14)	CH_3CHO	8(−3,6)−8(−2,7) E	0.70[b]	OriMC−1	NRAO 12 m	Tur87b	Kle96
	234783.367*(28)	CH_3OCHO	9(5,4)−8(4,4) E	[b]	OriMC−1	NRAO 12 m	Tur87b	Oes99
	234784.006*(35)	CH_3OCHO	9(5,5)−8(4,5) E	[b]	OriMC−1	NRAO 12 m	Tur87b	Oes99
	234795.450*(8)	CH_3CHO	12(2,10)−11(2,9) E	[b]	OriMC−1	NRAO 12 m	Tur87b	Kle96
	234797.130*(28)	CH_3OCHO	13(9,4)−13(8,5) A	0.90[b]	OriMC−1	NRAO 12 m	Tur87b	Oes99
	234797.144*(28)	CH_3OCHO	13(9,5)−13(8,6) A	[b]	OriMC−1	NRAO 12 m	Tur87b	Oes99
	234812.988*(15)	SiS	13−12 v=1	0.060	IRC+10216	NRAO 12 m	Tur87a	
	234825.875*(8)	CH_3CHO	12(2,10)−11(2,9) A++	0.2	OriMC−1	NRAO 12 m	Tur87b	Kle96
U	234831.	unidentified	(U232041)	0.2	OriMC−1	NRAO 12 m	Tur87b	
	234842.780*(13)	CH_3CHO	6(3,3)−6(2,4) A	0.2	OriMC−1	NRAO 12 m	Tur87b	Kle96
	234852.866*(15)	$t-CH_3CH_2OH$	9(5,4)−8(4,5)	0.7	OriMC−1	NRAO 12 m	Tur87b	
U	234859.	unidentified		2.6[f]	SgrB2(N)	SEST 15 m	Num98	
	234873.877*(15)	$t-CH_3CH_2OH$	9(5,5)−9(4,6)	3.7[f]	SgrB2(N)	SEST 15 m	Num98	
	234882.481*(17)	CH_3CH_2CN	14(3,12)−13(2,11)	0.2	OriMC−1	NRAO 12 m	Tur87b	
	234916.770*(29)	CH_3OCHO	9(5,4)−8(4,5) A	0.4	OriMC−1	NRAO 12 m	Tur87b	Oes99
U	234930.	unidentified		2.6[f]	SgrB2(N)	SEST 15 m	Num98	
	234935.69(10)	PN	5−4	0.400	OriMC−1	NRAO 12 m	Tur87b	Wys72
	234955.295*(10)	HNCS	20(1,19)−10(1,18)	0.3	OriMC−1	NRAO 12 m	Tur87b	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	234963.018*(29)	CH_3OCHO	12(9,3)−12(8,4) A	[b]	OriMC−1	NRAO 12 m	Tur87b	Oes99
	234963.022*(29)	CH_3OCHO	12(9,4)−12(8,5) A	0.3[b]	OriMC−1	NRAO 12 m	Tur87b	Oes99
	234984.050*(16)	$t-CH_3CH_2OH$	8(5,3)−8(4,4)	3.0[f]	SgrB2(N)	SEST 15 m	Num98	
	234992.183*(16)	$t-CH_3CH_2OH$	8(5,4)−8(4,5)	3.8[f]	SgrB2(N)	SEST 15 m	Num98	
U	235002.	unidentified		2.2[f]	SgrB2(N)	SEST 15 m	Num98	
	235029.886*(20)	CH_3OCHO	19(8,11)−18(8,10) E	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	235046.506*(17)	CH_3OCHO	19(8,12)−18(8,11) A	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	235051.295*(17)	CH_3OCHO	19(8,12)−18(8,11) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	235051.402*(17)	CH_3OCHO	19(8,11)−18(8,10) A	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	235073.313*(18)	$t-CH_3CH_2OH$	7(5,2)−7(4,3)	6.7[fb]	SgrB2(N)	SEST 15 m	Num98	
	235076.038*(18)	$t-CH_3CH_2OH$	7(5,3)−7(4,4)	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	235085.	unidentified		2.4[f]	SgrB2(N)	SEST 15 m	Num98	
	235105.060*(26)	$c-C_2H_4O$	8(0,8)−7(1,7)	0.27[b]	Sgr B2(N)	SEST 15 m	Dic97	
	235105.093*(26)	$c-C_2H_4O$	8(1,8)−7(0,7)	[b]	Sgr B2(N)	SEST 15 m	Dic97	
	235114.260*(46)	HOCO+	11(2,10)−10(2,9)	1.8[fb]	SgrB2(N)	SEST 15 m	Num98	
	235119.827*(46)	HOCO+	11(2,9)−10(2,8)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	235131.372*(20)	$t-CH_3CH_2OH$	6(5,1)−6(4,2)	9.3[fb]	SgrB2(N)	SEST 15 m	Num98	
	235131.372*(20)	$t-CH_3CH_2OH$	6(5,2)−6(4,1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	235151.704*(7)	SO_2	4(2,2)−3(1,3)	1.0	OriMC−1	MMWO 4.9 m	Lor84a	
	235166.771*(21)	$t-CH_3CH_2OH$	5(5,0)−5(4,1)	5.5[fb]	SgrB2(N)	SEST 15 m	Num98	
	235166.771*(21)	$t-CH_3CH_2OH$	5(5,1)−5(4,2)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	235190.393*(42)	$HOCO^+$	11(0,11)−10(0,10)	5.0[f]	SgrB2(N)	SEST 15 m	Num98	
	235217.832*(17)	CH_3CHO	12(1,11)−11(1,10) A−− $v_t=1$	1.3[f]	SgrB2(N)	SEST 15 m	Num98	Kle96
U	235261.	unidentified		0.7	OriMC−1	OVRO10.4m	Sut85	
	235263.319*(40)	CH_3OCHO	9(9,0)−9(8,1) A	11.6[f]	SgrB2(N)	SEST 15 m	Num98	Oes99
U	235300.	unidentified		1.8[f]	SgrB2(N)	SEST 15 m	Num98	
	235337.1*(5)	CH_3NH_2	14(6)−15(5) As−+	2.2[fb]	SgrB2(N)	SEST 15 m	Num98	Num98
	235337.2*(5)	CH_3NH_2	14(−6)−15(−5) As−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	235340.5*(22)	CH_3CHO	17(2,15)−17(1,16) A+− $v_t=1$	2.2[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	235371.060*(17)	$^{13}CH_3OH$	5(−2,3)−4(−2,2) E $v_t=1$	[b]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	235374.768*(13)	$^{13}CH_3OH$	5(2,3)−4(2,2) A++ $v_t=1$	[b]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	235375.249*(70)	CH_3OCHO	11(3,8)−10(2,9) A	4.2[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	235378.019*(13)	$^{13}CH_3OH$	5(2,4)−4(2,3) A−− $v_t=1$	4.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	235421.373*(29)	$^{13}CH_3OH$	5(−1,4)−4(−1,3) E $v_t=1$	2.2[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	235450.959*(31)	$^{13}CH_3OH$	5(0,5)−4(0,4) A++ $v_t=1$	3.8[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	235483.	unidentified		7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	235509.39* (14)	$HC^{13}CCN$	26−25	12.6[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
U	235524.	unidentified		6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	235532.357*(54)	$HCC^{13}CN$	26−25	4.6[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
U	235541.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	235549.	unidentified		3.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	235563.82*(6)	CH_2CHCN	25(2,24)−24(2,23)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	235613.029*(14)	$^{13}CH_3OH$	5(1,4)−4(1,3) A−− $v_t=1$	5.0[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	235629.949*(89)	CH_3CHO	18(2,17)−18(1,18) A−+	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	235713.323*(12)	CH_3OCH_3	26(4,22)−26(3,24) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	235714.475*(10)	CH_3OCH_3	26(4,22)−26(3,24) EE	4.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	235715.627*(14)	CH_3OCH_3	26(4,22)−26(3,24) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
U	235731.	unidentified		3.0[f]	Sgr B2(M)	SEST 15 m	Num98	
	235734.9*(5)	CH_3NH_2	8(−2)−8(1) Aa	7.8[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	235784.	unidentified		8.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	235789.641 (30)	CO^+	3/2,2−1/2,1	0.1	M17SW	CSO 10.4 m	Lat93	Sas81b
U	235800.	unidentified		6.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	235844.542*(17)	CH_3OCHO	19(7,13)−18(7,12) A	0.54	OriMC−1	OVRO 10.4 m	Bla84	Oes99
	235865.878*(17)	CH_3OCHO	19(7,13)−18(7,12) E	0.48	OriMC−1	OVRO 10.4 m	Bla84	Oes99
	235881.179*(8)	$^{13}CH_3OH$	5(0,5)−4(0,4) E	0.60	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235887.063*(20)	CH_3OCHO	19(7,12)−18(7,11) E	0.54	OriMC−1	OVRO 10.4 m	Bla84	Oes99
U	235904.	unidentified		4.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	235917.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	235927.489*(9)	$^{34}SO_2$	5(2,4)−4(1,3)	0.59	OriMC−1	OVRO 10.4 m	Bla84	
	235932.376*(17)	CH_3OCHO	19(7,12)−18(7,11) A	0.47	OriMC−1	OVRO 10.4 m	Bla84	Oes99
	235938.210*(8)	$^{13}CH_3OH$	5(−1,5)−4(−1,4) E	0.68	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235951.915*(10)	$^{34}SO_2$	10(3,7)−10(2,8)	0.71	OriMC−1	OVRO 10.4 m	Bla84	
	235960.390*(8)	$^{13}CH_3OH$	5(0,5)−4(0,4) A+	0.71	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235961.331*(18)	SiS	13−12	0.39	IRC+10216	MMWO 4.9 m	Sah84	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	235971.104*(9)	$^{13}CH_3OH$	5(4,2)−4(4,1) A−	0.25[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235971.105*(9)	$^{13}CH_3OH$	5(4,1)−4(4,0) A+	[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235978.630*(9)	$^{13}CH_3OH$	5(−4,2)−4(−4,1) E	0.12	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235983.358*(16)	$t-CH_3CH_2OH$	14(1,14)−13(0,13)	22.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	235994.432*(10)	$^{13}CH_3OH$	5(4,1)−4(4,0) E	[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235996.202*(8)	CH_3CHO	12(1,11)−11(1,10) E	15.5[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	235997.100*(8)	$^{13}CH_3OH$	5(3,3)−4(3,2) A+	0.72[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	235997.431*(8)	$^{13}CH_3OH$	5(3,2)−4(3,1) A−	0.72[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236006.170*(8)	$^{13}CH_3OH$	5(3,2)−4(3,1) E	0.35	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236008.434*(7)	$^{13}CH_3OH$	5(2,4)−4(2,3) A−	0.65	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236016.581*(8)	$^{13}CH_3OH$	5(−3,3)−4(−3,2) E	0.36	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236041.416*(8)	$^{13}CH_3OH$	5(1,4)−5(1,3) E	0.56	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236049.136*(8)	CH_3CHO	12(1,11)−11(1,10) A−−	14.8[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	236049.534*(7)	$^{13}CH_3OH$	5(2,3)−4(2,2) A+	0.41	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236062.064*(8)	$^{13}CH_3OH$	5(−2,4)−2(−2,3) E	[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236062.553 (20)	CO^+	3/2,2−1/2,1	0.1	M17SW	NRAO 12 m	Lat93	Sas81b
	236062.854*(8)	$^{13}CH_3OH$	5(2,3)−4(2,2) E	0.92[b]	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	236102.128*(14)	D_2CO	4(2,2)−3(2,1)	0.53	IRAS16293−2422	IRAM 30 m	Cec98	
	236146.424*(18)	$t-CH_3CH_2OH$	15(1,14)−14(2,13)	6.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	236159.906*(16)	CH_2CHCN	25(2,24)−24(2,23) $v_{11}=1$	25.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	236184.	unidentified		13.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	236216.685*(7)	SO_2	16(1,15)−15(2,14)	1.1	OriMC−1	MMWO 4.9 m	Lor81a	
	236229.170*(17)	CH_3CH_2CN	31(2,29)−30(3,28)	11.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	236287.610 (18)	SiC	$3\Pi_2$ 6−5e, f	0.18	IRC+10216	IRAM 30 m	Cer89	Cer89
	236295.657*(17)	$^{34}SO_2$	20(7,13)−21(6,16)	5.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	236299.039*(22)	$t-CH_3CH_2OH$	6(3,3)−5(2,4)	7.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	236353.064*(39)	$^{13}CH_3OH$	11(0,11)−10(1,10) A++	15.2[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	236355.911*(16)	CH_3OCHO	20(3,18)−19(3,17) E	0.9	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	236365.562*(17)	CH_3OCHO	20(3,18)−19(3,17) A	0.7	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	236407.9*(5)	CH_3NH_2	6(−2)−6(1) As	10.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	236452.297*(57)	SO	1(2)−2(1)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	236512.780*(8)	HCCCN	26−25	0.8	OriMC−1	MMWO 4.9 m	Lor81	
	236524.8*(14)	HCCCN	26−25 $v_5=1$ $\ell=1$ e	8.1[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
U	236553.	unidentified		2.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	236642.	unidentified		8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	236653.4*(14)	HCCCN	26−25 $v_5=1$ $\ell=1$ f	23.6[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	236717.20*(1)	HCOOH	11(1,11)−10(1,10)	0.4	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	236726.33* (27)	H_2CS	7(1,7)−6(1,6)	1.1	OriMC−1	MMWO 4.9 m	Lor84a	
	236743.645*(17)	CH_3OCHO	19(5,15)−18(5,14) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	236759.683*(17)	CH_3OCHO	19(5,15)−18(5,14) A	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	236800.513*(17)	CH_3OCHO	19(6,14)−18(6,13) E	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	236810.327*(17)	CH_3OCHO	19(6,14)−18(6,13) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	236844.005*(25)	NH_2CHO	24(3,21)−24(2,22)	11.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	236852.	unidentified		4.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	236902.16* (72)	HCCCN	26−25 $v_6=1$ $\ell=1$ e	15.1[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	236936.168*(29)	CH_3OH	14(1,13)−13(2,12) A−	2.3	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	236974.518*(6)	CH_3CH_2CN	50(5,46)−50(4,47)	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	236977.	unidentified		0.9	OriMC−1	OVRO 10.4 m	Sut85	
	237046.080*(8)	CH_3OCH_3	7(2,5)−6(1,6) AE	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237046.094*(8)	CH_3OCH_3	7(2,5)−6(1,6) EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237048.836*(6)	CH_3OCH_3	7(2,5)−6(1,6) EE	1.5[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237051.586*(10)	CH_3OCH_3	7(2,5)−6(1,6) AA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237068.819*(7)	SO_2	12(3,9)−12(2,10)	0.9	OriMC−1	MMWO 4.9 m	Lei84a	
	237093.183*(79)	HCCCN	26−25 $v_7=1$ $\ell=1$ e	0.8	OriMC−1	OVRO 10.4 m	Sut85	Laf78
	237095.785*(23)	NH_2CHO	23(3,20)−23(2,21)	16.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	237129.23* (19)	CH_3OH	22(1,21)−22(0,22) E	0.7	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	237144.4*(5)	CH_3NH_2	2(−2)−2(−1) Ea	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	237150.052*(30)	SiC_2	10(4,7)−9(4,6)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	237169.107*(25)	$^{34}SO_2$	25(8,18)−26(7,19)	[b]	OriMC−1	JCMT 15 m	Gre91	
	237170.451*(10)	CH_3CH_2CN	26(3,23)−25(3,22)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
U	237216.	unidentified		5.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	237260.103*(12)	CH_3OCH_3	25(3,23)−25(2,24) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	237262.593*(10)	CH_3OCH_3	25(3,23)−25(2,24) EE	10.0[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	237265.082*(14)	CH_3OCH_3	25(3,23)−25(2,24) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	237266.959*(20)	CH_3OCHO	21(1,20)−20(2,19) A	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	237273.631(8)	$OC^{34}S$	20−19	0.5	OriMC−1	OVRO 10.4 m	Sut85	Dub80
U	237288.0	unidentified		2.0	OriMC−1	JCMT 15 m	Gre91	
	237297.478*(16)	CH_3OCHO	20(2,18)−19(2,17) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237306.018*(17)	CH_3OCHO	20(2,18)−19(2,17) A	1.1[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237309.515*(17)	CH_3OCHO	21(2,20)−20(2,19) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237315.140*(20)	CH_3OCHO	21(2,20)−20(2,19) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237331.347*(29)	SiC_2	10(4,7)−9(4,6)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	237344.881*(17)	CH_3OCHO	21(1,20)−20(1,19) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237350.434*(20)	CH_3OCHO	21(1,20)−20(1,19) A	0.7	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237360.893*(11)	CH_3CH_2CN	28(1,27)−27(2,26)	6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	237393.188*(17)	CH_3OCHO	21(2,20)−20(1,19) E	2.1[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	237397.105*(4)	CH_2CHCN	25(7,*)−24(7,*)	26.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	237398.615*(20)	CH_3OCHO	21(2,20)−20(1,19) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	237405.190*(10)	CH_3CH_2CN	26(2,24)−25(2,23)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	237412.012*(4)	CH_2CHCN	25(6,20)−24(6,19)	23.1[fb]	Sgr B2(N)	SEST 15 m	Num98	
	237412.053*(4)	CH_2CHCN	25(6,19)−24(6,18)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237415.524*(4)	CH_2CHCN	25(8,*)−24(8,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237432.049*(79)	HCCCN	26−25 v_7 =1 ℓ=1 f	0.7	OriMC−1	OVRO 10.4 m	Sut85	Laf78
	237456.25* (19)	CH_2CHCN	25(9,*)−24(9,*)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	237476.064*(13)	CH_3CH_2CN	25(2,24)−24(1,23)	0.7	OriMC−1	JCMT 15 m	Gre91	
	237482.77*(9)	CH_2CHCN	25(5,21)−24(5,20)	0.3[b]	OriMC−1	OVRO 10.4 m	Sut85	
	237485.01*(9)	CH_2CHCN	25(5,20)−24(5,19)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	237514.258*(5)	CH_2CHCN	25(10,*)−24(10,*)	17.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	237521.048*(31)	$^{34}SO_2$	28(2,25)−28(2,26)	11.4[f]	Sgr B2(M)	SEST 15 m	Num98	
U	237545.	unidentified		6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	237585.809*(6)	CH_2CHCN	25(11,*)−24(11,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237591.40*(6)	CH_2CHCN	25(3,23)−24(3,22)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	237602.217*(38)	SO_2	28(3,25)−28(2,26) v_2 =1	8.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	237618.821*(8)	CH_3OCH_3	9(2,8)−8(1,7) EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237618.826*(8)	CH_3OCH_3	9(2,8)−8(1,7) AE	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237620.888*(6)	CH_3OCH_3	9(2,8)−8(1,7) EE	0.9[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237622.953*(8)	CH_3OCH_3	9(2,8)−8(1,7) AA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	237638.109*(3)	CH_2CHCN	25(4,22)−24(4,21)	11.1[fb]	Sgr B2(N)	SEST 15 m	Num98	
	237669.176*(7)	CH_2CHCN	25(12,*)−24(12,*)	8.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	237700.302*(13)	$OS^{18}O$	11(3,8)−11(2,9)	9.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	237711.89*(7)	CH_2CHCN	25(4,21)−24(4,20)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	237738.35* (13)	CH_2CHCN	25(8,*)−24(8,*) v_{15} =1	3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	237751.	unidentified		6.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	237763.118*(9)	CH_2CHCN	25(13,*)−24(13,*)	3.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	237781.47*(8)	CH_2CHCN	25(5,21)−24(5,20) v_{15} =1	7.2[fb]	Sgr B2(N)	SEST 15 m	Num98	
	237783.41*(8)	CH_2CHCN	25(5,20)−24(5,19) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237786.32* (16)	CH_2CHCN	25(9,*)−24(9,*) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237807.577*(17)	CH_3OCHO	19(6,13)−18(6,12) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237829.829*(17)	CH_3OCHO	19(6,13)−18(6,12) A	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	237851.858*(10)	CH_3CH_2CN	27(2,26)−26(2,25)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	237859.71*(7)	C_4H	51/2−49/2	0.053	IRC+10216	MMWO 4.9 m	Lor84a	
	237866.789*(12)	CH_2CHCN	25(14,11)−24(14,10)	5.3[fb]	Sgr B2(N)	SEST 15 m	Num98	
	237866.789*(12)	CH_2CHCN	25(14,12)−24(14,11)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237896.673*(7)	NH_2CHO	11(2,9)−10(2,8)	17.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	237898.03*(7)	C_4H	49/2−47/2	0.055	IRC+10216	MMWO 4.9 m	Lor84a	
	237910.384*(6)	NH_2CHO	10(1,10)−9(0,9)	3.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	237926.37*(7)	CH_2CHCN	25(4,22)−24(4,21) v_{15} =1	3.6[fb]	Sgr B2(N)	SEST 15 m	Num98	
	237930.08* (21)	CH_2CHCN	25(11,*)−24(11,*) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	237968.08* (17)	HCCCN	26−25 v_7 =2 ℓ=0	14.6[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	237983.445*(8)	$^{13}CH_3OH$	5(1,4)−4(1,3) A−	0.84	OriMC−1	OVRO 10.4 m	Bla84	Xu_97
	238009.67* (13)	HCCCN	26−25 v_7 =2 ℓ=2 e	18.2[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	238015.68* (19)	$H^{13}CCCN$	27−26	18.2[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	238053.90* (19)	HCCCN	26−25 v_7 =2 ℓ=2 f	8.7[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	238082.086*(16)	CH_2CHCN	25(7,*)−24(7,*) v_{11} =1	10.5[fb]	Sgr B2(N)	SEST 15 m	Num98	
	238091.646*(17)	CH_2CHCN	25(8,*)−24(8,*) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	238106.875*(16)	CH_2CHCN	25(6,20)−24(6,19) v_{11} =1	9.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	238106.927*(16)	CH_2CHCN	25(6,19)−24(6,18) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	238118.052*(32)	CH_3OCHO	7(6,2)−6(5,2) E	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	238124.055*(19)	CH_2CHCN	25(9,*)−24(9,*) v_{11} =1	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	238155.883*(20)	CH_3OCHO	22(1,22)−21(1,21) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	238156.319*(20)	CH_3OCHO	22(0,22)−21(0,21) E	2.7[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	238156.907*(21)	CH_3OCHO	22(1,22)−21(1,21) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	238157.342*(21)	CH_3OCHO	22(0,22)−21(0,21) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	238166.359*(10)	SO_2	17(3,15)−18(0,18)	9.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	238173.402*(21)	CH_2CHCN	25(10,*)−24(10,*) v_{11} =1	6.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	238182.	unidentified		3.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	238189.997*(15)	CH_2CHCN	25(5,21)−24(5,20) v_{11} =1	6.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	238190.083*(34)	CH_3OCHO	7(6,2)−6(5,1) A	0.2[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	238190.244*(34)	CH_3OCHO	7(6,1)−6(5,2) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	238192.700*(15)	CH_2CHCN	25(5,20)−24(5,19) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	238236.388*(25)	CH_2CHCN	25(11,*)−24(11,*) v_{11} =1	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	238296.827*(15)	CH_2CHCN	25(3,23)−24(3,22) v_{11} =1	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	238301.574 (15)	CP	5−4 J=9/2−7/2 F=5−4	0.040	IRC+10216	IRAM 30 m	Gue90	Sai89
	238304.519 (10)	CP	5−4 J=9/2−7/2 F=4−3	0.040	IRC+10216	IRAM 30 m	Gue90	Sai89
	238306.335*(28)	NH_2CHO	25(3,22)−25(2,23)	4.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	238316.004*(5)	NH_2CN	12(1,12)−11(1,11)	5.0[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	238359.342*(15)	CH_2CHCN	25(4,22)−24(4,21) v_{11} =1	7.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	238396.151*(42)	CH_2CHCN	25(13,*)−24(13,*) v_{11} =1	10.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	238444.515*(15)	CH_2CHCN	25(4,21)−24(4,20) v_{11} =1	9.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	238457.	unidentified		8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	238478.230*(21)	CH_3CN	13(12)−12(12)	6.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	238490.890*(57)	CH_2CHCN	25(14,*)−24(14,*) v_{11} =1	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	238532.389*(10)	NH_2CHO	11(2,10)−11(1,11)	8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	238554.	unidentified		5.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	238559.	unidentified		3.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	238568.317*(8)	$g-CH_3CH_2OH$	6(1,5)−5(0,5) v_t =1−0	3.0[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	238583.173*(18)	CH_3CN	13(11)−12(11)	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	238602.	unidentified		6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	238616.830*(45)	CH_3OCHO	38(10,29)−38(9,30) E	5.2[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	238632.	unidentified		12.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	238667.995*(61)	$t-CH_3CH_2OH$	27(5,23)−27(4,24)	11.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	238679.131*(14)	CH_3CN	13(10)−12(10)	13.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	238683.403*(14)	33 SO_2	5(2,4)−4(1,3)	8.2[f]	Sgr B2(M)	SEST 15 m	Num98	
	238690.178*(4)	CH_2CHCN	25(1,25)−24(0,24)	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	238697.744*(8)	SO_2	4(2,2)−3(1,3) v_2 =1	6.0[f]	Sgr B2(M)	SEST 15 m	Num98	
	238701.794*(23)	$t-CH_3CH_2OH$	11(2,10)−10(1,9)	7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	238726.70* (12)	CH_2CHCN	26(1,26)−25(1,25)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	238726.816*(4)	CH_2CHCN	26(1,26)−25(1,25)	21.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	238766.067*(12)	CH_3CN	13(9)−12(9)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
U	238778.	unidentified		9.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	238796.22*(7)	CH_2CHCN	25(3,22)−24(3,21)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	238826.5*(5)	CH_2CHCN	25(17,*)−24(17,*) v_{11} =1	6.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	238843.944*(9)	CH_3CN	13(8)−12(8)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	238854.779*(24)	$CH_3{}^{13}CN$	13(6)−12(6)	15.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	238855.959(8)	CP	5−4 J=11/2−9/2 F=6−5	0.050	IRC+10216	IRAM 30 m	Gue90	Sai89
	238856.932(4)	CP	5−4 J=11/2−9/2 F=5−4	0.050	IRC+10216	IRAM 30 m	Gue90	Sai89
U	238870.	unidentified		11.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	238889.	unidentified		13.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	238899.927*(22)	NH_2CHO	22(3,19)−22(2,20)	19.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	238905.106*(16)	$CH_3{}^{13}CN$	13(5)−12(5)	19.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	238912.733*(7)	CH_3CN	13(7)−12(7)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	238926.851*(16)	CH_3OCHO	20(3,18)−19(2,17) E	0.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	238946.311*(11)	$CH_3{}^{13}CN$	13(4)−12(4)	18.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	238972.405*(5)	CH_3CN	13(6)−12(6)	0.31	OriMC−1	MMWO 4.9 m	Lor84	
	238992.491*(7)	SO_2	21(7,15)−22(6,16)	<0.12	OriMC−1	MMWO 4.9 m	Lor84	
	239001.290*(9)	$CH_3{}^{13}CN$	12(2)−11(2)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	239015.042*(10)	$CH_3{}^{13}CN$	12(1)−11(1)	0.5[b]	OriMC−1	OVRO 10.4 m	Sut85	
	239019.614*(12)	CH_3OCH_3	24(5,19)−24(4,20) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	239019.616*(12)	CH_3OCH_3	24(5,19)−24(4,20) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	239019.627*(11)	$CH_3{}^{13}CN$	12(0)−11(0)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	239020.533*(12)	CH_3OCH_3	24(5,19)−24(4,20) EE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	239021.452*(12)	CH_3OCH_3	24(5,19)−24(4,20) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	239022.937*(4)	CH_3CN	13(5)−12(5)	0.33	OriMC−1	MMWO 4.9 m	Lor84	
U	239046.0	unidentified		1.3	OriMC−1	JCMT 15 m	Gre91	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	239064.309*(3)	CH_3CN	13(4)−12(4)	0.39	OriMC−1	MMWO 4.9 m	Lor84	
	239096.504*(3)	CH_3CN	13(3)−12(3)	0.68	OriMC−1	MMWO 4.9 m	Lor84	
	239119.510*(4)	CH_3CN	13(2)−12(2)	0.54	OriMC−1	MMWO 4.9 m	Lor84	
	239128.550*(16)	$S^{18}O$	6(6)−5(5)	0.13	W3(IRS5)	JCMT 15 m	Hel97	
	239133.317*(4)	CH_3CN	13(1)−12(1)	0.73	OriMC−1	MMWO 4.9 m	Lor84	
	239137.920*(4)	CH_3CN	13(0)−12(0)	0.83	OriMC−1	MMWO 4.9 m	Lor84	
U	239168.	unidentified		6.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	239179.278*(5)	CH_3CCH	14(4)−13(4)	0.16	OriMC−1	MMWO 4.9 m	Lor84a	
	239192.03*(9)	CH_2CHCN	26(1,26)−25(1,25) $v_{15}=1$	6.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	239198.13*(8)	CH_2CHCN	25(1,24)−24(1,23) $v_{15}=1$	7.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	239199.653*(16)	CH_2CHCN	26(1,26)−25(1,25) $v_{11}=1$	10.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	239211.212*(3)	CH_3CCH	14(3)−13(3)	0.24	OriMC−1	MMWO 4.9 m	Lor84a	
	239234.032*(2)	CH_3CCH	14(2)−13(2)	0.19	OriMC−1	MMWO 4.9 m	Lor84a	
	239247.727*(2)	CH_3CCH	14(1)−13(1)	0.36	OriMC−1	MMWO 4.9 m	Lor84a	
	239252.292*(2)	CH_3CCH	14(0)−13(0)	0.37	OriMC−1	MMWO 4.9 m	Lor84a	
	239278.548*(42)	CH_3OCHO	37(10,28)−37(9,29) E	4.0[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	239282.	unidentified		4.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	239305.848*(50)	CH_3COOH	22(*,22)−21(*,21) E	[b]	W51e2	BIMA Array	Rem02	Ily00
	239309.40* (20)	CH_3CN	13(12)−12(12) $v_8=1$ $\ell=+1$	0.95[be]	W51e2	BIMA Array	Rem02	Bou80
U	239321.	unidentified		2.83[e]	W51e2	BIMA Array	Rem02	
	239336.054*(17)	$OS^{18}O$	13(1,13)−12(0,12)	8.5[f]	Sgr B2(M)	SEST 15 m	Num98	
	239338.771*(50)	CH_3COOH	22(*,22)−21(*,21) A	[b]	W51e2	BIMA Array	Rem02	Ily00
U	239344.	unidentified		5.03[be]	W51e2	BIMA Array	Rem02	
	239389.842*(4)	NH_2CN	12(2,11)−11(2,10) v=1	3.8[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	239427.5*(5)	CH_3NH_2	4(−2)−4(−1) Ea	7.2[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	239444.4*(5)	CH_3NH_2	3(2)−3(1) Ea	4.3[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	239475.04* (12)	CH_3CN	13(8)−12(8) $v_8=1$ $\ell=-1$	12.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	239478.079 (50)	$g-CH_3CH_2OH$	14(2,13)−13(2,12) $v_t=0-0$	12.3[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	239492.33* (14)	CH_3CN	13(10)−12(10) $v_8=1$ $\ell=1$	6.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	239551.366 (50)	$g-CH_3CH_2OH$	14(2,13)−13(2,12) $v_t=1-1$	8.7[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	239554.22* (12)	CH_3CN	13(7)−12(7) $v_8=1$ $\ell=-1$	8.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	239562.032*(8)	^{18}OCS	21−20	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	239570.48* (12)	CH_3CN	13(9)−12(9) $v_8=1$ $\ell=1$	5.2[fb]	Sgr B2(N)	SEST 15 m	Num98	
	239609.95* (10)	CH_3OCHO	32(5,28)−32(3,29) A	0.9	OMC−IRc2	IRAM 30 m	Jac90	Plu84
	239624.07* (11)	CH_3CN	13(6)−12(6) $v_8=1$ $\ell=-1$	[b]	Sgr B2(N)	SEST 15 m	Num98	
	239627.16* (12)	CH_3CN	13(1)−12(1) $v_8=1$ $\ell=1$	0.4	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239639.45* (10)	CH_3CN	13(8)−12(8) $v_8=1$ $\ell=1$	0.8	OMC−IRc2	IRAM 30 m	Jac90	Bou80
U	239650.8	unidentified		0.8	OMC−IRc2	IRAM 30 m	Jac90	
U	239651.	unidentified		9.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	239674.0	unidentified		0.6	OMC−IRc2	IRAM 30 m	Jac90	
	239682.806*(10)	CH_3CH_2CN	27(1,26)−26(1,25)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	239684.57* (10)	CH_3CN	13(5)−12(5) $v_8=1$ $\ell=-1$	7.2	OMC−IRc2	IRAM 30 m	Jac90	Bou80
	239699.25* (10)	CH_3CN	13(7)−12(7) $v_8=1$ $\ell=1$	1.6	OMC−IRc2	IRAM 30 m	Jac90	Bou80
	239708.28* (11)	CH_2CHCN	26(0,26)−25(0,25)	0.1	OriMC−1	OVRO 10.4 m	Sut85	
	239731.344*(33)	CH_3OH	16(7,10)−17(6,11) A+	0.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	239731.344*(33)	CH_3OH	16(7,9)−17(6,12) A−	0.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	239735.65* (10)	CH_3CN	13(4)−12(4) $v_8=1$ $\ell=1$	2.2	OMC−IRc2	IRAM 30 m	Jac90	Bou80
	239746.220*(6)	CH_3OH	5(1,5)−4(1,4) A+	7.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	239777.19* (11)	CH_3CN	13(3)−12(3) $v_8=1$ $\ell=-1$	0.3	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239791.76* (11)	CH_3CN	13(5)−12(5) $v_8=1$ $\ell=1$	0.2	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239805.275*(5)	NH_2CN	12(4,8)−11(4,7)	0.4[b]	OMC−IRc2	IRAM 30 m	Jac90	JPL01
	239805.275*(5)	NH_2CN	12(4,9)−11(4,8)	[b]	OMC−IRc2	IRAM 30 m	Jac90	JPL01
	239808.91* (12)	CH_3CN	13(2)−12(2) $v_8=1$ $\ell=-1$	0.6	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239816.08*(5)	CH_2CHCN	25(1,24)−24(1,23)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	239824.78* (12)	CH_3CN	13(4)−12(4) $v_8=1$ $\ell=1$	0.8	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239829.96* (13)	CH_3CN	13(1)−12(1) $v_8=1$ $\ell=-1$	0.5	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239836.06* (18)	CH_3CN	13(0)−12(0) $v_8=1$ $\ell=1$	0.5	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239850.01* (14)	CH_3CN	13(3)−12(3) $v_8=1$ $\ell=1$	0.7	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	239871.67* (29)	CH_3CN	13(2)−12(2) $v_8=1$ $\ell=1$	0.4	OriMC−1	OVRO 10.4 m	Sut85	Bou80
U	239879.	unidentified		9.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	239887.277*(11)	CH_3CH_2CN	28(0,28)−27(1,27)	1.8	OMC−IRc2	IRAM 30 m	Jac90	
	239908.860*(3)	NH_2CN	12(2,10)−11(2,9)	0.16	OriMC−1	NRAO 12 m	Tur85	JPL01
	239927.456*(77)	CH_3OCHO	44(8,36)−44(7,37) E	0.6	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	239935.347*(45)	CH_3OCHO	39(8,32)−39(7,33) A	0.8	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	239945.202*(23)	CH_3CH_2CN	23(4,20)−23(2,21)	0.6	OMC−IRc2	IRAM 30 m	Jac90	
	239951.786*(7)	NH_2CHO	11(1,11)−10(1,9)	2.1	OMC−IRc2	IRAM 30 m	Jac90	
U	239960.7	unidentified		1.2	OMC−IRc2	IRAM 30 m	Jac90	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	239971.0	unidentified		0.4	OMC−IRc2	IRAM 30 m	Jac90	
	239974.426*(75)	CH_3OCHO	44(8,36)−44(7,37) A	4.5[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	239977.5	unidentified		2.0	OMC−IRc2	IRAM 30 m	Jac90	
	239984.730*(40)	$(CH_3)_2CO$	24(0,24)−23(1,23) AE	[b]	Ori−IRc2	IRAM 30 m	Jac90	Vac86
	239984.779*(40)	$(CH_3)_2CO$	24(0,24)−23(1,23) EA	0.9[b]	Ori−IRc2	IRAM 30 m	Jac90	Vac86
U	239988.	unidentified		7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	239991.110*(28)	$(CH_3)_2CO$	24(0,24)−23(1,23) EE	1.4	Ori−IRc2	IRAM 30 m	Jac90	Vac86
	239997.382*(42)	$(CH_3)_2CO$	24(0,24)−23(1,23) AA	0.5	Ori−IRc2	IRAM 30 m	Jac90	Vac86
U	240008.6	unidentified		0.4	OMC−IRc2	IRAM 30 m	Jac90	
	240021.129*(20)	CH_3OCHO	19(3,16)−18(3,15) E	1.0	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	240034.638*(20)	CH_3OCHO	19(3,16)−18(3,15) A	0.15	W3(H2O)	JCMT 15 m	Hel97	Oes99
U	240045.3	unidentified		0.5	OMC−IRc2	IRAM 30 m	Jac90	
	240050.1(15)	$^{30}SiC_2$	10(2,8)−9(2,7)	n.r.	IRC+10216	IRAM 30 m	Cer91b	Cer91b
	240057.476*(11)	SO_2	11(5,7)−12(4,8) $v_2=1$	0.28	OriMC−1	NRAO 12 m	Tur85	
U	240079.1	unidentified		0.5	OMC−IRc2	IRAM 30 m	Jac90	
U	240086.	unidentified		0.09	IRAS16293−2422	JCMT 15 m	Bla94	
	240089.83*(12)	CH_3CN	13(1)−12(1) $v_8=1$ $\ell=1$	0.6	OriMC−1	OVRO 10.4 m	Sut85	Bou80
	240110.199*(41)	$t-CH_3CH_2OH$	27(2,25)−27(1,26)	2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	240130.311*(16)	CH_2CHCN	26(0,26)−25(0,25) $v_{11}=1$	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	240130.645*(4)	NH_2CN	12(3,10)−11(3,9)	7.4[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	240132.690*(4)	NH_2CN	12(3,9)−11(3,8)	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	240185.612*(97)	CH_2CO	12(1,12)−11(1,11)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	240224.61*(8)	CH_2CHCN	26(0,26)−25(0,25) $v_{15}=1$	13.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	240241.502*(17)	CH_3OH	5(3,2)−6(2,4) E	0.55	OriMC−1	MMWO 4.9 m	Lor84a	Xu_97
	240266.26* (28)	H_2CS	7(0,7)−6(0,6)	0.55	OriMC−1	MMWO 4.9 m	Lor84a	
	240319.342*(12)	CH_3CH_2CN	28(1,28)−27(1,27)	0.16	OriMC−1	MMWO 4.9 m	Lor84a	
	240331.43* (16)	H_2CS	7(4,3)−6(4,2)	[b]	OriMC−1	MMWO 4.9 m	Lor84a	
	240331.43* (16)	H_2CS	7(4,4)−6(4,3)	0.07[b]	OriMC−1	MMWO 4.9 m	Lor84a	
U	240362.	unidentified		8.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	240381.28* (23)	H_2CS	7(2,6)−6(2,5)	0.16	OriMC−1	MMWO 4.9 m	Lor84a	
	240392.29* (18)	H_2CS	7(3,5)−6(3,4)	0.38[b]	OriMC−1	MMWO 4.9 m	Lor84a	
	240392.96* (18)	H_2CS	7(3,4)−6(3,3)	[b]	OriMC−1	MMWO 4.9 m	Lor84a	
	240400.827*(50)	CH_3OCHO	41(9,33)−41(8,34) A	4.9[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	240408.987*(50)	CH_3OCHO	41(9,33)−41(8,34) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	240417.	unidentified		9.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	240429.189*(12)	CH_3CH_2CN	28(0,28)−27(0,27)	0.12	OriMC−1	MMWO 4.9 m	Lor84a	
	240435.181*(16)	CH_2CHCN	25(1,24)−24(1,23) $v_{11}=1$	10.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240443.	unidentified		12.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	240454.85(5)	CH_3OH	5(1,5)−4(1,4) A++ $v_t=2$	7.6[f]	Sgr B2(N)	SEST 15 m	Num98	Her84
U	240471.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240473.4	unidentified		0.11	OriMC−1	MMWO 4.9 m	Lor84a	
U	240500.	unidentified		4.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240516.	unidentified		6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240525.	unidentified		5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	240548.29* (23)	H_2CS	7(2,5)−6(2,4)	0.16	OriMC−1	MMWO 4.9 m	Lor84a	
	240608.704*(26)	CH_3CHO	12(1,12)−11(0,11) A++ $v_t=1$	6.2[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	240612.350*(12)	$^{33}SO_2$	10(3,7)−10(2,8)	4.9[f]	Sgr B2(M)	SEST 15 m	Num98	
U	240627.	unidentified		4.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240636.	unidentified		8.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240717.	unidentified		9.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240729.	unidentified		5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240740.	unidentified		5.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240749.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240757.91(5)	CH_3OH	5(2,3)−4(2,2) A++ $v_t=2$	[b]	Sgr B2(N)	SEST 15 m	Num98	Her84
	240757.91(5)	CH_3OH	5(2,4)−4(2,3) A−− $v_t=2$	4.8[b]	Sgr B2(N)	SEST 15 m	Num98	Her84
U	240776.	unidentified		2.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240799.	unidentified		1.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	240807.	unidentified		1.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	240838.909*(17)	$g-CH_3CH_2OH$	14(1,13)−13(1,12) $v_t=0-0$	6.6[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	240861.254*(12)	CH_3CH_2CN	28(1,28)−27(0,27)	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	240875.735*(16)	HNCO	11(1,11)−10(1,10)	1.0	OriMC−1	OVRO 10.4 m	Sut85	
	240916.2	CH_3OH	5(3,3)−4(3,2) A++ $v_t=2$	0.14[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	240916.2	CH_3OH	5(3,3)−4(3,2) A−− $v_t=2$	[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
U	240929.	unidentified		8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	240932.018 (20)	CH_3OH	5(4,1)−4(4,0) A++ $v_t=2$	[b]	Sgr B2(N)	SEST 15 m	Num98	And90

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	240932.018 (20)	CH_3OH	5(4,2)−4(4,1) A−− v_t =2	[b]	Sgr B2(N)	SEST 15 m	Num98	And90
	240936.73(5)	CH_3OH	5(−2,3)−4(−2,2) E v_t =2	[b]	Sgr B2(N)	SEST 15 m	Num98	Her84
	240938.94(5)	CH_3OH	5(0,5)−4(0,4) A++ v_t =2	10.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Her84
	240942.788*(7)	SO_2	18(1,17)−18(0,18)	0.8	OriMC−1	MMWO 4.9 m	Lei84	
	240948.303 (20)	CH_3OH	5(3,3)−4(3,2) E v_t =2	[b]	Sgr B2(N)	SEST 15 m	Num98	And90
	240952.07(5)	CH_3OH	5(2,4)−4(2,3) E v_t =2	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	Her84
	240958.8	CH_3OH	5(−1,5)−4(−1,4) E v_t =2	0.24[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	240960.559*(9)	CH_3OH	5(1,5)−4(1,4) A+ v_t =1	0.9	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	240978.250*(16)	CH_3OCH_3	5(3,3)−4(2,2) EA	0.2	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	240982.770*(8)	CH_3OCH_3	5(3,3)−4(2,2) AE	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	240985.067*(8)	CH_3OCH_3	5(3,3)−4(2,2) EE	1.0[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	240989.973*(10)	CH_3OCH_3	5(3,3)−4(2,2) AA	0.7	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	241016.113*(18)	$C^{34}S$	5−4	0.83	OriMC−2	MMWO 4.9 m	Sne84	
U	241113.	unidentified		4.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	241130.	unidentified		5.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	241142.68* (10)	CH_3OH	22(−6,16)−23(−5,18) E	5.8[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	241146.20*(1)	HCOOH	11(0,11)−10(0,10)	0.2	OriMC−1	OVRO 10.4 m	Sut85	Wil80
	241159.144*(10)	CH_3OH	5(4,2)4(4,1) E v_t =1	0.7	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241166.564*(11)	CH_3OH	5(3,3)−4(3,2) E v_t =1	0.8	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241178.426*(14)	CH_3OH	5(4,1)−4(4,0) A+ v_t =1	[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241178.426*(14)	CH_3OH	5(4,2)−4(4,1) A− v_t =1	1.3[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241179.862*(9)	CH_3OH	5(−3,2)−4(−3,1) E v_t =1	[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241184.167*(11)	CH_3OH	5(−4,1)−4(−4,0) E v_t =1	1.1	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241187.417*(9)	CH_3OH	5(−2,3)−4(−2,2) E v_t =1	1.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241192.851*(9)	CH_3OH	5(2,3)4(2,2) A+ v_t =1	1.9	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241196.427*(10)	CH_3OH	5(2,4)−4(2,3) A− v_t =1	2.1[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241198.262*(10)	CH_3OH	5(3,3)−4(3,2) A+ v_t =1	[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241198.269*(10)	CH_3OH	5(3,2)−4(3,1) A− v_t =1	[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241203.710*(10)	CH_3OH	5(1,5)−4(1,4) E v_t =1	[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241206.039*(9)	CH_3OH	5(0,5)−4(0,4) E v_t =1	2.8	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241210.733*(11)	CH_3OH	5(2,4)−4(2,,3) E v_t =1	1.2[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241238.108*(14)	CH_3OH	5(−1,4)−4(−1,3) E v_t =1	0.7	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241267.822*(20)	CH_3OH	5(0,5)−4(0,4) A+ v_t =1	0.4	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	241289.	unidentified		7.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	241327.	unidentified		6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	241345.3	CH_2CN	12(0,12)−11(0,11) 25/2−23/2	4.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241353.3	CH_2CN	12(3)−11(3) 25/2−23/2	2.9[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241364.12(5)	CH_3OH	5(1,4)−4(1,3) A−− v_t =2	2.9[f]	Sgr B2(N)	SEST 15 m	Num98	Her84
	241365.35*(6)	CH_2CHCN	19(3,17)−20(0,20)	2.1	OMC−IRc2	IRAM 30 m	Jac90	
	241381.5	CH_2CN	12(3)−11(3) 27/2−25/2	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241386.2	CH_2CN	12(2,11)−11(2,10) 25/2−23/2	5.0[fb]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241391.4	CH_2CN	12(2,11)−11(2,10) 27/2−25/2	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241420.880 (20)	HCO	10(0,10)−9(1,9)	1.7	OMC−IRc2	IRAM 30 m	Jac90	Bla84a
	241436.182*(77)	CH_3OCHO	28(2,26)−28(2,27) A	[b]	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	241437.060*(77)	CH_3OCHO	28(2,26)−28(1,27) A	2.6[b]	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	241441.265*(10)	CH_3OH	5(1,4)4(1,3) A− v_t =1	1.5	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	241464.034*(77)	CH_3OCHO	28(3,26)−28(2,27) A	1.0	OMC−IRc2	IRAM 30 m	Jac90	Oes99
	241478.582*(4)	NH_2CN	12(1,11)−11(1,10)	6.8[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	241492.5	CH_2CN	12(2,10)−11(2,9) 25/2−23/2	9.2[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241501.7*(5)	CH_3NH_2	5(−2)−5(−1) Ea	11.8[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	241509.053*(9)	$^{34}SO_2$	16(1,15)−15(2,14)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	241523.801*(8)	CH_3OCH_3	5(3,2)−4(2,3) AE	0.9	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	241528.320*(14)	CH_3OCH_3	5(3,2)−4(2,3) EA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	241528.710*(8)	CH_3OCH_3	5(3,2)−4(2,3) EE	1.7[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
	241531.009*(10)	CH_3OCH_3	5(3,2)−4(2,3) AA	[b]	OriMC−1	OVRO 10.4 m	Sut85	Gro98
U	241534.	unidentified		0.4	OriMC−1	MMWO 4.9 m	Eri84b	
	241561.550 (37)	HDO	2(1,1)−2(1,2)	1.0	OriMC−1	MMWO 4.9 m	Bec82	DeL71
	241581.488*(39)	NH_2CHO	21(2,19)−20(3,18)	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	241590.12* (18)	CH_3OH	25(3,22)−25(2,23) A−+	7.5[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	241615.779*(7)	SO_2	5(2,4)−4(1,3)	1.4	OriMC−1	MMWO 4.9 m	Lor84e	
	241625.870*(10)	CH_3CH_2CN	27(3,25)−26(3,24)	22.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	241635.798*(16)	CH_3OCH_3	21(3,18)−20(4,17) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	241635.798*(16)	CH_3OCH_3	21(3,18)−20(4,17) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	241637.321*(12)	CH_3OCH_3	21(3,18)−20(4,17) EE	0.54[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	241637.321*(12)	CH_3OCH_3	21(3,18)−20(4,17) EE	6.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	241638.824*(14)	CH_3OCH_3	21(3,18)−20(4,17) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	241638.844*(14)	CH_3OCH_3	21(3,18)−20(4,17) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	241638.846*(14)	CH_3OCH_3	21(3,18)−20(4,17) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	241700.168*(6)	CH_3OH	5(0,5)−4(0,4) E	1.7	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
U	241719.	unidentified		9.1[f]	Sgr B2(NW)	SEST 15 m	Num98	
U	241732.	unidentified		9.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	241737.567*(3)	CH_2CHCN	25(2,23)−24(2,22)	20.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	241739.9	unidentified		2.5	OMC−IRc2	IRAM 30 m	Jac90	
	241767.247*(6)	CH_3OH	5(−1,5)−4(−1,4) E	1.8	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241774.037*(10)	HNCO	11(0,11)−10(0,10)	3.1	OriMC−1	OVRO 10.4 m	Sut85	
	241791.367*(6)	CH_3OH	5(0,5)−4(0,4) A+	1.8	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241806.521*(5)	CH_3OH	5(4,1)−4(4,0) A+	[b]	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241806.521*(5)	CH_3OH	5(4,2)−4(4,1) A−	0.8[b]	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241813.248*(5)	CH_3OH	5(−4,2)−4(−4,1) E	0.7	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241829.629*(6)	CH_3OH	5(4,1)−4(4,0) E	<0.7	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241832.716*(5)	CH_3OH	5(3,3)−4(3,2) A+	[b]	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241833.104*(5)	CH_3OH	5(3,2)−4(3,1) A−	1.6[b]	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241842.287*(6)	CH_3OH	5(2,4)−4(2,3) A−	[b]	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241843.608*(5)	CH_3OH	5(3,2)−4(3,1) E	1.7[b]	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241852.299*(5)	CH_3OH	5(−3,3)−4(−3,2) E	0.9	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241879.038*(6)	CH_3OH	5(1,4)−4(1,3) E	1.4	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241887.678*(6)	CH_3OH	5(2,3)−4(2,2) A+	1.2	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	241904.158*(5)	CH_3OH	5(−2,4)−4(−2,3) E	[b]	OriMC−1	MMWO 4.9 m	Lor81a	Xu_97
	241904.643*(6)	CH_3OH	5(2,3)−4(2,2) E	1.2[b]	OriMC−1	MMWO 4.9 m	Lor81a	Xu_97
	241922.546*(11)	CH_3CH_2CN	27(10,*)−26(10,*)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	241932.175*(11)	CH_3CH_2CN	27(9,*)−26(9,*)	1.3[b]	OriMC−1	OVRO 10.4 m	Sut85	
	241933.160*(12)	CH_3CH_2CN	27(11,*)−26(11,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	241946.245*(6)	CH_3OCH_3	13(1,13)−12(0,12) AE+EA	[b]	OriMC−1	MMWO 4.9 m	Lor81a	Gro98
	241946.537*(6)	CH_3OCH_3	13(1,13)−12(0,12) EE	0.5[b]	OriMC−1	MMWO 4.9 m	Lor81a	Gro98
	241946.830*(6)	CH_3OCH_3	13(1,13)−12(0,12) AA	[b]	OriMC−1	MMWO 4.9 m	Lor81a	Gro98
	241959.049*(12)	CH_3CH_2CN	27(12,*)−26(12,*)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	241970.442*(10)	CH_3CH_2CN	27(6,*)−26(6,*)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
U	241980.	unidentified		14.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	241985.446*(9)	$^{34}SO_2$	8(3,5)−8(2,5)	1.4	OriMC−1	OVRO 10.4 m	Sut85	
	241997.101*(13)	CH_3CH_2CN	27(13,*)−26(13,*)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
U	242017.	unidentified		8.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	242045.285*(13)	CH_3CH_2CN	27(14,*)−26(14,*)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	242052.483*(10)	CH_3CH_2CN	27(7,21)−26(7,20)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	242052.583*(10)	CH_3CH_2CN	27(7,20)−26(7,19)	0.8[b]	OriMC−1	OVRO 10.4 m	Sut85	
	242068.665*(21)	NH_2CHO	21(3,18)−21(2,19)	15.8[fb]	Sgr B2(N)	SEST 15 m	Num98	
	242073.408*(19)	NH_2CHO	16(1,15)−15(2,14)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	242102.219*(14)	CH_3CH_2CN	27(15,*)−26(15,*)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	242106.023*(10)	CH_3CHO	13(−1,13)−12(−1,12) E	31.9[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	242118.143*(10)	CH_3CHO	13(1,13)−12(1,12) A++	15.1[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	242143.	unidentified		4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	242159.201*(4)	CH_2CHCN	10(2,8)−9(1,9)	11.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	242166.935*(14)	CH_3CH_2CN	27(16,*)−26(16,*)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	242175.455 (50)	$g-CH_3CH_2OH$	14(11,3)−13(11,2) v_t =1−1	18.1[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	242206.974*(10)	CH_3CH_2CN	27(6,22)−26(6,21)	1.3[b]	OriMC−1	OVRO 10.4 m	Sut85	
	242210.413*(10)	CH_3CH_2CN	27(6,21)−26(6,20)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	242215,792 (50)	$g-CH_3CH_2OH$	13(3,10)−13(2,12) v_t =1−0	[b]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	242221.277 (50)	$g-CH_3CH_2OH$	14(9,5)−13(9,4) v_t =1−1	9.2[fb]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	242221.277 (50)	$g-CH_3CH_2OH$	14(9,6)−13(9,5) v_t =1−1	[b]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	242229.	unidentified		5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	242238.732*(14)	CH_3CH_2CN	27(17,*)−26(17,*)	27.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	242262.9*(5)	CH_3NH_2	6(−2)−6(1) Aa−+	13.2[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	242283.	unidentified		6.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	242309.307*(49)	CH_2CO	12(4,9)−11(4,8)	6.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	242309.308*(49)	CH_2CO	12(4,8)−11(4,7)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	242317.090*(15)	CH_3CH_2CN	27(18,*)−26(18,*)	24.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	242349.842 (50)	$g-CH_3CH_2OH$	14(7,*)−13(7,*) v_t =1−1	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	242360.	unidentified		15.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	242373.176*(20)	$^{13}CH_3OH$	4(2,3)−5(1,4) A−−	16.2[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	242375.38* (22)	CH_2CO	12(0,12)−11(0,11)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
	242398.458*(37)	CH_2CO	12(3,10)−11(3,9)	0.6[b]	OriMC−1	OVRO 10.4 m	Sut85	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	242398.956*(37)	CH_2CO	12(3,9)−11(3,8)	[b]	OriMC−1	OVRO 10.4 m	Sut85	
	242424.606*(46)	CH_2CO	12(2,11)−11(2,10)	0.2	OriMC−1	OVRO 10.4 m	Sut85	
	242435.425*(11)	$O^{13}CS$	19−18	0.14	IRAS16293−2422	JCMT 15 m	Bla94	
	242446.125*(20)	CH_3OH	14(−1,14)−13(−2,12) E	3.3	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	242470.399*(10)	CH_3CH_2CN	27(5,23)−26(5,22)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	242491.31* (15)	CH_3OH	24(3,21)−24(2,22) A−+	0.7	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	242512.	unidentified		11.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	242536.214*(47)	CH_2CO	12(2,10)−11(2,9)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	242547.326*(10)	CH_3CH_2CN	27(5,22)−26(5,21)	0.7	OriMC−1	OVRO 10.4 m	Sut85	
	242625.693 (50)	$g-CH_3CH_2OH$	14(6,*)−13(6,*) v_t =0−0	7.1[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	242639.717*(16)	HNCO	11(1,10)−10(1,9)	1.1	OriMC−1	OVRO 10.4 m	Sut85	
	242664.690*(10)	CH_3CH_2CN	27(4,24)−26(4,23)	1.0	OriMC−1	OVRO 10.4 m	Sut85	
	242685.010 (50)	$g-CH_3CH_2OH$	14(5,10)−13(5,9) v_t =1−1	8.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	242693.030 (50)	$g-CH_3CH_2OH$	14(5,9)−13(5,8) v_t =1−1	[b]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	242753.807*(18)	CH_3CH_2CN	9(4,6)−8(3,5)	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	242770.099 (50)	$g-CH_3CH_2OH$	14(3,12)−13(3,11) v_t =1−1	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	242778.	unidentified		2.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	242839.	unidentified		8.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	242870.574*(3)	$g-CH_3CH_2OH$	14(3,12)−13(3,11) v_t =0−0	5.8[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	242871.513*(20)	CH_3OCHO	19(5,14)−18(5,13) E	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	242872.861*(11)	SO_2	12(3,9)−12(2,10) v_2 =1	5.3[f]	Sgr B2(M)	SEST 15 m	Num98	
	242896.022*(21)	CH_3OCHO	19(5,14)−18(5,13) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	242913.72(10)	$C^{33}S$	5−4 13/2−11/2+11/2−9/2	1.5[b]	OriMC−1	OVRO 10.4 m	Sut85	Bog81
	242913.72(10)	$C^{33}S$	5−4 9/2−7/2+7/2−5/2	[b]	OriMC−1	OVRO 10.4 m	Sut85	Bog81
U	242970.	unidentified		0.011	IRC+10216	NRAO 12 m	Hig00	
	242997.786*(11)	SO_2	19(3,17)−20(0,20)	7.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	243013.996*(33)	NH_2CHO	8(4,4)−9(3,7)	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	243020.	unidentified		4.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	243039.339*(56)	$S^{18}O$	7(5)−6(5)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
U	243053.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	243087.650*(6)	SO_2	5(4,2)−6(3,3)	1.4	OriMC−1	OVRO 10.4 m	Sut85	
	243120.317 (50)	$g-CH_3CH_2OH$	14(4,11)−13(4,10) v_t =0−0	2.3[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	243156.	unidentified		1.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	243160.707*(28)	CS	5−4 v=1	0.067	IRC+10216	NRAO 12 m	Tur87	
	243176.934(8)	SiC	$3\Pi_1$ J=6−5 e	0.08	IRC+10216	NRAO 12 m	Hig00	Cer89
	243178.657*(18)	CH_3CHO	13(1,13)−12(1,12) E v_t =1	7.1[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	243218.034*(2)	OCS	20−19	0.67	OriMC−1	MMWO 4.9 m	Lor84a	
	243245.401*(10)	SO_2	26(8,18)−27(7,21)	15.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	243374.788*(48)	$OS^{18}O$	19(1,18)−19(0,19)	5.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	243397.555*(50)	CH_3OH	18(6,13)−19(5,14) A−	[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	243397.816*(50)	CH_3OH	18(6,12)−19(5,15) A+	1.6[b]	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	243413.43* (12)	CH_3OH	23(3,20)−23(2,21) A−+	0.9	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	243450.	unidentified		14.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	243490.	unidentified		3.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	243521.023*(7)	NH_2CHO	12(1,12)−11(1,11)	21.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	243522.660*(10)	SO_2	14(0,14)−13(1,13) v_2 =1	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	243556.853*(26)	$t-CH_3CH_2OH$	8(2,6)−7(1,7)	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	243564.632*(35)	CH_3OCHO	34(10,25)−34(9,26) A	2.1[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	243589.	unidentified		3.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	243643.235*(10)	CH_3CH_2CN	27(4,23)−26(4,22)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	243738.713*(12)	CH_3OCH_3	23(5,18)−23(4,19) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	243739.900*(8)	CH_3OCH_3	23(5,18)−23(4,19) EE	5.2[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	243741.087*(14)	CH_3OCH_3	23(5,18)−23(4,19) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
U	243747.	unidentified		1.1	OriMC−1	OVRO 10.4 m	Sut85	
U	243766.	unidentified		4.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	243823.055*(13)	CH_3CH_2CN	26(2,25)−25(1,24)	8.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	243839.	unidentified		4.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	243848.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	243869.	unidentified		1.4[f]	Sgr B2(NW)	SEST 15 m	Num98	
	243915.811*(6)	CH_3OH	5(1,4)−4(1,3) A−	8.1	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	243935.965*(11)	$^{34}SO_2$	18(1,17)−18(0,18)	0.4	OriMC−1	OVRO 10.4 m	Sut85	
	243966.283*(25)	$c-H^{13}CCCH$	13(6,7)−13(5,8)	3.4[f]	Sgr B2(M)	SEST 15 m	Num98	Bog86
	243975.379*(14)	CH_3CHO	14(3,12)−14(2,13) A+−	5.5[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	244047.80* (27)	H_2CS	7(1,6)−6(1,5)	0.91	OriMC−1	MMWO 4.9 m	Lor85	
U	244133.	unidentified		3.7[f]	Sgr B2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	244142.	unidentified		5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	244152.0*(5)	CH_3NH_2	6(−2)−6(−1) Ea	3.9[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	244222.170*(11)	$c-C_3H_2$	3(2,1)−2(1,2)	2.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	244254.205*(7)	SO_2	14(0,14)−13(1,13)	1.5	OriMC−1	MMWO 4.9 m	Lor85	
U	244284.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	244330.987*(98)	CH_3OH	22(,19)−22(2,20) A−+	1.1	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	244338.004*(15)	CH_3OH	9(1,9)−8(0,8) E v_t =1	1.2	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	U244353.	unidentified		0.08	OriMC−1	NRAO 12 m	Ziu94a	
	244364.019*(70)	HNO	3(0,3)−2(0,2)	0.020	NGC2024	NRAO 12 m	Ziu94a	
	244386.671*(13)	SO_2	18(1,17)−18(0,18) v_2 =1	11.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	244388.894*(12)	$^{33}SO_2$	14(0,14)−13(1,13)	11.9[f]	Sgr B2(M)	SEST 15 m	Num98	
	244392.329*(26)	CH_3CH_2CN	15(2,13)−14(1,14)	4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	244440.	unidentified		3.3[f]	Sgr B2(M)	SEST 15 m	Num98	
	244481.515*(10)	$^{34}SO_2$	14(0,14)−13(1,13)	1.4	OriMC−1	OVRO 10.4 m	Sut85	
	244503.902*(14)	CH_3OCH_3	23(2,22)−23(1,23) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	244503.902*(14)	CH_3OCH_3	23(2,22)−23(1,23) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	244508.305*(12)	CH_3OCH_3	23(2,22)−23(1,23) EE	0.89[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	244512.709*(16)	CH_3OCH_3	23(2,22)−23(1,23) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	244564.33* (16)	$HC^{13}CCN$	27−26	8.9[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	244580.313*(16)	CH_3OCHO	20(4,17)−19(4,16) E	1.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	244588.094*(63)	$HCC^{13}CN$	27−26	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	244594.036*(17)	CH_3OCHO	20(4,17)−19(4,16) A	1.1	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	244633.950 (50)	$g-CH_3CH_2OH$	14(1,13)−13(1,12) v_t =1−1	2.5[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	244712.079*(96)	CH_2CO	12(1,11)−11(1,10)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
	244789.253*(10)	CH_3CHO	13(0,13)−12(0,12) E	12.4[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	244799.	unidentified		7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	244832.183*(10)	CH_3CHO	13(0,13)−12(0,12) A++	15.2[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	244843.	unidentified		6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	244854.209*(9)	NH_2CHO	13(0,13)−12(1,12)	22.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	244857.39*(7)	CH_2CHCN	26(2,25)−25(2,24)	0.5	OriMC−1	OVRO 10.4 m	Sut85	
U	244878.	unidentified		2.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	244885.	unidentified		5.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	244935.560*(10)	CS	5−4	5.5	OriMC−2	MMWO 4.9 m	Sne84	
U	244993.	unidentified		2.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	245002.766*(8)	SO_2	5(2,4)−4(1,3) v_2 =1	6.2[f]	Sgr B2(M)	SEST 15 m	Num98	
U	245015.	unidentified		5.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	245023.654*(17)	CH_3CH_2CN	14(3,11)−13(2,12)	6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	245056.920*(4)	CH_2CHCN	27(3,25)−27(2,26)	2.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	245084.	unidentified		5.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	245092.	unidentified		3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	245125.79* (20)	CH_2NH	4(1,4)−3(1,3)	0.40	OriMC−1	NRAO 12 m	Dic97a	
	245141.329*(25)	$c-H^{13}CCCH$	12(5,7)−12(4,8)	5.6[f]	Sgr B2(M)	SEST 15 m	Num98	Bog86
	245178.721*(11)	$^{34}SO_2$	15(2,14)−15(1,15)	0.8	OriMC−1	OVRO 10.4 m	Sut85	
U	245200.	unidentified		2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	245223.465*(80)	CH_3OH	21(3,18)−22(2,19) A−+	1.3	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
U	245233.	unidentified		3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	245251.34*(8)	CH_2CHCN	26(2,25)−25(2,24) v_{15} =1	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	245267.	unidentified		8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	245302.235*(8)	$^{34}SO_2$	6(3,3)−6(2,4)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	245327.139 (50)	$g-CH_3CH_2OH$	14(3,11)−13(3,10) v_t =1−1	6.1[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	245339.279*(9)	SO_2	26(3,23)−25(4,22)	1.7	OriMC−1	OVRO 10.4 m	Sut85	
U	245352.	unidentified		7.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	245393.804*(32)	CH_3OCHO	33(0,24)−33(9,25) E	4.9[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245447.195*(42)	CH_3OCHO	20(19,*)−19(19,*) A	2.9[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245457.1*(5)	CH_3NH_2	10(5)−11(4) Aa++	5.0[fb]	Sgr B2(N)	SEST 15 m	Num98	Num98
	245458.2*(5)	CH_3NH_2	10(−5)−11(−4) Aa−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	245465.735*(43)	CH_3OCHO	20(19,1)−19(19,0) E	7.9[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245468.370*(58)	CH_3OCHO	20(19,2)−19(19,1) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245491.831*(40)	CH_3OCHO	20(18,2)−19(18,1) E	3.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245498.273*(48)	CH_3OCHO	20(18,3)−19(18,2) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	245515.	unidentified		−1.7[f]	Sgr B2(NW)	SEST 15 m	Num98	
U	245527.	unidentified		−1.1[f]	Sgr B2(NW)	SEST 15 m	Num98	
	245530.284*(35)	CH_3OCHO	20(17,3)−19(17,2) E	4.9[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245532.794*(15)	D_2CO	4(1,3)−3(1,2)	0.27	IRAS16293−2422	IRAM 30 m	Cec98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	245540.308*(37)	CH_3OCHO	20(17,4)−19(17,3) E	6.5[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	245563.410*(7)	SO_2	10(3,7)−10(2,8)	7.8	OriMC−1	OVRO 10.4 m	Sut85	
	245606.311*(9)	HCCCN	27−26	0.7	OriMC−1	MMWO 4.9 m	Lor81	
	245651.199*(24)	CH_3OCHO	20(15,*)−19(15,*) A	0.6	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	245710.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	245752.239*(24)	CH_3OCHO	20(14,*)−19(14,*) A	0.7	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	245753.993*(28)	CH_3OCHO	20(14,6)−19(14,5) E	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	245772.630*(24)	CH_3OCHO	20(14,7)−19(14,6) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	245782.	unidentified		6.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	245821.	unidentified		3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	245883.062*(25)	CH_3OCHO	20(13,7)−19(13,7) E	0.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	245885.201*(21)	CH_3OCHO	20(13,*)−19(13,*) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	245903.654*(21)	CH_3OCHO	20(13,8)−19(13,7) E	0.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	245993.	unidentified		8.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	246010.80* (82)	HCCCN	27−26 v_6 =1 ℓ=1 e	7.2[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	246054.775*(24)	CH_3OCHO	20(12,8)−19(12,7) E	0.5	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246060.791*(20)	CH_3OCHO	20(12,*)−19(12,*) A	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246074.914*(65)	CH_3OH	20(3,17)−20(2,18) A−+	1.6	OriMC−1	OVRO 10.4 m	Sut85	Xu_97
	246105.97*(1)	HCOOH	11(2,10)−10(2,9)	8.3[f]	Sgr B2(N)	SEST 15 m	Num98	Wil80
U	246109.	unidentified		4.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	246119.348*(12)	$OS^{18}O$	8(3,5)−8(2,6)	3.6[f]	Sgr B2(M)	SEST 15 m	Num98	
U	246126.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246143.	unidentified		1.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246170.	unidentified		5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246187.	unidentified		9.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	246201.40* (94)	HCCCN	27−26 v_6 =1 ℓ=1 f	14.4[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	246208.942*(91)	HCCCN	27−26 v_7 =1 ℓ=1 e	22.7[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
U	246232.	unidentified		2.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	246268.741*(10)	CH_3CH_2CN	27(2,25)−26(2,24)	0.9	OriMC−1	OVRO 10.4 m	Sut85	
	246285.300*(21)	CH_3OCHO	20(11,9)−19(11,8) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246295.106*(20)	CH_3OCHO	20(11,*)−19(11,*) A	1.3	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246308.197*(20)	CH_3OCHO	20(11,10)−19(11,9) E	0.4	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246330.689*(16)	CH_3CHO	15(3,13)−15(2,14) A+−	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	246355.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	246389.273*(20)	NH_2CHO	20(3,17)−20(2,18)	7.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	246404.604*(67)	SO	2(3)−3(2)	9.0[f]	Sgr B2(M)	SEST 15 m	Num98	COL01
	246414.762 (50)	$g-CH_3CH_2OH$	14(3,11)−13(3,10) v_t =0−0	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	246421.915*(11)	CH_3CH_2CN	28(2,27)−27(2,26)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
U	246448.	unidentified		5.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	246455.765*(11)	$^{33}SO_2$	8(3,5)−8(2,6)	9.8[f]	Sgr B2(M)	SEST 15 m	Num98	
U	246459.	unidentified		7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246488.	unidentified		3.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246495.	unidentified		2.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	246522.43* (66)	CH_3OD	8(0,8)−7(1,7) A++	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	And88
	246524.586*(16)	$g-CH_3CH_2OH$	13(2,12)−12(1,12) v_t =0−1	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	246548.703*(10)	CH_3CH_2CN	27(3,24)−26(3,23)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	246560.749*(91)	HCCCN	27−26 v_7 =1 ℓ=1 f	1.1	OriMC−1	OVRO 10.4 m	Sut85	Laf78
	246599.935*(20)	CH_3OCHO	20(10,10)−19(10,9) E	0.7	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246613.385*(20)	CH_3OCHO	20(10,11)−19(10,10) A	1.1[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246613.400*(20)	CH_3OCHO	20(10,10)−19(10,9) A	[b]	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246623.159*(17)	CH_3OCHO	20(10,11)−19(10,10) E	0.8	OriMC−1	OVRO 10.4 m	Sut85	Oes99
U	246645.	unidentified		5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	246663.403*(32)	^{34}SO	5(6)−4(5)	2.9	OriMC−1	OVRO 10.4 m	Sut85	
	246678.431*(4)	CH_2CHCN	26(1,26)−25(0,25)	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	246686.115*(8)	$^{34}SO_2$	4(3,1)−4(2,2)	0.3	OriMC−1	OVRO 10.4 m	Sut85	
	246697.454*(16)	CH_3OCH_3	27(4,24)−26(5,21) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	246697.903*(16)	CH_3OCH_3	27(4,24)−26(5,21) EE	7.6[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	246698.352*(16)	CH_3OCH_3	27(4,24)−26(5,21) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
U	246764.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246790.	unidentified		6.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246799.	unidentified		7.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246807.	unidentified		3.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	246816.	unidentified		9.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	246827.92* (21)	$H^{13}CCCN$	28−27	10.1[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
U	246839.	unidentified		8.3[f]	Sgr B2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	246851.	unidentified		5.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	246873.503*(53)	CH_3OH	19(3,16)−19(2,17) A−+	0.30	OriMC−1	MMWO 4.9 m	Lor85	Xu_97
	246891.590*(17)	CH_3OCHO	19(4,15)−18(4,14) E	0.18	OriMC−1	MMWO 4.9 m	Lor85	Oes99
	246896.87* (16)	CH_2CHCN	26(7,*)−25(7,*)	0.1	OriMC−1	MMWO 4.9 m	Lor85	
	246912.406*(4)	CH_2CHCN	26(8,*)−25(8,*)	27.4[fb]	Sgr B2(N)	SEST 15 m	Num98	
	246914.657*(20)	CH_3OCHO	19(4,15)−18(4,14) A	1.2	OriMC−1	OVRO 10.4 m	Sut85	Oes99
	246918.442*(4)	CH_2CHCN	26(6,21)−25(6,20)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	246918.505*(4)	CH_2CHCN	26(6,20)−25(6,19)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	246924.3*(5)	CH_3NH_2	2(2)−2(−1) As+−	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	246924.681*(11)	HDCO	4(1,4)−3(1,3)	0.40	OriMC−1	MMWO 4.9 m	Lor85	
	246945.776*(45)	CH_3OCHO	10(5,6)−9(4,6) E	0.16	OriMC−1	MMWO 4.9 m	Lor85	Plu87
	246952.14* (23)	CH_2CHCN	26(9,*)−25(9,*)	0.6	OriMC−1	OVRO 10.4 m	Sut85	
	247001.71* (11)	CH_2CHCN	26(5,22)−25(5,21)	0.2[b]	OriMC−1	OVRO 10.4 m	Bla86	
	247004.92* (11)	CH_2CHCN	26(5,21)−25(5,20)	[b]	OriMC−1	OVRO 10.4 m	Bla86	
	247010.671*(5)	CH_2CHCN	26(10,*)−25(10,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247040.570*(20)	CH_3OCHO	20(9,11)−19(9,10) E	0.6	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247044.108*(16)	CH_3OCHO	21(3,19)−20(3,18) E	1.1	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247053.496*(17)	CH_3OCHO	21(3,19)−20(3,18) A	1.2	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247057.273*(17)	CH_3OCHO	20(9,12)−19(9,11) A	1.2[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247057.751*(17)	CH_3OCHO	20(9,11)−19(9,10) A	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247063.586*(17)	CH_3OCHO	20(9,12)−19(9,11) E	0.5	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247081.8*(5)	CH_3NH_2	4(−2)−4(1) Aa−+	15.4[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	247083.717*(6)	CH_2CHCN	26(11,*)−25(11,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247086.93*(8)	CH_2CHCN	26(3,24)−25(3,23)	0.2	OriMC−1	OVRO 10.4 m	Bla86	
	247113.16* (20)	HCCCN	27−26 v_7 =2 ℓ=0	5.5[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	247124.165*(29)	CH_3OCHO	10(5,5)−9(4,6) A	3.1[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	247127.386*(8)	$^{34}SO_2$	3(3,1)−3(2,2)	4.0[f]	Sgr B2(M)	SEST 15 m	Num98	
	247161.994*(33)	CH_3OH	16(2,14)−15(3,12) E	1.6	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	247169.371*(7)	CH_2CHCN	26(12,*)−25(12,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247169.842*(15)	SO_2	31(9,23)−32(8,24)	8.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	247173.939*(4)	CH_2CHCN	26(4,23)−25(4,22)	8.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	247210.01* (22)	HCCCN	27−26 v_7 =2 ℓ=2 f	12.3[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	247228.737*(17)	CH_3OH	4(2,2)−5(1,5) A+	3.9	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	247247.54* (16)	CH_2CHCN	26(8,*)−25(8,*) v_{15} =1	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	247261.771*(12)	CH_3OCH_3	26(3,24)−26(2,25) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247264.269*(10)	CH_3OCH_3	26(3,24)−26(2,25) EE	5.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247266.246*(9)	CH_2CHCN	26(13,*)−25(13,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247266.767*(16)	CH_3OCH_3	26(3,24)−26(2,25) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247270.64*(9)	CH_2CHCN	26(4,22)−25(4,21)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	247310.92*(9)	CH_2CHCN	26(5,22)−25(5,21) v_{15} =1	3.6[fb]	Sgr B2(N)	SEST 15 m	Num98	
	247313.68*(9)	CH_2CHCN	26(5,21)−25(5,20) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	247327.	unidentified		4.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	247360.73*(22)	CH_2CHCN	26(10,*)−25(10,*) v_{15} =1	1.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	247362.5*(5)	CH_3NH_2	7(−2)−7(−1) Ea	1.6[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	247368.523*(32)	CH_3OCHO	31(10,21)−31(7,24) E	5.0[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	247390.697*(7)	NH_2CHO	12(0,12)−11(0,11)	15.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	247440.294*(8)	$^{34}SO_2$	5(3,3)−5(2,4)	0.7	OriMC−1	OVRO 10.4 m	Bla86	
U	247460.	unidentified		4.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	247469.	unidentified		0.6	OriMC−1	OVRO 10.4 m	Bla86	
	247472.24*(8)	CH_2CHCN	26(4,23)−25(4,22) v_{15} =1	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	247490.140*(16)	CH_2CHCN	26(15,*)−25(15,*)	4.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	247514.12*(1)	HCOOH	11(2,10)−10(2,9)	2.7[f]	Sgr B2(N)	SEST 15 m	Num98	Wil80
	247525.867*(32)	CH_3CHO	14(0,14)−13(1,13) E v_t =1	2.6[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	247558.67*(8)	CH_2CHCN	26(4,22)−25(4,21) v_{15} =1	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	247563.	unidentified		10.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	247611.037*(43)	CH_3OH	18(3,15)−18(2,16) A−+	1.1	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	247630.	unidentified		0.4	OriMC−1	OVRO 10.4 m	Bla86	
	247633.635*(7)	NH_2CHO	3(2,2)−2(1,1)	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	247636.	unidentified		0.4	OriMC−1	OVRO 10.4 m	Bla86	
	247642.490*(16)	CH_2CHCN	26(6,21)−25(6,20) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247642.570*(16)	CH_2CHCN	26(6,20)−25(6,19) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247647.276*(19)	CH_2CHCN	26(9,*)−25(9,*) v_{11} =1	6.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	247656.861*(16)	CH_3OCHO	21(2,19)−20(2,18) E	1.4	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247665.389*(17)	CH_3OCHO	21(2,19)−20(2,18) A	1.2	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247682.634*(17)	CH_3OCHO	20(8,12)−19(8,11) E	0.2	OriMC−1	OVRO 10.4 m	Bla86	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	247696.638*(22)	CH_2CHCN	26(10,*)−24(10,*) $v_{11}=1$	9.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	247697.214*(17)	CH_3OCHO	20(8,13)−19(8,12) A	0.7	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247704.315*(17)	CH_3OCHO	20(8,13)−19(8,12) E	0.8	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247707.983*(17)	CH_3OCHO	20(8,12)−19(8,11) A	1.1	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247739.262*(15)	CH_2CHCN	26(5,22)−25(5,21) $v_{11}=1$	10.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
U	247741.	unidentified		6.3[f]	Sgr B2(M)	SEST 15 m	Num98	
	247743.109*(15)	CH_2CHCN	26(5,21)−25(5,20) $v_{11}=1$	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247754.80* (35)	CH_2CHCN	26(14,*)−25(14,*) $v_{15}=1$	4.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	247760.692*(26)	CH_2CHCN	26(11,*)−24(11,*) $v_{11}=1$	5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	247770.686*(10)	CH_3OCH_3	22(5,17)−22(4,18) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247770.692*(10)	CH_3OCH_3	22(5,17)−22(4,18) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247772.121*(8)	CH_3OCH_3	22(5,17)−22(4,18) EE	3.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247773.554*(14)	CH_3OCH_3	22(5,17)−22(4,18) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	247798.55* (15)	CH_2CHCN	27(1,27)−26(1,26)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	247818.061*(15)	CH_2CHCN	26(3,24)−25(3,23) $v_{11}=1$	4.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	247835.	unidentified		5.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	247837.228*(33)	CH_2CHCN	26(12,*)−24(12,*) $v_{11}=1$	9.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	247840.224*(75)	CH_3OH	12(−2,10)−13(−3,10) E $v_t=1$	1.0	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	247873.934*(17)	CH_3OCHO	22(1,21)−21(2,20) E	10.0[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	247879.552*(17)	CH_3OCHO	22(1,21)−21(2,20) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	247901.631*(17)	CH_3OCHO	22(2,21)−21(2,20) E	0.7	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247907.169*(17)	CH_3OCHO	22(2,21)−21(2,20) A	0.6	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247911.869*(16)	$t-CH_3CH_2OH$	15(0,15)−14(1,14)	6.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	247922.241*(17)	CH_3OCHO	22(1,21)−21(1,20) E	0.6	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247924.864*(43)	CH_2CHCN	26(13,*)−24(13,*) $v_{11}=1$	[b]	Sgr B2(N)	SEST 15 m	Num98	
	247926.084*(15)	CH_2CHCN	26(4,23)−25(4,22) $v_{11}=1$	16.6[fb]	Sgr B2(N)	SEST 15 m	Num98	
	247927.733*(17)	CH_3OCHO	22(1,21)−21(1,20) A	0.5	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	247943.406 (50)	$g-CH_3CH_2OH$	15(1,15)−14(1,14) $v_t=0-0$	4.6[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	247949.938*(17)	CH_3OCHO	22(2,21)−21(1,20) A	6.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	247955.350*(17)	CH_3OCHO	22(2,21)−21(1,20) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	247967.093*(25)	CH_3OH	23(1,22)−23(0.23) E	4.3[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	248022.693*(59)	CH_2CHCN	26(14,*)−24(14,*) $v_{11}=1$	4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	248042.561*(11)	CH_3CH_2CN	28(1,27)−27(1,26)	17.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	248057.387*(8)	SO_2	15(2,14)−15(1,15)	6.1	OriMC−1	OVRO 10.4 m	Bla86	
	248143.406*(12)	$g-CH_3CH_2OH$	7(5,2)−6(4,2) $v_t=0-1$	2.0[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	248143.906*(12)	$g-CH_3CH_2OH$	7(5,3)−6(4,3) $v_t=0-1$	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	248178.548*(5)	$g-CH_3CH_2OH$	15(1,15)−14(1,14) $v_t=1-1$	8.2[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	248213.	unidentified		2.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	248245.7*(5)	CH_2CHCN	26(16,*)−24(16,*) $v_{11}=1$	2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	248282.480*(36)	CH_3OH	17(3,14)−17(2,15) A− +	2.2	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	248317.032*(56)	CH_3OCHO	43(11,33)−42(12,30) A	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	248326.	unidentified		3.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	248355.6*(5)	CH_2CHCN	26(6,*)−25(6,*) $v_{11}=2$	3.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	248364.764*(8)	$^{34}SO_2$	7(3,5)−7(2,6)	0.9	OriMC−1	OVRO 10.4 m	Bla86	
U	248392.	unidentified		34.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	248419.925*(4)	CH_3CH_2CN	39(6,34)−39(5,35)	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	248436.921*(8)	SO_2	13(3,11)−14(0,14)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
	248463.614 (50)	$g-CH_3CH_2OH$	14(2,12)−13(2,11) $v_t=0-0$	8.3[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	248481.	unidentified		3.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	248500.	unidentified		1.1[f]	Sgr B2(M)	SEST 15 m	Num98	
U	248520.	unidentified		3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	248528.95* (78)	CH_2CHCN	26(3,23)−25(3,22)	0.4	OriMC−1	OVRO 10.4 m	Bla86	
U	248547.	unidentified		10.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	248577.119 (50)	$g-CH_3CH_2OH$	15(0,15)−14(0,14) $v_t=0-0$	8.5[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	248608.	unidentified		1.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	248617.441*(17)	CH_3OCHO	20(7,14)−19(7,13) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	248633.613*(21)	CH_3OCHO	20(7,14)−19(7,13) E	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	248640.	unidentified		18.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	248653.	unidentified		3.5[f]	Sgr B2(M)	SEST 15 m	Num98	
	248666.5*(4)	CH_2CHCN	26(4,23)−25(4,22) $v_{11}=2$	3.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	248677.200*(4)	CH_2CHCN	27(0,27)−26(0,26)	5.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	248687.	unidentified		7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	248698.688*(12)	$^{34}SO_2$	13(1,13)−12(0,12)	38.4[f]	Sgr B2(M)	SEST 15 m	Num98	
U	248727.	unidentified		10.0[f]	Sgr B2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	248744.628*(24)	CH_3OCHO	20(7,13)−19(7,12) E	7.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	248749.602*(20)	CH_3OCHO	23(1,23)−22(1,22) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	248749.839*(20)	CH_3OCHO	23(0,23)−22(0,22) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	248771.523*(15)	$OS^{18}O$	15(0,15)−14(1,14)	10.8[fb]	Sgr B2(M)	SEST 15 m	Num98	
	248781.110*(12)	CH_3CH_2CN	29(1,29)−28(1,28)	14.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	248784.368*(12)	$OS^{18}O$	6(3,3)−6(2,4)	[b]	Sgr B2(M)	SEST 15 m	Num98	
	248786.821*(17)	CH_3OCHO	20(7,13)−19(7,12) A	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	248830.823*(7)	SO_2	10(5,5)−11(4,8)	38.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	248840.3*(5)	CH_3NH_2	3(−2)−3(1) Aa−+	7.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	248869.418*(12)	CH_3CH_2CN	29(0,29)−28(0,28)	27.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	248885.479*(30)	CH_3OH	16(3,13)−16(2,14) A−+	25.2[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	248946.	unidentified		2.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	248992.483*(28)	CH_3OCHO	31(10,22)−31(9,23) E	8.6[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	248997.	unidentified		13.2[f]	Sgr B2(M)	SEST 15 m	Num98	
	248999.2*(5)	CH_3NH_2	3(−2)−3(−1) Es	5.4[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	249024.531*(42)	CH_3OCHO	33(4,29)−33(3,30) A	3.8[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	249030.981*(16)	CH_3OCHO	20(5,16)−19(5,15) E	7.6[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	249047.435*(17)	CH_3OCHO	20(5,16)−19(5,15) A	14.7[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	249054.409*(5)	$c-C_3H_2$	5(2,3)−4(3,2)	13.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	249099.227*(45)	$^{34}SO_2$	30(4,26)−30(3,27)	14.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	249107.186*(4)	CH_2CHCN	26(1,25)−25(1,24)	18.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	249121.	unidentified		11.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	249133.047*(9)	$OC^{34}S$	21−20	0.16	IRAS16293−2422	JCMT 15 m	Bla94	
	249142.279*(5)	$g-CH_3CH_2OH$	15(0,15)−14(0,14) v_t =0−1	3.8[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	249158.549*(20)	CH_3CH_2CN	37(6,32)−37(5,33)	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	249162.745*(20)	^{33}SO	5(6)−4(5)	16.0[f]	Sgr B2(M)	SEST 15 m	Num98	
U	249167.	unidentified		6.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	249174.	unidentified		7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	249184.736*(16)	CH_3CH_2CN	33(6,27)−33(5,28)	8.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	249192.864*(24)	CH_3OH	16(−3,14)−15(−4,12) E	6.5[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	249213.175*(12)	CH_3CH_2CN	29(1,29)−28(0,28)	10.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	249247.	unidentified		1.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	249323.932*(9)	CH_3CHO	13(2,12)−12(2,11) A−−	0.89[fb]	NGC6334F	SEST 15 m	Num98a	Kle96
	249326.631*(9)	CH_3CHO	13(−2,12)−12(−2,11) E	[b]	NGC6334F	SEST 15 m	Num98a	Kle96
U	249365.	unidentified		3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	249397.	unidentified		4.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	249404.737*(16)	CH_2CHCN	26(3,23)−25(3,22) v_{11} =1	7.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	249419.904*(26)	CH_3OH	15(3,12)−15(2,13) A−+	23.8[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	249443.402*(50)	CH_3OH	7(4,4)−8(3,5) A−	16.9[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	249451.885*(19)	CH_3OH	7(4,3)−8(3,6) A+	20.0[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	249491.128*(4)	CH_3CH_2CN	49(6,44)−49(5,45)	6.8[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	249519.28*(8)	CH_2CHCN	26(1,25)−25(1,24) v_{15} =1	9.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	249542.8*(7)	CH_2CHCN	27(0,27)−26(0,26) v_{11} =2	3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	249561.244*(19)	CH_3CH_2CN	36(6,31)−36(5,32)	6.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	249578.094*(16)	CH_3OCHO	20(6,15)−19(6,14) E	12.5[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	249591.732*(17)	CH_3OCHO	20(6,15)−19(6,14) A	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	249603.922*(42)	CH_3OCHO	33(5,29)−33(4,30) A	2.6[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	249623.885*(22)	$c-C_2H_4O$	5(5,0)−4(4,1)	0.30	Sgr B2(N)	SEST 15 m	Dic97	
	249650.186*(11)	$^{33}SO_2$	6(3,3)−6(2,4)	5.6[f]	Sgr B2(M)	SEST 15 m	Num98	
U	249658.	unidentified		5.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	249682.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	249692.	unidentified		3.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	249729.829*(16)	CH_2CHCN	26(1,25)−25(1,24) v_{11} =1	8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	249773.360*(15)	$CH3C^{15}N$	14(1)−13(1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	249778.080*(15)	$CH3C^{15}N$	14(0)−13(0)	5.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	249887.427*(23)	CH_3OH	14(3,11)−14(2,12) A−+	3.6	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	249903.	unidentified		3.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	249907.901*(17)	$^{33}SO_2$	13(1,13)−12(0,12)	4.0[f]	Sgr B2(M)	SEST 15 m	Num98	
	249923.816*(8)	CH_3OCH_3	15(1,14)−14(2,13) AA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	249923.860*(27)	$^{13}CH_3CN$	14(6)−13(6)	8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	249924.463*(6)	CH_3OCH_3	15(1,14)−14(2,13) EE	1.1[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	249925.110*(8)	CH_3OCH_3	15(1,14)−14(2,13) AE+EA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	249973.273*(18)	CH_3CH_2CN	35(6,30)−35(5,31)	4.5[f]	Sgr B2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	249975.454*(22)	$^{13}CH_3CN$	14(5)−13(5)	4.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	250005.87* (13)	CH_3OCHO	27(1,26)−27(1,27) A	2.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	250005.90* (13)	CH_3OCHO	27(1,26)−27(0,27) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	250007.45* (13)	CH_3OCHO	27(2,26)−27(1,27) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	250017.695*(20)	$^{13}CH_3CN$	14(4)−13(4)	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	250027.	unidentified		3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	250038.	unidentified		2.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	250050.567*(20)	$^{13}CH_3CN$	14(3)−13(3)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
	250074.057*(20)	$^{13}CH_3CN$	14(2)−13(2)	0.5	OriMC−1	OVRO 10.4 m	Bla86	
	250088.154*(21)	$^{13}CH_3CN$	14(1)−13(1)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	250092.854*(21)	$^{13}CH_3CN$	14(0)−13(0)	0.4	OriMC−1	OVRO 10.4 m	Bla86	
	250161.68* (30)	CH_2NH	7(1,6)−7(0,7)	0.22	OriMC−1	NRAO 12 m	Dic97a	
	250246.522*(17)	CH_3OCHO	20(3,17)−19(3,16) E	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	250258.391*(17)	CH_3OCHO	20(3,17)−19(3,16) A	0.9	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	250291.130*(20)	CH_3OH	13(3,10)−13(2,11) A−+	4.2	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	250312.	unidentified		8.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	250315.134*(12)	$OS^{18}O$	4(3,2)−4(2,3)	3.9[f]	Sgr B2(M)	SEST 15 m	Num98	
U	250325.	unidentified		8.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	250332.7*(4)	CH_2CHCN	26(1,25)−25(1,24) $v_{11}=2$	4.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	250345.	unidentified		6.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	250358.379*(9)	$^{34}SO_2$	9(3,7)−9(2,8)	0.9	OriMC−1	OVRO 10.4 m	Bla86	
	250364.474*(12)	CH_3CH_2CN	27(2,26)−26(1,25)	9.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	250386.497*(18)	CH_3CH_2CN	34(6,29)−34(5,30)	4.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	250410.974*(32)	CH_3OCHO	8(6,2)−7(5,2) E	4.7[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	250436.845*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,7/2-3/2,5/2$ e	39.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250440.337*(10)	CH_3CH_2CN	28(3,26)−27(3,25)	1.7[W]	OriMC−1	OVRO 10.4 m	Bla86	
	250440.656*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,5/2-3/2,3/2$ e	[b]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250448.528*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,3/2-3/2,1/2$ e	9.4[f]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250475.422*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,3/2-3/2,3/2$ e	10.7[f]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250482.941(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,5/2-3/2,3/2$ e	0.3	OriMC−1	OVRO 10.4 m	Bla86	Win94
	250491.595*(23)	$t-CH_3CH_2OH$	12(2,11)−11(1,10)	9.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	250507.016*(22)	CH_3OH	11(0,11)−10(1,10) A+	5.8	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	250524.485*(11)	CH_3CHO	13(7,6)−12(7,5) A−−	5.6[fb]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250524.485*(11)	CH_3CHO	13(7,7)−12(7,6) A++	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250550.131*(11)	CH_3CHO	13(7,7)−12(7,6) E	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250559.093*(10)	CH_3CHO	13(6,8)−12(6,7) A−−	3.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250559.097*(10)	CH_3CHO	13(6,7)−12(6,6) A++	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250569.506*(15)	CH_3CHO	13(−6,7)−12(−6,6) E	2.2[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250635.144*(18)	CH_3OH	12(3,9)−12(2,10) A−+	5.9	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	250673.675*(9)	CH_3CHO	13(−5,8)−12(−5,7) E	12.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250680.124*(9)	CH_3CHO	13(5,9)−12(5,8) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250699.6*(5)	CH_3NH_2	8(0)−7(1) As++	3.4[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	250708.244*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,5/2-3/2,5/2$ f	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250738.126*(15)	CH_3CHO	13(−3,10)−12(−3,9) E $v_t=1$	2.6[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250767.453*(12)	$OS^{18}O$	6(3,4)−6(2,5)	3.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	250796.426*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,7/2-3/2,5/2$ f	22.7[f]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250815.612*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,5/2-3/2,3/2$ f	24.2[fb]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250816.932*(4)	NO	$2\Pi_{1/2}$ J, $F=5/2,3/2-3/2,1/2$ f	[b]	Sgr B2(N)	SEST 15 m	Num98	Win94
	250829.155*(8)	CH_3CHO	13(4,9)−12(4,8) E	3.2[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250853.155*(8)	CH_3CHO	13(−4,10)−12(−4,9) E	8.7[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250882.744*(12)	CH_3CH_2CN	28(10,*)−27(10,*)	16.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	250890.447*(12)	CH_3CH_2CN	28(11,*)−27(11,*)	8.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	250897.226*(11)	CH_3CH_2CN	28(9,*)−27(9,*)	7.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	250924.342*(16)	CH_3OH	11(3,8)−11(2,9) A−+	50.1[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	250934.551*(9)	CH_3CHO	13(3,11)−12(3,10) A++	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	250943.266*(11)	CH_3CH_2CN	28(8,21)−27(8,20)	8.2[fb]	Sgr B2(N)	SEST 15 m	Num98	
	250943.270*(11)	CH_3CH_2CN	28(8,20)−27(8,19)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	250952.303*(13)	CH_3CH_2CN	28(13,*)−27(13,*)	4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	250965.460*(8)	^{18}OCS	22−21	4.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	250992.	unidentified		4.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	251000.725*(14)	CH_3CH_2CN	28(14,*)−27(14,*)	3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	251023.365*(39)	$t-CH_3CH_2OH$	27(3,25)−27(2,26)	6.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	251037.791*(11)	CH_3CH_2CN	28(7,22)−27(7,21)	11.4[fb]	Sgr B2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	251037.952*(11)	CH_3CH_2CN	28(7,21)−27(7,20)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	251058.517*(14)	CH_3CH_2CN	28(15,*)−27(15,*)	3.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	251078.966*(37)	CH_3CH2CN	41(2,40)−41(1,41)	5.9[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	251081.305*(37)	CH_3OCHO	31(4,28)−31(3,29) E	5.9[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	251138.714*(42)	CH_3OCHO	29(2,27)−29(1,28) E	4.3[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	251140.801*(10)	CH_3OCH_3	21(5,16)−21(4,17) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251140.817*(10)	CH_3OCH_3	21(5,16)−21(4,17) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251142.466*(8)	CH_3OCH_3	21(5,16)−21(4,17) EE	4.2[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251144.122*(10)	CH_3OCH_3	21(5,16)−21(4,17) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251164.056*(14)	CH_3OH	10(3,7)−10(2,8) A−+	41.7[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	251192.333 (50)	CH_3SH	10(−1)−9(−1) E	10.7[f]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	251199.655*(8)	SO_2	13(1,13)−12(0,12)	1.09	IRAS16293−2422	JCMT 15 m	Bla94	
	251210.575*(7)	SO_2	8(3,5)−8(2,6)	0.63	IRAS16293−2422	JCMT 15 m	Bla94	
	251212.967*(9)	AlNC	21−20	0.005	IRC+10216	IRAM 30 m	Ziu02	
	251264.443*(17)	CH_3OCHO	20(6,14)−19(6,13) E	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	251271.329*(15)	CH_3CH_2CN	30(6,24)−30(5,25)	10.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	251285.732*(20)	CH_3OCHO	20(6,14)−19(6,13) A	8.0[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	251301.712*(23)	$t-CH_3CH_2OH$	7(3,5)−6(2,4)	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	251314.348*(44)	$c-C_3H_2$	7(0,7)−6(1,6)	12.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	251314.354*(44)	$c-C_3H_2$	7(1,7)−6(2,6)	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	251332.	unidentified		18.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	251359.841*(13)	CH_3OH	9(3,6)−9(2,7) A−+	39.4[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	251375.	unidentified		6.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	251421.22* (18)	CH_2NH	6(0,6)−5(1,5)	0.46	OriMC−1	NRAO 12 m	Dic97a	
	251428.534*(9)	SO_2	10(3,7)−10(2,8) v_2 =1	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	251450.167*(11)	SO_2	13(1,13)−12(0,12) v_2 =1	8.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	251489.283*(9)	CH_3CHO	13(3,10)−12(3,9) A−−	9.3[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	251501.407*(10)	CH_3CH_2CN	28(5,24)−27(5,23)	11.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	251505.966*(4)	CH_2CHCN	26(2,24)−25(2,23)	11.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	251517.269*(13)	CH_3OH	8(3,5)−8(2,6) A−+	31.5[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	251527.309*(14)	$c-C_3H_2$	6(2,5)−5(1,4)	8.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	251566.475*(16)	$t-CH_3CH_2OH$	15(1,15)−14(0,14)	6.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	251581.691*(8)	CH_3OCH_3	10(2,9)−9(1,8) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251583.634*(6)	CH_3OCH_3	10(2,9)−9(1,8) EE	3.6[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251585.576*(6)	CH_3OCH_3	10(2,9)−9(1,8) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	251607.120*(10)	CH_3CH_2CN	28(5,23)−27(5,22)	9.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	251641.754*(13)	CH_3OH	7(3,4)−7(2,5) A−+	32.3[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	251661.030*(18)	CH_3CH_2CN	10(4,7)−9(3,6)	5.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	251668.849*(10)	CH_3CH_2CN	28(4,25)−27(4,24)	6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	251714.06*(8)	CH_2CHCN	26(2,24)−25(2,23) v_{15} =1	2.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	251738.411*(13)	CH_3OH	6(3,3)−6(2,4) A−+	2.0	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251758.357*(47)	$^{34}SO_2$	32(4,28)−32(3,29)	11.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	251811.936*(14)	CH_3OH	5(3,2)−5(2,3) A−+	1.2	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251825.816*(16)	SO	5(6)−4(5)	3.3	OriMC−1	MMWO 4.9 m	Cle84	
	251866.511*(15)	CH_3OH	4(3,1)−4(2,2) A−+	1.5	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251890.868*(14)	CH_3OH	5(3,3)−5(2,4) A+−	1.8	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251895.703*(13)	CH_3OH	6(3,4)−6(2,5) A+−	2.1	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251900.439*(15)	CH_3OH	4(3,2)−4(2,3) A+−	1.7	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251905.720*(16)	CH_3OH	3(3,0)−3(2,1) A−+	1.0	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251917.057*(16)	CH_3OH	3(3,1)−3(2,2) A+−	1.1	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
	251923.671*(12)	CH_3OH	7(3,5)−7(2,6) A+−	1.8	OriMC−1	MMWO 4.9 m	Cle84	Xu_97
U	251953.	unidentified		1.2	OriMC−1	MMWO 4.9 m	Cle84	
	251984.802*(12)	CH_3OH	8(3,6)−8(2,7) A+−	52.1[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	252025.	unidentified		7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	252090.369*(13)	CH_3OH	9(3,7)−9(2,8) A+−	54.4[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	252107.954*(75)	CH_3OCHO	31(7,24)−30(8,23) A	9.6[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	252133.	unidentified		3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252154.	unidentified		10.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252182.	unidentified		5.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252192.	unidentified		7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	252252.807*(14)	CH_3OH	10(3,8)−10(2,9) A+−	55.9[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	252280.	unidentified		2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252328.	unidentified		2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252354.	unidentified		4.6[f]	Sgr B2(N)	SEST 15 m	Num98	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	252360.863*(16)	CH_3OCH_3	28(2,26)−28(1,27) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	252363.627*(14)	CH_3OCH_3	28(2,26)−28(1,27) EE	7.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	252366.391*(16)	CH_3OCH_3	28(2,26)−28(1,27) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	252395.180*(7)	NH_2CHO	3(2,1)−2(1,2)	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252440.	unidentified		8.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	252464.159 (50)	CH_3SH	10(0)−9(0) E	6.7[f]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252485.631*(15)	CH_3OH	11(3,9)−11(2,10) A+−	30.1[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	252508.348 (50)	CH_3SH	10(0)−9(0) A++	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252563.945*(12)	SO_2	32(4,28)−31(5,27)	19.9[f]	Sgr B2(M)	SEST 15 m	Num98	
	252582.442*(15)	CH_3CH_2CN	28(6,23)−28(5,24)	7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	252591.691*(11)	$^{33}SO_2$	7(3,5)−7(2,6)	2.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	252615.371*(10)	$^{34}SO_2$	9(5,5)−10(4,6)	7.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	252731.049*(13)	SO_2	15(2,14)−15(1,15) v_2 =1	6.8[f]	Sgr B2(M)	SEST 15 m	Num98	
U	252764.	unidentified		2.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	252803.346*(17)	CH_3OH	12(3,10)−12(2,11) A+−	4.1	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	252814.801*(12)	$OS^{18}O$	9(3,7)−9(2,8)	4.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	252841.551 (50)	CH_3SH	10(4)−9(4) A++	14.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252841.551 (50)	CH_3SH	10(4)−9(4) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252844.091 (50)	CH_3SH	10(4)−9(4) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252848.436 (50)	CH_3SH	10(−4)−9(−4) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252871.368*(14)	CH_3CH_2CN	27(6,22)−27(5,23)	13.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	252878.153 (50)	CH_3SH	10(3)−9(3) A++	10.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252880.499 (50)	CH_3SH	10(3)−9(3) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252882.567 (50)	CH_3SH	10(−3)−9(−3) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252882.612 (50)	CH_3SH	10(3)−9(3) A−−	[b]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	252896.054*(11)	CH_3CH_2CN	28(4,24)−27(4,23)	0.7	OriMC−1	OVRO 10.4 m	Bla86	
	252908.6*(5)	CH_3NH_2	6(2)−6(−1) Ea	8.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	252926.	unidentified		8.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	252942.	unidentified		7.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	252951.131*(25)	$t-CH_3CH_2OH$	4(4,1)−3(3,0)	11.6[fb]	Sgr B2(N)	SEST 15 m	Num98	
	252952.070*(25)	$t-CH_3CH_2OH$	4(4,0)−3(3,1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	252966.930*(14)	CH_3CH_2CN	26(6,20)−26(5,21)	8.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	252967.333 (50)	CH_3SH	10(−2)−9(−2) E	8.4[f]	Sgr B2(N)	SEST 15 m	Num98	Sas86
U	252976.	unidentified		10.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	252984.032 (50)	CH_3SH	10(2)−9(2) E	10.3[f]	Sgr B2(N)	SEST 15 m	Num98	Sas86
U	253058.	unidentified		2.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253078.	unidentified		7.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253115.	unidentified		5.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	253124.169 (50)	CH_3SH	10(2)−9(2) A++	5.8[f]	Sgr B2(N)	SEST 15 m	Num98	Sas86
	253134.792*(14)	CH_3CH_2CN	26(6,21)−26(5,22)	8.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	253165.778*(8)	NH_2CHO	12(2,11)−11(2,10)	22.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	253207.034*(16)	^{34}SO	6(6)−5(5)	3.0	OriMC−1	OVRO 10.4 m	Bla86	
	253221.340*(19)	CH_3OH	13(3,11)−13(2,12) A+−	3.1	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	253257.907*(14)	CH_3CH_2CN	25(6,19)−25(5,20)	9.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	253266.009*(19)	CH_3CH_2CN	5(5,1)−4(4,0)	8.5[fb]	Sgr B2(N)	SEST 15 m	Num98	
	253266.010*(19)	CH_3CH_2CN	5(5,0)−4(4,1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	253308.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253352.	unidentified		11.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253362.	unidentified		10.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	253372.836*(14)	CH_3CH_2CN	25(6,20)−25(5,21)	9.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	253392.037*(40)	CH_3OCHO	28(10,18)−28(9,19) E	6.5[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	253401.	unidentified		9.1[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253423.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	253497.404*(18)	$OS^{18}O$	14(1,14)−13(0,13)	5.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	253508.682*(14)	CH_3CH_2CN	24(6,18)−24(5,19)	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253537.	unidentified		7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	253545.519*(10)	NH_2CHO	8(2,7)−8(0,8)	7.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	253570.406*(20)	NS	$^2\Pi_{1/2}$ J, F=5.5,6.5−4.5,5.5 e	56.6[fb]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	253570.735*(20)	NS	$^2\Pi_{1/2}$ J, F=5.5,5.5−4.5,4.5 e	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	253572.148(7)	NS	$^2\Pi_{1/2}$ J, F=5.5,4.5−4.5,3.5 e	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	253586.052*(14)	CH_3CH_2CN	24(6,19)−24(5,21)	9.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253594.	unidentified		4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	253605.972*(20)	NS	$^2\Pi_{1/2}$ J, F=5.5,4.5−4.5,4.5 e	11.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Lee95

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	253610.002(3)	NS	$^2\Pi_{1/2}$ J, F=5.5,5.5−4.5,5.5 e	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	253619.61* (18)	$HC^{13}CCN$	28−27	11.4[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
U	253629.	unidentified		6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	253643.580*(72)	$HCC^{13}CN$	28−27	18.7[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	253660.115*(48)	CH_3OCHO	28(10,19)−28(9,20) E	7.3[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	253683.707*(7)	NH_2CHO	11(1,11)−10(0,10)	25.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	253703.23* (14)	^{29}SiO	6−5 v=2	4.0	VYCMa	IRAM 30 m	Cer92	
	253717.539*(50)	CH_3OCHO	28(10,18)−28(9,20) E	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	253718.237*(40)	CH_3OCHO	23(4,19)−22(5,18) E	9.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	253724.193*(14)	CH_3CH_2CN	23(6,17)−23(5,18)	5.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	253755.783*(22)	CH_3OH	14(3,12)−14(2,13) A+−	0.73	OriMC−1	MMWO 4.9 m	Lor84b	Xu_97
	253766.948*(48)	CH_3OCHO	23(4,19)−22(5,18) A	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	253768.2*(5)	CH_3NH_2	6(−2)−6(−1) Es	6.2[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	253775.338*(14)	CH_3CH_2CN	23(6,18)−23(5,19)	4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	253802.	unidentified		3.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	253825.381*(5)	CH_2CHCN	3(3,1)−2(2,0)	2.8[fb]	Sgr B2(N)	SEST 15 m	Num98	
	253828.873*(5)	CH_2CHCN	3(3,0)−2(2,1)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	253904.677*(10)	CH_3OCH_3	20(5,15)−20(4,16) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	253904.710*(10)	CH_3OCH_3	20(5,15)−20(4,16) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	253906.554*(8)	CH_3OCH_3	20(5,15)−20(4,16) EE	16.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	253908.413*(12)	CH_3OCH_3	20(5,15)−20(4,16) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	253908.706*(14)	CH_3CH2CN	22(6,16)−22(5,17)	16.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	253936.313*(10)	$^{34}SO_2$	11(3,9)−11(2,10)	29.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	253941.855*(14)	CH_3CH_2CN	22(6,17)−22(5,18)	14.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	253956.546*(7)	SO_2	15(6,10)−16(5,11)	40.9[f]	Sgr B2(M)	SEST 15 m	Num98	
	253968.393(4)	NS	$^2\Pi_{1/2}$ J, F=5.5,6.5−4.5,5.5 f	57.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	253970.581(3)	NS	$^2\Pi_{1/2}$ J, F=5.5,4.5−4.5,3.5 f	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	253970.581(3)	NS	$^2\Pi_{1/2}$ J, F=5.5,5.5−4.5,4.5 f	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	254015.367*(15)	CH_3OH	2(0,2)−1(−1,1) E	0.95	OriMC−1	MMWO 4.9 m	Lor84	Xu_97
	254055.8*(5)	CH_3NH_2	4(−1)−3(0) Ea	5.0[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	254063.	unidentified		6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	254080.	unidentified		11.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	254103.175*(19)	SiS	14−13	0.85	IRC+10216	MMWO 4.9 m	Sah84	
	254137.467*(4)	CH_2CHCN	27(2,26)−26(2,25)	11.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	254216.29* (14)	^{30}SiO	6−5 v=0	0.6	OriMC−1	MMWO 4.9 m	Lor84b	
	254231.776*(25)	$c-C_2H_4O$	8(1,7)−7(2,6)	0.57	Sgr B2(N)	SEST 15 m	Dic97	
	254235.701*(25)	$c-C_2H_4O$	8(2,7)−7(1,6)	1.06[f]	NGC6334F	SEST 15 m	Num98a	
	254277.654*(44)	$^{34}SO_2$	28(4,24)−28(3,25)	[b]	W3(IRS5)	JCMT 15 m	Hel97	
	254280.527*(7)	SO_2	6(3,3)−6(2,4)	[b]	W3(IRS5)	JCMT 15 m	Hel97	
	254283.326*(12)	SO_2	24(2,22)−24(1,23)	2.09[b]	W3(IRS5)	JCMT 15 m	Hel97	
	254311.091*(14)	CH_3CH_2CN	19(6,13)−19(5,14)	11.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	254318.956*(14)	CH_3CH_2CN	19(6,14)−19(5,15)	12.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	254321.787*(20)	$^{13}CH_3OH$	4(2,2)−5(1,5) A++	12.3[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	254384.040*(22)	$t-CH_3CH_2OH$	7(3,4)−6(2,5)	4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	254423.511*(25)	CH_3OH	15(3,13)−15(2,14) A+−	3.0	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	254481.340*(15)	CH_3CH_2CN	17(6,11)−17(5,12)	5.2[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254483.861*(15)	CH_3CH_2CN	17(6,12)−17(5,13)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254509.349*(20)	$^{13}CH_3OH$	10(3,7)−10(2,8) A−+	5.6[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	254510.013*(11)	$^{33}SO_2$	9(3,7)−9(2,8)	7.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	254516.763*(13)	$^{34}SO_2$	14(6,8)−15(5,11)	7.7[f]	Sgr B2(M)	SEST 15 m	Num98	
U	254536.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	254543.911*(15)	CH_3CH_2CN	16(6,10)−16(5,11)	5.7[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254545.347*(15)	CH_3CH_2CN	16(6,11)−16(5,12)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254551.67*(8)	CH_2CHCN	27(2,26)−26(2,25) v_{15} =1	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	254552.727*(13)	$O^{13}CS$	21−20	6.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	254573.610*(80)	SO	8(9)−8(8)	0.39	OriMC−1	MMWO 4.9 m	Lor84	
	254586.635*(77)	NH_2CHO	19(6,14)−20(5,15)	10.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	254633.218*(16)	CH_3CH_2CN	14(6,8)−14(5,9)	6.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254633.597*(16)	CH_3CH_2CN	14(6,9)−14(5,10)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254663.179*(16)	CH_3CH_2CN	13(6,7)−13(5,8)	8.5[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254663.359*(16)	CH_3CH_2CN	13(6,8)−13(5,9)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254685.07* (18)	CH_2NH	4(0,4)−3(0,3)	36.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	254699.490*(10)	HCCCN	28−27	5.0	OriMC−1	OVRO 10.4 m	Bla86	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	254710.892*(17)	CH_3CH_2CN	10(6,4)−10(5,5)	21.8[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254710.904*(17)	CH_3CH_2CN	10(6,5)−10(5,6)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254716.683*(18)	CH_3CH_2CN	9(6,3)−9(5,4)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254716.687*(18)	CH_3CH_2CN	9(6,4)−9(5,5)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254717.373*(18)	CH_3CH_2CN	6(6,*)−6(5,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254719.098*(18)	CH_3CH_2CN	7(6,*)−7(5,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254719.127*(18)	CH_3CH_2CN	8(6,*)−8(5,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254726.974*(31)	NH_2CHO	12(9,3)−11(9,2)	8.1[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254726.974*(31)	NH_2CHO	12(9,4)−11(9,3)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254727.263*(25)	NH_2CHO	12(8,4)−11(8,3)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254727.263*(25)	NH_2CHO	12(8,5)−11(8,4)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254743.791*(20)	NH_2CHO	12(7,5)−11(7,4)	14.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254743.791*(20)	NH_2CHO	12(7,6)−11(7,5)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254786.398*(16)	NH_2CHO	12(6,7)−11(6,6)	10.0[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254786.401*(16)	NH_2CHO	12(6,6)−11(6,5)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254827.143*(10)	CH_3CHO	13(2,11)−12(2,10) E	6.2[f]	Sgr B2(M)	SEST 15 m	Num98	Kle96
	254841.836*(19)	$^{13}CH_3OH$	8(3,5)−8(2,6) A−+	0.7	OriMC−1	OVRO 10.4 m	Sut88	Xu_97
	254850.487*(10)	CH_3CHO	13(2,11)−12(2,10) A++	6.8[f]	Sgr B2(M)	SEST 15 m	Num98	Kle96
	254876.293*(12)	NH_2CHO	12(5,8)−11(5,7)	20.3[fb]	Sgr B2(N)	SEST 15 m	Num98	
	254876.610*(12)	NH_2CHO	12(5,7)−11(5,6)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	254959.414*(16)	$^{13}CH_3OH$	7(3,4)−7(2,5) A−+	1.2	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	254976.352*(11)	CH_3CH_2CN	29(2,28)−28(2,27)	1.5	OriMC−1	OVRO 10.4 m	Bla86	
	254976.353*(11)	CH_3CH_2CN	29(2,28)−28(2,27)	29.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	254977.935 (20)	SO^+	$^2\Pi_{1/2}$ J=11/2−9/2	15.4[f]	Sgr B2(M)	SEST 15 m	Num98	Ama91
	254987.648*(6)	$c-C_3H_2$	5(3,3)−4(2,2)	13.9[f]	Sgr B2(M)	SEST 15 m	Num98	
	255002.604*(18)	CH_3CH_2CN	17(3,15)−16(2,14)	5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	255016.04* (10)	CH_2NH	8(3,5)−9(2,8)	7.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	255050.260 (59)	HDO	5(2,3)−4(3,2)	2.1	OriMC−1	OVRO 10.4 m	Bla86	DeL71
	255050.985*(16)	$^{13}CH_3OH$	6(3,3)−6(2,4) A−+	n.r.	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255058.504*(10)	NH_2CHO	12(4,9)−11(4,8)	21.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	255071.237*(11)	CH_3CH_2CN	28(2,26)−27(2,25)	11.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	255078.883*(10)	NH_2CHO	12(4,8)−11(4,7)	15.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	255119.11* (92)	HCCCN	28−27 v_6 =1 ℓ=1 e	22.8[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	255120.895*(16)	$^{13}CH_3OH$	5(3,2)−5(2,3) A−+	1.7	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	255158.	unidentified		4.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	255172.998*(18)	$^{13}CH_3OH$	4(3,1)−4(2,2) A−+	1.2	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	255184.	unidentified		10.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	255192.391*(16)	$^{13}CH_3OH$	5(3,3)−5(2,4) A+−	[b]	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255193.491*(16)	$^{13}CH_3OH$	6(3,4)−6(2,5) A+−	1.8[b]	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255203.725*(18)	$^{13}CH_3OH$	4(3,2)−4(2,3) A+−	1.3	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255210.596*(20)	$^{13}CH_3OH$	3(3,0)−3(2,1) A−+	0.6	OriMC−1	OVRO 10.4 m	Sut88	Xu_97
	255214.890*(16)	$^{13}CH_3OH$	7(3,5)−7(2,6) A+−	1.0	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255220.861*(20)	$^{13}CH_3OH$	3(3,1)−3(2,2) A+−	0.9	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255225.630*(9)	NH_2CHO	12(3,10)−11(3,9)	22.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	255241.905*(29)	CH_3OH	16(3,14)−16(2,15) A+−	3.8	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	255256.	unidentified		6.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	255264.930*(17)	CH_3CH_2CN	15(3,12)−14(2,13)	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	255265.639*(19)	$^{13}CH_3OH$	8(3,6)−8(2,7) A+−	1.4	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255316.5*(11)	HCCCN	28−27 v_6 =1 ℓ=1 f	20.8[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	255324.34* (11)	HCCCN	28−27 v_7 =1 ℓ=1 e	1.0	OriMC−1	OVRO 10.4 m	Bla86	Laf78
	255353.237 (20)	SO^+	$^2\Pi_{1/2}$ J=11/2−9/2 f	0.13	Sgr B2(N)	NRAO 12 m	Tur94a	Ama91
	255355.916*(23)	$^{13}CH_3OH$	9(3,7)−9(2,8) A+−	1.0	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255374.453*(2)	OCS	21−20	6.5	OriMC−1	OVRO 10.4 m	Bla86	
	255384.756*(10)	CH_3CHO	13(1,12)−12(1,11) A−−	12.0[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	255444.1*(5)	CH_3NH_2	9(−2)−9(−1) Ea	9.6[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	255456.	unidentified		4.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	255466.	unidentified		3.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	255478.30* (12)	^{29}SiO	6−5 v=1	4.0	VYCMa	IRAM 30 m	Cer92	
	255479.389 (10)	$HC^{18}O^+$	3−2	1.0	OriMC−1	OVRO 10.4 m	Bla86	Plu83
U	255487.	unidentified		2.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	255496.963*(30)	$^{13}CH_3OH$	10(3,8)−10(2,9) A+−	0.8	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	255520.	unidentified		3.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	255553.294*(7)	SO_2	4(3,1)−4(2,2)	7.4	OriMC−1	OVRO 10.4 m	Bla86	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	255564.159*(57)	$HOCO^+$	12(1,12)−11(1,11)	5.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	255573.	unidentified		1.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	255595.391*(32)	SO_2	51(7,45)−50(8,42)	0.4[V]	OriMC−1	OVRO 10.4 m	Bla86	
	255596.896(6)	NS	$^2\Pi_{3/2}$ J, F=5.5,6.5−4.5,5.5	18.8[fb]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	255600.379(3)	NS	$^2\Pi_{3/2}$ J, F=5.5,5.5−4.5,4.5	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
	255602.964(3)	NS	$^2\Pi_{3/2}$ J, F=5.5,4.5−4.5,3.5	[b]	Sgr B2(N)	SEST 15 m	Num98	Lee95
U	255633.	unidentified		14.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	255639.83* (24)	$H^{13}CCCN$	29−28	5.2[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	255651.323*(16)	^{33}SO	6(6)−5(5)	8.7[f]	Sgr B2(M)	SEST 15 m	Num98	
	255689.08* (11)	HCCCN	28−27 v_7 =1 ℓ=1 f	1.1	OriMC−1	OVRO 10.4 m	Bla86	Laf78
	255701.008*(38)	$^{13}CH_3OH$	11(3,9)−11(2,10) A+−	8.9[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	U255729.	unidentified		3.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	255776.135*(16)	CH_3OCHO	21(4,18)−20(4,17) E	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	255789.443*(16)	CH_3OCHO	21(4,18)−20(4,17) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	255818.387*(19)	SO_2	44(6,38)−43(7,37)	2.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	255840.21* (29)	CH_2NH	4(2,3)−3(2,2)	0.03	W51	NRAO 12 m	Dic97a	
	255871.810*(9)	NH_2CHO	12(3,9)−11(3,8)	17.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	255892.271*(19)	$^{34}SO_2$	19(7,13)−20(6,14)	2.3[f]	Sgr B2(M)	SEST 15 m	Num98	
	255906.479*(11)	CH_3CH_2CN	28(3,25)−27(3,24)	0.9	OriMC−1	OVRO 10.4 m	Bla86	
	255958.037*(7)	SO_2	3(3,1)−3(2,2)	>3.	OriMC−1	BTL 7 m	Tha81	
	255981.193*(50)	$^{13}CH_3OH$	12(3,10)−12(2,11) A+−	0.5	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	255999.5*(5)	CH_3NH_2	4(2)−4(−1) Aa+−	10.3[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	256027.111*(22)	HCS^+	6−5	0.16	W3(IRS5)	JCMT 15 m	Hel97	
	256049.474*(28)	CH_3OCHO	26(10,16)−26(9,17) A	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	256060.154*(30)	CH_3CHO	18(3,18)−18(2,17) A+−	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	256071.124*(32)	CH_3OCHO	26(10,16)−26(9,17) E	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	256081.	unidentified		5.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	256091.96* (23)	$OS^{17}O$	15(0,15)−14(1,14)	6.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	256135.123*(10)	CH_3OCH_3	19(5,14)−19(4,15) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	256135.190*(10)	CH_3OCH_3	19(5,14)−19(4,15) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	256137.199*(6)	CH_3OCH_3	19(5,14)−19(4,15) EE	11.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	256139.241*(12)	CH_3OCH_3	19(5,14)−19(4,15) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	256160.781*(11)	CH_3CCH	15(6)−14(6)	3.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	256165.7*(43)	CH_2NH	4(3,2)−3(3,1)	12.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	256176.71* (43)	CH_2NH	4(3,1)−3(3,0)	8.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	256206.216*(3)	$g-CH_3CH_2OH$	15(2,14)−14(2,13) v_t =0−0	5.6[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	256214.468*(8)	CH_3CCH	15(5)−14(5)	6.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	256228.765*(35)	CH_3OH	17(3,15)−17(2,16) A+−	1.7	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	256246.937*(7)	SO_2	5(3,3)−5(2,4)	1.2	OriMC−1	MMWO 4.9 m	Lor84b	
	256258.423*(5)	CH_3CCH	15(4)−14(4)	1540[f]	Sgr B2(N)	SEST 15 m	Num98	
U	256274.	unidentified		11.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	256292.627*(4)	CH_3CCH	15(3)−14(3)	0.3	OriMC−1	MMWO 4.9 m	Lor84b	
	256310.77* (17)	HCCCN	28−27 v_7 =2 ℓ=2 e	16.6[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	256317.069*(3)	CH_3CCH	15(2)−14(2)	0.3	OriMC−1	MMWO 4.9 m	Lor84b	
	256331.737*(3)	CH_3CCH	15(1)−14(1)	0.4	OriMC−1	MMWO 4.9 m	Lor84b	
	256336.627*(3)	CH_3CCH	15(0)−14(0)	0.4	OriMC−1	MMWO 4.9 m	Lor84b	
U	256351.	unidentified		6.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	256366.14* (25)	HCCCN	28−27 v_7 =2 ℓ=2 f	8.9[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	256395.934*(11)	CH_3CH_2CN	29(1,28)−28(1,27)	1.0	OriMC−1	OVRO 10.4 m	Bla86	
	256397.423*(5)	CH_2CHCN	27(7,*)−26(7,*)	17.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	256409.07* (29)	CH_2CHCN	27(8,*)−26(8,*)	0.7	OriMC−1	OVRO 10.4 m	Bla86	
	256425.85* (16)	CH_2CHCN	27(6,22)−26(6,21)	0.7[b]	OriMC−1	OVRO 10.4 m	Bla86	
	256425.95* (16)	CH_2CHCN	27(6,21)−26(6,20)	[b]	OriMC−1	OVRO 10.4 m	Bla86	
	256447.75* (28)	CH_2CHCN	27(9,*)−26(9,*)	0.4	OriMC−1	OVRO 10.4 m	Bla86	
	256506.569*(5)	CH_2CHCN	27(10,*)−26(10,*)	10.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	256522.86* (13)	CH_2CHCN	27(5,23)−26(5,22)	0.8	OriMC−1	OVRO 10.4 m	Bla86	
	256527.36* (13)	CH_2CHCN	27(5,22)−26(5,21)	0.5	OriMC−1	OVRO 10.4 m	Bla86	
	256566.278*(43)	$HOCO^+$	12(0,12)−11(0,11)	5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	256576.351*(4)	CH_2CHCN	27(3,25)−26(3,24)	21.4[fb]	Sgr B2(N)	SEST 15 m	Num98	
	256580.971*(6)	CH_2CHCN	27(11,*)−26(11,*)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	256585.558*(11)	HDCO	4(0,4)−3(0,3)	0.54	OriMC−1	MMWO 4.9 m	Lor85	
U	256622.	unidentified		3.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	256632.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	256668.790*(7)	CH_2CHCN	27(12,*)−26(12,*)	8.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	256671.783*(21)	$^{13}CH_3OH$	9(0,9)−8(1,7) E	0.5	OriMC−1	OVRO 10.4 m	Bla86	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	256711.75* (11)	CH_2CHCN	27(4,24)−26(4,23)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
U	256725.	unidentified		4.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	256736.68* (16)	CH_2CHCN	27(7,*)−26(7,*) v_{15} =1	4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	256756.33* (13)	CH_2CHCN	27(6,22)−26(6,21) v_{15} =1	7.6[fb]	Sgr B2(N)	SEST 15 m	Num98	
	256756.41* (13)	CH_2CHCN	27(6,21)−26(6,20) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	256756.68* (19)	CH_2CHCN	27(8,*)−26(8,*) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	256768.502*(9)	CH_2CHCN	27(13,*)−26(13,*)	8.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	256785.415*(37)	CH_3OCHO	36(6,31)−36(5,32) A	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	256803.26* (23)	CH_2CHCN	27(9,*)−26(9,*) v_{15} =1	9.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	256817.173*(22)	CH_3CN	14(12)−13(12)	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	256826.	unidentified		5.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	256837.22* (11)	CH_2CHCN	27(4,23)−26(4,22)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	256842.41* (10)	CH_2CHCN	27(5,23)−26(5,22) v_{15} =1	8.4[fb]	Sgr B2(N)	SEST 15 m	Num98	
	256846.29* (10)	CH_2CHCN	27(5,22)−26(5,21) v_{15} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	256863.936*(5)	CH_2CHCN	28(1,28)−27(1,27)	11.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	256877.810*(30)	^{34}SO	7(6)−6(5)	0.79	OriMC−1	MMWO 4.9 m	Lor84	
	256898.37* (14)	SiO	6−5 v=2	3.5	VYCMa	IRAM 30 m	Cer93	
	256904.30*(8)	CH_2CHCN	27(3,25)−26(3,24) v_{15} =1	5.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	256952.01* (30)	CH_2CHCN	27(11,*)−26(11,*) v_{15} =1	1.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	256957.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	256966.892*(13)	CH_3CH_2CN	30(0,30)−29(1,29)	0.2	OriMC−1	OVRO 10.4 m	Bla86	
	256999.700*(17)	CH_2CHCN	27(15,*)−26(15,*)	8.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	257015.	unidentified		5.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	257020.20*(9)	CH_2CHCN	27(4,24)−26(4,23) v_{15} =1	4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	257033.461*(15)	CH_3CN	14(10)−13(10)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	257048.570*(10)	CH_3OCH_3	18(2,16)−17(3,15) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257049.891*(10)	CH_3OCH_3	18(2,16)−17(3,15) EE	7.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257051.212*(12)	CH_3OCH_3	18(2,16)−17(3,15) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257060.879*(18)	$t-CH_3CH_2OH$	16(1,15)−15(2,14)	5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	257074.938*(16)	CH_3OCHO	22(2,20)−21(3,19) A	9.8[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	257099.956*(7)	SO_2	7(3,5)−7(2,6)	7.9	OriMC−1	OVRO 10.4 m	Bla86	
	257103.583*(13)	CH_3CH_2CN	28(2,27)−27(1,26)	[b]	OriMC−1	JCMT 15 m	Gre91	
	257106.443*(12)	CH_3CH_2CN	30(1,29)−29(2,28)	[b]	OriMC−1	JCMT 15 m	Gre91	
	257112.54* (28)	CH_2NH	4(2,2)−3(2,1)	21.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	257127.054*(12)	CH_3CN	14(9)−13(9)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
	257132.25*(9)	CH_2CHCN	27(4,23)−26(4,22) v_{15} =1	7.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	257139.308*(17)	CH_2CHCN	27(7,*)−26(7,*) v_{11} =1	7.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	257141.092*(18)	CH_2CHCN	27(8,*)−26(8,*) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	257158.535*(36)	$CH_3{}^{13}CN$	14(7)−13(7)	2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	257170.283*(20)	CH_2CHCN	27(9,*)−26(9,*) v_{11} =1	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	257179.423*(16)	CH_2CHCN	27(6,22)−26(6,21) v_{11} =1	3.3[fb]	Sgr B2(N)	SEST 15 m	Num98	
	257179.544*(16)	CH_2CHCN	27(6,21)−26(6,20) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
U	257188.0	unidentified		3.5	OriMC−1	JCMT 15 m	Gre91	
	257210.896*(10)	CH_3CN	14(8)−13(8)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
	257222.517*(26)	$CH_3{}^{13}CN$	14(6)−13(6)	7.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	257226.577*(20)	CH_3OCHO	20(5,15)−19(5,14) E	0.8	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	257239.863*(13)	CH_3CH_2CN	30(1,30)−29(1,29)	0.4	OriMC−1	OVRO 10.4 m	Bla86	
	257252.661*(21)	CH_3OCHO	20(5,15)−19(5,14) A	0.9	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	257255.06* (14)	^{29}SiO	6−5 v=0	1.6	OriMC−1	OVRO 10.4 m	Bla86	
	257276.699*(17)	$CH_3{}^{13}CN$	14(5)−13(5)	13.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	257284.953*(7)	CH_3CN	14(7)−13(7)	1.0	OriMC−1	OVRO 10.4 m	Bla86	
	257290.955*(16)	CH_2CHCN	27(5,23)−26(5,22) v_{11} =1	12.9[fb]	Sgr B2(N)	SEST 15 m	Num98	
	257296.354*(16)	CH_2CHCN	27(5,22)−26(5,21) v_{11} =1	[b]	Sgr B2(N)	SEST 15 m	Num98	
	257310.649*(13)	CH_3CH_2CN	30(0,30)−29(0,29)	0.8	OriMC−1	OVRO 10.4 m	Bla86	
	257321.060*(11)	$CH_3{}^{13}CN$	14(4)−13(4)	8.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	257349.196*(6)	CH_3CN	14(6)−13(6)	1.8	OriMC−1	OVRO 10.4 m	Bla86	
	257355.581*(9)	$CH_3{}^{13}CN$	14(3)−13(3)	1.5[f]	Sgr B2(M)	SEST 15 m	Num98	
	257365.580*(16)	CH_2CHCN	28(1,28)−27(1,27) v_{11} =1	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	257369.72* (12)	CH_2CHCN	28(1,28)−27(1,27) v_{15} =1	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	257380.249*(10)	$CH_3{}^{13}CN$	14(2)−13(2)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	257395.055*(11)	$CH_3{}^{13}CN$	14(1)−13(1)	[b]	Sgr B2(M)	SEST 15 m	Num98	
	257399.900*(11)	$CH_3{}^{13}CN$	14(0)−13(0)	10.7[fb]	Sgr B2(M)	SEST 15 m	Num98	
	257402.182*(43)	CH_3OH	18(3,16)−18(2,17) A+−	2.8[b]	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	257403.598*(4)	CH_3CN	14(5)−13(5)	0.5	OriMC−1	MMWO 4.9 m	Lor84	
	257420.292*(25)	SO_2	24(2,22)−24(1,23) v_2 =1	0.4	OriMC−1	OVRO 10.4 m	Bla86	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	257448.139*(4)	CH_3CN	14(4)−13(4)	0.5	OriMC−1	MMWO 4.9 m	Lor84	
	257466.843*(44)	$^{34}SO_2$	29(9,21)−30(8,22)	0.17	W3(H2O)	JCMT 15 m	Hel97	
	257482.800*(4)	CH_3CN	14(3)−13(3)	1.1	OriMC−1	MMWO 4.9 m	Lor84	
	257507.567*(4)	CH_3CN	14(2)−13(2)	0.85	OriMC−1	MMWO 4.9 m	Lor84	
	257522.432*(4)	CH_3CN	14(1)−13(1)	1.15	OriMC−1	MMWO 4.9 m	Lor84	
	257527.387*(4)	CH_3CN	14(0)−13(0)	1.2	OriMC−1	MMWO 4.9 m	Lor84	
	257553.574*(60)	CH_2CHCN	27(14,*)−26(14,*) $v_{11}=1$	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	257583.620*(13)	CH_3CH_2CN	30(1,30)−29(0,29)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	257612.026*(14)	CH_3OCH_3	27(3,25)−27(2,26) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257614.538*(12)	CH_3OCH_3	27(3,25)−27(2,26) EE	10.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257617.049*(16)	CH_3OCH_3	27(3,25)−27(2,26) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
U	257629.	unidentified		7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	257639.553*(16)	CH_2CHCN	27(4,23)−26(4,22) $v_{11}=1$	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	257646.01* (19)	CH_2CHCN	28(0,28)−27(0,27)	0.5	OriMC−1	OVRO 10.4 m	Bla86	
	257664.49*(8)	CH_2CHCN	27(15,*)−26(15,*) $v_{11}=1$	2.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	257677.	unidentified		3.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	257690.313*(16)	CH_3OCHO	22(3,20)−21(3,19) E	1.4	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	257699.464*(16)	CH_3OCHO	22(3,20)−21(3,19) A	0.9	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	257738.	unidentified		1.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	257748.718*(10)	HDCO	4(2,3)−3(2,2)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
	257790.430*(29)	CH_3OCHO	21(18,*)−20(18,*) A	5.0[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	257821.499*(12)	NO	$^2\Pi_{3/2}$ J, F=5/2,3/2−3/2,3/2 e	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	257822.086 (40)	NO	$^2\Pi_{3/2}$ J, F=5/2,7/2−3/2,5/2 e	3.7[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	257824.695*(12)	NO	$^2\Pi_{3/2}$ J, F=5/2,3/2−3/2,3/2 f	2.5[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	257825.025 (40)	NO	$^2\Pi_{3/2}$ J, F=5/2,7/2−3/2,5/2 f	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	257852.746 (20)	NO	$^2\Pi_{3/2}$ J, F=5/2,5/2−3/2,3/2 e	4.7[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	257854.467*(29)	CH_3OCHO	21(17,4)−20(17,3) E	1.8[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	257855.289 (20)	NO	$^2\Pi_{3/2}$ J, F=5/2,5/2−3/2,3/2 f	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	257865.047*(34)	CH_3OCHO	21(17,5)−20(17,4) E	1.9[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	257890.00* (15)	CH_3CN	14(8)−13(8) $v_8=1$ $\ell=-1$	3.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	257911.060*(10)	CH_3OCH_3	18(5,13)−18(4,14) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257911.198*(10)	CH_3OCH_3	18(5,13)−18(4,14) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257913.330*(6)	CH_3OCH_3	18(5,13)−18(4,14) EE	8.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257915.532*(10)	CH_3OCH_3	18(5,13)−18(4,14) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	257957.216*(12)	$^{33}SO_2$	11(3,9)−11(2,10)	6.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	257975.01*(1)	HCOOH	12(1,12)−11(1,11)	0.3	OriMC−1	OVRO 10.4 m	Bla86	Wil80
	257975.22* (14)	CH_3CN	14(7)−13(7) $v_8=1$ $\ell=-1$	5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	257993.28* (14)	CH_3CN	14(9)−13(9) $v_8=1$ $\ell=1$	2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	258001.726*(21)	CH_3OCHO	21(15,*)−20(15,*) A	2.6	OriMC−1	JCMT 15 m	Gre91	Oes99
	258007.205*(25)	CH_3OCHO	21(15,6)−20(15,5) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	258050.40* (14)	CH_3CN	14(6)−13(6) $v_8=1$ $\ell=-1$	[b]	Sgr B2(N)	SEST 15 m	Num98	
	258054.14* (15)	CH_3CN	14(1)−13(1) $v_8=1$ $\ell=1$	1.1	OriMC−1	OVRO 10.4 m	Bla86	Bou80
	258070.958*(9)	HDCO	4(3,2)−3(3,1)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	258072.433*(25)	CH_3OCHO	24(10,15)−24(9,16) A	5.8[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258081.010*(16)	CH_3OCHO	22(2,20)−21(2,19) E	1.2	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258089.525*(16)	CH_3OCHO	22(2,20)−21(2,19) A	1.1	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258099.753*(16)	CH_2CHCN	28(0,28)−27(0,27) $v_{11}=1$	5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	258115.48* (14)	CH_3CN	14(5)−13(5) $v_8=1$ $\ell=-1$	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	258121.149*(20)	CH_3OCHO	21(14,*)−20(14,*) A	1.0[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258122.655*(24)	CH_3OCHO	21(14,7)−20(14,6) E	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258132.27* (14)	CH_3CN	14(7)−13(7) $v_8=1$ $\ell=1$	5.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	258142.069*(21)	CH_3OCHO	21(14,8)−20(14,7) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	258152.528*(70)	CH_3OCHO	11(5,7)−10(4,6) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	258157.005*(11)	$HC^{15}N$	3−2	5.2	OriMC−1	OVRO 10.4 m	Bla86	
	258170.39* (14)	CH_3CN	14(4)−13(4) $v_8=1$ $\ell=-1$	10.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	258186.99* (13)	CH_3CN	14(6)−13(5) $v_8=1$ $\ell=1$	0.3	OriMC−1	OVRO 10.4 m	Bla86	Bou80
	258214.98* (15)	CH_3CN	14(3)−13(3) $v_8=1$ $\ell=-1$	6.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	258232.10* (14)	CH_3CN	14(5)−13(5) $v_8=1$ $\ell=1$	12.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	258255.893*(13)	SO	6(6)−5(5)	4.0	OriMC−1	MMWO 4.9 m	Cle84	
	258267.94* (14)	CH_3CN	14(4)−13(4) $v_8=1$ $\ell=1$	20.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	258271.07* (16)	CH_3CN	14(1)−13(1) $v_8=1$ $\ell=-1$	[b]	Sgr B2(N)	SEST 15 m	Num98	
	258274.868*(24)	CH_3OCHO	21(13,8)−20(13,7) E	[b]	W3(H2O)	JCMT 15 m	Hel97	Oes99
	258276.18* (23)	CH_3CN	14(0)−13(0) $v_8=1$ $\ell=+-1$	12.2[fb]	Sgr B2(N)	SEST 15 m	Num98	
	258277.399*(20)	CH_3OCHO	21(13,8)−20(13,7) A	0.10	W3(H2O)	JCMT 15 m	Hel97	Oes99
	258277.399*(20)	CH_3OCHO	21(13,9)−20(13,8) A	[b]	W3(H2O)	JCMT 15 m	Hel97	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	258285.663*(4)	CH_2CHCN	27(3,24)−26(3,23)	8.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	258295.60* (18)	CH_3CN	14(3)−13(3) v_8 =1 ℓ=1	1.1	OriMC−1	OVRO 10.4 m	Bla86	Bou80
	258306.213*(28)	CH_3OCHO	11(5,7)−10(4,6) A	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	258315.	unidentified		0.9[f]	Sgr B2(NW)	SEST 15 m	Num98	
	258320.39* (25)	CH_3CN	14(2)−13(2) v_8 =1 ℓ=1	0.7	OriMC−1	OVRO 10.4 m	Bla86	Bou80
	258350.7*(5)	CH_3NH_2	5(2)−5(−1) Aa+−	5.9[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	258360.05*(7)	CH_2CHCN	27(1,26)−26(1,25)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
	258388.697*(31)	SO_2	32(4,28)−32(3,29)	1.5	OriMC−1	OVRO 10.4 m	Bla86	
	258431.5*(6)	CH_2CHCN	27(4,23)−26(4,22) v_{11} =2	3.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	258475.068*(17)	CH_3OCHO	23(1,22)−22(2,21) E	5.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258476.407*(21)	CH_3OCHO	21(12,9)−20(12,8) E	0.9	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258480.576*(17)	CH_3OCHO	23(1,22)−22(2,21) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258482.960*(20)	CH_3OCHO	21(12,*)−20(12,*) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258490.850*(17)	CH_3OCHO	23(2,22)−22(2,21) E	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258496.308*(17)	CH_3OCHO	23(2,22)−22(2,21) A	1.1	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258499.265*(17)	CH_3OCHO	21(12,10)−20(12,9) E	0.8	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258502.765*(17)	CH_3OCHO	23(1,22)−22(1,21) E	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258508.193*(17)	CH_3OCHO	23(1,22)−22(1,21) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258518.547*(17)	CH_3OCHO	23(2,22)−22(1,21) E	2.0[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258523.925*(17)	CH_3OCHO	23(2,22)−22(1,21)A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258548.817*(6)	CH_3OCH_3	14(1,14)−13(0,13)AE+EA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	258549.061*(6)	CH_3OCH_3	14(1,14)−13(0,13)EE	3.2[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	258549.305*(6)	CH_3OCH_3	14(1,14)−13(0,13)AA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	258552.40* (15)	CH_3CN	14(1)−13(1)v_8 =1ℓ=1	0.6[b]	OriMC−1	OVRO 10.4 m	Bla86	Bou80
U	258568.	unidentified		5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258579.	unidentified		5.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258608.	unidentified		2.8[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258618.	unidentified		2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	258636.348*(14)	NH_2CHO	13(2,12)−13(1,13)	2.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	258666.921*(8)	SO_2	20(7,13)−21(6,16)	0.7	OriMC−1	OVRO 10.4 m	Bla86	
U	258676.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258698.	unidentified		3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	258707.36* (12)	SiO	6−5 v=1	41.7[e]	RLeo	OVRO 10.4 m	Jew87	
U	258737.	unidentified		3.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	258746.170*(20)	CH_3OCHO	21(11,10)−20(11,9) E	0.5	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258756.662*(17)	CH_3OCHO	21(11,*)−20(11,*) A	0.7	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258769.910*(17)	CH_3OCHO	21(11,11)−20(11,10) E	0.4	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	258780.405*(52)	CH_3OH	19(3,17)−19(2,18) A+−	1.8	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	258793.	unidentified		6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	258803.81*(9)	CH_2CHCN	27(1,26)−26(1,25) v_{15} =1	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	258847.857*(29)	CH_3OCHO	23(10,13)−23(9,14) E	5.9[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258859.125*(25)	CH_3OCHO	23(10,13)−23(9,14) A	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	258859.8*(5)	CH_3NH_2	7(2)−7(−1) As+−	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	258864.	unidentified		3.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	258874.744*(62)	HCCCHO	7(2,5)−6(1.6)	4.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258908.	unidentified		7.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258917.	unidentified		6.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	258926.	unidentified		7.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	258942.188*(7)	SO_2	9(3,7)−9(2,8)	0.9	OriMC−1	MMWO 4.9 m	Lor84b	
	259011.799*(11)	$H^{13}CN$	3−2	2.3	OriMC−1	MMWO 4.9 m	Lor84b	
	259034.772*(10)	HDCO	4(2,2)−3(2,1)	0.18	OriMC−1	MMWO 4.9 m	Lor84b	
U	259067.	unidentified		5.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	259078.	unidentified		9.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	259113.888*(17)	CH_3OCHO	21(10,11)−20(10,10) E	0.6	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259128.159*(17)	CH_3OCHO	21(10,12)−20(10,11) A	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259128.200*(17)	CH_3OCHO	21(10,11)−20(10,10) A	1.1[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259137.936*(17)	CH_3OCHO	21(10,12)−20(10,11) E	0.3	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259210.110*(16)	CH_2CHCN	27(3,24)−26(3,23) v_{11} =1	10.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	259232.728*(11)	CH_3CH_2CN	29(3,27)−28(3,26)	0.7	OriMC−1	OVRO 10.4 m	Bla86	
U	259263.	unidentified		12.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	259273.51* (13)	CH_3OH	17(2,16)−16(1,15) A−+ v_t =1	1.0	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	259281.753*(20)	^{33}SO	7(6)−6(5)	22.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	259309.492*(10)	CH_3OCH_3	17(5,12)−17(4,13) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259309.777*(10)	CH_3OCH_3	17(5,12)−17(4,13) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259311.964*(6)	CH_3OCH_3	17(5,12)−17(4,13) EE	14.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	259314.293*(10)	CH_3OCH_3	17(5,12)−17(4,13) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259342.052*(20)	CH_3OCHO	24(1,24)−23(1,23) E	2.0[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259342.180*(20)	CH_3OCHO	24(0,24)−23(0,23) E	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259342.924*(21)	CH_3OCHO	24(1,24)−23(1,23) A	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259343.052*(21)	CH_3OCHO	24(0,24)−23(0,23) A	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	259354.	unidentified		8.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	259367.	unidentified		9.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	259376.189*(28)	CH_3OCHO	11(5,6)−10(4,7) A	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	259390.543 (20)	NH_2CN	13(2,11)−12(2,10) v=1	3.9[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	259398.0	unidentified		0.8	OriMC−1	JCMT 15 m	Gre91	
U	259405.	unidentified		8.3[f]	Sgr B2(N)	SEST 15 m	Num98	
U	259428.	unidentified		3.4[f]	Sgr B2(N)	SEST 15 m	Num98	
U	259438.	unidentified		3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	259478.284*(12)	$g-CH_3CH_2OH$	15(11,*)−14(11,*) v_t =1−1	13.1[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259484.844*(10)	CH_3OCH_3	6(3,4)−5(2,3) EA	0.7[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	259486.608*(8)	CH_3OCH_3	6(3,4)−5(2,3) AE	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	259489.720*(6)	CH_3OCH_3	6(3,4)−5(2,3) EE	1.3	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	259493.733*(10)	CH_3OCH_3	6(3,4)−5(2,3) AA	0.6	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	259499.905*(17)	CH_3OCHO	20(4,16)−19(4,15) E	0.8	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259521.773*(20)	CH_3OCHO	20(4,16)−19(4,15) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259539.240*(6)	$g-CH_3CH_2OH$	15(9,*)−14(9,*) v_t =1−1	7.8[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	259571.	unidentified		5.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	259581.21* (32)	CH_3OH	24(1,23)−24(0,24) E	6.3[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	259599.421*(30)	SO_2	30(4,26)−30(3,27)	1.5	OriMC−1	OVRO 10.4 m	Bla86	
	259615.913*(10)	CH_3OCH_3	22(5,18)−22(4,19) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259615.920*(10)	CH_3OCH_3	22(5,18)−22(4,19) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259617.201*(12)	$^{34}SO_2$	13(3,11)−13(2,12)	1.0	OriMC−1	OVRO 10.4 m	Bla86	
	259617.356*(8)	CH_3OCH_3	22(5,18)−22(4,19) EE	13.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259618.796*(12)	CH_3OCH_3	22(5,18)−22(4,19) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259629.214*(17)	CH_3OCHO	21(9,12)−20(9,11) E	0.6	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259646.576*(17)	CH_3OCHO	21(9,13)−20(9,12) A	0.8[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259647.711*(17)	CH_3OCHO	21(9,12)−20(9,11) A	[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	259653.009*(16)	CH_3OCHO	21(9,13)−20(9,12) E	0.5	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	259669.	unidentified		10.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	259688.856*(10)	CH_3OCH_3	23(5,19)−23(4,20) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259690.082*(8)	CH_3OCH_3	23(5,19)−23(4,20) EE	9.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259691.308*(14)	CH_3OCH_3	23(5,19)−23(4,20) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259697.808*(15)	$g-CH_3CH_2OH$	15(7,9)−14(7,8) v_t =1−1	4.1[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259725.15* (12)	CH_3OCHO	28(1,27)−28(1,28) A	1.4[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	259725.16* (12)	CH_3OCHO	28(1,27)−28(0,28) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	259726.03* (12)	CH_3OCHO	28(2,27)−28(1,28) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	259730.510*(8)	CH_3OCH_3	21(5,17)−21(4,18) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259730.526*(8)	CH_3OCH_3	21(5,17)−21(4,18) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259732.167*(8)	CH_3OCH_3	21(5,17)−21(4,18) EE	12.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259733.816*(12)	CH_3OCH_3	21(5,17)−21(4,18) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	259744.274*(15)	$g-CH_3CH_2OH$	13(1,12)−12(2,10) v_t =1−0	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259749.366*(17)	$g-CH_3CH_2OH$	18(4,15)−18(2,16) v_t =1−1	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259750.828*(11)	$g-CH_3CH_2OH$	15(11,*)−14(11,*) v_t =0−0	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259753.256*(14)	$g-CH_3CH_2OH$	15(12,*)−14(12,*) v_t =0−0	[b]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259757.134*(14)	$g-CH_3CH_2OH$	15(10,5)−14(10,4) v_t =0−0	17.0[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259775.917*(6)	$g-CH_3CH_2OH$	15(9,*)−14(9,*) v_t =0−0	1.5[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	259814.446 (50)	$g-CH_3CH_2OH$	15(8,*)−14(8,*) v_t =0−0	1.4[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	259842.927*(13)	CH_3CH_2CN	29(10,*)−28(10,*)	1.0	OriMC−1	OVRO 10.4 m	Bla86	
	259847.139 (20)	NH_2CN	13(0,13)−12(0,12)	4.7[f]	Sgr B2(M)	SEST 15 m	Num98	JPL01
	259847.361*(13)	CH_3CH_2CN	29(11,*)−28(11,*)	0.9	OriMC−1	OVRO 10.4 m	Bla86	
	259852.277 (50)	$g-CH_3CH_2OH$	15(6,*)−14(6,*) v_t =1−1	11.3[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	259862.749*(12)	CH_3CH_2CN	29(9,*)−28(9,*)	0.9	OriMC−1	OVRO 10.4 m	Bla86	
	259869.887*(14)	CH_3CH_2CN	29(12,*)−28(12,*)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
U	259878.	unidentified		10.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	259906.654*(14)	CH_3CH_2CN	29(13,*)−28(13,*)	0.5	OriMC−1	OVRO 10.4 m	Bla86	
	259917.261*(12)	CH_3CH_2CN	29(8,*)−28(8,*)	1.0	OriMC−1	OVRO 10.4 m	Bla86	
	259942.467*(11)	NH_2CHO	12(2,9)−11(2,10)	4.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	259955.149*(14)	CH_3CH_2CN	29(14,*)−28(14,*)	0.4	OriMC−1	OVRO 10.4 m	Bla86	
	259982.558*(10)	CH_3OCH_3	20(5,16)−20(4,17) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	259982.591*(10)	CH_3OCH_3	20(5,16)−20(4,17) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	259984.426*(8)	CH_3OCH_3	20(5,16)−20(4,17) EE	0.20[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	259986.278*(12)	CH_3OCH_3	20(5,16)−20(4,17) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	259986.566*(14)	$^{13}CH_3OH$	2(1,1)−1(0,1) E	0.8	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	260003.398*(12)	CH_3OCH_3	24(5,20)−24(4,21) EA+AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260004.406*(10)	CH_3OCH_3	24(5,20)−24(4,21) EE	8.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260005.413*(14)	CH_3OCH_3	24(5,20)−24(4,21) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260013.666*(14)	CH_3CH_2CN	29(15,*)−28(15,*)	0.5	OriMC−1	OVRO 10.4 m	Bla86	
	260025.314*(11)	CH_3CH_2CN	29(7,23)−28(7,22)	0.8[b]	OriMC−1	OVRO 10.4 m	Bla86	
	260025.569*(11)	CH_3CH_2CN	29(7,23)−28(7,22)	[b]	OriMC−1	OVRO 10.4 m	Bla86	
U	260036.	unidentified		10.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	260046.626*(3)	$g-CH_3CH_2OH$	15(3,13)−14(3,12) $v_t=1-1$	5.9[fb]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	260060.33(10)	HCO	3(0,3)−2(0,2)7/2−5/2 $F=4-3$	0.09	OriMC−2	MMWO 4.9 m	Sny85a	Bla84a
	260081.013*(14)	CH_3CH_2CN	29(16,*)−28(16,*)	0.3	OriMC−1	OVRO 10.4 m	Bla86	
	260090.165 (50)	$g-CH_3CH_2OH$	15(1,14)−14(1,13) $v_t=0-0$	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
U	260097.	unidentified		6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	260107.590 (50)	$g-CH_3CH_2OH$	15(5,11)−14(5,10) $v_t=1-1$	6.1[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	260122.690 (50)	$g-CH_3CH_2OH$	15(5,10)−14(5,9) $v_t=1-1$	5.2[f]	Sgr B2(N)	SEST 15 m	Num98	Pea96
	260156.326*(14)	CH_3CH_2CN	29(17,*)−28(17,*)	0.4	OriMC−1	OVRO 10.4 m	Bla86	
	260189.078*(9)	NH_2CHO	12(2,10)−11(2,9)	14.1[f]	Sgr B2(M)	SEST 15 m	Num98	
	260191.76* (12)	CH_2CO	13(1,13)−12(1,12)	0.6	OriMC−1	OVRO 10.4 m	Bla86	
U	260204.	unidentified		6.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	260221.653*(11)	CH_3CH_2CN	29(6,24)−28(6,23)	0.9[b]	OriMC−1	OVRO 10.4 m	Bla86	
	260229.157*(11)	CH_3CH_2CN	29(6,23)−28(6,22)	[b]	OriMC−1	OVRO 10.4 m	Bla86	
	260244.481*(17)	CH_3OCHO	21(3,18)−20(3,17) E	0.8	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	260249.723*(3)	$g-CH_3CH_2OH$	15(5,11)−14(5,10) $v_t=0-0$	5.3[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	260255.151*(17)	CH_3OCHO	21(3,18)−20(3,17) A	2.1[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	260255.48* (10)	$H^{13}CO^+$	3−2	0.95	OriMC−1	MMWO 4.9 m	Woo84a	
	260266.089*(3)	$g-CH_3CH_2OH$	15(5,10)−14(5,9) $v_t=0-0$	11.2[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	260292.7*(5)	CH_3NH_2	10(−2)−10(−1) Ea	4.8[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	260300.	unidentified		8.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	260310.	unidentified		7.7[f]	Sgr B2(N)	SEST 15 m	Num98	
U	260314.0	unidentified		1.9	OriMC−1	JCMT 15 m	Gre91	
U	260319.	unidentified		5.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	260326.965*(21)	$^{34}SO_2$	24(2,22)−24(1,23)	1.0	OriMC−1	OVRO 10.4 m	Bla86	
	260327.155*(10)	CH_3OCH_3	19(5,15)−19(4,16) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	260327.223*(10)	CH_3OCH_3	19(5,15)−19(4,16) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	260329.239*(6)	CH_3OCH_3	19(5,15)−19(4,16) EE	0.17[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	260331.289*(10)	CH_3OCH_3	19(5,15)−19(4,16) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	260381.697*(65)	CH_3OH	20(3,18)−20(2,19) A+−	1.8[b]	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	260384.263*(17)	CH_3OCHO	21(8,13)−20(8,12) E	1.6[b]	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	260392.767*(17)	CH_3OCHO	21(8,14)−20(8,13) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	260400.557*(10)	CH_3OCH_3	16(5,11)−16(4,12) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260401.150*(10)	CH_3OCH_3	16(5,11)−16(4,12) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260403.260*(6)	CH_3OCH_3	16(5,11)−16(4,12) EE	19.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260404.003*(16)	CH_3OCHO	21(8,14)−20(8,13) E	1.8	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	260405.664*(10)	CH_3OCH_3	16(5,11)−16(4,12) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260415.357*(17)	CH_3OCHO	21(8,13)−20(8,12) A	0.7	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	260424.406*(18)	CH_3CH_2CN	29(20,*)−28(20,*)	8.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	260437.683*(3)	$g-CH_3CH_2OH$	7(1,6)−6(0,6) $v_t=1-0$	5.9	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	260440.	unidentified		1.2	OriMC−1	OVRO 10.4 m	Bla86	
	260457.651*(3)	$g-CH_3CH_2OH$	15(4,12)−14(4,11) $v_t=1-1$	11.0[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	260479.408*(33)	$OS^{18}O$	17(2,16)−17(1,17)	8.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	260518.08* (14)	SiO	6−5 v=0	2.9	OriMC−1	MMWO 4.9 m	Lor84b	
	260535.671*(11)	CH_3CH_2CN	29(5,25)−28(5,24)	35.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	260541.147*(18)	CH_3CH_2CN	11(4,8)−10(3,7)	13.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	260544.027*(14)	CH_3CHO	14(1,14)−13(1,13) A++	13.7[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	260568.	unidentified		4.6[f]	Sgr B2(N)	SEST 15 m	Num98	
U	260578.0	unidentified		1.3	OriMC−1	JCMT 15 m	Gre91	
	260591.325*(3)	$g-CH_3CH_2OH$	15(4,12)−14(4,11) $v_t=0-0$	18.1[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	260605.	unidentified		7.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	260616.079*(12)	CH_3OCH_3	25(5,21)−25(4,22) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260616.867*(10)	CH_3OCH_3	25(5,21)−25(4,22) EE	5.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260617.654*(14)	CH_3OCH_3	25(5,21)−25(4,22) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	260624.	unidentified		3.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	260634.556*(28)	CH_3CH_2CN	29(22,*)−28(22,*)	3.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	260664.778*(11)	CH_3CH_2CN	29(4,26)−28(4,25)	0.9[b]	OriMC−1	OVRO 10.4 m	Bla86	
	260667.109*(18)	CH_3CH_2CN	11(4,7)−10(3,6)	[b]	OriMC−1	OVRO 10.4 m	Bla86	
	260679.047*(11)	CH_3CH_2CN	29(5,24)−28(5,23)	0.8	OriMC−1	OVRO 10.4 m	Bla86	
	260682.044*(24)	CH_3OCHO	20(10,10)−20(9,11) A	3.2[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	260682.797*(24)	CH_3OCHO	20(10,11)−20(9,12) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	260693.997*(14)	CH_3CHO	13(1,13)−12(0,12) A++	9.7[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	260725.469*(10)	CH_3OCH_3	18(5,14)−18(4,15) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260725.607*(10)	CH_3OCH_3	18(5,14)−18(4,15) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260727.785*(6)	CH_3OCH_3	18(5,14)−18(4,15) EE	9.1[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260730.032*(10)	CH_3OCH_3	18(5,14)−18(4,15) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	260758.391*(6)	CH_3OCH_3	6(3,3)−5(2,4) EE	1.9	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	260761.508*(10)	CH_3OCH_3	6(3,3)−5(2,4) AA	1.5	OriMC−1	OVRO 10.4 m	Bla86	Gro98
U	260771.	unidentified		5.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	260796.805*(3)	$g-CH_3CH_2OH$	15(4,11)−14(4,10) v_t =1−1	5.7[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
U	260815.	unidentified		6.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	260825.741*(18)	CH_3CH_2CN	24(11,*)−25(10,*)	4.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	260826.541*(25)	CH_3CHO	14(1,14)−13(1,13) A++ v_t =1	4.8[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
U	260895.	unidentified		8.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	260920.	unidentified		4.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	260934.986*(42)	CH_3OCHO	30(3,28)−30(2,29) E	2.7[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	260960.5*(5)	CH_3NH_2	11(1)−10(2) Aa+−	6.4[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	260960.976*(3)	$g-CH_3CH_2OH$	15(4,11)−14(4,10) v_t =0−0	6.4[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	260991.818*(11)	$OC^{34}S$	22−21	0.12	IRAS16293−2422	JCMT 15 m	Bla94	
U	261010.	unidentified		4.0[f]	Sgr B2(N)	SEST 15 m	Num98	
	261024.4*(5)	CH_3NH_2	4(1)−3(0) Es	3.4[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	261061.615 (62)	CH_3OH	21(−4,18)−20(−5,15) E	0.5	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
U	261066.	unidentified		3.8[f]	Sgr B2(M)	SEST 15 m	Num98	
	261073.299*(19)	CH_3CH_2CN	18(3,16)−17(2,15)	3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
	261084.089*(24)	CH_3OCHO	19(10,10)−19(9,11) E	6.6[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	261091.126*(28)	SO_2	27(4,24)−28(1,27)	6.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	261095.760*(28)	CH_3OCHO	19(10,9)−19(9,10) E	2.0[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	261102.	unidentified		2.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	261145.225*(10)	CH_3OCH_3	17(5,13)−17(4,14) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	261145.510*(10)	CH_3OCH_3	17(5,13)−17(4,14) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	261147.820*(6)	CH_3OCH_3	17(5,13)−17(4,14) EE	0.23[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	261148.888*(16)	CH_3OCHO	21(5,17)−20(5,16) E	1.4	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	261150.272*(10)	CH_3OCH_3	17(5,13)−17(4,14) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	261164.920*(10)	$HC^{17}O^+$	3−2	1.8	OriMC−1	JCMT 15 m	Gre91	
	261165.451*(17)	CH_3OCHO	21(5,17)−20(5,16) A	1.2	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	261206.0	unidentified		2.0	OriMC−1	JCMT 15 m	Gre91	
	261220.0*(5)	CH_3NH_2	4(1)−3(0) Aa++	7.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
U	261221.	unidentified		3.1[f]	Sgr B2(M)	SEST 15 m	Num98	
U	261234.	unidentified		3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	261248.127*(8)	CH_3OCH_3	15(5,10)−15(4,11) EE	1.5	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	261250.503*(12)	CH_3OCH_3	15(5,10)−15(4,11) AA	0.8	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	261254.679*(1)	CH_2CHCN	27(2,25)−26(2,24)	2.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	261263.39* (10)	$HN^{13}C$	3−2	0.2	OriMC−1	MMWO 4.9 m	Lor84b	
	261286.241*(4)	$g-CH_3CH_2OH$	15(1,14)−14(1,13) v_t =1−1	2.9[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	261307.039*(5)	CH_2CHCN	29(0,29)−28(1,28)	2.1[f]	Sgr B2(N)	SEST 15 m	Num98	
	261327.439*(8)	NH_2CHO	12(1,11)−11(1,10)	15.0[f]	Sgr B2(N)	SEST 15 m	Num98	
U	261410.	unidentified		3.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	261420.5	CH_2CN	13(0,13)−12(0,12) 29/2−27/2	3.3[fb]	Sgr B2(N)	SEST 15 m	Num98	Num98
	261433.787*(17)	CH_3OCHO	21(7,15)−20(7,14) A	0.9	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	261436.691*(20)	CH_3OCHO	21(7,15)−20(7,14) E	1.3	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	261479.60*(9)	CH_2CHCN	27(2,25)−26(2,24) v15 =1	3.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	261495.1	CH_2CN	13(2,12)−12(2,11) 27/2−25/2	[b]	Sgr B2(N)	SEST 15 m	Num98	Num98
	261497.6	CH_2CN	13(2,12)−12(2,11) 29/2−27/2	6.4f	Sgr B2(N)	SEST 15 m	Num98	Num98
	261560.815*(10)	CH_3OCH3	16(5,12)−16(4,13) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	261561.409*(10)	CH_3OCH3	16(5,12)−16(4,13) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	261562.5*(5)	CH_3NH_2	8(0)−7(1) Aa++	9.6[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	261563.798*(6)	CH_3OCH_3	16(5,12)−16(4,13) EE	9.6[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	261566.486*(10)	CH_3OCH_3	16(5,12)−16(4,13) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	261584.228*(12)	CH_3OCH_3	26(5,22)−26(4,23) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	261584.796*(10)	CH_3OCH_3	26(5,22)−26(4,23) EE	3.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	261585.364*(16)	CH_3OCH_3	26(5,22)−26(4,23) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	261594.362 (20)	NH_2CN	13(1,12)−12(1,11)	3.7[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	261631.9	CH_2CN	13(2,11)−12(2,10)	5.7[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	261649.31* (16)	SiN	6−5 J=11/2−9/2 F=13/2−11/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	261650.25* (16)	SiN	6−5 J=11/2−9/2 F=11/2−9/2	0.03[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	261651.10* (16)	SiN	6−5 J=11/2−9/2 F=9/2−7/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	261704.420*(28)	CH_3OH	12(6,7)−13(5,9) E	0.9	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	261715.504*(21)	CH_3OCHO	21(7,14)−20(7,13) E	1.1	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	261746.608*(17)	CH_3OCHO	21(7,14)−20(7,13) A	1.1	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	261759.	unidentified		3.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	261805.736*(8)	CH_3OH	2(1,1)−1(0,1) E	1.0	OriMC−1	MMWO 4.9 m	Lor85	Xu_97
	261843.756*(18)	SO	7(6)−6(5)	4.2	OriMC−1	MMWO 4.9 m	Lor85	
	261897.640*(10)	CH_3OCH_3	14(5,9)−14(4,10) EE	0.23[b]	OriMC−1	MMWO 4.9 m	Lor85	Gro98
	261899.788*(12)	CH_3OCH_3	14(5,9)−14(4,10) AA	[b]	OriMC−1	MMWO 4.9 m	Lor85	Gro98
	261956.633*(8)	CH_3OCH_3	15(5,11)−15(4,12) EE	0.28	OriMC−1	MMWO 4.9 m	Lor85	Gro98
	261959.638*(10)	CH_3OCH_3	15(5,11)−15(4,12) AA	1.1	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262004.26(5)	C_2H	3−2 J=7/2−5/2 F=4−3	3.5	OriMC−1	MMWO 4.9 m	Ziu82	Ziu82
	262064.99(5)	C_2HC	3−2 J=5/2−3/2 F=3−2	2.8	OriMC−1	MMWO 4.9 m	Ziu82	Ziu82
	262067.46(5)	C_2H	3−2 J=5/2−3/2 F=2−1	2.4	OriMC−1	MMWO 4.9 m	Ziu82	Ziu82
	262078.89* (30)	C_2H	3−2 J=5/2−3/2 F=2−2	0.8	OriMC−1	OVRO 10.4 m	Bla86	
	262088.177*(21)	CH_3OCHO	16(10,6)−16(9,7) A	2.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	262088.188*(21)	CH_3OCHO	16(10,6)−16(9,7) A	[b]	Sgr B2(N)	SEST 15 m	Num98	Oes99
	262103.48*(1)	HCOOH	12(0,12)−11(0,11)	0.4	OriMC−1	OVRO 10.4 m	Bla86	Wil80
U	262108.	unidentified		1.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	262144.895*(8)	SO_2	5(3,3)−5(2,4) v_2 =1	2.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	262154.300*(22)	$t-CH_3CH_2OH$	13(2,12)−12(1,11)	4.7f	Sgr B2(N)	SEST 15 m	Num98	
	262154.74* (16)	SiN	6−5 J=13/2−11/2 F=15/2−13/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	262155.54* (16)	SiN	6−5 J=13/2−11/2 F=13/2−11/2	0.03[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	262156.08* (16)	SiN	6−5 J=13/2−11/2 F=11/2−9/2	[b]	IRC+10216	NRAO 12 m	Tur92	Tur92
	262172.531*(16)	CH_2CHCN	27(2,25)−26(2,24) v_{11} =1	10.5[f]	Sgr B2(N)	SEST 15 m	Num98	
	262183.751*(11)	CH_3CH_2CN	29(4,25)−28(4,24)	0.7	OriMC−1	OVRO 10.4 m	Bla86	
	262208.61* (30)	C_2H	3−2 J=5/2−3/2 F=3−3	<0.8	OriMC−1	OVRO 10.4 m	Bla86	
	262222.858*(19)	CH_3CH_2CN	6(5,1)−5(4,2)	[b]	OriMC−1	JCMT 15 m	Gre91	
	262222.858*(19)	CH_3CH_2CN	6(5,2)−5(4,1)	2.4[b]	OriMC−1	JCMT 15 m	Gre91	
	262224.203*(80)	CH_3OH	21(3,19)−21(2,20) A+−	1.3	OriMC−1	OVRO 10.4 m	Bla86	Xu_97
	262256.893*(7)	SO2	11(3,9)−11(2,10)	1.7	OriMC−1	MMWO 4.9 m	Eri84a	
U	262273.	unidentified		5.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	262292.	unidentified		7.3[f]	Sgr B2(N)	SEST 15 m	Num98	
	262308.633*(16)	CH_3OCH_3	14(5,10)−14(4,11) EA	0.8[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262311.019*(10)	CH_3OCH_3	14(5,10)−14(4,11) AE	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262313.161*(8)	CH_3OCH_3	14(5,10)−14(4,11) EE	1.0	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262316.664*(12)	CH_3OCH_3	14(5,10)−14(4,11) AA	0.9	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262324.873*(16)	CH_3OCHO	21(6,16)−20(6,15) E	1.2	OriMC−1	OVRO 10.4 m	Bla86	Oes99
	262333.967*(7)	SO_2	4(4,0)−5(3,5)	10.6[f]	Sgr B2(M)	SEST 15 m	Num98	
	262340.570*(17)	CH_3OCHO	21(6,16)−20(6,15) A	1.0	OriMC−1	OVRO 10.4 m	Bla86	Oes99
U	262351.	unidentified		4.5[f]	Sgr B2(N)	SEST 15 m	Num98	
U	262359.	unidentified		3.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	262368.291*(8)	^{18}OCS	23−22	5.8[f]	Sgr B2(N)	SEST 15 m	Num98	
	262384.537*(12)	CH_3OCH_3	13(5,9)−13(4,9) EE	5.4[f]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	262393.101*(24)	CH_3OCH_3	13(5,8)−13(4,9) EA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262393.520*(12)	CH_3OCH_3	13(5,8)−13(4,9) EE	1.3b	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262395.128*(12)	CH_3OCH_3	13(5,8)−13(4,9) AA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
U	262462.	unidentified		4.2[f]	Sgr B2(N)	SEST 15 m	Num98	
U	262473.	unidentified		8.7[f]	Sgr B2(N)	SEST 15 m	Num98	
	262487.490*(25)	CH_3OCHO	14(10,*)−14(9,*) A	3.4[f]	Sgr B2(N)	SEST 15 m	Num98	Oes99
U	262498.	unidentified		3.9[f]	Sgr B2(N)	SEST 15 m	Num98	
U	262518.	unidentified		5.4[f]	Sgr B2(N)	SEST 15 m	Num98	
	262524.897*(21)	SO_2	28(2,26)−29(1,29)	3.5[f]	Sgr B2(M)	SEST 15 m	Num98	
	262547.77* (28)	CH_2CO	13(0,13)−12(0,12)	0.5	OriMC−1	OVRO 10.4 m	Bla86	
	262596.643*(36)	CH_2CO	13(3,11)−12(3,10)	9.4[fb]	Sgr B2(N)	SEST 15 m	Num98	
	262597.391*(37)	CH_2CO	13(3,10)−12(3,9)	[b]	Sgr B2(N)	SEST 15 m	Num98	
	262599.761*(29)	CH_3OCHO	9(6,4)−8(5,4) E	2.1[f]	Sgr B2(M)	SEST 15 m	Num98	Oes99
	262618.909*(52)	CH_2CO	13(2,12)−12(2,11)	0.6	OriMC−1	JCMT 15 m	Gre91	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	262625.453*(12)	CH_3OCH_3	13(5,9)−13(4,10) EE	1.6	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262629.746*(12)	CH_3OCH_3	13(5,9)−13(4,10) AA	0.6	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262673.14* (21)	$HC^{13}CCN$	29−28	9.8[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	262698.703*(82)	$HCC^{13}CN$	29−28	12.0[f]	Sgr B2(N)	SEST 15 m	Num98	Laf78
	262768.962*(14)	CH_3OCH_3	12(5,7)−12,4,6) EE	1.3[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262769.484*(20)	HNCO	12(1,12)−11(1,11)	1.3[b]	OriMC−1	OVRO 10.4 m	Bla86	
	262769.870*(14)	CH_3OCH_3	12(5,7)−12,4,6) AA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262774.015*(6)	CH_3OCH_3	8(2,6)−7(1,7) EE	0.7[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262776.841*(10)	CH_3OCH_3	8(2,6)−7(1,7) AA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262890.225*(14)	CH_3OCH_3	12(5,8)−11(4,9) EE	0.5	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262895.447*(12)	CH_3OCH_3	12(5,8)−11(4,9) AA	0.5	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	262897.564*(12)	CH_3OCH_3	12(5,7)−12(4,9) EE	3.6[f]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	262913.026*(23)	$^{13}CH_3OH$	7(4,4)−8(3,5) A−−	3.4[fb]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	262920.316*(23)	$^{13}CH_3OH$	7(4,3)−8(3,6) A++	[b]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	262960.100*(13)	CH_3CHO	14(0,14)−13(0,13) E	7.5[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	262964.187*(12)	CH_3OCH_3	27(5,23)−27(4,24) AE+EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	262964.540*(10)	CH_3OCH_3	27(5,23)−27(4,24) EE	7.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	262964.893*(16)	CH_3OCH_3	27(5,23)−27(4,24) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	262969.693*(11)	SO_2	25(8,18)−26(7,19)	1.4	OriMC−1	JCMT 15 m	Gre91	
	262981.36* (10)	$CH_3{}^{18}OH$	5(3,3)−5(2,4) A+−	[b]	Sgr B2(N)	SEST 15 m	Num98	Hos96
	262987.36*(8)	$CH_3{}^{18}OH$	4(3,2)−4(2,3) A+−	[b]	Sgr B2(N)	SEST 15 m	Num98	Hos96
	262988.27* (13)	$CH_3{}^{18}OH$	6(3,4)−6(2,5) A+−	6.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Hos96
	262990.043*(83)	$CH_3{}^{18}OH$	3(3,0)−3(2,1) A+−	[b]	Sgr B2(N)	SEST 15 m	Num98	Hos96
	262999.769*(8)	SO_2	7(3,5)−7(2,6) v_2 =1	7.0[f]	Sgr B2(M)	SEST 15 m	Num98	
	263003.988*(13)	CH_3CHO	14(0,14)−13(0,13) A++	7.0[f]	Sgr B2(N)	SEST 15 m	Num98	Kle96
	263035.285*(32)	CH_3OCH_3	11(5,7)−11(4,7) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263042.827*(16)	CH_3OCH_3	11(5,7)−11(4,7) EE	2.2[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263049.967*(16)	CH_3OCH_3	11(5,6)−11(4,7) EE	1.1[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	263050.431*(14)	CH_3OCH_3	11(5,6)−11(4,7) AA	[b]	OriMC−1	OVRO 10.4 m	Bla86	Gro98
U	263065.	unidentified		0.9	OriMC−1	OVRO 10.4 m	Bla86	
	263107.922*(16)	CH_3OCH_3	11(5,7)−11(4,8) EE	0.3	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	263113.378*(20)	$^{13}CH_3OH$	5(2,3)−4(1,3) E	12.2[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
	263113.799*(14)	CH_3OCH_3	11(5,7)−11(4,8) AA	1.2	OriMC−1	OVRO 10.4 m	Bla86	Gro98
	263216.431*(16)	SO_2	45(5,41)−44(6,38)	6.0[f]	Sgr B2(M)	SEST 15 m	Num98	
	263249.833*(16)	CH_3OCH_3	10(5,6)−10(4,6) EE	3.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263251.079*(12)	CH_3OCH_3	10(5,5)−10(4,6) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263255.648*(24)	CH_3OCH_3	10(5,5)−10(4,6) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263257.114*(14)	CH_3OCH_3	10(5,5)−10(4,6) EE	5.8[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263257.613*(24)	CH_3OCH_3	10(5,5)−10(4,6) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263280.881*(12)	CH_3OCH_3	10(5,6)−10(4,7) AE	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263281.379*(14)	CH_3OCH_3	10(5,6)−10(4,7) EE	6.5[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263287.414*(14)	CH_3OCH_3	10(5,6)−10(4,7) AA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263288.660*(16)	CH_3OCH_3	10(5,5)−10(4,7) EE	8.7[fb]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263290.855*(40)	CH_3OCH_3	10(5,5)−10(4,7) EA	[b]	Sgr B2(N)	SEST 15 m	Num98	Gro98
	263306.048*(38)	$^{13}CH_3OH$	11(2,10)−10(3,7) A−−	3.3[f]	Sgr B2(N)	SEST 15 m	Num98	Xu_97
U	263330.	unidentified		4.6[f]	Sgr B2(N)	SEST 15 m	Num98	
	263377.225*(14)	$OS^{18}O$	14(3,12)−14(2,13)	3.5[f]	Sgr B2(M)	SEST 15 m	Num98	
	263378.3*(5)	CH_3NH_2	8(0)−7(1) Es	5.1[f]	Sgr B2(N)	SEST 15 m	Num98	Num98
	263399.160*(20)	CH_3OCH_3	9(5,5)−9(4,5) EE	4.2[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263401.095*(14)	CH_3OCH_3	9(5,4)−9(4,5) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263403.663*(24)	CH_3OCH_3	9(5,4)−9(4,5) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263403.702*(4)	CH_2CHCN	28(2,27)−27(2,26)	29.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	263406.626*(14)	CH_3OCH_3	9(5,4)−9(4,5) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263407.803*(16)	CH_3OCH_3	9(5,4)−9(4,5) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263411.382*(16)	CH_3OCH_3	9(5,5)−9(4,6) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263413.950*(14)	CH_3OCH_3	9(5,5)−9(4,6) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263415.126*(14)	CH_3OCH_3	9(5,5)−9(4,6) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263420.657*(16)	CH_3OCH_3	9(5,5)−9(4,6) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263436.115*(48)	$^{34}SO_2$	34(4,30)−34(4,31)	1.1	OriMC−1	JCMT 15 m	Gre91	
	263439.621*(13)	$^{33}SO_2$	13(3,11)−13(2,12)	11.4[f]	Sgr B2(M)	SEST 15 m	Num98	
	263472.358*(3)	$g-CH_3CH_2OH$	15(3,12)−14(3,11) v_t =1−1	1.7[f]	Sgr B2(N)	SEST 15 m	Num98	JPL01
	263507.112*(14)	CH_3OCH_3	8(5,3)−8(4,4) AE	4.8[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263507.414*(24)	CH_3OCH_3	8(5,3)−8(4,4) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263511.479*(12)	CH_3OCH_3	8(5,3)−8(4,4) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	263511.779*(18)	CH_3OCH_3	8(5,4)−8(4,5) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263512.082*(14)	CH_3OCH_3	8(5,4)−8(4,5) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263513.976*(16)	CH_3OCH_3	8(5,3)−8(4,4) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263514.578*(14)	CH_3OCH_3	8(5,4)−8(4,5) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263516.236*(12)	CH_3CH_2CN	30(2,29)−29(2,29)	5.7	OriMC−1	JCMT 15 m	Gre91	
	263518.946*(14)	CH_3OCH_3	8(5,4)−8(4,5) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263542.225*(9)	NH_2CHO	13(1,13)−12(1,12)	16.2[f]	Sgr B2(N)	SEST 15 m	Num98	
	263543.959*(21)	SO_2	30(3,27)−30(2,28)	5.4	OriMC−1	JCMT 15 m	Gre91	
	263578.388*(24)	CH_3OCH_3	7(5,2)−7(4,3) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263579.441*(14)	CH_3OCH_3	7(5,2)−7(4,3) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263581.155*(14)	CH_3OCH_3	7(5,3)−7(4,4) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263582.259*(16)	CH_3OCH_3	7(5,3)−7(4,4) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263582.803*(12)	CH_3OCH_3	7(5,2)−7(4,3) EE	6.0[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263584.846*(14)	CH_3OCH_3	7(5,3)−7(4,4) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263586.494*(16)	CH_3OCH_3	7(5,2)−7(4,3) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263588.158*(16)	CH_3OCH_3	7(5,3)−7(4,4) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263624.890*(24)	CH_3OCH_3	6(5,1)−6(4,2) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263626.601*(14)	CH_3OCH_3	6(5,1)−6(4,2) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263627.056*(14)	CH_3OCH_3	6(5,2)−6(4,3) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263628.767*(16)	CH_3OCH_3	6(5,2)−6(4,3) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263629.417*(14)	CH_3OCH_3	6(5,1)−6(4,2) EE	3.7[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263631.363*(14)	CH_3OCH_3	6(5,2)−6(4,3) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263633.724*(16)	CH_3OCH_3	6(5,1)−6(4,2) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263634.179*(16)	CH_3OCH_3	6(5,2)−6(4,3) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263653.326*(24)	CH_3OCH_3	5(5,0)−5(4,1) EA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263655.248*(16)	CH_3OCH_3	5(5,0)−5(4,1) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263655.339*(16)	CH_3OCH_3	5(5,1)−5(4,2) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263657.260*(16)	CH_3OCH_3	5(5,1)−5(4,2) AE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263657.923*(14)	CH_3OCH_3	5(5,0)−5(4,1) EE	1.8[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263659.890*(14)	CH_3OCH_3	5(5,1)−5(4,2) EE	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263662.424*(14)	CH_3OCH_3	5(5,0)−5(4,1) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
	263662.565*(14)	CH_3OCH_3	5(5,1)−5(4,2) AA	[b]	OriMC−1	JCMT 15 m	Gre91	Gro98
U	263744.0	unidentified		2.8	OriMC−1	JCMT 15 m	Gre91	
	263748.630*(13)	HNCO	12(0,12)−11(0,11)	0.3	OriMC−1	MMWO 4.9 m	Arm84	
	263749.414*(31)	AlF	8−7	0.027	CRL2688	NRAO 12 m	Hig01	
	263792.304*(11)	HCCCN	29−28	0.6	OriMC−1	MMWO 4.9 m	Arm84	
	263810.807*(14)	CH_3CH_2CN	29(2,27)−28(2,26)	1.9	OriMC−1	JCMT 15 m	Gre91	
	264270.108*(19)	H_2CO	10(1,9)−10(1,10)	1.0	OriMC−1	NRAO 12 m	Ziu86	
U	264330.	unidentified		1.0	OriMC−1	NRAO 12 m	Ziu86	
	264439.36* (12)	HCCCN	29−28 v_7 =1 ℓ=1 e	3.6[b]	OriMC−1	JCMT 15 m	Gre91	Laf78
	264451.38* (27)	$H^{13}CCCN$	30−29	[b]	OriMC−1	JCMT 15 m	Gre91	
	264693.665*(20)	HNCO	12(1,11)−11(1,10)	6.7	OriMC−1	JCMT 15 m	Gre91	Win76
	264747.883*(12)	CH_3CH_2CN	30(1,29)−29(1,28)	4.0	OriMC−1	JCMT 15 m	Gre91	
	264817.01* (12)	HCCCN	29−28 v_7 =1 ℓ=1 f	3.9	OriMC−1	JCMT 15 m	Gre91	Laf78
	265024.851*(20)	CH_3OCHO	21(6,15)−20(6,14) A	1.7	OriMC−1	JCMT 15 m	Gre91	Oes99
U	265176.0	unidentified		2.0	OriMC−1	JCMT 15 m	Gre91	
U	265200.0	unidentified		2.6	OriMC−1	JCMT 15 m	Gre91	
	265289.616*(15)	CH_3OH	6(1,5)−5(2,3) E	5.6	OriMC−1	JCMT 15 m	Gre91	Xu_97
	265481.962*(31)	SO_2	34(4,30)−34(3,31)	3.2	OriMC−1	JCMT 15 m	Gre91	
	265488.699*(41)	$^{34}SO_2$	26(4,22)−26(2,23)	n.r.	OriMC−1	JCMT 15 m	Gre91	
	265554.040*(11)	$^{34}SO_2$	7(2,6)−6(1,5)	1.3	OriMC−1	JCMT 15 m	Gre91	
U	265630.0	unidentified		3.1	OriMC−1	JCMT 15 m	Gre91	
U	265698.	unidentified		0.16	OriMC−1	MMWO 4.9 m	Lor84a	
U	265700.	unidentified		0.8	OriMC−1	NRAO 12 m	Ziu86	
	265759.484*(6)	$c-C_3H_2$	4(4,1)−3(3,0)	0.21	OriMC−1	MMWO 4.9 m	Lor84a	
U	265760.	unidentified		0.8	OriMC−1	NRAO 12 m	Ziu86	
	265852.709*(10)	HCN	3−2 v_2 =1 ℓ=1 e	1.5	OriMC−1	NRAO 12 m	Ziu86	Mak02
	265886.436*(4)	HCN	3−2	20.	OriMC−1	Hale 5m	Hug79	Mak02
U	266084.0	unidentified		8.6	OriMC−1	JCMT 15 m	Gre91	
	266161.070 (25)	HDO	2(2,0)−3(1,3)	2.5	OriMC−1	JCMT 15 m	Gre91	DeL71
	266334.469*(20)	CH_3CH_2CN	8(8,*)−9(7,*)	8.0	OriMC−1	JCMT 15 m	Gre91	
U	266386.0	unidentified		3.5	OriMC−1	JCMT 15 m	Gre91	
U	266613.0	unidentified		1.1	OriMC−1	JCMT 15 m	Gre91	
	266832.197*(16)	CH_3OCHO	22(4,19)−21(4,18) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	266838.123*(15)	CH_3OH	5(2,3)−4(1,3) E	1.7	OriMC−1	MMWO 4.9 m	Joh84	Xu_97
	266943.323*(5)	SO_2	30(9,21)−31(8,24)	0.20	OriMC−1	NRAO 12 m	Tur90	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	266951.661*(23)	CH_3CH_2CN	14(4,12)−15(2,13)	1.8	OriMC−1	JCMT 15 m	Gre91	
	267109.142*(4)	HCN	3−2 v_2 =2 ℓ=2 f	0.2	IRC+10216	IRAM 30 m	Luc89	Mak02
	267120.101*(4)	HCN	3−2 v_2 =2 ℓ=2 e	0.5	IRC+10216	IRAM 30 m	Luc89	Mak02
	267197.774*(85)	SO	3(4)−4(3)	6.3	OriMC−1	JCMT 15 m	Gre91	
	267199.282*(10)	HCN	3−2 v_2 =1 ℓ=1 f	1.5	OriMC−1	NRAO 12 m	Ziu86	Mak02
	267242.195*(27)	^{29}SiS	15−14	0.1[b]	IRC+10216	NRAO 12 m	Ziu86	
	267243.195*(5)	HCN	3−2 v_2 =2 ℓ=0	0.17[b]	OriMC−1	NRAO 12 m	Tur87	Mak02
U	267360.0	unidentified		2.8	OriMC−1	JCMT 15 m	Gre91	
	267403.394*(15)	CH_3OH	9(0,9)−8(1,7) E	1.8	OriMC−1	UKIRT 3.8 m	Den84	Xu_97
	267530.216*(2)	OCS	22−21	r	OriMC−1	MMWO 4.9 m	Lor84b	
	267537.437*(8)	SO_2	13(3,11)−13(2,12)	r	OriMC−1	MMWO 4.9 m	Lor84b	
	267557.633*(60)	HCO^+	3−2	12.	OriMC−1	Hale 5 m	Hug79	
U	267620.0	unidentified		4.1	OriMC−1	JCMT 15 m	Gre91	
	267638.833*(44)	$^{13}CH_3CN$	15(8)−14(8)	1.5	OriMC−1	JCMT 15 m	Gre91	
	267642.78(10)	NH_2D	12(5,8)−12(4,8) L	2.6	OriMC−1	JCMT 15 m	Gre91	
	267704.059*(34)	$^{13}CH_3CN$	15(7)−14(7)	[b]	OriMC−1	JCMT 15 m	Gre91	
	267719.808*(28)	SO_2	28(4,24)−28(3,25)	4.9[b]	OriMC−1	JCMT 15 m	Gre91	
	267869.822*(19)	$^{13}CH_3CN$	15(4)−14(4)	2.3[b]	OriMC−1	JCMT 15 m	Gre91	
	267871.059*(15)	$^{34}SO_2$	15(3,13)−15(2,14)	[b]	OriMC−1	JCMT 15 m	Gre91	
	267887.64* (12)	CH_3OH	24(5,20)−23(6,18) E	1.0	OriMC−1	JCMT 15 m	Gre91	Xu_97
	267905.031*(18)	$^{13}CH_3CN$	15(3)−14(3)	1.0	OriMC−1	JCMT 15 m	Gre91	
	267945.291*(20)	$^{13}CH_3CN$	15(1)−14(0)	[b]	OriMC−1	JCMT 15 m	Gre91	
	267950.325*(20)	$^{13}CH_3CN$	15(0)−14(0)	1.0[b]	OriMC−1	JCMT 15 m	Gre91	
	268002.524*(12)	CH_3CH_2CN	30(3,28)−29(3,27)	2.7	OriMC−1	JCMT 15 m	Gre91	
	268168.331*(7)	SO_2	9(5,5)−10(4,6)	3.9	OriMC−1	JCMT 15 m	Gre91	
U	268435.	unidentified		0.02	OriMC−1	NRAO 12 m	App97	
U	268445.	unidentified		0.02	OriMC−1	NRAO 12 m	App97	
	268451.09(5)	HOC^+	3−2	0.062	Sgr B2(OH)	NRAO 12 m	Ziu95a	Bla83
U	268463.	unidentified		0.02	OriMC−1	NRAO 12 m	App97	
U	268475.	unidentified		0.02	OriMC−1	NRAO 12 m	App97	
	268552.675*(16)	CH_3OCHO	23(2,21)−22(2,20) E	1.3	OriMC−1	JCMT 15 m	Gre91	Oes99
	268561.162*(16)	CH_3OCHO	23(2,21)−22(2,20) A	0.8	OriMC−1	JCMT 15 m	Gre91	Oes99
	268745.769*(12)	$H_2C^{18}O$	4(1,4)−3(1,3)	0.64	OriMC−1	MMWO 4.9 m	Man90	
	268803.090*(13)	CH_3CH_2CN	30(10,*)−29(10,*)	2.8[b]	OriMC−1	JCMT 15 m	Gre91	
	268803.888*(13)	CH_3CH_2CN	30(11,*)−29(11,*)	[b]	OriMC−1	JCMT 15 m	Gre91	
	268824.320*(14)	CH_3CH_2CN	30(12,*)−29(12,*)	3.8[b]	OriMC−1	JCMT 15 m	Gre91	
	268828.759*(13)	CH_3CH_2CN	30(9,*)−29(9,*)	[b]	OriMC−1	JCMT 15 m	Gre91	
	268860.124*(15)	CH_3CH_2CN	30(13,*)−29(13,*)	2.8	OriMC−1	JCMT 15 m	Gre91	
	268892.467*(13)	CH_3CH_2CN	30(8,23)−29(8,22)	4.0[b]	OriMC−1	JCMT 15 m	Gre91	
	268892.477*(13)	CH_3CH_2CN	30(8,22)−29(8,21)	[b]	OriMC−1	JCMT 15 m	Gre91	
	268908.520*(15)	CH_3CH_2CN	30(14,*)−29(14,*)	2.8	OriMC−1	JCMT 15 m	Gre91	
	268967.624*(15)	CH_3CH_2CN	30(15,*)−29(15,*)	1.0	OriMC−1	JCMT 15 m	Gre91	
	269015.133*(12)	CH_3CH_2CN	30(7,24)−29(7,23)	3.3[b]	OriMC−1	JCMT 15 m	Gre91	
	269015.530*(12)	CH_3CH_2CN	30(7,23)−29(7,22)	[b]	OriMC−1	JCMT 15 m	Gre91	
	269036.117*(14)	CH_3CH_2CN	30(16,*)−29(16,*)	0.5	OriMC−1	JCMT 15 m	Gre91	
	269078.016*(17)	CH_3OCHO	24(2,23)−23(2,22) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269083.401*(17)	CH_3OCHO	24(2,23)−23(2,22) A	1.8[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269084.854*(17)	CH_3OCHO	24(1,23)−23(1,22) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269090.220*(17)	CH_3OCHO	24(1,23)−23(1,22) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
U	269156.	unidentified		0.5	OriMC−1	NRAO 12 m	Ziu91a	
	269933.102*(21)	CH_3OCHO	25(0,25)−24(1,24) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269933.182*(21)	CH_3OCHO	25(1,25)−24(1,24) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269933.252*(21)	CH_3OCHO	25(0,25)−24(0,24) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269933.332*(21)	CH_3OCHO	25(1,25)−24(0,24) E	4.3[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269933.899*(21)	CH_3OCHO	25(0,25)−24(1,24) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269933.979*(21)	CH_3OCHO	25(1,25)−24(1,24) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269934.048*(21)	CH_3OCHO	25(0,25)−24(0,24) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	269934.128*(21)	CH_3OCHO	25(1,25)−24(0,24) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	270013.753*(43)	CH_3OCHO	22(21,*)−21(21,*) A	1.5	OriMC−1	JCMT 15 m	Gre91	Oes99
	270501.929*(17)	CH_3OCHO	22(14,*)−21(14,*) A	1.7[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	270503.152*(21)	CH_3OCHO	22(14,8)−21(14,7) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	270520.90* (42)	H_2CS	8(1,8)−7(1,7)	3.6	OriMC−1	JCMT 15 m	Gre91	
U	270598.0	unidentified		3.2	OriMC−1	JCMT 15 m	Gre91	
U	270664.0	unidentified		4.7	OriMC−1	JCMT 15 m	Gre91	
	270681.011*(21)	CH_3OCHO	22(13,9)−21(13,8) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	270683.963*(17)	CH_3OCHO	22(13,*)−21(13,*) A	1.9[b]	OriMC−1	JCMT 15 m	Gre91	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	271228.929*(20)	CH_3OCHO	22(11,11)−21(11,10) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271240.112*(17)	CH_3OCHO	22(11,12)−21(11,11) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271240.119*(17)	CH_3OCHO	22(11,11)−21(11,10) A	2.1[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271253.451*(17)	CH_3OCHO	22(11,11)−21(11,10) E	1.5	OriMC−1	JCMT 15 m	Gre91	Oes99
U	271312.0	unidentified		1.8	OriMC−1	JCMT 15 m	Gre91	
	271410.221*(15)	$^{34}SO2$	17(2,16)−17(1,17)	2.3	OriMC−1	JCMT 15 m	Gre91	
	271505.919*(17)	CH_3OCHO	21(5,16)−20(5,15) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271506.602*(12)	CH_3CH_2CN	30(4,26)−29(4,25)	[b]	OriMC−1	JCMT 15 m	Gre91	
	271524.741*(17)	CH_3OCHO	21(4,17)−20(4,16) E	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271528.993*(8)	SO_2	7(2,6)−6(1,5)	2.7[b]	OriMC−1	JCMT 15 m	Gre91	
	271532.859*(21)	CH_3OCHO	21(5,16)−20(5,15) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271544.794*(17)	CH_3OCHO	21(4,17)−20(4,16) A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	271981.131*(12)	HNC	3−2	10.	OriMC−1	Hale 5 m	Hug79	
U	272028.0	unidentified		1.7	OriMC−1	JCMT 15 m	Gre91	
U	272204.	unidentified		0.3	OriMC−1	NRAO 12 m	Ziu91a	
	272243.013*(20)	SiS	15−14	0.48	IRC+10216	MMWO 4.9 m	Sah84	
	272254.817*(17)	CH_3OCHO	22(9,13)−21(9,12) E	0.9	Ori−KL(N)	NRAO 12 m	Ziu91a	
	272272.437*(17)	CH_3OCHO	22(9,14)−21(9,13) A	0.9	Ori−KL(N)	NRAO 12 m	Ziu91a	
	272275.002*(17)	CH_3OCHO	22(9,13)−21(9,12) A	0.9	Ori−KL(N)	NRAO 12 m	Ziu91a	
	272279.286*(16)	CH_3OCHO	22(9,14)−21(9,13) E	0.9	Ori−KL(N)	NRAO 12 m	Ziu91a	
	272849.944*(12)	$OC^{34}S$	23−22	1.7	OriMC−1	JCMT 15 m	Gre91	
	272864.400*(17)	CH_3OCHO	23(3,20)−22(4,19)E	2.4	OriMC−1	JCMT 15 m	Gre91	Oes99
	272884.738*(12)	HCCCN	30−29	0.8	OriMC−1	MMWO 4.9 m	Lor81	Laf78
	272885.543*(20)	CH_3OCHO	23(3,20)−22(4,19)A	[b]	OriMC−1	JCMT 15 m	Gre91	Oes99
	274762.114*(7)	$H_2{}^{13}CO$	4(1,4)−3(1,3)	1.20	OriMC−1	MMWO 4.9 m	Man90	
	275240.168*(10)	SO_2	15(3,13)−15(2,14)	1.7	OriMC−1	MMWO 4.9 m	Lor84c	
	275724.719*(6)	CH_3CN	15(6)−14(6)	0.47	OriMC−1	MMWO 4.9 m	Lor84	
	275782.988*(5)	CH_3CN	15(5)−14(5)	0.39	OriMC−1	MMWO 4.9 m	Lor84	
	275830.694*(4)	CH_3CN	15(4)−14(4)	0.42	OriMC−1	MMWO 4.9 m	Lor84	
	275867.819*(4)	CH_3CN	15(3)−14(3)	0.96	OriMC−1	MMWO 4.9 m	Lor84	
	275894.347*(4)	CH_3CN	15(2)−14(2)	0.83	OriMC−1	MMWO 4.9 m	Lor84	
	275910.268*(4)	CH_3CN	15(1)−14(1)	1.17	OriMC−1	MMWO 4.9 m	Lor84	
	275915.575*(4)	CH_3CN	15(0)−14(0)	1.24	OriMC−1	MMWO 4.9 m	Lor84	
U	278263.	unidentified		1.0	OriMC−1	MMWO 4.9 m	Lor84c	
	278304.575*(15)	CH_3OH	9(−1,9)−8(0,8) E	1.5	OriMC−1	MMWO 4.9 m	Lor84c	Xu_97
	278886.56* (42)	H_2CS	8(1,7)−7(1,6)	0.8	OriMC−1	MMWO 4.9 m	Lor84f	
	279511.732*(77)	N_2H^+	3−2	0.9	OriMC−1	MMWO 4.9 m	Lor84g	
	281526.918*(13)	H_2CO	4(1,4)−3(1,3)	1.4	rhoOphB	MMWO 4.9 m	Lor83	
	281762.581*(10)	SO_2	15(1,15)−14(0,14)	1.0	OriMC−1	MMWO 4.9 m	Lor84c	
	281914.13(10)	PN	6−5	0.10	OriMC−1	NRAO 12 m	Tur87b	Wys72
	281956.537*(19)	CH_3OH	9(−3,7)−10(−2,9)E	0.8	OriMC−1	MMWO 4.9 m	Lor81	Xu_97
	281976.781*(13)	HCCCN	31−30	0.8	OriMC−1	MMWO 4.9 m	Lor81	
	282036.546*(8)	SO_2	6(2,4)−5(1,5)	1.6	OriMC−1	MMWO 4.9 m	Lor81	
	282292.801*(8)	SO_2	20(1,19)−20(0,20)	0.7	OriMC−1	MMWO 4.9 m	Lor84f	
	283441.874*(7)	$H_2{}^{13}CO$	4(0,4)−3(0,3)	0.50	OriMC−1	MMWO 4.9 m	Man90	
	286293.697*(12)	H_2C18O	4(1,3)−3(1,2)	0.10	OriMC−1	MMWO 4.9 m	Man90	
U	286342.45	unidentified		0.36	OriMC−1	MMWO 4.9 m	Lor85	
	286416.298*(9)	SO_2	22(2,20)−21(3,19)	0.22	OriMC−1	MMWO 4.9 m	Lor85	
	288143.911*(29)	DCO^+	4−3	<1.3	p−Oph	MMWO 4.9 m	Lor82	
	289209.098*(22)	$C^{34}S$	6−5	0.8	OriMC−1	MMWO 4.9 m	Lor85	
	289644.920*(4)	DCN	4−3	1.65	OriMC−1	MMWO 4.9 m	Gre85	
	289939.386*(7)	CH_3OH	6(0,6)−5(0,5) E	2.1	OriMC−1	MMWO 4.9 m	Pla82	Xu_97
	290307.294*(6)	CH_3OH	6(−2,5)−5−2,4) E	4.0[b]	OriMC−1	MMWO 4.9 m	Man90	Xu_97
	290307.738*(7)	CH_3OH	6(2,4)−5(2,3) E	[b]	OriMC−1	MMWO 4.9 m	Man90	Xu_97
	290380.702*(22)	SiS	16−15	0.22	IRC+10216	MMWO 4.9 m	Sah84	
	290479.902*(4)	CH_3CCH	17(2)−16(2)	0.14	OriMC−1	MMWO 4.9 m	Lor84b	
	290496.515*(4)	CH_3CCH	17(1)−16(1)	0.32	OriMC−1	MMWO 4.9 m	Lor84b	
	290502.053*(4)	CH_3CCH	17(0)−16(0)	0.3	OriMC−1	MMWO 4.9 m	Lor84b	
	290562.252*(36)	^{34}SO	6(7)−5(6)	0.4	OriMC−1	MMWO 4.9 m	Lor84b	
	290623.410*(13)	H_2CO	4(0,4)−3(0,3)	3.8	OriMC−1	MMWO 4.9 m	Lor84b	
	291237.769*(12)	H_2CO	4(2,3)−3(2,2)	2.2	OriMC−1	MMWO 4.9 m	Lor84a	
	291380.454*(13)	H_2CO	4(3,2)−3(3,1)	2.3[b]	OriMC−1	MMWO 4.9 m	Lor84a	
	291384.373*(13)	H_2CO	4(3,1)−3(3,0)	[b]	OriMC−1	MMWO 4.9 m	Lor84a	
	291782.262*(33)	CS	6−5 v=1	0.027	IRC+10216	NRAO 12 m	Hig00	
	291839.649*(3)	OCS	24−23	0.53	OriMC−1	MMWO 4.9 m	Lor84b	
	291948.071*(12)	H_2CO	4(2,2)−3(2,1)	1.9	OriMC−1	MMWO 4.9 m	Lor84a	
	292412.248*(6)	CH_3OCH_3	16(1,16)−15(0,15) AE+EA	[b]	OriMC−1	MMWO 4.9 m	Woo85	Gro98
	292412.420*(6)	CH_3OCH_3	16(1,16)−15(0,15) EE	0.36[b]	OriMC−1	MMWO 4.9 m	Woo85	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	292412.592*(6)	CH_3OCH_3	16(1,16)−15(0,15) AA	[b]	OriMC−1	MMWO 4.9 m	Woo85	Gro98
	293126.507*(7)	$H_2{}^{13}CO$	4(1,3)−3(1,2)	1.00	OriMC−1	MMWO 4.9 m	Man90	
	293464.203*(17)	CH_3OH	3(2,1)−4(1,4) A+	0.95	OriMC−1	MMWO 4.9 m	Lor84b	Xu_97
	293912.097*(13)	CS	6−5	3.3	OriMC−2	MMWO 4.9 m	Sne84	
	294098.885*(6)	CH_3CN	16(6)−15(6)	0.29	OriMC−1	MMWO 4.9 m	Lor84a	
	294161.016*(5)	CH_3CN	16(5)−15(5)	0.16	OriMC−1	MMWO 4.9 m	Lor84a	
	294211.885*(4)	CH_3CN	16(4)−15(4)	0.29	OriMC−1	MMWO 4.9 m	Lor84a	
	298576.283*(9)	SO_2	9(2,8)−8(1,7)	2.0	OriMC−1	MMWO 4.9 m	Eri84	
	299703.88* (16)	SiO	7−6 v=2	6.4[e]	RAqr	JCMT 15 m	Gra95	
	300836.631*(13)	H_2CO	4(1,3)−3(1,2)	3.9	OriMC−1	MMWO 4.9 m	Lor86	
	301286.193*(14)	SO	7(7)−6(6)	2.7	OriMC−1	MMWO 4.9 m	Lor86	
	301814.37* (15)	SiO	7−6 v=1	22.0[e]	RAqr	JCMT 15 m	Gra95	
	303926.88* (16)	SiO	7−6 v=0	8.	OriMC−1	NRAO 12 m	Hol86	
	303993.256*(3)	OCS	25−24	3.3	OriMC−1	NRAO 12 m	Hol86	
	304077.914*(19)	SO	8(7)−7(6)	13.	OriMC−1	NRAO 12 m	Hol86	
U	304122.6	unidentified		0.4	OriMC−1	NRAO 12 m	Woo86	
	304208.324*(13)	CH_3OH	2(1,1)−2(0,2) A−+	7.2	OriMC−1	NRAO 12 m	Hol86	Xu_97
	304306.2*(6)	H_2CS	9(1,9)−8(1,8)	2.0	OriMC−1	NRAO 12 m	Hol86	
	304306.20* (61)	H_2CS	9(1,9)−8(1,8)	6.0	OriMC−1	CSO 10.4 m	Phi92	
	304332.022*(11)	$^{34}SO_2$	3(3,1)−2(2,0)	0.7	OriMC−1	NRAO 12 m	Hol86	
	304371.281*(8)	CH_3OCH_3	14(2,13)−13(1,12) AE+EA	[b]	OriMC−1	NRAO 12 m	Hol86	Gro98
	304372.642*(6)	CH_3OCH_3	14(2,13)−13(1,12) EE	1.6[b]	OriMC−1	NRAO 12 m	Hol86	Gro98
	304374.003*(8)	CH_3OCH_3	14(2,13)−13(1,12) AA	[b]	OriMC−1	NRAO 12 m	Hol86	Gro98
	307165.911*(13)	CH_3CHO	4(1,3)−4(0,4) A−+	0.6	Barnard1	CSO 10.4 m	Lis02	Kle96
	307165.911*(13)	CH_3OH	4(1,3)−4(0,4) A−+	6.6	OriMC−1	NRAO 12 m	Hol86	Xu_97
	307192.41(5)	H_3O^+	1(1) − −2(1) +	0.6	OriMC−1	NRAO 12 m	Hol86	Plu85
U	307205.4	unidentified		0.5	OriMC−1	NRAO 12 m	Woo86	
	307311.413*(20)	$^{13}CH_3OH$	4(1,3)−4(0,4) A−+	1.0	OriMC−1	NRAO 12 m	Woo86	Xu_97
	307311.431*(20)	$^{13}CH_3OH$	4(1,3)−4(0,4) A++	4.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
	309502.468*(57)	SO	2(2)−2(1)	0.24	Barnard1	CSO 10.4 m	Lis02	
	309908.111*(1)	ND_3	1(0) a−0(0) s F=1−1	0.7	Barnard1	CSO 10.4 m	Lis02	
	309909.338*(1)	ND_3	1(0)a−0(0) s F=2−1	1.3	Barnard1	CSO 10.4 m	Lis02	
	309911.179*(1)	ND_3	1(0)a−0(0) s F=0−1	0.3	Barnard1	CSO 10.4 m	Lis02	
	310193.059*(8)	CH_3CHO	3(1,2)−2(0,2) E	0.5	Barnard1	CSO 10.4 m	Lis02	Kle96
	317250.336*(11)	SO_2	17(7,11)−18(6,12)	0.71	W3(IRS5)	JCMT 15 m	Hel97	
	318318.934*(18)	CH_3OH	8(1,7)−8(0,8) A−+	6.0	W51	CSO 10.4 m	Men90	Xu_97
	321225.64(24)	H_2O	10(2,9)−9(3,6)	3.0	W51	CSO 10.4 m	Men90	DeL72a
	322161.6*(4)	CH_2NH	5(2,3)−4(2,2)	1.1	OriMC−1	CSO 10.4 m	Men90a	
	322239.480*(20)	CH_3OH	9(1,8)−9(0,9) A−+	5.5	OriMC−1	CSO 10.4 m	Men90a	Xu_97
	322496.309*(9)	HDCO	5(4,1)−4(4,0)	1.0[b]	OriMC−1	CSO 10.4 m	Men90a	
	322496.309*(9)	HDCO	5(4,2)−4(4,1)	1.0[b]	OriMC−1	CSO 10.4 m	Men90a	
	322521.684*(20)	CH_3OCHO	25(6,19)−24(6,18) A	0.5	OriMC−1	CSO 10.4 m	Men90a	Oes99
	322530.0*(7)	CH_2CHCN	38(4,35)−38(3,36)	1.0	OriMC−1	CSO 10.4 m	Men90a	
	322965.17(5)	$H_2{}^{18}O$	5(1,5)−4(2,2)	0.5	OriMC−1	CSO 10.4 m	Men90a	DeL72
	325152.919 (27)	H_2O	5(1,5)−4(2,2)	2.2	OriMC−1	CSO 10.4 m	Men90a	DeL72a
	329330.546*(5)	$C^{18}O$	3−2	15.3	Ori−bar$\Delta\alpha$=+20″	JCMT 15 m	Hog95	
U	330035.9	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
	330191.143*(11)	$^{34}SO2$	8(2,60_7(1,7)	0.7	G34.3+0.15	JCMT 15 m	Mac96	
	330355.780*(52)	CH_3OH	20(3,17)−19(4,16) A−−	0.8	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	330371.935*(5)	CH_2CHCN	11(3,8)−10(2,9)	0.7	G34.3+0.15	JCMT 15 m	Mac96	
	330405.459*(8)	CH_3OCH_3	16(2,15)−15(1,14) EA+AE	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	330406.505*(6)	CH_3OCH_3	16(2,15)−15(1,14) EE	0.7[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	330407.552*(8)	CH_3OCH_3	16(2,15)−15(1,14) AA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	330459.651*(28)	NH_2CHO	19(1,18)−18(2,17)	0.7	G34.3+0.15	JCMT 15 m	Mac96	
	330587.960*(4)	^{13}CO	3−2	16.03	OriMC−1	NRAO 12 m	Jew89	
	330667.759*(24)	$^{34}SO_2$	21(2,20)−21(1,21)	7.3[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	330793.977*(19)	CH_3OH	8(−3,6)−9(−2,8) E	7.8[f]	Sgr B2(M)	CSO 10.4 m	Sut91	Xu_97
U	330797.	unidentified		1.59	OriMC−1	NRAO 12 m	Jew89	
	330842.781*(7)	CH_3CN	18(6)−17(6)	1.23	OriMC−1	NRAO 12 m	Jew89	
	330848.8*( )	HNCO	15(1,14)−14(1,13)	17.2[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	330870.463*(45)	SiC_2	14(6,9)−13(6,8)	6.4[bf]	IRC+10216	CSO 10.4 m	Gro94	
	330874.450*(46)	SiC_2	14(6,8)−13(6,7)	[b]	IRC+10216	CSO 10.4 m	Gro94	
	330912.624*(5)	CH_3CN	18(5)−17(5)	0.88	OriMC−1	NRAO 12 m	Jew89	
	330969.806*(5)	CH_3CN	18(4)−17(4)	1.38	OriMC−1	NRAO 12 m	Jew89	
	331014.305*(5)	CH_3CN	18(3)−17(3)	1.38	OriMC−1	NRAO 12 m	Jew89	
	331046.103*(5)	CH_3CN	18(2)−17(2)	1.60	OriMC−1	NRAO 12 m	Jew89	
	331065.186*(5)	CH_3CN	18(1)−17(1)	1.64	OriMC−1	NRAO 12 m	Jew89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	331071.548*(5)	CH_3CN	18(0)−17(0)	1.77	OriMC−1	NRAO 12 m	Jew89	
	331220.395*(29)	CH_3OH	16(−1,16)−15(−2,14) E	0.8	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	331469.442*(17)	CH_3OCHO	28(3,25)−27(3,24) A	0.5	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	331502.333*(24)	CH_3OH	11(1,10)−11(0,11) A−+	1.99	OriMC−1	NRAO 12 m	Jew89	Xu_97
	331580.171*(11)	SO_2	11(6,6)−12(5,7)	29.1[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	332015.78* (10)	CH_3CN	17(0)−16(0) v_8 =1 ℓ=−1	1.22[b]	OriMC−1	NRAO 12 m	Jew89	Wlo88
	332017.77* (10)	CH_3CN	17(−1)−16(−1) v_8 =1 ℓ=+1	[b]	OriMC−1	NRAO 12 m	Jew89	Wlo88
	332091.412*(12)	SO_2	21(2,20)−21(1,21)	1.92	OriMC−1	NRAO 12 m	Jew89	
	332173.585*(33)	$^{34}SO_2$	23(3,21)−23(1,22)	13.6[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	332505.226*(9)	SO_2	4(3,1)−3(2,2)	3.02	OriMC−1	NRAO 12 m	Jew89	
	332533.155*(7)	CH_2CHCN	35(6,30)−34(6,29)	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	332550.294*(65)	^{30}SiS	19−18	5.1[f]	IRC+10216	CSO 10.4 m	Gro94	
	332572.83* (29)	CH_2NH	5(1,4)−4(1,3)	13.5[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	332575.690*(24)	CH_3OCHO	30(1,29)−29(1,28) A	0.64[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	332575.959*(24)	CH_3OCHO	30(2,29)−29(2,28) A	[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	332780.945*(50)	NH_2D	1(0,1)−0(0,0) F=0−1 o	[b]	L134N	IRAM 30 m	Tin00	JPL01
	332781.796*(50)	NH_2D	1(0,1)−0(0,0) F=2−1 o	0.4[b]	L134N	IRAM 30 m	Tin00	JPL01
	332782.363*(50)	NH_2D	1(0,1)−0(0,0) F=1−1 o	[b]	L134N	IRAM 30 m	Tin00	JPL01
	332821.560*(50)	NH_2D	1(0,1)−0(0,0) F=0−1 p	[b]	L1689N	CSO 10.4 m	Sha01	JPL01
	332822.415*(50)	NH_2D	1(0,1)−0(0,0) F=2−1 p	0.4[b]	L1689N	CSO 10.4 m	Sha01	JPL01
	332822.985*(50)	NH_2D	1(0,1)−0(0,0) F=1−1 p	[b]	L1689N	CSO 10.4 m	Sha01	JPL01
	332836.235*(21)	$^{34}SO_2$	16(4,12)−16(3,13)	2.8[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	333114.787*(9)	$^{13}CH_3OH$	7(1,6)−6(1,5) A−−	0.5	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
U	333118.5	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
U	333162.1	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	333278.60* (16)	HDS	2(0,2)−1(1,1)	0.3	G34.3+0.15	JCMT 15 m	Mac96	Hel73
	333386.048*(52)	SiC_2	14(4,11)−13(4,10)	11.0[f]	IRC+10216	CSO 10.4 m	Gro94	
	333419.207*(17)	CH_3OCHO	27(12,16)−26(12,15) A	0.6[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	333419.220*(17)	CH_3OCHO	27(12,15)−26(12,14) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
U	333438.1	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	333449.021*(25)	CH_3OCHO	31(1,31)−30(1,30) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	333449.023*(25)	CH_3OCHO	31(0,31)−30(0,30) E	0.9[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	333449.382*(37)	CH_3OCHO	31(0,31)−30(0,30) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	333449.384*(37)	CH_3OCHO	31(1,31)−30(1,30) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	333900.981*(40)	^{34}SO	7(8)−6(7)	2.18	OriMC−1	NRAO 12 m	Jew89	
	334017.024*(20)	CH_3OCHO	27(11,16)−26(11,15) E	4.2	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334031.604*(17)	CH_3OCHO	27(11,17)−26(11,16) A	4.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334031.907*(17)	CH_3OCHO	27(11,16)−26(11,15) A	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334044.338*(17)	CH_3OCHO	27(11,17)−26(11,16) E	2.2	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334109.090*(25)	CH_3OCHO	15(6,10)−14(5,9) A	1.2	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334265.8*( )	HCOOH	15(2,14)−14(2,13)	2.5	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	334426.561*(13)	CH_3OH	3(0,3)−2(1,2) E v_t =1	6.5	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
U	334456.9	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	334483.460*(9)	NH_2CHO	8(2,7)−7(1,6)	2.2	OriMC−1(CR)	JCMT 15 m	Sut95	
	334620.7	CH_3OH	22(3)−22(2) E v_t =2	0.37[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	334673.328*(10)	SO_2	8(2,6)−7(1,7)	3.25	OriMC−1	NRAO 12 m	Jew89	
	334709.932*(17)	NH_2CHO	17(0,17)−16(1,16)	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	334850.962*(20)	CH_3OCHO	27(10,17)−26(10,16) E	3.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334867.021*(16)	CH_3OCHO	27(10,18)−26(10,17) A	2.2	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334872.802*(16)	CH_3OCHO	27(10,17)−26(10,16) A	3.0	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	334877.659*(17)	CH_3OCHO	27(10,18)−26(10,17) E	3.3	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
U	334893.0	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	334929.49* (61)	$H^{13}CCCN$	37−36	2.0	OriMC−1(SP)	JCMT 15 m	Sut95	
	335092.20* (49)	$HC^{13}CCN$	37−36	0.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	335096.786*(13)	HDCO	5(1,4)−4(1,3)	4.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	335109.135*(17)	CCCS	58−57	1.8	OriMC−1(CR)	JCMT 15 m	Sut95	
	335125.05* (20)	$HCC^{13}CN$	37−36	0.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	335128.523*(34)	SO_2	20(4,16)−20(3,17) v_2 =1	[b]	Sgr B2(M)	CSO 10.4 m	Sut91	
	335133.686*(17)	CH_3OH	2(2,1)−3(1,2) A−	1.98	OriMC−1	NRAO 12 m	Jew89	Xu_97
	335158.094*(20)	CH_3OCHO	28(4,24)−26(5,23) E	0.9	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	335183.323*(20)	CH_3OCHO	28(4,24)−26(5,23) A	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	335226.854*(20)	CH_3CH2CN	34(3,32)−33(2,31)	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	335289.690*(47)	SiC_2	14(4,10)−13(4,9)	13.0[f]	IRC+10216	CSO 10.4 m	Gro94	
	335321.262*(22)	CH_3CH_2CN	9(6,*)−8(5,*)	1.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	335341.931*(77)	$Si^{34}S$	19−18	9.6[f]	IRC+10216	CSO 10.4 m	Gro94	
	335395.50(3)	HDO	3(3,1)−4(2,2)	0.52	OriMC−1	NRAO 12 m	Jew89	DeL71
	335402.700*(25)	CH_3OCHO	15(6,9)−14(5,10) A	1.8	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	33546.53(10)	NHD_2	1(1,1)−0(0,0)O−(a)	0.015	OriMC−1	NRAO 12 m	Tur90a	DeL75
U	335559.	unidentified		0.71	OriMC−1	NRAO 12 m	Jew89	
	335560.207*(40)	$^{13}CH_3OH$	12(1,11)−12(0,12) A−+	4.4	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	335582.022*(7)	CH_3OH	7(1,7)−6(1,6) A+	3.37	OriMC−1	NRAO 12 m	Jew89	Xu_97
	335773.132*(48)	SO_2	29(5,25)−30(2,28)	0.28	W3(IRS5)	JCMT 15 m	Hel97	
	335815.938*(21)	$H_2C^{18}O$	5(1,5)−4(1,4)	2.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	335827.922*(34)	CH_3OCHO	26(5,22)−26(4,21) A	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	335839.494*(32)	CH_3OCHO	26(5,22)−26(4,21) E	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
U	335964.9	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	336028.154*(16)	CH_3OCHO	27(9,19)−26(9,18) A	3.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336032.505*(24)	CH_3OCHO	27(9,19)−26(9,18) E	3.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336086.111*(25)	CH_3OCHO	27(9,18)−26(9,17) E	3.0	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336089.210*(20)	SO_2	23(3,21)−23(2,22)	2.17	OriMC−1	NRAO 12 m	Jew89	
	336111.318*(16)	CH_3OCHO	27(9,18)−26(9,17) A	2.3	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336135.519*(15)	NH_2CHO	16(2,15)−15(2,14)	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	336351.347*(17)	CH_3OCHO	27(6,22)−26(6,21) E	3.8	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336352.205*(87)	NH_2CHO	29(4,25)−29(3,26)	0.62	OriMC−1	NRAO 12 m	Jew89	
	336354.806*(20)	CH_3OCHO	26(5,21)−25(5,20) E	5.5	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336368.188*(17)	CH_3OCHO	27(6,22)−26(6,21) A	3.5	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336373.824*(20)	CH_3OCHO	26(5,21)−25(5,20) A	3.9	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336438.219*(36)	CH_3OH	14(7,7)−15(6,10) A−−	4.6[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	336438.219*(36)	CH_3OH	14(7,8)−15(6,9) A++	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	336520.085*(21)	HCCCN	37−36	1.09	OriMC−1	NRAO 12 m	Jew89	
	336553.75* (12)	SO	10(11)−10(10)	16.2[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	336605.8*( )	CH_3OH	7(1,7)−6(1,6) A++ v_t =2	2.1	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	336614.038*(18)	CH_3CH_2CN	20(4,17)−19(3,16)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
U	336638.0	unidentified		1.3	OriMC−1(CR)	JCMT 15 m	Sut95	
	336669.515*(13)	SO_2	16(7,9)−17(6,12)	19.9[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	336760.698*(21)	SO_2	20(1,19)−19(2,18) v_2 =1	10.2[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	336808.457*(8)	CH_2CHCN	37(0,37)−36(1,36)	0.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	336865.153*(26)	CH_3OH	12(1,11)−12(0,12) A−+	3.47	OriMC−1	NRAO 12 m	Jew89	Xu_97
U	336887.2	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
	336889.203*(20)	CH_3OCHO	26(6,20)−25(6,19) E	4.4	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	336918.151*(20)	CH_3OCHO	26(6,20)−25(6,19) A	4.4	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	337029.5*( )	CH_3OH	7(2,5)−6(2,4) A++ v_t =2	1.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337029.5*( )	CH_3OH	7(2,6)−6(2,5) A−− v_t =2	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337039.739*(7)	CH_2CHCN	36(2,35)−35(2,34)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	337050.913*(7)	CH_2CHCN	35(3,32)−34(3,31)	1.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	337061.123*(4)	$C^{17}O$	3−2	1.47	OriMC−1	NRAO 12 m	Jew89	
	337098.5*( )	CH_3OH	7(5,2)−6(5,1) A−− v_t =2	1.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337098.5*( )	CH_3OH	7(5,3)−6(5,2) A++ v_t =2	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337113.8*( )	CH_3OH	7(1,7)−6(1,6) E v_t =2	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337135.858*(18)	CH_3OH	3(3,0)−4(2,2) E	0.76	OriMC−1	NRAO 12 m	Jew89	Xu_97
U	337149.8	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	337159.4*( )	CH_3OH	7(6,1)−6(6,0) E v_t =2	1.2	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
U	337167.	unidentified		0.63	OriMC−1	NRAO 12 m	Jew89	
	337175.2*( )	CH_3OH	7(−4,3)−6(−4,2) E v_t =2	1.3	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337186.6*( )	CH_3OH	7(0,7)−6(0,6) E v_t =2	1.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337198.4*( )	CH_3OH	7(−5,3)−6(−5,2) E v_t =2	1.8[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337199.730*(24)	^{33}SO	7(8)−6(7)	9.6[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
U	337201.	unidentified		0.97	OriMC−1	NRAO 12 m	Jew89	
	337252.3*( )	CH_3OH	7(3,4)−6(3,3) A−− v_t =2	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337252.3*( )	CH_3OH	7(3,5)−6(3,4) A++ v_t =2	3.7[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337273.6*( )	CH_3OH	7(4,3)−6(4,2) A++ v_t =2	4.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337273.6*( )	CH_3OH	7(4,4)−6(4,3) A−− v_t =2	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337278.9*( )	CH_3OH	7(−2,5)−6(−2,4) E v_t =2	3.7	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337284.4*( )	CH_3OH	7(0,7)−6(0,6) A v_t =2	5.2[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337296.0*( )	CH_3OH	7(3,5)−6(3,4) E v_t =2	3.0	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337297.483*(11)	CH_3OH	7(1,7)−6(1,6) A++ v_t =1	7.1	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337300.924*(34)	NH_2CHO	19(2,18)−19(1,19)	0.88	OriMC−1	NRAO 12 m	Jew89	
	337302.9*( )	CH_3OH	7(2,6)−6(2,5) E v_t =2	3.5	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337312.3*( )	CH_3OH	7(−1,6)−6(−1,5) E v_t =2	4.1	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337323.531*(41)	$t-CH_3CH_2OH$	20(7,14)−20(6,15)	0.4	G34.3+0.15	JCMT 15 m	Mil95	
	337344.3*(4)	HCCCN	37−36 v_7 =1 ℓ=1 e	2.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	337347.559*(19)	CH_3CH_2CN	38(3,36)−37(3,35)	3.0	OriMC−1(CR)	JCMT 15 m	Sut95	
U	337353.	unidentified		0.72	OriMC−1	NRAO 12 m	Jew89	
	337396.498*(27)	$C^{34}S$	7−6	1.89	OriMC−1	NRAO 12 m	Jew89	
	337420.484*(16)	CH_3OCH_3	21(2,19)−20(3,18) AA	[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	337421.032*(12)	CH_3OCH_3	21(2,19)−20(3,18) EE	4.6[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337421.580*(14)	CH_3OCH_3	21(2,19)−20(3,18) AE+EA	[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337427.8*( )	NH_2CN	17(1,17)−16(1,16) v_t =1	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	337445.858*(18)	CH_3CH_2CN	37(4,33)−36(4,32)	2.5	OriMC−1(CR)	JCMT 15 m	Sut95	
U	337461.6	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	337463.624*(17)	CH_3OH	7(6,1)−6(6,0) A++ v_t =1	4.0	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
U	337473.1	unidentified		1.7	OriMC−1(CR)	JCMT 15 m	Sut95	
	337489.669*(16)	CH_3OCHO	27(8,20)−26(8,19) E	2.2	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	337490.378*(29)	CH_3OH	7(−6,2)−6(−6,1) E v_t =1	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337490.5*( )	HCOOH	15(7,*)−14(7,*)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	337503.489*(16)	CH_3OCHO	27(8,20)−26(8,19) A	4.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	337519.117*(13)	CH_3OH	7(3,5)−6(3,4) E v_t =1	5.8	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337545.987*(18)	CH_3OH	7(5,2)−6(5,1) A−− v_t =1	5.6[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337545.987*(18)	CH_3OH	7(5,3)−6(5,2) A++ v_t =1	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337580.162*(20)	^{34}SO	8(8)−7(7)	1.92	OriMC−1	NRAO 12 m	Jew89	
	337581.604*(13)	CH_3OH	7(4,4)−6(4,3) E v_t =1	3.5	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337589.9*( )	HCOOH	15(6,*)−14(6,*)	2.0	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	337605.276*(11)	CH_3OH	7(−2,5)−6(−2,4) E v_t =1	5.5	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337610.627*(11)	CH_3OH	7(−3,4)−6(−3,3) E v_t =1	8.9	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337625.745*(11)	CH_3OH	7(2,5)−6(2,4) A++ v_t =1	9.4	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337635.750*(11)	CH_3OH	7(2,6)−6(2,5) A−− v_t =1	10.9	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337642.484*(12)	CH_3OH	7(1,7)−6(1,6) E v_t =1	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	337643.921*(11)	CH_3OH	7(0,7)−6(0,6) E v_t =1	1.05[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	337646.021*(13)	CH_3OH	7(−4,3)−6(−4,2) E v_t =1	4.5	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337648.188*(24)	CH_3OH	7(−5,3)−6(−5,2) E v_t =1	1.9	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337655.174*(13)	CH_3OH	7(3,5)−6(3,4) A++ v_t =1	8.5[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337655.211*(13)	CH_3OH	7(3,4)−6(3,3) A−− v_t =1	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337655.211*(18)	CH_3OH	7(4,4)−6(4,3) A−− v_t =1	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337671.194*(14)	CH_3OH	7(2,6)−6(2,5) E v_t =1	6.7	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337685.218*(14)	CH_3OH	7(5,2)−6(5,1) E v_t =1	2.3	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337685.594*(18)	CH_3OH	7(4,4)−6(4,2) A++ v_t =1	5.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337707.520*(18)	CH_3OH	7(−1,6)−6(−1,5) E v_t =1	6.6	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337722.348*(12)	CH_3OCH_3	7(4,4)−6(3,3) EE	0.12[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337722.348*(12)	CH_3OCH_3	7(4,4)−6(3,3) EE	6.1[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337722.995*(10)	CH_3OCH_3	7(4,4)−6(3,3) AE	[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337722.995*(10)	CH_3OCH_3	7(4,4)−6(3,3) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337726.967*(40)	$t-CH_3CH_2OH$	19(7,12)−19(6,13)	0.4	G34.3+0.15	JCMT 15 m	Mil95	
	337730.742*(12)	CH_3OCH_3	7(4,4)−6(3,3) AA	[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337730.742*(12)	CH_3OCH_3	7(4,4)−6(3,3) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337731.850*(12)	CH_3OCH_3	7(4,3)−6(3,3) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337731.850*(17)	CH_3OCH_3	7(4,3)−6(3,3) EA	8.1[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337732.186*(12)	CH_3OCH_3	7(4,3)−6(3,3) EE	[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337732.186*(12)	CH_3OCH_3	7(4,3)−6(3,3) EE	0.26[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337748.771*(26)	CH_3OH	7(0,7)−6(0,6) A++ v_t =1	7.0	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337770.614*(16)	CH_3OCH_3	7(4,4)−6(3,4) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337770.614*(17)	CH_3OCH_3	7(4,4)−6(3,4) EA	2.3	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337778.025*(10)	CH_3OCH_3	7(4,4)−6(3,4) EE	0.47[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337778.025*(10)	CH_3OCH_3	7(4,4)−6(3,4) EE	7.3[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337779.470*(10)	CH_3OCH_3	7(4,3)−6(3,4) AE	[b]	OriMC−1(CR)	JCMT 15 m	Sot95	Gro98
	337779.470*(10)	CH_3OCH_3	7(4,3)−6(3,4) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337785.1*( )	HCOOH	15(5,11)−14(5,10)	9.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	337787.216*(12)	CH_3OCH_3	7(4,3)−6(3,4) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337787.8*( )	HCOOH	15(5,10)−14(5,9)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	337787.863*(14)	CH_3OCH_3	7(4,3)−6(3,4) EE	0.39[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337790.076*(24)	CH_3OCH_3	7(4,3)−6(3,4) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	337811.639*(50)	CH_3OCHO	44(6,39)−44(5,40) A	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	337824.9*(4)	HCCCN	37−36 v_7 =1 ℓ=1 f	2.3	OriMC−1(CR)	JCMT 15 m	Sut95	
U	337829.1	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
U	337839.3	unidentified		1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
U	337844.4	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	337877.5*( )	CH_3OH	7(1,6)−6(1,5) A v_t =2	2.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	337892.524*(27)	SO_2	21(2,20)−21(1,21) v_2 =1	0.4	G34.3+0.15	JCMT 15 m	Mac96	
	337938.089*(67)	CH_3OH	20(−6,14)−21(−5,16) E	0.28	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	337969.434*(12)	CH_3OH	7(1,6)−6(1,5) A−− v_t =1	8.4	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
U	337969.6	unidentified		0.9	G34.3+0.15	JCMT 15 m	Mac96	
U	337973.	unidentified		0.86	OriMC−1	NRAO 12 m	Jew89	
	338081.1*(9)	H_2CS	10(1,10)−9(1,9)	1.78	OriMC−1	NRAO 12 m	Jew89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	338099.107*(35)	$t-CH_3CH_2OH$	18(7,11)−18(6,12)	0.5	G34.3+0.15	JCMT 15 m	Mil95	
	338109.733*(35)	$t-CH_3CH_2OH$	18(7,12)−18(6,13)	0.5	G34.3+0.15	JCMT 15 m	Mil95	
	338124.498*(7)	CH_3OH	7(0,7)−6(0,6) E	4.48	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338142.834*(18)	CH_3CH_2CN	37(3,34)−36(3,33)	3.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	338143.7*( )	HCOOH	15(4,12)−14(4,11)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
U	338147.	unidentified		0.67	OriMC−1	NRAO 12 m	Jew89	
	338201.8*( )	HCOOH	15(3,13)−14(3,12)	0.7	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	338204.003*(7)	$c-C_3H_2$	5(5,1)−4(4,0)	5.3[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	338213.505*(8)	CH_2CHCN	37(1,37)−36(0,36)	0.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	338248.7*()	HCOOH	15(4,11)−14(4,10)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	338278.149*(7)	CH_2CHCN	35(2,33)−34(2,32)	1.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	338305.976*(15)	SO_2	18(4,14)−18(3,15)	3.42	OriMC−1	NRAO 12 m	Jew89	
	338320.348*(19)	$^{34}SO_2$	13(2,12)−12(1,11)	16.4[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	338338.014*(16)	CH_3OCHO	27(8,19)−26(8,18) E	4.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	338344.605*(7)	CH_3OH	7(−1,7)−6(−1,6) E	4.23	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338355.823*(16)	CH_3OCHO	27(8,19)−26(8,18) A	4.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	338396.331*(16)	CH_3OCHO	27(7,21)−26(7,20) E	3.7	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	338404.593*(9)	CH_3OH	7(6,2)−6(6,1) E	4.52[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338408.718*(7)	CH_3OH	7(0,7)−6(0,6) A+	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338414.117*(16)	CH_3OCHO	27(7,21)−26(7,20) A	1.2	OriMC−1	MMWO 4.9 m	Lor85	Oes99
	338430.981*(10)	CH_3OH	7(−6,1)−6(−6,0) E	0.80	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338442.367*(11)	CH_3OH	7(6,1)−6(6,0) A+	1.08[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338442.367*(11)	CH_3OH	7(6,2)−6(6,1) A−	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338447.318*(36)	^{29}SiS	19−18	13.5[f]	IRC+10216	CSO 10.4 m	Gro94	
	338447.690*(8)	CH_2CHCN	37(0,37)−36(0,36)	2.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	338456.521*(7)	CH_3OH	7(−5,2)−6(−5,1) E	1.72	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338475.217*(8)	CH_3OH	7(5,3)−6(5,2) E	1.80	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338486.322*(8)	CH_3OH	7(5,2)−6(5,1) A−	2.12[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338486.322*(8)	CH_3OH	7(5,3)−6(5,2) A+	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338504.056*(7)	CH_3OH	7(−4,4)−6(−4,3) E	3.05	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338512.627*(7)	CH_3OH	7(4,4)−6(4,3) A−	4.13[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338512.639*(7)	CH_3OH	7(4,3)−6(4,2) A+	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338512.856*(7)	CH_3OH	7(2,6)−6(2,5) A−	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338530.256*(7)	CH_3OH	7(4,3)−6(4,2) E	1.98	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338540.824*(7)	CH_3OH	7(3,5)−6(3,4) A+	4.75[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338543.149*(7)	CH_3OH	7(3,4)−6(3,3) A−	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338559.963*(7)	CH_3OH	7(−3,5)−6(−3,4) E	3.05	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338583.223*(7)	CH_3OH	7(3,4)−6(3,3) E	4.05	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338611.816*(12)	SO_2	20(4,19)−19(2,18)	0.73	IRAS16293−2422	JCMT 15 m	Bla94	
	338614.953*(7)	CH_3OH	7(1,6)−6(1,5) E	7.75	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338639.807*(7)	CH_3OH	7(2,5)−6(2,4) A+	3.82	OriMC−1	NRAO 12 m	Jew89	Xu_97
U	338708.8	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	338721.694*(7)	CH_3OH	7(2,5)−6(2,4) E	5.08[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	338722.914*(5)	CH_3OH	7(−2,6)−6(−2,5) E	[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
U	338747.0	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
U	338759.8	unidentified		1.3	G34.3+0.15	JCMT 15 m	Mac96	
	338759.948*(50)	$^{13}CH_3OH$	13(0,13)−12(1,12) A+	3.2	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
U	338771.4	unidentified		0.8	G34.3+0.15	JCMT 15 m	Mac96	
U	338773.0	unidentified		2.8	OriMC−1(CR)	JCMT 15 m	Sut95	
	338785.692*(17)	$^{34}SO_2$	14(4,10)−14(3,11)	0.53	OriMC−1	NRAO 12 m	Jew89	
	338788.813*(19)	CH_3CH_2CN	39(1,38)−38(2,37)	0.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
U	338821.	unidentified		33[f]	IRC+10216	CSO 10.4 m	Gro94	
U	338843.4	unidentified		0.8	G34.3+0.15	JCMT 15 m	Mac96	
	338886.171*(26)	$t-CH_3CH_2OH$	15(7,8)−15(6,9)	1.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	338887.356*(26)	$t-CH_3CH_2OH$	15(7,9)−15(6,10)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	338929.56*(18)	^{30}SiO	8−7 v=0	1.07	OriMC−1	NRAO 12 m	Jew89	
	339061.026*(25)	$t-CH_3CH_2OH$	14(7,7)−14(6,8)	0.6[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339061.537*(25)	$t-CH_3CH_2OH$	14(7,8)−14(6,9)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339129.374*(25)	CH_3OCHO	13(7,7)−12(6,7) E	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
U	339137.1	unidentified		1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	339149.160*(33)	SO_2	37(4,34)−38(1,37)	0.09	W3(IRS5)	JCMT 15 m	Hel97	
	339152.730*(28)	CH_3OCHO	13(7,6)−12(6,6) E	1.5	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	339185.942*(25)	CH_3OCHO	13(7,7)−12(6,7) A	1.5	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	339196.327*(25)	CH_3OCHO	13(7,6)−12(6,6) A	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	339201.539*(26)	$t-CH_3CH_2OH$	13(7,6)−13(6,7)	0.8[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339201.745*(26)	$t-CH_3CH_2OH$	13(7,7)−13(6,8)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339309.002*(14)	$^{13}CH_3CN$	19(3)−18(3)	2.7	OriMC−1(CR)	JCMT 15 m	Sut95	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	339312.559*(27)	$t-CH_3CH_2OH$	12(7,5)−12(6,6)	2.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339312.635*(27)	$t-CH_3CH_2OH$	12(7,6)−12(6,7)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339340.824*(15)	$^{13}CH_3CN$	19(2)−18(2)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	339341.502*(62)	SO	3(3)−3(2)	1.90	OriMC−1	NRAO 12 m	Jew89	
	339353.782*(35)	$O^{13}CS$	28−27	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	339359.923*(17)	$^{13}CH_3CN$	19(1)−18(1)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	339366.290*(17)	$^{13}CH_3CN$	19(0)−18(0)	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	339398.498*(29)	$t-CH_3CH_2OH$	11(7,4)−11(6,5)	1.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339398.524*(29)	$t-CH_3CH_2OH$	11(7,5)−11(6,6)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339446.779*(30)	CN	3−2 J=5/2−5/2 F=3/2−3/2	0.6	OriMC−1(ER)	JCMT 15 m	Sut95	
	339459.994*(30)	CN	3−2 J=5/2−5/2 F=3/2−5/2	0.2[b]	OriMC−1(ER)	JCMT 15 m	Sut95	
	339462.679*(30)	CN	3−2 J=5/2−5/2 F=5/2−3/2	[b]	OriMC−1(ER)	JCMT 15 m	Sut95	
	339463.379*(31)	$t-CH_3CH_2OH$	10(7,3)−10(6,4)	0.5[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339463.387*(31)	$t-CH_3CH_2OH$	10(7,4)−10(6,5)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339475.894*(30)	CN	3−2 J=5/2−5/2 F=5/2−5/2	1.3	OriMC−1(ER)	JCMT 15 m	Sut95	
	339491.485*(8)	CH_3OCH_3	19(1,18)−18(2,17) AA	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Gro98
	339491.549*(6)	CH_3OCH_3	19(1,18)−18(2,17) EE	8.5[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Gro98
	339491.613*(4)	CH_3OCH_3	19(1,18)−18(2,17) AE+EA	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Gro98
	339493.281*(30)	CN	3−2 J=5/2−5/2 F=5/2−7/2	0.3	OriMC−1(ER)	JCMT 15 m	Sut95	
	339499.303*(30)	CN	3−2 J=5/2−5/2 F=7/2−5/2	0.3	OriMC−1(ER)	JCMT 15 m	Sut95	
	339510.854*(34)	$t-CH_3CH_2OH$	9(7,2)−9(6,3)	0.5[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339510.856*(34)	$t-CH_3CH_2OH$	9(7,3)−9(6,4)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339516.690*(30)	CN	3−2 J=5/2−5/2 F=7/2−7/2	2.4	OriMC−1(ER)	JCMT 15 m	Sut95	
	339544.224*(37)	$t-CH_3CH_2OH$	8(7,1)−8(6,2)	1.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339544.225*(37)	$t-CH_3CH_2OH$	8(7,2)−8(6,3)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339566.451*(41)	$t-CH_3CH_2OH$	7(7,*)−7(6,*)	0.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	339686.037*(30)	NH_2CHO	16(9,*)−15(9,*)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	339715.156*(25)	NH_2CHO	16(8,*)−15(8,*)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	339779.493*(22)	NH_2CHO	16(7,*)−15(7,*)	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	
	339857.266*(38)	^{34}SO	9(8)−8(7)	3.29	OriMC−1	NRAO 12 m	Jew89	
	339894.686*(20)	CH_3CH_2CN	39(2,38)−38(2,37)	2.7[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339902.430*(19)	NH_2CHO	16(6,11)−15(6,10)	0.60[b]	OriMC−1	NRAO 12 m	Jew89	
	339902.509*(19)	NH_2CHO	16(6,10)−15(6,9)	[b]	OriMC−1	NRAO 12 m	Jew89	
	339910.922*(43)	$Si^{33}S$	19−18 v=0	3.0[f]	IRC+10216	CSO 10.4 m	Gro94	
	339968.188*(19)	CH_3CH_2CN	38(2,36)−37(2,35)	3.7[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	339978.945*(26)	$t-CH_3CH_2OH$	9(4,6)−8(3,5)	2.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	339978.945*(26)	$t-CH_3CH_2OH$	9(4,6)−8(3,5)	2.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	339992.258*(50)	CN	3−2 J=5/2−3/2 F=3/2−5/2	2.23[b]	W3(H2O)	JCMT 15 m	Hel97	
	340008.097 (50)	CN	3−2 J=5/2−3/2 F=5/2−5/2	n.r.	Sgr B2(M)	CSO 10.4 m	Sut91	Ska83
	340019.605 (50)	CN	3−2 J=5/2−3/2 F=3/2−3/2	n.r.	Sgr B2(M)	CSO 10.4 m	Sut91	Ska83
	340031.567*(40)	CN	3−2 J=5/2−3/2 F=7/2−5/2	1.6[b]	OriMC−1	MMWO 4.9 m	Lor85	Ska83
	340035.281*(50)	CN	3−2 J=5/2−3/2 F=3/2−1/2	[b]	OriMC−1	MMWO 4.9 m	Lor85	Ska83
	340035.525*(50)	CN	3−2 J=5/2−3/2 F=5/2−3/2	[b]	OriMC−1	MMWO 4.9 m	Lor85	Ska83
	340047.924*(7)	CH_2CHCN	36(1,35)−35(1,34)	1.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	340052.600*(18)	$C^{33}S$	7−6	0.38	IRAS16293−2422	CSO 10.4 m	Bla94	
	340058.548*(8)	CH_2CHCN	31(2,30)−30(1,29)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
U	340114.7	unidentified		2.2	OriMC−1(CR)	JCMT 15 m	Sut95	
	340133.036*(17)	NH_2CHO	16(5,12)−15(5,11)	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	
	340137.638*(17)	NH_2CHO	16(5,11)−15(5,10)	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	
	340141.288*(17)	CH_3OH	2(2,0_−3(1,3) A+	1.47	OriMC−1	NRAO 12 m	Jew89	Xu_97
	340149.089*(20)	CH_3CH_2CN	39(1,38)−38(1,37)	3.9[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	340151.218*(21)	CH_3CH_2CN	35(3,33)−34(2,32)	0.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	340189.267*(26)	$t-CH_3CH_2OH$	6(5,2)−5(4,1)	7.1[bf]	Sgr B2(M)	CSO 10.4 m	Sut91	
	340189.420*(26)	$t-CH_3CH_2OH$	6(5,1)−5(4,2)	[b]	Sgr B2(M)	CSO 10.4 m	Sut91	
	340192.54* (29)	CH_2CO	17(1,17)−16(1,16)	7.1[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	340200.122*(9)	$HC^{15}N$	4−3	0.29	IRC+10216	JCMT 15 m	Ave94	
	340229.0*( )	HCOOH	15(3,12)−14(3,11)	1.7	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	340247.625*(50)	CN	3−2 J=7/2−5/2 F=7/2−5/2	3.1[b]	OriMC−1	MMWO 4.9 m	Lor85	Ska83
	340247.874*(50)	CN	3−2 J=7/2−5/2 F=9/2−7/2	[b]	OriMC−1	MMWO 4.9 m	Lor85	Ska83
	340248.573*(50)	CN	3−2 J=7/2−5/2 F=5/2−3/2	[b]	OriMC−1	MMWO 4.9 m	Lor85	Ska83
	340261.818 (50)	CN	3−2 J=7/2−7/2 F=5/2−5/2	n.r.	Sgr B2(M)	CSO 10.4 m	Sut91	Ska83
	340265.025 (50)	CN	3−2 J=7/2−7/2 F=7/2−7/2	n.r.	Sgr B2(M)	CSO 10.4 m	Sut91	Ska83
	340316.416*(18)	SO_2	28(2,26)−28(1,27)	1.07	OriMC−1	NRAO 12 m	Jew89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	340353.85* (25)	CH_2NH	3(1,3)−2(0,2)	n.r.	Sgr B2(M)	CSO 10.4 m	Sut91	
	340393.660*(40)	CH_3OH	16(6,10)−17(5,13) A++	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	340393.660*(40)	CH_3OH	16(6,11)−17(5,12) A−−	7.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	340398.042*(39)	CS	7−6 v=1	0.18	IRAS16293−2422	CSO 10.4 m	Bla94	
	340420.397*(26)	$t-CH_3CH_2OH$	9(4,5)−8(3,6)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	340432.606*(22)	CH_3CH_2CN	38(12,*)−37(12,*)	2.5	OriMC−1(CR)	JCMT 15 m	Sut95	
U	340436.9	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	340440.034*(22)	CH_3CH_2CN	38(11,*)−37(11,*)	2.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	340449.267*(5)	OCS	28−27	2.23	OriMC−1	NRAO 12 m	Jew89	
	340452.120*(23)	CH_3CH_2CN	38(13,*)−37(13,*)	1.8	OriMC−1(CR)	JCMT 15 m	Sut95	
U	340463.	unidentified		0.08	IRC+10216	NRAO 12 m	Hig00	
	340483.114*(21)	CH_3CH_2CN	38(10,*)−37(10,*)	2.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	340489.609*(16)	NH_2CHO	16(3,14)−15(3,13)	0.72	OriMC−1	NRAO 12 m	Jew89	
	340492.935*(23)	CH_3CH_2CN	38(14,*)−37(14,*)	2.7	OriMC−1(CR)	JCMT 15 m	Sut95	
	340534.378*(16)	NH_2CHO	16(4,13)−15(4,12)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	340534.544*(6)	CH_2CHCN	17(2,15)−16(1,16)	0.2[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	340551.252*(23)	CH_3CH_2CN	38(15,*)−37(15,*)	0.8	OriMC−1(CR)	JCMT 15 m	Sut95	
	340575.950*(21)	CH_3CH_2CN	38(9,*)−37(9,*)	2.5	OriMC−1(CR)	JCMT 15 m	Sut95	
	340609.234*(8)	CH_3OCH_3	10(3,7)−9(2,8) AE	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Gro98
	340609.311*(8)	CH_3OCH_3	10(3,7)−9(2,8) EA	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Gro98
	340612.609*(6)	CH_3OCH_3	10(3,7)−9(2,8) EE	0.79	OriMC−1	NRAO 12 m	Jew89	Gro98
	340615.944*(8)	CH_3OCH_3	10(3,7)−9(2,8) AA	0.79	OriMC−1	NRAO 12 m	Jew89	Gro98
	340630.71* (60)	$HC^{18}O^+$	4−3	4.9[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	340683.989*(16)	CH_3OH	11(1,11)−10(0,10) E v_t =1	8.0	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
	340690.738*(16)	NH_2CHO	16(4,12)−15(4,11)	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	340714.350*(17)	SO	7(8)−6(7)	2.7	OriMC−1	MMWO 4.9 m	Lor85	
	340741.966*(17)	CH_3OCHO	28(5,24)−27(5,23) E	4.0	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	340742.711*(20)	CH_3CH_2CN	38(8,31)−37(8,30)	3.0[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	340743.063*(20)	CH_3CH_2CN	38(8,30)−37(8,29)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	340754.702*(17)	CH_3OCHO	28(5,24)−27(5,23) A	4.0	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	340838.645*(20)	^{33}SO	8(8)−7(7)	5.8	OriMC−1(CR)	JCMT 15 m	Sut95	
U	340843.	unidentified		0.91	OriMC−1	NRAO 12 m	Jew89	
U	340918.8	unidentified		1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	340972.693*(19)	CH_3CH_2CN	38(4,35)−37(4,34)	1.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	341025.581*(20)	CH_3CH_2CN	38(7,32)−37(7,31)	2.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	U341037.0	unidentified		2.3	OriMC−1(CR)	JCMT 15 m	Sut95	
	U341039.	unidentified		0.43	OriMC−1	NRAO 12 m	Jew89	
	341131.665*(50)	$^{13}CH_3OH$	13(1,12)−13(0,13) A−+	4.1	OriMC−1(CR)	JCMT 15 m	Sut95	Xu_97
U	341132.3	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
U	341173.3	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
U	341236.1	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	341242.607*(50)	HCO	11(0,11)−10(1,10)	0.5	G34.3+0.15	JCMT 15 m	Mac96	Bla84a
U	341252.	unidentified		0.06	IRC+10216	JCMT 15 m	Ave94	
	341254.961*(20)	CH_3CH_2CN	39(2,38)−38(1,37)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	341275.467*(16)	SO_2	21(8,14)−22(7,15)	11.9[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	341350.204*(25)	HCS^+	8−7	0.23	IRAS16293−2422	CSO 10.4 m	Bla94	
	341403.084*(34)	SO_2	40(4,36)−40(3,37)	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	341410.213*(20)	CH_3OCHO	29(3,26)−28(4,25) E	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	341415.641*(7)	CH_3OH	7(1,6)−6(1,5) A−	2.93	OriMC−1	NRAO 12 m	Jew89	Xu_97
	341421.312*(20)	CH_3OCHO	29(3,26)−28(4,25) A	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
U	341425.	unidentified		0.05	IRC+10216	JCMT 15 m	Ave94	
U	341467.1	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	341468.680*(19)	CH_3CH_2CN	38(6,33)−37(6,32)	1.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	341563.758*(7)	CH_2CHCN	36(3,34)−35(3,33)	1.4	OriMC−1(CR)	JCMT 15 m	Sut95	
	341603.214*(19)	CH_3CH_2CN	38(6,32)−37(6,31)	2.3	OriMC−1(CR)	JCMT 15 m	Sut95	
	341673.947*(46)	SO_2	36(5,31)−36(4,32)	12.5[f]	Sgr B2(M)	CSO 10.4 m	Sut91	
	341678.455*(30)	CH_3CH_2CN	40(0,40)−39(1,39)	1.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341682.468*(7)	CH_3CCH	20(3)−19(3)	1.5	OriMC−1(ER)	JCMT 15 m	Sut95	
	341703.758*(36)	CH_3CH_2CN	40(1,40)−39(1,39)	3.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	341710.690*(36)	CH_3CH_2CN	40(0,40)−39(0,39)	3.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341714.993*(7)	CH_3CCH	20(2)−19(2)	1.7	OriMC−1(ER)	JCMT 15 m	Sut95	
	341722.194*(20)	CH_3OCHO	29(4,26)−28(4,25) E	4.8	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	341732.276*(20)	CH_3OCHO	29(4,26)−28(4,25) A	2.5	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	341734.513*(7)	CH_3CCH	20(1)−19(1)	2.6	OriMC−1(ER)	JCMT 15 m	Sut95	
	341735.881*(36)	CH_3CH_2CN	40(1,40)−39(0,39)	0.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341741.021*(7)	CH_3CCH	20(0)−19(0)	2.8	OriMC−1(ER)	JCMT 15 m	Sut95	
	341852.665*(19)	CH_3CH_2CN	38(5,34)−37(5,33)	3.7[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341862.518*(29)	CH_3OCHO	27(5,23)−26(4,22) A	0.9	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	341870.166*(28)	CH_3OCHO	27(5,23)−26(4,22) E	1.3	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	341882.010*(8)	CH_2CHCN	36(8,28)−35(8,27)	1.6[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341882.012*(8)	CH_2CHCN	36(8,29)−35(8,28)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341894.224*(8)	CH_2CHCN	36(9,*)−35(9,*)	1.3	OriMC−1(CR)	JCMT 15 m	Sut95	
	341917.909*(20)	CH_3OCHO	29(3,26)−28(3,25) E	3.1	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	341924.241*(7)	CH_2CHCN	36(7,30)−35(7,29)	4.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341924.300*(7)	CH_2CHCN	36(7,29)−35(7,28)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341927.201*(18)	CH_3CH_2CN	20(4,16)−19(3,17)	0.3[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	341927.482*(20)	CH_3OCHO	29(3,26)−28(3,25) A	1.7	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	341944.154*(8)	CH_2CHCN	36(10,*)−35(10,*)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	342052.935*(7)	CH_2CHCN	36(6,31)−35(6,30)	1.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	342055.212*(7)	CH_2CHCN	36(6,30)−35(6,29)	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	
	342208.848*(12)	$^{34}SO_2$	5(3,3)−4(2,2)	17.1[f]	SgrB2(M)	CSO10.4 m	Sut91	
	342229.890*(20)	CH_3OCHO	29(4,26)−28(3,25) E	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342231.652*(18)	$^{34}SO_2$	20(1,19)−19(2,18)	10.3[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	342238.446*(20)	CH_3OCHO	29(4,26)−28(3,25) A	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
U	342288.7	unidentified		2.3	OriMC−1(CR)	JCMT 15 m	Sut95	
U	342290.6	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	342317.552*(7)	CH_2CHCN	36(5,32)−35(5,31)	2.2	OriMC−1(CR)	JCMT 15 m	Sut95	
	342332.016*(13)	$^{34}SO_2$	12(4,8)−12(3,9)	0.83	OriMC−1	NRAO 12 m	Jew89	
	342342.025*(20)	CH_3OCHO	30(2,28)−29(3,27) E	1.3	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342350.082*(21)	CH_3OCHO	30(2,28)−29(3,27) A	0.4	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342351.425*(20)	CH_3OCHO	30(3,28)−29(3,27) E	1.9	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342358.279*(20)	CH_3OCHO	30(2,28)−29(2,27) E	6.4[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342359.441*(21)	CH_3OCHO	30(3,28)−29(3,27) A	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342366.269*(21)	CH_3OCHO	30(2,28)−29(2,27) A	3.3	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342367.679*(20)	CH_3OCHO	30(3,28)−29(2,27) E	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342375.562*(7)	CH_2CHCN	36(5,31)−35(5,30)	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	
	342375.627*(21)	CH_3OCHO	30(3,28)−29(2,27) A	0.5	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342433.950*(30)	CH_3CH_2CN	40(2,38)−39(3,37)	0.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	342435.928*(39)	SO_2	23(3,21)−23(2,22) v_2 =1	0.48	OriMC−1	NRAO 12 m	Jew89	
	342504.35* (19)	SiO	8−7 v=2	3.1e	VYCMa	JCMT 15 m	Gra99	
	342506.772*(28)	CH_3OCHO	11(8,4)−10(7,4) E	2.3	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342511.025*(18)	NH_2CHO	18(3,16)−18(2,17)	1.6	OriMC−1(CR)	JCMT 15 m	Sut95	
	342521.2*( )	HCOOH	16(1,16)−15(1,15)	1.1	OriMC−1(CR)	JCMT 15 m	Sut95	Sut95
	342522.150*(21)	D_2CO	6(0,6)−5(0,5)	0.27	OriMC−1	NRAO 12 m	Tur90a	
	342525.278*(32)	CH_3OCHO	11(8,3)−10(7,3) E	2.0	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342572.398*(28)	CH_3OCHO	11(8,4)−10(7,3) A	3.1[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342572.412*(28)	CH_3OCHO	11(8,3)−10(7,4) A	[b]	OriMC−1(CR)	JCMT 15 m	Sut95	Oes99
	342585.469*(7)	CH_2CHCN	36(4,33)−35(4,32)	0.8	OriMC−1(CR)	JCMT 15 m	Sut95	
	342607.916*(6)	CH_3OCH_3	19(0,19)−18(1,18) AE+EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	342607.987*(6)	CH_3OCH_3	19(0,19)−18(1,18) EE	1.13[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	342608.058*(6)	CH_3OCH_3	19(0,19)−18(1,18) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	342651.908*(20)	CH_3CH_2CN	15(5,11)−14(4,10)	1.0	OriMC−1(CR)	JCMT 15 m	Sut95	
	342677.583*(20)	CH_3CH_2CN	15(5,10)−14(4,11)	1.3	OriMC−1(CR)	JCMT 15 m	Sut95	
	342692.894*(28)	CH_3OCHO	27(13,14)−27(12,15) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	342692.913*(28)	CH_3OCHO	27(13,15)−27(12,16) A	0.6[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	342729.781*(28)	CH_3OH	13(1,12)−13(0,13) A−+	4.83[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
U	342731.	unidentified		0.33	IRAS16293−2422	CSO 10.4 m	Bla94	
U	342754.0	unidentified		1.9	OriMC−1(CR)	JCMT 15 m	Sut95	
	342761.646*(26)	SO_2	34(3,31)−34(2,32)	6.7[f]	SgrB2(M)	CSO 10.4 m	Sut91	
U	342778.	unidentified		0.4	IRC+10216	JCMT 15 m	Ave94	
	342804.95*(25)	SiC_2	15(2,14)−14(2,13)	26.3[f]	IRC+10216	CSO 10.4 m	Gro94	
	342882.866*(16)	CS	7−6	9.65	OriMC−1	NRAO 12 m	Jew89	
	342944.55*(88)	H_2CS	10(0,10)−9(0,9)	0.22	IRAS16293−2422	CSO 10.4 m	Bla94	
	342980.64* (18)	^{29}SiO	8−7 v=0	0.18	IRAS16293−2422	CSO 10.4 m	Bla94	
U	343003.	unidentified		0.17	IRAS16293−2422	CSO 10.4 m	Bla94	
U	343058.	unidentified		0.20	IRAS16293−2422	CSO 10.4 m	Bla94	
	343083.099*(16)	NH_2CHO	16(3,13)−15(3,12)	1.01	OriMC−1	NRAO 12 m	Jew89	
	343086.847*(24)	^{33}SO	9(8)−8(7)	0.66	W3(IRS5)	JCMT 15 m	Hel97	
U	343087.	unidentified		0.18	IRAS16293−2422	CSO 10.4 m	Bla94	
	343101.001*(24)	SiS	19−18 v=1	5.1f	IRC+10216	CSO 10.4 m	Gro94	
U	343105.	unidentified		0.20	IRC+10216	JCMT 15 m	Ave94	
	343147.921*(24)	CH_3OCHO	31(1,30)−30(2,29) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343148.071*(24)	CH_3OCHO	31(2,30)−30(2,29) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343148.192*(24)	CH_3OCHO	31(1,30)−30(1,29) E	1.0[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343148.341*(24)	CH_3OCHO	31(2,30)−30(1,29) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343152.922*(25)	CH_3OCHO	31(1,30)−30(2,29) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	343153.070*(25)	CH_3OCHO	31(2,30)−30(2,29) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343153.191*(25)	CH_3OCHO	31(1,30)−30(1,29) A	0.9[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343153.340*(25)	CH_3OCHO	31(2,30)−30(1,29) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	343196.972*(17)	NH_2CHO	17(1,17)−16(1,16)	0.4	G34.3+0.15	JCMT 15 m	Mac96	
	343201.05* (55)	H_2CS	10(5,*)−9(5,*)	0.98	OriMC−1	NRAO 12 m	Jew89	
	343207.58* (63)	H_2CS	10(4,*)−9(4,*)	0.7	G34.3+0.15	JCMT 15 m	Mac96	
U	343313.6	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	343319.83* (81)	H_2CS	10(2,9)−9(2,8)	0.25	IRAS16293−2422	CSO 10.4 m	Bla94	
	343325.672*(16)	$H_2{}^{13}CO$	5(1,5)−4(1,4)	1.32	OriMC−1	NRAO 12 m	Jew89	
	343384.718*(49)	CH_2CO	17(3,15)−16(3,14)	0.5[b]	G34.3+0.15	JCMT 15 m	Mac96	
	343387.610*(53)	CH_2CO	17(3,14)−16(3,13)	[b]	G34.3+0.15	JCMT 15 m	Mac96	
	343407.73* (73)	H_2CS	10(3,8)−9(3,7)	0.15	IRAS16293−2422	CSO 10.4 m	Bla94	
	343411.9*(7)	H_2CS	10(3,7)−9(3,6)	0.83	W3(H2O)	JCMT 15 m	Hel97	
	343411.92* (73)	H_2CS	10(3,7)−9(3,6)	0.98	OriMC−1	NRAO 12 m	Jew89	
	343435.239*(20)	CH_3OCHO	28(4,24)−27(4,23) E	1.13	W3(H2O)	JCMT 15 m	Hel97	Oes99
	343443.930*(20)	CH_3OCHO	28(4,24)−27(4,23) A	0.95	OriMC−1	NRAO 12 m	Jew89	Oes99
	343693.913*(98)	CH_2CO	17(2,15)−16(2,14)	0.4	G34.3+0.15	JCMT 15 m	Mac96	
	343753.325*(8)	CH_3OCH_3	17(2,16)−16(1,15) AE+EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	343754.222*(6)	CH_3OCH_3	17(2,16)−16(1,15) EE	0.88[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	343755.118*(8)	CH_3OCH_3	17(2,16)−16(1,15) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	343758.015*(20)	CH_3OCHO	27(7,20)−26(7,19) A	[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	343810.89* (81)	H_2CS	10(2,8)−9(2,7)	0.68	OriMC−1	NRAO 12 m	Jew89	
	343851.130*(51)	^{34}SO	2(3)−2(1)	0.4	G34.3+0.15	JCMT 15 m	Mac96	Mul01
	343923.802*(24)	SO_2	24(2,22)−23(3,21) v_2 =1	3.3f	SgrB2(M)	CSO 10.4 m	Sut91	
	343983.267*(27)	$OC^{34}S$	29−28	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	344029.286*(28)	CH_3OCHO	32(1,32)−31(1,31) E	0.81[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	344029.287*(28)	CH_3OCHO	32(0,32)−31(0,31) E	[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	344029.580*(40)	CH_3OCHO	32(1,32)−31(1,31) A	[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	344029.581*(40)	CH_3OCHO	32(0,32)−31(0,31) A	[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	344109.132*(50)	CH_3OH	18(2,16)−17(3,14) E	0.9	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	344200.122*(9)	$HC^{15}N$	4−3	37.2f	SgrB2(M)	CSO 10.4 m	Sut91	
	344245.347*(11)	$^{34}SO_2$	10(4,6)−10(3,7)	0.94	OriMC−1	NRAO 12 m	Jew89	
U	344288.4	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	344310.792*(16)	SO	8(8)−7(7)	10.93	OriMC−1	NRAO 12 m	Jew89	
	344357.832*(6)	CH_3OCH_3	19(1,19)−18(0,18) AE+EA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	344357.944*(6)	CH_3OCH_3	19(1,19)−18(0,18) EE	1.30[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	344358.056*(6)	CH_3OCH_3	19(1,19)−18(0,18) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	344443.90* (10)	CH_3OH	19(1,19)−18(2,16) A++	0.7	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	344512.169*(8)	CH_3OCH_3	10(3,9)−10(2,8) EA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	344512.211*(8)	CH_3OCH_3	10(3,9)−10(2,8) AE	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	344515.377*(6)	CH_3OCH_3	10(3,9)−10(2,8) EE	0.6[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	344515.418*(20)	CH_3OCHO	28(16,*)−28(16,*) A	0.9[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	344518.563*(10)	CH_3OCH_3	10(3,9)−10(2,8) AA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	344541.313*(21)	CH_3OCHO	28(16,13)−27(16,12) E	0.94	W3(H2O)	JCMT 15 m	Hel97	Oes99
	344581.052*(21)	$^{34}SO_2$	19(1,19)−18(0,18)	0.60	OriMC−1	NRAO 12 m	Jew89	
	344807.918*(14)	$^{34}SO_2$	13(4,10)−13(3,11)	0.50	OriMC−1	NRAO 12 m	Jew89	
	344906.030*(34)	SiC_2	16(0,16)−15(0,15)	27.1[f]	IRC+10216	CSO 10.4 m	Gro94	
	344916.36*(17)	SiO	8−7 v=1	0.8	G34.3+0.15	JCMT 15 m	Mac96	
	344987.591*(18)	$^{34}SO_2$	15(4,12)−15(3,13)	0.60	OriMC−1	NRAO 12 m	Jew89	
	344998.162*(12)	$^{34}SO_2$	11(4,8)−11(3,9)	0.60	OriMC−1	NRAO 12 m	Jew89	
	345069.042*(20)	CH_3OCHO	28(14,14)−28(14,13) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	345128.186*(42)	CH_3OCH_3	35(2,33)−35(1,34) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	345128.186*(42)	CH_3OCH_3	35(2,33)−35(1,34) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	345130.999*(42)	CH_3OCH_3	35(2,33)−35(1,34) EE	0.27[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	345133.811*(42)	CH_3OCH_3	35(2,33)−35(1,34) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	345148.959*(10)	SO_2	5(5,1)−6(4,2)	7.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	345168.663*(10)	$^{34}SO_2$	8(4,4)−8(3,5)	8.7[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	345181.244*(17)	NH_2CHO	17(0,17)−16(0,16)	0.6	G34.3+0.15	JCMT 15 m	Mac96	
U	345203.4	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
U	345226.6	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	345238.735*(20)	$H^{13}CN$	4−3 v_2 =1, ℓ=1 c	6.0[f]	IRC+10216	CSO 10.4 m	Gro94	Pre93
	345285.620*(10)	$^{34}SO_2$	9(4,6)−9(3,7)	6.5[f]	SgrB2(M)	CSO 10.4 m	Sut91	
U	345291.6	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	345338.509*(12)	SO_2	13,(2,12)−12(1,11)	7.71[b]	OriMC−1	NRAO 12 m	Jew89	
	345339.771*(13)	$H^{13}CN$	4−3	[b]	OriMC−1	NRAO 12 m	Jew89	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	345449.068*(25)	SO_2	26(9,17)−27(8,20)	7.1[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	345461.052*(24)	CH_3OCHO	28(13,15)−27(13,14) E	0.4	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	345466.990*(20)	CH_3OCHO	28(13,*)−27(13,*) A	0.5	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	345486.661*(20)	CH_3OCHO	28(13,16)−27(13,15) E	0.19	W3(H2O)	JCMT 15 m	Hel97	Oes99
	345519.655*(10)	$^{34}SO_2$	7(4,4)−7(3,5)	6.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
U	345544.4	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	345553.090*(10)	$^{34}SO_2$	6(4,2)−6(3,3)	9.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	345609.022*(23)	HCCCN	38−37	1.95	OriMC−1	NRAO12 m	Jew89	
	345651.290*(11)	$^{34}SO_2$	5(4,2)−5(3,3)	35.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	345678.784*(11)	$^{34}SO_2$	4(4,0)−4(3,1)	35.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	345795.990*(1)	CO	3−2	70.00	OriMC−1	NRAO 12 m	Jew89	
	345903.965*(37)	CH_3OH	16(1,15)−15(2,14) A−	1.80	OriMC−1	NRAO 12 m	Jew89	Xu_97
	345919.191*(34)	CH_3OH	18(−3,16)−17(−4,14) E	1.1	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	345929.294*(23)	$^{34}SO_2$	17(4,14)−17(3,15)	6.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	346109.992*(68)	SiC_2	14(2,12)−13(2,11)	26.6[f]	IRC+10216	CSO 10.4 m	Gro94	
	346202.766*(21)	CH_3OH	5(4,2)−6(3,3) A−−	1.3	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	346204.318*(21)	CH_3OH	5(4,1)−6(3,4) A−−	1.3	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
U	346218.2	unidentified		1.1	G34.3+0.15	JCMT 15 m	Mac96	
	346220.137(6)	NS	$^2\Pi_{1/2}$ J=7/2−6/2 F=8/2−7/2 f	1.2[b]	G34.3+0.15	JCMT 15 m	Mac96	Lee95
	346365.300*(56)	SO_2	34(3,31)−34(2,32) v_2 =1	8.6[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	346379.186*(24)	SO_2	19(1,19)−18(0,18) v_2 =1	8.6[f]	SgrB2(M)	CSO 10.4 m	Sut91	
U	346508.7	unidentified		0.3	G34.3+0.15	JCMT 15 m	Mac96	
	346523.864*(13)	SO_2	16(4,12)−16(3,13)	8.73[b]	OriMC−1	NRAO 12 m	Jew89	
	346528.587*(20)	SO	9(8)−8(7)	[b]	OriMC−1	NRAO 12 m	Jew89	
	346591.783*(28)	SO_2	18(4,14)−18(3,15) v_2 =1	23.1[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	346599.97*(29)	CH_2CO	17(1,16)−16(1,15)	0.8	G34.3+0.15	JCMT 15 m	Mac96	
	346652.155*(14)	SO_2	19(1,19)−18(0,18)	4.82	OriMC−1	NRAO 12 m	Jew89	
	346674.998*(17)	CH_3OCHO	28(11,18)−27(11,17) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	346675.661*(17)	CH_3OCHO	28(11,17)−27(11,16) A	0.3[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
U	346686.2	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
	346725.172 (50)	HCO	4(0,4)−3(0,3)	0.7	G34.3+0.15	JCMT 15 m	Mac96	Bla84a
	346998.54* (40)	$H^{13}CO^+$	4−3	1.03	OriMC−1	NRAO 12 m	Jew89	
U	347191.	unidentified		0.72	OriMC−1	NRAO 12 m	Jew89	
	347330.67*(18)	SiO	8−7 v=0	6.81	OriMC−1	NRAO 12 m	Jew89	
	347443.1	CH_3OH	19(3)−19(2) E v_t =2	0.37[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	347740.011 (20)	SO^+	$^2\Pi_{1/2}$ J=15/2−13/2 e	0.51	W3(IRS5)	JCMT 15 m	Hel97	Ama91
	347991.839*(17)	SO_2	13(2,12)−12(1,11) v_2 =1	19.9[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	348100.194*(30)	CH_3OH	11(0,11)−10(1,9)E	0.4	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	348117.481*(28)	$^{34}SO_2$	19(4,16)−19(3,17)	1.32	OriMC−1	NRAO 12 m	Jew89	
U	348202.6	unidentified		0.3	G34.3+0.15	JCMT 15 m	Mac96	
	348262.00* (22)	HCOOD	16(8,8)−15(8,7)	0.5	G34.3+0.15	JCMT 15 m	Mac96	Wil80
U	348269.	unidentified		0.97	OriMC−1	NRAO 12 m	Jew89	
U	348330.5	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	348340.49* (10)	$HN^{13}C$	4−3	33.9[f]	SgrB2(M)	CSO10.4 m	Sut91	
	348387.835*(13)	SO_2	24(2,22)−23(3,21)	4.13	OriMC−1	NRAO 12 m	Jew89	
	348518.39* (14)	HNO	1(1,1)−2(0,2)	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	348532.18* (86)	H_2CS	10(1,9)−9(1,8)	3.38	OriMC−1	NRAO 12 m	Jew89	
	348637.059*(8)	CH_2CHCN	38(1,38)−37(1,37)	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	348909.527*(20)	CH_3OCHO	28(9,20)−27(9,19) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	348911.426*(15)	CH_3CN	19(9)−18(9)	1.50	OriMC−1	NRAO 12 m	Jew89	
	348915.019*(16)	CH_3OCHO	28(9,20)−27(9,19) A	0.7[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	349024.995*(12)	CH_3CN	19(8)−18(8)	1.03	OriMC−1	NRAO 12 m	Jew89	
	349106.954*(31)	CH_3OH	14(1,13)−14(0,14) A−+	3.52[b]	OriMC−1	NRAO 12 m	Jew89	Xu_97
	349125.310*(9)	CH_3CN	19(7)−18(7)	0.5	G34.3+0.15	JCMT 15 m	Mac96	
	349212.331*(7)	CH_3CN	19(6)−18(6)	0.71	OriMC−1	NRAO 12 m	Jew89	
	349286.022*(5)	CH_3CN	19(5)−18(5)	0.79	OriMC−1	NRAO 12 m	Jew89	
	349337.741*(13)	C_2H	4−3 J=9/2−7/2 F=5−4	1.2[b]	M17	MMWO 4.9 m	Lor85	Mul00
	349339.067*(16)	C_2H	4−3 J=9/2−7/2 F=4−3	[b]	M17	MMWO 4.9 m	Lor85	Mul00
	349346.356*(5)	CH_3CN	19(4)−18(4)	1.27	OriMC−1	NRAO 12 m	Jew89	
	349393.307*(5)	CH_3CN	19(3)−18(3)	3.38[b]	OriMC−1	NRAO 12 m	Jew89	
	349399.342*(14)	C_2H	4−3 J=7/2−5/2 F=4−3	1.0[b]	M17	MMWO 4.9 m	Lor85	Mul00
	349400.692*(14)	C_2H	4−3 J=7/2−5/2 F=3−2	[b]	M17	MMWO 4.9 m	Lor85	Mul00
	349426.856*(5)	CH_3CN	19(2)−18(2)	1.50	OriMC−1	NRAO 12 m	Jew89	
	349446.992*(5)	CH_3CN	19(1)−18(1)	2.10[b]	OriMC−1	NRAO 12 m	Jew89	
	349453.704*(5)	CH_3CN	19(0)−18(0)	[b]	OriMC−1	NRAO 12 m	Jew89	
	349783.325*(45)	SO_2	46(5,41)−46(4,42)	0.25	W3(IRS5)	JCMT 15 m	Hel97	
	349802.991*(10)	CH_3OCH_3	10(1,10)−11(2,9) EA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	349802.993*(10)	CH_3OCH_3	10(1,10)−11(2,9) AE	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	349806.165*(6)	CH_3OCH_3	10(1,10)−11(2,9) EE	0.7[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	349809.338*(12)	CH_3OCH_3	10(1,10)−11(2,9) AA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
U	349891.2	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
U	349995.4	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	350035.613*(69)	^{30}SiS	20−19	8.4[f]	IRC+10216	CSO10.4m	Gro94	
	350103.084*(23)	$^{13}CH_3OH$	1(1,1)−0(0,0) A++	0.6	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
U	350149.	unidentified		0.78	OriMC−1	NRAO 12 m	Jew89	
U	350169.9	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	350280.0*	SiC_2	15(10,*)−14(10,*)	1.6[f]	IRC+10216	CSO10.4m	Gro94	Gro94
U	350286.9	unidentified		1.1	G34.3+0.15	JCMT 15 m	Mac96	
	350333.34*(5)	HNCO	16(1,16)−15(1,15)	0.8	G34.3+0.15	JCMT 15 m	Mac96	JPL01
	350423.50*(5)	CH_3CN	18(−2)−17(−2) v_8 =1 ℓ=+1	1.02[b]	OriMC−1	NRAO 12 m	Jew89	Wlo88
	350423.50*(5)	CH_3CN	18(2)−17(2) v_8 =1 ℓ=−1	[b]	OriMC−1	NRAO 12 m	Jew89	Wlo88
	350449.53*(5)	CH_3CN	18(−1)−17(−1) v_8 =1 ℓ=+1	1.27	OriMC−1	NRAO 12 m	Jew89	Wlo88
U	350515.	unidentified		0.95	OriMC−1	NRAO 12 m	Jew89	
	350552.23*(5)	CH_3CN	18(2)−17(2) v_8 =1 ℓ=+1	1.25	OriMC−1	NRAO 12 m	Jew89	Wlo88
	350687.651*(15)	CH_3OH	4(0,4)−3(−1,3) E	5.12	OriMC−1	NRAO 12 m	Jew89	Xu_97
U	350804.4	unidentified		2.5	G34.3+0.15	JCMT 15 m	Mac96	
U	350847.1	unidentified		0.9	G34.3+0.15	JCMT 15 m	Mac96	
	350862.718*(12)	SO_2	10(6,4)−11(5,7)	2.10	OriMC−1	NRAO 12 m	Jew89	
	350905.070*(14)	CH_3OH	1(1,1)−0(0,0) A+	3.33	OriMC−1	NRAO 12 m	Jew89	Xu_97
	351015.853*(17)	CH_3OCHO	28(7,22)−27(7,21) A	0.6	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	351043.525(6)	NO	$^2\Pi_{1/2}$ J, F=7/2,9/2−5/2,7/2 f	0.20	Ori−bar$\Delta\alpha$=+20″	CSO 10.4 m	Hog95	
U	351047.	unidentified		1.98	OriMC−1	NRAO 12 m	Jew89	
	351051.524(6)	NO	$^2\Pi_{1/2}$ J, F=7/2,7/2−5/2,5/2 f	0.30[b]	Ori−bar$\Delta\alpha$=+20″	CSO 10.4 m	Hog95	
	351051.798(6)	NO	$^2\Pi_{1/2}$ J, F=7/2,5/2−5/2,3/2 f	[b]	Ori−bar$\Delta\alpha$=+20″	CSO 10.4 m	Hog95	
	351236.343*(28)	CH_3OH	9(5,5)−10(4,6) E	1.2	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	351257.205*(10)	SO_2	5(3,3)−4(2,2)	7.52	OriMC−1	NRAO 12 m	Jew89	
	351289.99* (10)	SO_2	36(5,31)−36(4,32) v_2 =1	15.0[f]	SgrB2(M)	CSO 10.4 m	Sut91	
U	351420.1	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	351454.24*(66)	CH_2NH	10(1,9)−10(0,10)	7.6[f]	SgrB2(M)	CSO 10.4 m	Sut91	
	351464.979*(39)	OCS	29−28	0.7	G34.3+0.15	JCMT 15 m	Mac96	
U	351539.4	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
U	351553.9	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	351633.4*(5)	HNCO	16(0,16)−15(0,15)	2.77	OriMC−1	NRAO 12 m	Jew89	
	351768.636*(16)	H_2CO	5(1,5)−4(1,4)	11.31	OriMC−1	NRAO 12 m	Jew89	
U	351822.7	unidentified		0.3	G34.3+0.15	JCMT 15 m	Mac96	
	351873.861*(11)	SO_2	14(4,10)−14(3,11)	6.67	OriMC−1	NRAO 12 m	Jew89	
	351917.665*(54)	$t-CH_3CH_2OH$	25(3,22)−24(4,21)	0.3	G34.3+0.15	JCMT 15 m	Mil95	
	351965.98* (24)	$c-C_3H_2$	9(1,8)−8(2,7)	4.0[bf]	SgrB2(M)	CSO 10.4 m	Sut91	
	351965.99*(24)	$c-C_3H_2$	9(2,8)−8(1,7)	[b]	Sgr B2(M)	CSO 10.4 m	Sut91	
	352005.764*(50)	HCN	4−3 v_1 =1	2.6[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
U	352041.	unidentified		1.37	OriMC−1	NRAO 12 m	Jew89	
	352082.906*(34)	$^{34}SO_2$	21(4,18)−21(3,19)	1.46	OriMC−1	NRAO 12 m	Jew89	
	352087.918*(7)	HCN	4−3 v_3 =1	6.8[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
U	352277.8	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	352292.578*(20)	CH_3OCHO	30(4,27)−29(4,26) A	1.17	OriMC−1	NRAO 12 m	Jew89	Oes99
U	352405.2	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
	352436.554*(91)	SiC_2	15(8,8)−14(8,7)	9.1[bf]	IRC+10216	CSO 10.4 m	Gro94	
	352436.558*(91)	SiC_2	15(8,7)−14(8,6)	[b]	IRC+10216	CSO 10.4 m	Gro94	
U	352505.	unidentified		1.00	OriMC−1	NRAO 12 m	Jew89	
	352599.562*(5)	OCS	29−28	2.99	OriMC−1	NRAO 12 m	Jew89	
U	352903.	unidentified		1.20	OriMC−1	NRAO 12 m	Jew89	
	352925.620*(21)	CH_3OCHO	31(3,29)−30(3,28) A	0.97[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	352929.594*(21)	CH_3OCHO	31(2,29)−30(2,28) A	[b]	OriMC−1	NRAO 12 m	Jew89	Oes99
	352973.886*(82)	$Si^{34}S$	20−19	17.2[f]	IRC+10216	CSO 10.4 m	Gro94	
U	353660.	unidentified		0.05	IRC+10216	JCMT 15 m	Ave94	
U	353695.	unidentified		0.06	IRC+10216	JCMT 15 m	Ave94	
	353728.575*(29)	CH_3OCHO	32(2,31)−31(2,30) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	353728.642*(29)	CH_3OCHO	32(1,31)−31(1,30) A	0.7[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	353741.26(10)	CO^+	3/2,2−1/2,1	0.1	M17SW	CSO 10.4 m	Lat93	Sas81b
	353808.398*(50)	HCN	4−3(0,1,1) ℓ=1 f	0.11	IRC+10216	JCMT 15 m	Ave94	Mak02
	353811.876*(13)	$H_2{}^{13}CO$	5(0,5)−4(0,4)	0.58	OriMC−1	NRAO 12 m	Jew89	
	353820.616*(54)	HCN	4−3(1,1,0) ℓ=1 f	0.08[b]	IRC+10216	JCMT 15 m	Ave94	Mak02
	353822.504*(50)	HCN	4−3(0,2,1) ℓ=0	[b]	IRC+10216	JCMT 15 m	Ave94	Mak02
	353904.226*(50)	HCN	4−3(0,2,1) ℓ=0	0.04	IRC+10216	JCMT 15 m	Ave94	Mak02

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	354014.254*(88)	CO^+	7/2,3−5/2,2	0.18	Ori−bar$\Delta\alpha$=+20″	CSO 10.4 m	Hog95	
U	354122.4	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	354460.433*(13)	HCN	4−3 v_2 =1 ℓ=1 e	62.5[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
U	354496.8	unidentified		2.0	G34.3+0.15	JCMT 15 m	Mac96	
	354505.480*(4)	HCN	4−3	17.40	OriMC−1	NRAO 12 m	Jew89	Mak02
U	354546.5	unidentified		0.3	G34.3+0.15	JCMT 15 m	Mac96	
U	354576.8	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	354607.765*(29)	CH_3OCHO	33(1,33)−32(1,32) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	354607.766*(29)	CH_3OCHO	33(0,33)−32(0,32) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	354607.996*(42)	CH_3OCHO	33(0,33)−32(0,32) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	354607.996*(42)	CH_3OCHO	33(1,33)−32(1,32) A	0.8[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
U	354610.	unidentified		1.5	Sgr B2(N)	CSO 10.4 m	Lis91	
	354697.462*(24)	HCCCN	39−38	2.0	Sgr B2(N)	CSO 10.4 m	Lis91	
	354789.526*(48)	SiC_2	15(6,10)−14(6,9)	9.5[bf]	IRC+10216	CSO 10.4 m	Gro94	
	354798.371*(54)	SiC_2	15(6,9)−14(6,8)	[b]	IRC+10216	CSO 10.4 m	Gro94	
	354799.992*(22)	SO_2	16(4,12)−16(3,13) v_2 =1	4.3[f]	SgrB2(M)	CSO 10.4 m	Sut91	
U	354845.0	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	354898.657*(33)	$H_2{}^{13}CO$	5(2,4)−4(2,3)	0.97[b]	W3(IRS5)	JCMT 15 m	Hel97	
	355041.900*(47)	$H_2{}^{13}CO$	12(1,11)−12(1,12)	2.29[b]	W3(IRS5)	JCMT 15 m	Hel97	
	355045.506*(9)	SO_2	12(4,8)−12(3,9)	7.73	OriMC−1	NRAO 12 m	Jew89	
	355154.951*(42)	SO_2	32(2,30)−33(1,33)	0.3	G34.3+0.15	JCMT 15 m	Mac96	
	355186.463*(18)	SO_2	17(4,14)−18(1,17)	0.4	G34.3+0.15	JCMT 15 m	Mac96	
	355190.95* (11)	$H_2{}^{13}CO$	5(3,3)−4(3,2)	2.22[b]	OriMC−1	NRAO 12 m	Jew89	
	355202.66* (11)	$H_2{}^{13}CO$	5(3,2)−4(3,1)	[b]	OriMC−1	NRAO 12 m	Jew89	
U	355278.2	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	355439.87*(20)	$H^{15}NC$	1−0	1.39	W3(H2O)	JCMT 15 m	Hel97	
U	355571.	unidentified		1.08	OriMC−1	NRAO 12 m	Jew89	
	355571.120*(82)	$S^{18}O$	8(9)−7(8)	0.24	W3(IRS5)	JCMT 15 m	Hel97	
	355603.110*(26)	CH_3OH	13(0,13)−12(1,12) A++	1.5	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
U	355759.	unidentified		0.90	OriMC−1	NRAO 12 m	Jew89	
	355921.70* (42)	$^{34}SO_2$	34(11,24)−34(10,25)	[b]	W3(IRS5)	JCMT 15 m	Hel97	
	355921.72* (42)	$^{34}SO_2$	34(11,23)−34(10,26)	0.52[b]	W3(IRS5)	JCMT 15 m	Hel97	
	355965.98* (30)	CH_3OH	16(3,14)−16(2,15) E v_t =1	0.4	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
U	355990.6	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	356007.152*(37)	CH_3OH	15(1,14)−15(0,15) A++	2.1	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
U	356009.	unidentified		3.80	OriMC−1	NRAO 12 m	Jew89	
	356040.573*(14)	SO_2	15(7,9)−16(6,10)	1.26	OriMC−1	NRAO 12 m	Jew89	
	356135.347*(5)	HCN	4−3 v_2 =2 ℓ=2 f	5.2[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
	356162.751*(5)	HCN	4−3 v_2 =2 ℓ=2 e	6.3[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
	356222.390*(39)	$^{34}SO_2$	25(3,23)−25(2,24)	0.24	W3(IRS5)	JCMT 15 m	Hel97	
	356242.386*(38)	^{29}SiS	20−19	20.[f]	IRC+10216	CSO 10.4 m	Gro94	
	356255.566*(13)	HCN	4−3 v_2 =1 ℓ=1 f	72.[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
U	356261.	unidentified		2.33	OriMC−1	NRAO 12 m	Jew89	
U	356293.6	unidentified		0.4	G34.3+0.15	JCMT 15 m	Mac96	
	356301.176*(6)	HCN	4−3 v_2 =2 ℓ=0	9.4[f]	IRC+10216	CSO 10.4 m	Gro94	Mak02
U	356400.8	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	356575.247*(10)	CH_3OCH_3	8(4,5)−7(3,4) AE	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	356576.016*(10)	CH_3OCH_3	8(4,5)−7(3,4) EE	0.7[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
U	356577.7	unidentified		0.7	G34.3+0.15	JCMT 15 m	Mac96	
	356582.855*(10)	CH_3OCH_3	8(4,5)−7(3,4) AA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	356586.756*(12)	CH_3OCH_3	8(4,4)−7(3,4) EE	0.7[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	356586.896*(20)	CH_3OCH_3	8(4,4)−7(3,4) EA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
U	356723.	unidentified		0.025	IRC+10216	JCMT 15 m	Ave94	
	356734.242*(75)	HCO^+	4−3	17.40	OriMC−1	NRAO12 m	Jew89	
	356755.179*(9)	SO_2	10(4,6)−10(3,7)	0.42	IRAS16293−2422	CSO 10.4 m	Bla94	
	356755.179*(9)	SO_2	10(4,6)−10(3,7)	0.80	W3(IRS5)	JCMT 15 m	Hel97	
	356839.549*(8)	HCN	4−3 (0,3,0) ℓ=3 e	0.10	IRC+10216	JCMT 15 m	Ave94	Mak02
	357067.465*(22)	$t-CH_3CH_2OH$	10(4,7)−9(3,6)	0.5	G34.3+0.15	JCMT 15 m	Mil95	
	357102.195*(22)	$^{34}SO_2$	20(0,20)−19(1,19)	0.61	W3(IRS5)	JCMT 15 m	Hel97	
	357165.379*(10)	SO_2	13(4,10)−13(3,11)	3.46	OriMC−1	NRAO 12 m	Jew89	
U	357215.6	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
	357241.180*(12)	SO_2	15(4,12)−15(3,13)	3.21	OriMC−1	NRAO 12 m	Jew89	
	357387.569*(9)	SO_2	11(4,8)−11(3,9)	3.21	OriMC−1	NRAO 12 m	Jew89	
	357459.417*(8)	CH_3OCH_3	18(2,17)−17(1,16) AE+EA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	357460.174*(6)	CH_3OCH_3	18(2,17)−17(1,16) EE	0.8[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98
	357460.930*(8)	CH_3OCH_3	18(2,17)−17(1,16) AA	[b]	G34.3+0.15	JCMT 15 m	Mac96	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	357473.425*(68)	SiC_2	15(4,12)−14(4,11)	16.6[f]	IRC+10216	CSO10.4m	Gro94	
	357548.131*(25)	CH_3OCHO	29(14,15)−28(14,14) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	357549.768*(20)	CH_3OCHO	29(14,15)−28(14,14) A	0.5[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	357549.768*(20)	CH_3OCHO	29(14,16)−28(14,15) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	357581.439*(8)	SO_2	8(4,4)−8(3,5)	0.6	G34.3+0.15	JCMT 15 m	Mac96	
	357657.980*(19)	$^{13}CH_3OH$	7(2,5)−6(1,5) E	0.7	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	357671.810*(8)	SO_2	9(4,6)−9(3,7)	2.75	OriMC−1	NRAO 12 m	Jew89	
	357681.234*(29)	$t-CH_3CH_2OH$	7(5,3)−6(4,2)	[b]	G34.3+0.15	JCMT 15 m	Mil95	
	357682.001*(29)	$t-CH_3CH_2OH$	7(5,2)−6(4,3)	0.6[b]	G34.3+0.15	JCMT 15 m	Mil95	
	357892.433*(9)	SO_2	7(4,4)−7(3,5)	3.13	OriMC−1	NRAO 12 m	Jew89	
	357925.838*(9)	SO_2	6(4,2)−6(3,3)	2.18	OriMC−1	NRAO 12 m	Jew89	
	357962.891*(14)	SO_2	17(4,14)−17(3,15)	1.83	OriMC−1	NRAO 12 m	Jew89	
	357995.05* (23)	CH_3OH	15(3,13)−15(2,14) E v_t =1	[b]	G34.3+0.15	JCMT 15 m	Mac96	Xu_97
	357995.604*(20)	CH_3OCHO	29(13,17)−29(13,16) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	357995.607*(20)	CH_3OCHO	29(13,16)−29(13,15) A	1.2[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	357995.677*(21)	CH_3OCHO	28(5,23)−27(5,22) E	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	358013.144*(9)	SO_2	5(4,2)−5(3,3)	2.35	OriMC−1	NRAO 12 m	Jew89	
	358037.878*(9)	SO_2	4(4,0)−4(3,1)	0.7	G34.3+0.15	JCMT 15 m	Mac96	
	358215.625*(15)	SO_2	20(0,20)−19(1,19)	2.50	OriMC−1	NRAO 12 m	Jew89	
	358347.336*(40)	$^{34}SO_2$	23(4,20)−22323221	0.25	W3(IRS5)	JCMT 15 m	Hel97	
	358364.221*(20)	CH_3OCHO	28(7,21)−27(7,20) E	0.17	W3(H2O)	JCMT 15 m	Hel97	Oes99
	358392.411*(20)	CH_3OCHO	28(7,21)−27(7,20) A	0.14	W3(H2O)	JCMT 15 m	Hel97	Oes99
	358414.688*(32)	CH_3OH	10(6,5)−11(5,7) E	0.49	W3(H2O)	JCMT 15 m	Hel97	Xu_97
U	358453.2	unidentified		1.5	G34.3+0.15	JCMT 15 m	Mac96	
	358576.600*(17)	CH_3OCHO	29(12,18)−29(12,17) A	[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	358576.669*(17)	CH_3OCHO	29(12,17)−29(12,16) A	1.1[b]	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	358605.870*(9)	CH_3OH	4(1,3)−3(0,3) E	3.18	OriMC−1	NRAO 12 m	Jew89	Xu_97
	358645.723*(20)	$S^{18}O$	9(9)−8(8)	0.21	W3(IRS5)	JCMT 15 m	Hel97	
U	358728.5	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	358756.497*(8)	CH_3CCH	21(3)−20(3)	0.20	W3(H2O)	JCMT 15 m	Hel97	
	358790.633*(8)	CH_3CCH	21(2)−20(2)	0.15	W3(H2O)	JCMT 15 m	Hel97	
	358811.119*(8)	CH_3CCH	21(1)−20(1)	[b]	W3(H2O)	JCMT 15 m	Hel97	
U	358816.3	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
	358817.949*(8)	CH_3CCH	21(0)−20(0)	0.29[b]	W3(H2O)	JCMT 15 m	Hel97	
	358987.965*(22)	$^{34}SO_2$	15(2,14)−14(1,13)	0.14	W3(IRS5)	JCMT 15 m	Hel97	
U	358990.3	unidentified		0.5	G34.3+0.15	JCMT 15 m	Mac96	
U	359004.8	unidentified		0.8	G34.3+0.15	JCMT 15 m	Mac96	
	359151.140*(23)	SO_2	25(3,23)−25(2,24)	2.21	OriMC−1	NRAO 12 m	Jew89	
	359384.584*(8)	CH_3OCH_3	12(3,10)−11(2,9) EE	0.63[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
	359387.637*(10)	CH_3OCH_3	12(3,10)−11(2,9) AA	[b]	OriMC−1	NRAO 12 m	Jew89	Gro98
U	359544.7	unidentified		0.6	G34.3+0.15	JCMT 15 m	Mac96	
U	359558.004*(17)	CH_3OCHO	29(6,24)−28(6,23) A	0.7	G34.3+0.15	JCMT 15 m	Mac96	Oes99
	359651.770*(22)	$^{34}SO_2$	24(2,22)−23(2,21)	0.30	W3(IRS5)	JCMT 15 m	Hel97	
	359677.68* (18)	CH_3OH	14(3,12)−14(2,13) E v_t =1	4.80[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	359770.669*(17)	SO_2	19(4,16)−19(3,17)	3.04	OriMC−1	NRAO 12 m	Jew89	
	360169.830*(29)	DCO^+	5−4	0.22	W3(IRS5)	JCMT 15 m	Hel97	
	360290.386*(45)	SO_2	34(5,29)−34(4,30)	0.64	W3(IRS5)	JCMT 15 m	Hel97	
	360848.861*(20)	CH_3OH	11(0,11)−10(1,9) E	4.55[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	361236.467*(25)	CH_3OH	3(1,2)−4(2,3) A−−	n.r.	W3(IRS5)	JCMT 15 m	Hel94	Xu_97
U	361780.2	unidentified		0.5	OriMC−1	NRAO 12 m	Woo91	
U	361798.7	unidentified		0.5	OriMC−1	NRAO 12 m	Woo91	
	361835.144*(17)	CH_3OCHO	29(9,21)−28(9,20) E	1.0	OriMC−1	NRAO 12 m	Woo91	Oes99
	361852.279*(19)	CH_3OH	8(1,7)−7(2,5) E	7.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
	361852.279*(19)	CH_3OH	8(1,7)−7(2,5) E	17.0	OriMC−1	NRAO 12 m	Woo91	
	361863.466*(6)	CH_3OCH_3	20(1,20)−19(0,19) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	361863.466*(6)	CH_3OCH_3	20(1,20)−19(0,19) AE+EA	[b]	OriMC−1	CSO 10.4 m	Phi92	Gro98
	361863.466*(6)	CH_3OCH_3	20(1,20)−19(0,19) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	361863.566*(6)	CH_3OCH_3	20(1,20)−19(0,19) EE	0.41[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	361863.566*(6)	CH_3OCH_3	20(1,20)−19(0,19) EE	0.5[b]	OriMC−1	CSO 10.4 m	Phi92	Gro98
	361863.667*(6)	CH_3OCH_3	20(1,20)−19(0,19) AA	[b]	OriMC−1	CSO 10.4 m	Phi92	Gro98
	361863.667*(8)	CH_3OCH_3	20(1,20)−19(0,19) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	361871.020*(6)	CH_3OCH_3	11(3,8)−10(2,9) AE	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	361871.062*(6)	CH_3OCH_3	11(3,8)−10(2,9) EA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
	361874.319*(6)	CH_3OCH_3	11(3,8)−10(2,9) EE	1.22[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98
U	361874.6	unidentified		2.0	OriMC−1	NRAO 12 m	Woo91	
	361877.597*(8)	CH_3OCH_3	11(3,8)−10(2,9) AA	[b]	W3(H2O)	JCMT 15 m	Hel97	Gro98

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	361893.5	unidentified		0.5	OriMC−1	NRAO 12 m	Woo91	
U	361950.2	unidentified		1.0	OriMC−1	NRAO 12 m	Woo91	
	362045.759*(8)	DCN	5−4	10.0	OriMC−1	NRAO 12 m	Woo91	
	362096.725*(17)	CH_3OCHO	29(9,20)−28(9,19) E	2.0	OriMC−1	NRAO 12 m	Woo91	Oes99
U	362101.	unidentified		2.0	OriMC−1	CSO 10.4 m	Phi92	
	362110.620*(16)	CH_3OCHO	29(9,20)−28(9,19) A	2.0	OriMC−1	NRAO 12 m	Woo91	Oes99
	362149.60* (11)	CH_3OH	13(3,10)−12(2,11) E v_t =1	2.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
	362158.223*(13)	$^{34}SO_2$	6(3,3)−5(2,4)	0.31	W3(IRS5)	JCMT 15 m	Hel97	
U	362191.5	unidentified		1.0	OriMC−1	NRAO 12 m	Woo91	
U	362211.9	unidentified		1.5	OriMC−1	NRAO 12 m	Woo91	
	362221.777*(20)	CH_3OCHO	30(5,26)−29(5,25) A	1.5	OriMC−1	NRAO 12 m	Woo91	Oes99
	362630.327*(14)	HNC	4−3	3.0	OriMC−1	MMWO 4.9 m	Man90	
	362736.010*(16)	H_2CO	5(0,5)−4(0,4)	4.7	OriMC−1	MMWO 4.9 m	Man90	
	362834.170*(30)	$^{34}SO_2$	23(2,22)−23(1,23)	0.16	W3(IRS5)	JCMT 15 m	Hel97	
	363159.246*(21)	SO_2	21(4,18)−21(3,19)	2.36	W3(IRS5)	JCMT 15 m	Hel97	
	363890.884*(13)	SO_2	24(1,23)−24(0,24)	1.0	W3(IRS5)	JCMT 15 m	Hel94	
	363925.816*(14)	SO_2	23(2,22)−23(1,23)	1.0	W3(IRS5)	JCMT 15 m	Hel94	
	363945.869*(15)	H_2CO	5(2,4)−4(2,3)	9.94	OriMC−1	CSO 10.4 m	Man93	
	364103.229*(19)	H_2CO	5(4,2)−4(4,1)	2.10[b]	OriMC−1	CSO 10.4 m	Man93	
	364103.269*(19)	H_2CO	5(4,1)−4(4,0)	[b]	OriMC−1	CSO 10.4 m	Man93	
	364275.204*(15)	H_2CO	5(3,3)−4(3,2)	8.6	OriMC−1	CSO 10.4 m	Man93	
	364288.914*(15)	H_2CO	5(3,2)−4(3,1)	8.3	OriMC−1	CSO 10.4 m	Man93	
	364508.172*(47)	CH_3OH	8(3,6)−8(2,9) E v_t =1	0.41[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
U	364640.	unidentified		0.6	G34.3+15	CSO 10.4 m	Phi92	
U	364642.4	unidentified		2.0	OriMC−1	NRAO 12 m	Woo91	
U	364680.	unidentified		0.3	G34.3+15	CSO 10.4 m	Phi92	
U	364681.0	unidentified		3.5	OriMC−1	NRAO 12 m	Woo91	
	364746.206*(40)	CH_3OH	7(3,5)−7(2,6) E v_t =1	[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	364748.952*(5)	OCS	30−29	11.0	OriMC−1	NRAO 12 m	Woo91	
	364757.51* (17)	CH_3OH	12(6,7)−13(5,8) A++ v_t =1	0.86[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	364757.51* (17)	CH_3OH	12(6,7)−13(5,8) A−− v_t =1	[b]	W3(H2O)	JCMT 15 m	Hel97	Xu_97
	364797.43(10)	H_3O^+	3,2−2,2	0.5	OriMC−1	NRAO 12 m	Woo91	Bog85
U	364836.	unidentified		1.0	OriMC−1	CSO 10.4 m	Phi92	
U	364836.3	unidentified		2.0	OriMC−1	NRAO 12 m	Woo91	
U	364860.7	unidentified		1.0	OriMC−1	NRAO 12 m	Woo91	
	364898.282*(39)	CH_3OH	6(3,4)−6(2,5) E v_t =1	1.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
	364950.171*(27)	SO_2	25(9,17)−26(8,18)	0.43	W3(IRS5)	JCMT 15 m	Hel97	
U	364954.6	unidentified		1.5	OriMC−1	NRAO 12 m	Woo91	
	364986.766*(11)	CH_3OH	5(3,3)−5(2,4) E v_t =1	1.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
U	364990.4	unidentified		1.5	OriMC−1	NRAO 12 m	Woo91	
	365030.935*(50)	CH_3OH	4(3,2)−4(2,3) E v_t =1	1.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
U	365037.1	unidentified		1.0	OriMC−1	NRAO 12 m	Woo91	
	365046.901*(58)	CH_3OH	3(3,1)−3(2,2) E v_t =1	n.r.	OriMC−1	CSO 10.4 m	Phi92	Xu_97
	365363.410*(15)	H_2CO	5(2,3)−4(2,2)	0.055	IC443G	CSO 10.4 m	Tur91a	
	372421.34(20)	H_2D^+	1(1,0)−1(1,1)	0.08	N1333	JCMT 15 m	Sta99	Bog84b
	380197.372*(25)	H_2O	4(1,4)−3(2,1)	12.	OriMC−1	KAO 1 m	Phi80	
U	396162.	unidentified		0.3	G34.3+15	CSO 10.4 m	Phi92	
	396272.412 (60)	H_3O^+	3,0−2,0	1.8	OriMC−1	CSO 10.4 m	Phi92	Bog85
U	396358.	unidentified		9.0	OriMC−1	CSO 10.4 m	Phi92	
	396517.309*(23)	$^{13}CH_3OH$	2(1,2)−1(0,1) A++	5.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
	398946.209*(15)	CH_3OH	5(0,5)−4(−1,4) E	11.0	OriMC−1	CSO 10.4 m	Phi92	Xu_97
U	398989.	unidentified		0.15	IRAS16293−2422	CSO 10.4 m	Bla94	
	434120.31* (23)	SiO	10−9 v=0	1.40	RXBoo	HHT 10 m	Bie00	
	437346.67(20)	H_2O	7(5,3)−6(6,0)	340.[e]	UHer	CSO 10.4 m	Mel93	DeL74
	439150.812(50)	H_2O	6(4,3)−5(5,0)	280.[e]	UHer	CSO 10.4 m	Mel93	DeL74
	443952.93(12)	LiH	1−0	0.007	B0218+357	IRAM 30 m	Com98	Bel94
	457005.658*(24)	CH_3OH	11(2,9)−11(1,11) A+−	1.8	W3(OH)	JCMT 15 m	Hel96	Xu_97
	459487.007*(7)	CH_3CN	25(5)−25(5)	0.69	G34.26+0.15	HHT 10 m	Pan01	
	459566.153*(7)	CH_3CN	25(4)−25(4)	0.74	G34.26+0.15	HHT 10 m	Pan01	
	459627.724*(7)	CH_3CN	25(3)−25(3)	1.11	G34.26+0.15	HHT 10 m	Pan01	
	459671.755*(7)	CH_3CN	25(2)−25(2)	0.5[b]	G34.26+0.15	HHT 10 m	Pan01	
	459698.169*(8)	CH_3CN	25(1)−25(1)	0.57[b]	G34.26+0.15	HHT 10 m	Pan01	
	459706.974*(8)	CH_3CN	25(0)−25(0)	1.21[b]	G34.26+0.15	HHT 10 m	Pan01	
	461040.768*(1)	CO	4−3	60.	OriMC−1	KAO 1 m	Phi80	
	461182.45* (31)	HNCO	21(3,19)−20(3,18)	1.[b]	OriMC−1	HHT 10 m	Zin00	JPL01
	461182.51* (31)	HNCO	21(3,18)−20(3,17)	[b]	OriMC−1	HHT 10 m	Zin00	JPL01
	461336.93* (38)	HNCO	21(2,20)−20(2,19)	n.r.	OriMC−1	HHT 10 m	Zin00	JPL01
	461368.88* (35)	HNCO	21(2,19)−20(2,18)	3.	OriMC−1	HHT 10 m	Zin00	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	461392.564*(32)	NH_2	1(1,0)−1(0,1)3/2−1/21/2−1/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	461399.552*(30)	NH_2	1(1,0)−1(0,1)3/2−1/23/2−1/2	−1.5[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	461449.562*(34)	NH_2	1(1,0)−1(0,1)3/2−1/21/2−3/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	461450.67* (20)	HNCO	21(0,21)−20(0,20)	20.	OriMC−1	HHT 10 m	Zin00	JPL01
	461456.550*(29)	NH_2	1(1,0)−1(0,1)3/2−1/21/2−3/2	−2.0[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	461465.106*(29)	NH_2	1(1,0)−1(0,1)3/2−1/23/2−3/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	461755.942*(33)	SO	13(14)−13(13)	25.	OriMC−1	CSO 10.4 m	Sch91	COL01
	461882.08*(7)	HCOOH	11(4,7)−11(3,8)	2.0	OriMC−1	CSO 10.4 m	Sch91	JPL01
	461907.700*(9)	OCS	38−37	10.	OriMC−1	CSO 10.4 m	Sch91	
	461934.421*(3)	CH_2CHCN	10(0,10)−9(0,9)	2.0	OriMC−1	CSO 10.4 m	Sch91	JPL01
	462236.037*(15)	^{34}SO	10(11)−9(10)	20.[b]	OriMC−1	CSO 10.4 m	Sch91	COL01
	462241.656*(29)	CH_3OH	5(−5,0)−6(−4,3) E	20.[b]	OriMC−1	CSO 10.4 m	Sch91	Xu_97
	462424.981*(29)	NH_2	1(1,0)−1(0,1)3/2−3/23/2−5/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	462433.537*(23)	NH_2	1(1,0)−1(0,1)3/2−3/25/2−5/2	−9.0[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	462448.723*(28)	NH_2	1(1,0)−1(0,1)3/2−3/21/2−3/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	462455.711*(25)	NH_2	1(1,0)−1(0,1)3/2−3/23/2−3/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	462464.267*(31)	NH_2	1(1,0)−1(0,1)3/2−3/25/2−3/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	462467.171*(28)	NH_2	1(1,0)−1(0,1)3/2−3/21/2−1/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	462474.158*(27)	NH_2	1(1,0)−1(0,1)3/2−3/23/2−1/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	463011.403*(14)	SO_2	12(2,10)−11(1,11)	6.8	OriMC−1	CSO 10.4 m	Sch92	
	463119.( )	HNCO	21(1,20)−20(1,19)	8.4	OriMC−1	CSO 10.4 m	Sch92	Sch92
U	463198.	unidentified		−2.0	OriMC−1	CSO 10.4 m	Sch92	
	463326.224*(45)	SO_2	35(4,32)−35(3,33)	21.8	OriMC−1	CSO 10.4 m	Sch92	
	464834.670*(19)	CH_3OH	9(2,7)−9(1,8) A+−	30.	OriMC−1	CSO 10.4 m	Sch91	Xu_97
	464924.520 (32)	HDO	1(0,1)−0(0,0)	20.	OriMC−1	CSO 10.4 m	Sch91	DeL71
U	464960.5	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch91	
	466245.2(6)	NH_3	0(0)−1(0) v_2 =1	1.7	OriMC−1	CSO 10.4 m	Sch92	Urb81
U	466367.	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch92	
	469366.331*(34)	NH_2	1(1,0)−1(0,1)1/2−1/21/2−3/2	−3.0[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	469383.623*(34)	NH_2	1(1,0)−1(0,1)1/2−1/23/2−1/2	[b]	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	469440.621*(32)	NH_2	1(1,0)−1(0,1)1/2−1/23/2−3/2	−3.0	Sgr B2(M)	CSO 10.4 m	vDi93	COL01
	470888.95(19)	H_2O	6(4,2)−5(5,1)	69.e	UHer	CSO10.4 m	Mel93	DeL74
	477504.73*(25)	SiO	11−10	1.0	HH211	JCMT 15 m	Nis02	
	481915.883*(51)	$C^{34}S$	10−9	3.1	Sgr B2(N)	CSO 10.4 m	Hau93	
	489750.952*(37)	CS	10−9	11.7	Sgr B2(N)	CSO 10.4 m	Hau93	
	491968.367*(20)	H_2CO	7(1,7)−6(1,6)	1.51	Ori−barΔα=+20″	JCMT 15 m	Hog95	
	556936.002 (89)	H_2O	1(1,0)−1(0,1)	−3.7	OriMC−1	PIROG7 60c m	Tau96	DeL74
	572498.15(10)	NH_3	1(0)−0(0)	3.5	OriMC−1	KAO 1 m	Kee83	
	607175.1*(10)	$H^{13}CO^+$	7−6	2.9	OriMC−1	CSO10.4 m	Sch01	
	607215.814*(28)	CH_3OH	12(2,10)−11(1,10) E	3.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	607607.79* (30)	SiO	14−13v=0	10.6	OriMC−1	CSO 10.4 m	Sch01	
	608021.337* (6)	CH_3CH_2CN	24(9,15)−23(8,16)	5.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	608094.265*(72)	CH_3OCH_3	12(7,6)−11(6,5) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608096.853*(68)	CH_3OCH_3	12(7,6)−11(6,5) EE	5.8[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608098.248*(68)	CH_3OCH_3	12(7,6)−11(6,5) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608098.260*(68)	CH_3OCH_3	12(7,5)−11(6,6) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608099.434*(68)	CH_3OCH_3	12(7,6)−11(6,5) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608099.446*(68)	CH_3OCH_3	12(7,5)−11(6,6) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608100.841*(70)	CH_3OCH_3	12(7,5)−11(6,6) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	608102.243*(74)	CH_3OCH_3	12(7,5)−11(6,6) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
U	608269.3	unidentified		5.2	OriMC−1	CSO 10.4 m	Sch01	
U	609131.2	unidentified		2.1	OriMC−1	CSO 10.4 m	Sch01	
	609507.66* (20)	$HN^{13}C$	7−6	3.6	OriMC−1	CSO 10.4 m	Sch01	
	609558.445*(47)	SO_2	33(2,32)−32(1,31)	11.7	OriMC−1	CSO 10.4 m	Sch01	
	609960.050*(53)	SO	10(10)−10(9)	17.2	OriMC−1	CSO 10.4 m	Sch01	Mul01
	610692.70* (17)	$^{13}CH_3OH$	13(6,7)−12(6,6) A++ v_t =1	8.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	610721.9*(13)	$^{13}CH_3OH$	13(−12,2)−12(−12,1) E v_t =1	8.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	610844.451*(28)	CH_3OCH_3	20(3,17)−19(2,18) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	610844.452*(28)	CH_3OCH_3	20(3,17)−19(2,18) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	610847.489*(24)	CH_3OCH_3	20(3,17)−19(2,18) EE	5.8[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	610850.525*(32)	CH_3OCH_3	20(3,17)−19(2,18) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	610890.4*(10)	$^{13}CH_3OH$	13(−11,3)−12(−11,2) E v_t =1	4.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	611267.20(8)	C_2H	7−615/2,13/2−13/2,11/2	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	611267.20(8)	C_2H	7−615/2,15/2−13/2,13/2	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	611329.71(8)	C_2H	7−613/2,11/2−11/2,9/2	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	611329.71(8)	C_2H	7−613/2,13/2−11/2,11/2	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	611441.629 (70)	H_2S	5(3,2)−5(2,3)	13.2	OriMC−1	CSO 10.4 m	Sch01	JPL01
	611552.412*(30)	SO	4(5)−3(2)	3.7	OriMC−1	CSO 10.4 m	Sch01	Mul01
	611579.832*(55)	CH_3OH	18(2,17)−17(3,14) A−−	4.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	612124.206*(26)	$^{13}CH_3OH$	13(−1,13)−12(−1,12) E	2.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	612227.427*(5)	CH_3CH_2CN	35(7,28)−34(6,29)	5.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
	612285.51* (77)	CH_3OCH_3	30(11,19)−30(10,20) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612285.51* (77)	CH_3OCH_3	30(11,20)−30(10,21) AA	2.7[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612285.81* (77)	CH_3OCH_3	30(11,19)−30(10,20) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612286.11* (77)	CH_3OCH_3	30(11,19)−30(10,20) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612286.28* (77)	CH_3OCH_3	30(11,20)−30(10,21) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612286.58* (77)	CH_3OCH_3	30(11,19)−30(10,20) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612286.59* (77)	CH_3OCH_3	30(11,20)−30(10,21) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612287.06* (77)	CH_3OCH_3	30(11,20)−30(10,21) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	612442.747*(27)	SO_2	13(4,10)−12(3,9) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	612479.632*(24)	$^{13}CH_3OH$	13(0,13)−12(0,12) A++	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	612867.63* (31)	HNCO	28(1,28)−27(1,27)	2.6	OriMC−1	CSO 10.4 m	Sch01	JPL01
	612892.089*(88)	$^{13}CH_3OH$	13(7,6)−12(7,5) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	612892.089*(88)	$^{13}CH_3OH$	13(7,7)−12(7,6) A++	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	612933.657*(32)	$^{13}CH_3OH$	13(2,12)−12(2,11) A−−	1.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613076.211*(14)	SO_2	8(5,3)−7(4,4)	7.8	OriMC−1	CSO 10.4 m	Sch01	
	613303.946*(34)	$^{13}CH_3OH$	13(3,11)−12(3,10) A++	7.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613334.287*(44)	$^{13}CH_3OH$	13(4,10)−12(4,9) A−−	5.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613335.238*(44)	$^{13}CH_3OH$	13(4,9)−12(4,8) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613338.136*(30)	$^{34}SO_2$	14(4,10)−13(3,11)	5.1[b]	OriMC−1	CSO 10.4 m	Sch01	
	613351.033*(34)	$^{13}CH_3OH$	13(3,10)−12(3,9) A−−	4.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613522.469*(25)	$^{13}CH_3OH$	13(1,12)−12(1,11) E	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613611.908*(34)	$^{13}CH_3OH$	13(3,10)−12(3,9) E	2.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	613676.374*(48)	SO_2	41(3,39)−41(2,40)	2.6	OriMC−1	CSO 10.4 m	Sch01	
	613904.956*(23)	$^{13}CH_3OH$	4(−2,3)−3(−1,3) E	1.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	614018.969*(66)	CH_3OCHO	34(9,26)−33(8,25) A	4.0	OriMC−1	CSO 10.4 m	Sch01	Oes99
	614089.934*(25)	$^{13}CH_3OH$	13(2,11)−12(2,10) E	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	614113.666*(69)	SO_2	42(7,35)−42(6,36)	2.9	OriMC−1	CSO 10.4 m	Sch01	
	614361.002*(27)	$^{13}CH_3OH$	13(−2,12)−12(−2,11) E	3.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	614780.01* (39)	HNCO	28(3,26)−27(3,25)	2.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	614780.23* (39)	HNCO	28(3,25)−27(3,24)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	614976.38* (47)	HNCO	28(2,27)−27(2,26)	1.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
	615052.07* (43)	HNCO	28(2,26)−27(2,25)	2.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
	615098.94* (27)	HNCO	28(0,28)−27(0,27)	4.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
	615248.689*(5)	CH_3CH_2CN	30(8,23)−29(7,22)	2.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	615276.7	unidentified		6.1	OriMC−1	CSO 10.4 m	Sch01	
	615628.825*(50)	SO_2	12(9,3)−12(8,6)	1.7	OriMC−1	CSO 10.4 m	Sch01	
	615985.382*(19)	$^{34}SO_2$	9(5,5)−8(4,4)	4.3	OriMC−1	CSO 10.4 m	Sch01	
U	616226.3	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
	616322.23* (61)	CH_3OH	20(2,19)−19(3,17) E v_t =1	9.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	616347.430*(87)	SO_2	34(2,32)−33(3,31) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	616472.243*(48)	SO_2	29(3,27)−28(2,26)	5.6	OriMC−1	CSO 10.4 m	Sch01	
U	616603.6	unidentified		3.2	OriMC−1	CSO 10.4 m	Sch01	
	616638.96* (13)	$H_2{}^{13}CO$	9(1,9)−8(1,8)	2.7	OriMC−1	CSO 10.4 m	Sch01	
	616979.845*(15)	CH_3OH	4(−2,3)−3(−1,3) E	5.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	617097.1	unidentified		6.8	OriMC−1	CSO 10.4 m	Sch01	
U	617149.5	unidentified		7.0	OriMC−1	CSO 10.4 m	Sch01	
	617180.497*(43)	CH_3CH_2CN	72(2,71)−71(2,70)	2.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	617180.663*(43)	CH_3CH_2CN	72(1,71)−72(1,70)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	617234.380*(12)	CH_3CH_2CN	69(12,58)−68(12,57)	4.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	617234.439*(12)	CH_3CH_2CN	69(12,58)−68(12,57)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	617340.582*(6)	CH_3CH_2CN	43(6,38)−42(5,37)	8.0	OriMC−1	CSO 10.4 m	Sch01	JPL01
	617346.67* (30)	HNCO	28(1,27)−27(1,26)	3.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	617627.4*( )	CH_3OH	20(−7)−20(−6) E v_t =2	3.3	OriMC−1	CSO 10.4 m	Sch01	Sch01
	617919.038*(6)	CH_3CH_2CN	41(6,35)−40(5,36)	6.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
	618152.108*(43)	SO_2	34(2,32)−33(3,31)	2.4	OriMC−1	CSO 10.4 m	Sch01	
U	619157.0	unidentified		5.5	OriMC−1	CSO 10.4 m	Sch01	
	619251.217*(94)	SO_2	29(3,27)−28(2,26) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
U	619318.7	unidentified		11.7	OriMC−1	CSO 10.4 m	Sch01	
U	619365.2	unidentified		9.8	OriMC−1	CSO 10.4 m	Sch01	
	623071.654*(54)	CH_3OH	18(2,16)−17(3,15) A++	5.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	623145.8	unidentified		6.34	OriMC−1	CSO 10.4 m	Sch01	
	623193.27* (25)	CH_3OH	14(−7,8)−14(−6,9) E v_t =1	9.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	623262.2	unidentified		4.8	OriMC−1	CSO 10.4 m	Sch01	
U	623296.5	unidentified		11.7	OriMC−1	CSO 10.4 m	Sch01	
U	623316.9	unidentified		9.6	OriMC−1	CSO 10.4 m	Sch01	
U	623340.9	unidentified		17.3	OriMC−1	CSO 10.4 m	Sch01	
	623363.570*(21)	HCN	7−6 v_2 =1 ℓ=1 f	15.7	OriMC−1	CSO 10.4 m	Sch01	Mak02
U	623487.1	unidentified		10.4	OriMC−1	CSO 10.4 m	Sch01	
	623516.691*(17)	SO_2	8(5,3)−7(4,4) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
U	623570.7	unidentified		19.9	OriMC−1	CSO 10.4 m	Sch01	
U	623644.1	unidentified		13.4	OriMC−1	CSO 10.4 m	Sch01	
	623693.10* (23)	$^{34}SO_2$	46(3,43)−46(2,44)	10.3[b]	OriMC−1	CSO 10.4 m	Sch01	
	623737.869*(15)	CH_3OH	9(0,9)−8(1,8) E v_t =1	6.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	623779.824*(32)	CH_3CH_2CN	72(3,70)−71(3,69)	4.8	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	623848.6	unidentified		5.8	OriMC−1	CSO 10.4 m	Sch01	
	624024.403*(29)	CH_3OCHO	25(12,14)−24(11,14) E	2.4[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	624031.728*(28)	CH_3OCHO	25(12,14)−24(11,13) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	624031.768*(28)	CH_3OCHO	25(12,13)−24(11,14) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
U	624072.8	unidentified		4.7	OriMC−1	CSO 10.4 m	Sch01	
	624166.255*(22)	CH_3CN	34(8)−33(8)	8.0[b]	OriMC−1	CSO 10.4 m	Sch01	
	624208.46* (13)	HCO^+	7−6	14.3	OriMC−1	CSO10.4m	Sch01	
	624232.42*(11)	CH_3OH	21(1,20)−20(2,19) A− −	19.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	624263.6	unidentified		4.9	OriMC−1	CSO 10.4 m	Sch01	
	624344.136*(16)	CH_3CN	34(7)−33(7)	16.4[b]	OriMC−1	CSO 10.4 m	Sch01	
	624344.618*(79)	SO_2	35(1,35)−34(0,34)	16.4[b]	OriMC−1	CSO 10.4 m	Sch01	
U	624460.9	unidentified		8.5	OriMC−1	CSO 10.4 m	Sch01	
	624498.445*(12)	CH_3CN	34(6)−33(6)	9.7	OriMC−1	CSO 10.4 m	Sch01	
	624551.7*(5)	CH_3OCHO	54(5,49)−53(6,48) A	4.5[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	624551.9*(5)	CH_3OCHO	54(6,49)−53(6,48) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	624552.1*(5)	CH_3OCHO	54(5,49)−53(5,48) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	624552.4*(5)	CH_3OCHO	54(6,49)−53(5,48) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	624629.119*(11)	CH_3CN	34(5)−33(5)	16.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	624680.365*(58)	CH_3OCHO	16(16,0)−15(15,1) A	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	624680.365*(58)	CH_3OCHO	16(16,1)−15(15,0) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	624736.106*(11)	CH_3CN	34(4)−33(4)	9.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	624744.289*(26)	$^{13}CH_3OH$	3(2,2)−2(1,1) A− −	9.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	624778.0	unidentified		5.9	OriMC−1	CSO 10.4 m	Sch01	
	624819.363*(12)	CH_3CN	34(3)−33(3)	6.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	624838.0*( )	CH_3OH	13(1)−12(1) A++ v_t =2	6.7[b]	OriMC−1	CSO 10.4 m	Sch01	Sch01
	624878.856*(13)	CH_3CN	34(2)−33(2)	6.7	OriMC−1	CSO 10.4 m	Sch01	
	624887.539*(37)	SO_2	42(4,38)−41(5,37)	6.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	624914.561*(14)	CH_3CN	34(1)−33(1)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	624926.465*(14)	CH_3CN	34(0)−33(0)	16.9[b]	OriMC−1	CSO 10.4 m	Sch01	
	624932.124*(10)	CH_3OCH_3	16(6,11)−15(5,11) EE	16.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	624932.402*(18)	CH_3OCH_3	16(6,10)−15(5,11) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	624935.401*(24)	CH_3OCH_3	16(6,10)−15(5,11) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	624935.641*(20)	CH_3OCH_3	16(6,10)−15(5,11) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	624936.218*(22)	CH_3OCH_3	16(6,10)−15(5,11) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	624964.37(10)	$H^{37}Cl$	1−0 3/2−3/2	0.7	OriMC−1	CSO 10.4 m	Sal96	DeL71a
	624977.82(10)	$H^{37}Cl$	1−0 5/2−3/2	1.4	OriMC−1	CSO 10.4 m	Sal96	DeL71a
	624988.33(10)	$H^{37}Cl$	1−0 1/2−3/2	1.0	OriMC−1	CSO 10.4 m	Sal96	DeL71a
	625024.694*(7)	CH_3CH2CN	44(6,39)−43(5,38)	1.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	625063.4	unidentified		4.8	OriMC−1	CSO 10.4 m	Sch01	
	625072.8*( )	CH_3OH	13(9)−12(9) A++ v_t =2	6.0	OriMC−1	CSO 10.4 m	Sch01	Sch01
	625155.8*( )	CH_3OH	13(11)−12(11) E v_t =2	8.1	OriMC−1	CSO 10.4 m	Sch01	Sch01
	625207.6*( )	CH_3OH	13(−10)−12(−10) A++ v_t =2	5.7	OriMC−1	CSO 10.4 m	Sch01	Sch01
U	625335.0	unidentified		4.6	OriMC−1	CSO 10.4 m	Sch01	
	625352.52* (73)	CH_3OH	24(10,14)−25(9,17) A++	4.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	625352.52* (73)	CH_3OH	24(10,15)−25(9,16) A− −	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	625383.1*( )	CH_3OH	13(10)−12(10) A++ v_t =2	4.6	OriMC−1	CSO 10.4 m	Sch01	Sch01
	625434.0*( )	CH_3OH	13(−1)−12(−1) E v_t =2	2.2	OriMC−1	CSO 10.4 m	Sch01	Sch01
	625510.225*(58)	CH_3OH	13(8,5)−12(8,4) A++ v_t =1	5.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	625668.1	unidentified		4.9	OriMC−1	CSO 10.4 m	Sch01	
	625749.466*(9)	CH_3OH	13(0,13)−12(0,12) E	18.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	625782.413*(38)	CH_3OH	13(3,11)−12(3,10) E v_t =1	6.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	625901.60(10)	$H^{35}Cl$	1−0 3/2−3/2	4.5	OriMC−1	CSO 10.4 m	Sch95	DeL71a
	625918.76(10)	$H^{35}Cl$	1−0 5/2−3/2	6.5	OriMC−1	CSO 10.4 m	Sch95	DeL71a
	625932.01(10)	$H^{35}Cl$	1−0 1/2−3/2	6.0	OriMC−1	CSO 10.4 m	Sch95	DeL71a

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	625971.256*(18)	CH_3OH	13(1,13)−12(1,12) A++ v_t =1	5.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626007.723*(23)	$^{13}CH_3OH$	10(0,10)−9(−1,9) E	5.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626043.503*(34)	$^{34}SO_2$	15(4,12)−14(3,11)	21.1[b]	OriMC−1	CSO 10.4 m	Sch01	
	626087.297*(20)	SO_2	14(4,10)−13(3,11)	21.1[b]	OriMC−1	CSO 10.4 m	Sch01	
	626156.8*( )	CH_3OH	13(10)−12(10) E v_t =2	6.2	OriMC−1	CSO 10.4 m	Sch01	Sch01
	626185.892*(97)	CH_3OH	13(7,6)−12(7,5) E v_t =1	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626185.941*(32)	$^{34}SO_2$	25(12,14)−26(11,15)	5.4[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	626192.162*(31)	$^{34}SO_2$	20(11,9)−21(10,12)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	626351.502*(94)	$C^{34}S$	13−12	8.8	OriMC−1	CSO 10.4 m	Sch01	
	626381.697*(33)	CH_3OH	13(−8,6)−12(−8,5) E v_t =1	2.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626397.983*(40)	CH_3OH	13(−6,8)−12(−6,7) E v_t =1	4.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626452.169*(21)	CH_3OH	13(−2,11)−12(−2,10) E v_t =1	6.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626474.625 (70)	H_2S	7(6,1)−7(5,7)	13.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
	626476.517*(31)	CH_3OH	13(7,6)−12(7,5) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626476.517*(31)	CH_3OH	13(7,7)−12(7,6) A++ v_t =1	13.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626489.93* (10)	CH_3OH	21(−1,21)−20(2,18) E	8.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626511.037*(28)	CH_3OH	13(5,8)−12(5,7) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626511.037*(28)	CH_3OH	13(5,9)−12(5,8) A++ v_t =1	9.4[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626555.117*(45)	CH_3OH	17(0,17)−16(1,15) E v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626555.150*(20)	CH_3OH	13(4,10)−12(4,9) E v_t =1	13.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626608.113*(17)	CH_3OH	13(−3,10)−12(−3,9) E v_t =1	14.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626609.821*(17)	CH_3OH	13(2,11)−12(2,10) A++ v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626626.362*(18)	CH_3OH	3(2,2)−2(1,1) A−−	26.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626639.928*(18)	CH_3OH	13(0,13)−12(0,12) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626654.090*(17)	CH_3OH	13(1,13)−12(1,12) E v_t =1	18.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626673.583*(17)	CH_3OH	13(2,12)−12(2,11) A−− v_t =1	15.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	626724.8	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
	626865.178*(19)	CH_3OH	13(3,11)−12(3,10) A++ v_t =1	8.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626879.380*(41)	CH_3OH	13(8,5)−12(8,4) E v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626881.664*(22)	CH_3OH	13(2,12)−12(2,11) E v_t =1	9.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626930.794*(31)	CH_3OH	13(−1,12)−12(−1,11) E v_t =1	9.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626945.944*(23)	CH_3OH	13(−4,9)−12(−4,8) E v_t =1	12.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	626978.722*(54)	CH_3OCH_3	35(0,35)−34(1,34) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626978.722*(54)	CH_3OCH_3	35(0,35)−34(1,34) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626978.777*(54)	CH_3OCH_3	35(0,35)−34(1,34) EE	4.3[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626978.833*(54)	CH_3OCH_3	35(0,35)−34(1,34) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626986.840*(54)	CH_3OCH_3	35(1,35)−34(0,34) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626986.840*(54)	CH_3OCH_3	35(1,35)−34(0,34) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626986.894*(54)	CH_3OCH_3	35(1,35)−34(0,34) EE	4.3[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	626986.948*(54)	CH_3OCH_3	35(1,35)−34(0,34) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627004.212*(47)	CH_3OH	13(0,13)−12(0,12) A++ v_t =1	8.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627013.605*(38)	CH_3OH	13(−5,9)−12(−5,8) E v_t =1	14.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627016.318*(68)	CH_3OCH_3	13(7,7)−12(6,6) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627018.797*(64)	CH_3OCH_3	13(7,7)−12(6,6) EE	14.6[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627020.168*(66)	CH_3OCH_3	13(7,7)−12(6,6) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627020.204*(66)	CH_3OCH_3	13(7,6)−12(6,7) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627021.259*(64)	CH_3OCH_3	13(7,7)−12(6,6) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627021.294*(64)	CH_3OCH_3	13(7,6)−12(6,7) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627022.665*(66)	CH_3OCH_3	13(7,6)−12(6,7) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627024.054*(70)	CH_3OCH_3	13(7,6)−12(6,7) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	627138.621*(26)	$^{13}CH_3OH$	3(2,1)−2(1,2) A++	6.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627170.503*(9)	CH_3OH	13(−1,13)−12(−1,12) E	19.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627209.067*(25)	CH_3OH	13(1,12)−12(1,11) A−− v_t =1	8.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627331.141*(20)	SO_2	16(2,14)−15(1,15)	14.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	627335.271*(87)	$^{34}SO_2$	33(7,27)−33(6,28)	14.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	627445.408*(46)	CH_3OH	13(4,9)−12(4,8) A++ v_t =1	7.4[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627445.410*(46)	CH_3OH	13(4,10)−12(4,9) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	627476.1	unidentified		6.1	OriMC−1	CSO 10.4 m	Sch01	
	627529.217*(51)	CH_3OH	13(5,8)−12(5,7) E v_t =1	6.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627558.440*(9)	CH_3OH	13(0,13)−12(0,12) A++	23.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627647.660*(42)	CH_3OH	13(10,4)−12(10,3) E	3.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627715.243*(53)	SO_2	42(2,40)−42(1,41)	2.4[b]	OriMC−1	CSO 10.4 m	Sch01	
	627774.178*(40)	CH_3OH	13(−10,3)−12(−10,2) E	3.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627809.639*(37)	CH_3OH	13(9,5)−12(9,4) E	6.3[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627814.509*(28)	CH_3OH	13(−9,4)−12(−9,3) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	627898.317*(28)	CH_3OH	13(9,4)−12(9,3) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627898.317*(28)	CH_3OH	13(9,5)−12(9,4) A++	4.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627922.137*(24)	CH_3OH	13(−8,5)−12(−8,4) E	6.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627971.284*(20)	CH_3OH	13(8,5)−12(8,4) A++	6.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	627971.284*(20)	CH_3OH	13(8,6)−12(8,5) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628021.276*(21)	CH_3OH	13(8,6)−12(8,5) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628039.186*(17)	CH_3OH	13(7,6)−12(7,5) A−−	7.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628039.186*(17)	CH_3OH	13(7,7)−12(7,6) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628051.884*(10)	CH_3OH	13(2,12)−12(2,11) A++	22.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	628093.4	unidentified		2.7	OriMC−1	CSO 10.4 m	Sch01	
	628113.718*(16)	CH_3OH	13(7,7)−12(7,6) E	7.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628115.613*(17)	CH_3OH	13(−7,6)−12(−7,5) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628167.709*(14)	CH_3OH	13(6,8)−12(6,7) E	10.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628187.885*(13)	CH_3OH	13(6,7)−12(6,6) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628187.885*(13)	CH_3OH	13(6,8)−12(6,7) A−−	12.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628237.723*(14)	CH_3OH	13(−6,7)−12(−6,6) E	11.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628251.336*(11)	CH_3OH	13(5,9)−12(5,8) E	13.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628318.246*(11)	CH_3OH	13(−5,8)−12(−5,7) E	17.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628329.925*(10)	CH_3OH	13(−4,10)−12(−4,9) E	17.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628338.242*(12)	CH_3OH	13(5,8)−12(5,7) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628338.242*(12)	CH_3OH	13(5,9)−12(5,8) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628341.176*(28)	$^{34}SO_2$	16(2,14)−15(1,15)	17.1[b]	OriMC−1	CSO 10.4 m	Sch01	
	628408.882*(10)	CH_3OH	13(4,9)−12(4,8) E	16.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628445.283*(10)	CH_3OH	13(−3,11)−12(−3,10) E	17.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628469.879*(9)	CH_3OH	13(3,11)−12(3,10) A++	19.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628512.151*(10)	CH_3OH	13(4,10)−12(4,9) A−−	25.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628513.330*(10)	CH_3OH	13(4,9)−12(4,8) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628525.026*(9)	CH_3OH	13(3,10)−12(3,9) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628660.07* (18)	CH_3OCH_3	10(8,3)−9(7,3) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628661.18* (18)	CH_3OCH_3	10(8,3)−9(7,3) EE	12.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628662.28* (18)	CH_3OCH_3	10(8,2)−9(7,3) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628662.28* (18)	CH_3OCH_3	10(8,3)−9(7,2) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628664.24* (18)	CH_3OCH_3	10(8,2)−9(7,3) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628664.24* (18)	CH_3OCH_3	10(8,3)−9(7,2) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628665.34* (18)	CH_3OCH_3	10(8,2)−9(7,2) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628668.40* (19)	CH_3OCH_3	10(8,2)−9(7,2) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	628696.381*(9)	CH_3OH	13(1,12)−12(1,11) E	18.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628816.121*(9)	CH_3OH	13(3,10)−12(3,9) E	16.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	628869.040*(10)	CH_3OH	13(2,11)−12(2,10) A++	16.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	628889.7	unidentified		5.4	OriMC−1	CSO 10.4 m	Sch01	
	629140.501*(18)	CH_3OH	3(2,1)−2(1,2) A++	21.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	629321.677*(10)	CH_3OH	13(2,11)−12(2,10) E	19.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	629363.8*()	CH_3OH	17(1)−16(0) E v_t =2	5.3	OriMC−1	CSO 10.4 m	Sch01	Sch01
	629651.808*(9)	CH_3OH	13(−2,12)−12(−2,11) E	17.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	629696.0	unidentified		2.3	OriMC−1	CSO 10.4 m	Sch01	
	629790.563*(24)	CH_3CH_2CN	71(4,67)−70(4,66)	2.0	OriMC−1	CSO 10.4 m	Sch01	JPL01
	629825.3*	CH_3OD	5(3,3)−4(2,3) E	1.5	OriMC−1	CSO 10.4 m	Sch01	Sch01
	629921.263*(17)	CH_3OH	7(1,7)−6(0,6) A++	25.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	630376.0	unidentified		3.4	OriMC−1	CSO 10.4 m	Sch01	
	630583.01* (49)	CH_3OH	7(−1,6)−8(−2,6) E v_t =1	4.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	630951.028*(48)	CH_3OH	13(6,4)−12(4,8) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	630951.029*(48)	CH_3OH	13(6,5)−12(4,8) A++	8.4[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	631702.829*(24)	H_2CO	9(1,9)−8(1,8)	37.1	OriMC−1	CSO 10.4 m	Sch01	
	631742.131 (50)	^{34}SO	14(15)−13(14)	14.8	OriMC−1	CSO 10.4 m	Sch01	COL01
	632193.333*(15)	SO_2	9(5,5)−8(4,4)	25.6	OriMC−1	CSO 10.4 m	Sch01	
	632401.43* (30)	CH_3OCHO	51(17,35)−50(17,34) A	3.6[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	632401.67* (30)	CH_3OCHO	51(17,34)−50(17,33) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	632474.710*(74)	$^{34}SO_2$	29(7,23)−29(6,24)	3.0	OriMC−1	CSO 10.4 m	Sch01	
	632505.472*(19)	$^{13}CH_3OH$	8(3,6)−7(2,5) A++	5.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	632571.66* (14)	HNCO	11(1,11)−12(0,12)	6.2	OriMC−1	CSO 10.4 m	Sch01	JPL01
	632647.840 (50)	^{34}SO	15(15)−14(14)	15.0	OriMC−1	CSO 10.4 m	Sch01	COL01
	632771.534*(19)	$^{13}CH_3OH$	8(3,5)−7(2,6) A−−	6.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	632852.2	unidentified		1.9	OriMC−1	CSO 10.4 m	Sch01	
U	633023.5	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
U	633114.6	unidentified		3.4	OriMC−1	CSO 10.4 m	Sch01	
	633147.801*(70)	$^{34}SO_2$	28(7,21)−28(6,22)	4.1	OriMC−1	CSO 10.4 m	Sch01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	633293.153 (50)	^{34}SO	16(15)−15(14)	17.1	OriMC−1	CSO 10.4 m	Sch01	COL01
	633423.069*(10)	CH_3OH	13(1,12)−12(1,11) A−−	23.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	633571.984*(75)	CH_3OH	4(−2,2)−5(−3,2) E v_t =1	12.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	633674.4	unidentified		3.9	OriMC−1	CSO 10.4 m	Sch01	
U	633802.5	unidentified		3.2	OriMC−1	CSO 10.4 m	Sch01	
U	633832.8	unidentified		7.2	OriMC−1	CSO 10.4 m	Sch01	
U	633860.1	unidentified		5.0	OriMC−1	CSO 10.4 m	Sch01	
U	633891.1	unidentified		4.6	OriMC−1	CSO 10.4 m	Sch01	
U	633898.3	unidentified		4.6	OriMC−1	CSO 10.4 m	Sch01	
	633907.894*(48)	CH_3OCHO	19(15,4)−18(14,4) E	5.2	OriMC−1	CSO 10.4 m	Sch01	Oes99
U	633926.9	unidentified		5.2	OriMC−1	CSO 10.4 m	Sch01	
	633952.831*(51)	CH_3OCHO	19(15,5)−18(14,5) E	7.9[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	633960.580*(45)	CH_3OCHO	19(15,4)−18(14,5) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	633960.580*(45)	CH_3OCHO	19(15,5)−18(14,4) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
U	634081.2	unidentified		5.4	OriMC−1	CSO 10.4 m	Sch01	
	634118.947*(31)	SO_2	14(4,10)−13(3,11) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	634454.275*(66)	$^{34}SO_2$	27(7,21)−27(6,22)	5.4	OriMC−1	CSO 10.4 m	Sch01	
	634510.837*(12)	HNC	7−6	14.8	OriMC−1	CSO 10.4 m	Sch01	
U	634584.6	unidentified		6.7	OriMC−1	CSO 10.4 m	Sch01	
	634634.296*(57)	$^{33}SO_2$	34(7,27)−34(6,28)	2.8	OriMC−1	CSO 10.4 m	Sch01	
	634692.28* (45)	SO_2	38(1,37)−38(0,38) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	634731.65* (34)	HNCO	29(1,29)−28(1,28)	4.8	OriMC−1	CSO 10.4 m	Sch01	JPL01
	634766.649*(19)	CH_3CH_2CN	71(13,59)−70(13,58)	2.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	634766.654*(19)	CH_3CH_2CN	71(13,58)−70(13,57)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	634782.522*(52)	SO_2	11(9,3)−12(8,4)	3.3	OriMC−1	CSO 10.4 m	Sch01	
U	634878.9	unidentified		9.1	OriMC−1	CSO 10.4 m	Sch01	
	634898.408*(52)	SO_2	31(3,29)−30(2,28)	12.9	OriMC−1	CSO 10.4 m	Sch01	
	635027.6*(6)	CH_3OCHO	55(5,50)−54(6,49) A	3.6[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635027.8*(6)	CH_3OCHO	55(5,50)−54(5,49) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635027.8*(6)	CH_3OCHO	55(6,50)−54(6,49) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635027.9*(6)	CH_3OCHO	55(6,50)−54(5,49) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635051.001*(20)	$^{34}SO_2$	10(5,5)−9(4,6)	5.5	OriMC−1	CSO 10.4 m	Sch01	
U	635085.0	unidentified		4.2	OriMC−1	CSO 10.4 m	Sch01	
	635144.278*(61)	$^{34}SO_2$	26(7,19)−26(6,20)	1.9	OriMC−1	CSO 10.4 m	Sch01	
	635218.10* (35)	^{30}SiO	15−14 v=0	3.5	OriMC−1	CSO 10.4 m	Sch01	
U	635295.3	unidentified		1.3	OriMC−1	CSO 10.4 m	Sch01	
	635324.846*(63)	SO_2	38(7,31)−38(6,32)	1.4	OriMC−1	CSO 10.4 m	Sch01	
	635389.85* (22)	CH_3OH	26(4,22)−26(3,23) E	2.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	635414.461*(26)	CH_3CH_2CN	71(23,48)−70(23,47)	1.8[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635414.461*(26)	CH_3CH_2CN	71(23,49)−70(23,48)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635668.93* (18)	CH_3OH	25(4,21)−25(3,21) A+−	5.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	635697.60* (10)	CH_3CH_2CN	75(0,75)−74(0,74)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635697.60* (10)	CH_3CH_2CN	75(1,75)−74(1,74)	3.3[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635750.578*(34)	CH_3OCHO	31(10,22)−30(9,21) A	1.5[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	635750.8*(6)	CH_3OCHO	56(4,52)−55(4,51) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635750.8*(6)	CH_3OCHO	56(4,52)−55(5,51) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635750.8*(6)	CH_3OCHO	56(5,52)−55(4,51) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635750.8*(6)	CH_3OCHO	56(5,52)−55(5,51) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635751.2*(3)	CH_3OCHO	51(15,37)−50(15,36) E	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	635754.586*(32)	CH_3OCHO	31(10,22)−30(7,23) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	635871.06* (15)	CH_3OH	24(4,20)−24(3,21) A+−	3.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	635904.9	unidentified		2.5	OriMC−1	CSO 10.4 m	Sch01	
	635943.85* (13)	CH_3OH	24(−3,22)−23(−4,20) E	1.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636011.46* (12)	CH_3OH	23(4,19)−23(3,20) A+−	3.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636053.035*(57)	$^{34}SO_2$	25(7,19)−25(6,20)	1.1	OriMC−1	CSO 10.4 m	Sch01	
	636073.895*(28)	CH_3OCHO	26(12,15)−25(11,14) A	1.2[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	636073.997*(28)	CH_3OCHO	26(12,15)−25(11,14) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	636103.69* (10)	CH_3OH	22(4,18)−24(3,19) A+−	5.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636159.60*(8)	CH_3OH	21(4,17)−21(3,18) A+−	7.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636189.302*(61)	CH_3OH	20(4,16)−20(3,17) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636190.088*(23)	CH_3OH	15(4,11)−15(3,12) A+−	16.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636190.924*(21)	CH_3OH	14(4,10)−15(3,11) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636193.270*(26)	CH_3OH	16(4,12)−16(3,13) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636196.960*(20)	CH_3OH	13(4,9)−13(3,10) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636198.424*(31)	CH_3OH	17(4,13)−17(3,14) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636201.292*(48)	CH_3OH	19(4,15)−19(3,16) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	636202.500*(38)	CH_3OH	18(4,14)−18(3,15) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636208.656*(18)	CH_3OH	12(4,8)−12(3,9) A+−	17.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636225.884*(18)	CH_3OH	11(4,7)−11(3,8) A+−	16.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636248.048*(17)	CH_3OH	10(4,6)−10(3,7) A+−	15.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636274.205*(17)	CH_3OH	9(4,5)−9(3,6) A+−	21.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636279.367*(17)	CH_3OH	10(4,7)−10(3,8) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636280.535*(18)	CH_3OH	11(4,8)−10(3,9) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636299.453*(18)	CH_3OH	12(4,9)−12(3,10) A−+	20.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636303.169*(18)	CH_3OH	8(4,4)−8(3,5) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636311.642*(18)	CH_3OH	8(4,5)−8(3,6) A−+	19.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636333.605*(19)	CH_3OH	7(4,3)−7(3,4) A+−	21.3[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636337.464*(19)	CH_3OH	7(4,4)−7(3,5) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636341.725*(19)	CH_3OH	13(4,10)−13(3,11) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636363.115*(21)	CH_3OH	6(4,2)−6(3,3) A+−	20.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636365.661*(21)	CH_3OH	6(4,3)−6(3,4) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636393.314*(22)	CH_3OH	5(4,1)−5(3,2) A+−	20.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636393.830*(22)	CH_3OH	5(4,2)−5(3,3) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636413.793*(21)	CH_3OH	14(4,11)−14(3,12) A−+	19.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636419.896*(24)	CH_3OH	4(4,0)−4(3,1) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636420.026*(24)	CH_3OH	4(4,1)−4(3,2) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636468.335*(14)	CH_3OCH_3	20(5,16)−19(4,15) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	636468.378*(14)	CH_3OCH_3	20(5,16)−19(4,15) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	636470.257*(12)	CH_3OCH_3	20(5,16)−19(4,15) EE	6.4[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	636472.158*(14)	CH_3OCH_3	20(5,16)−19(4,15) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	636522.990*(23)	CH_3OH	15(4,12)−15(3,13) A−+	29.9[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636532.519*(80)	CS	13−12	29.9	OriMC−1	CSO 10.4 m	Sch01	
	636677.598*(26)	CH_3OH	16(4,13)−16(3,14) A−+	10.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636714.07* (44)	HNCO	29(3,27)−28(3,26)	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	636714.34* (44)	HNCO	29(3,26)−28(3,25)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	636886.893*(32)	CH_3OH	17(4,14)−17(3,15) A−+	6.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	636952.080*(58)	CH_3OCHO	17(16,2)−16(15,2) E	2.7[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	636953.794*(35)	CH_3OCHO	31(10,21)−30(9,22) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	636954.752*(53)	CH_3OCHO	17(16,1)−16(15,2) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	636954.752*(53)	CH_3OCHO	17(16,2)−16(15,1) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	636999.88* (48)	HNCO	29(2,27)−28(2,26)	2.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	637037.75* (31)	HNCO	29(0,29)−28(0,28)	7.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
	637161.182*(39)	CH_3OH	18(4,15)−18(3,16) A−+	5.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	637307.324*(48)	$^{34}SO_2$	23(7,17)−23(6,18)	1.1	OriMC−1	CSO 10.4 m	Sch01	
	637511.827*(50)	CH_3OH	19(4,16)−19(3,17) A−+	5.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	637684.0*(15)	$^{13}CH_3OH$	11(5,7)−12(4,8) A−−	1.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	637685.1*(15)	$^{13}CH_3OH$	11(5,6)−12(4,9) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	637723.300*(9)	CH_3CH_2CN	12(12,0)−11(11,1)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	637723.300*(9)	CH_3CH_2CN	12(12,1)−11(11,0)	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	637797.437*(43)	$^{34}SO_2$	22(7,15)−22(6,16)	2.3	OriMC−1	CSO 10.4 m	Sch01	
U	637863.7	unidentified		4.1	OriMC−1	CSO 10.4 m	Sch01	
	637951.258*(64)	CH_3OH	20(4,17)−20(3,18) A−+	4.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	638084.3	unidentified		2.6	OriMC−1	CSO 10.4 m	Sch01	
	638119.367*(6)	CH_3CH_2CN	38(7,31)−37(6,32)	2.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	638220.4	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch01	
	638279.610*(17)	CH_3OH	10(0,10)−9(−1,9) E	16.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	638492.967*(82)	CH_3OH	21(4,18)−21(3,19) A−+	2.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	638523.473*(15)	CH_3OH	8(3,6)−7(2,5) A++	29.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	638586.	unidentified		1.2	OriMC−1	CSO 10.4 m	Sch01	
	638635.265*(35)	$^{34}SO_2$	20(7,13)−20(6,14)	1.2	OriMC−1	CSO 10.4 m	Sch01	
	638770.436*(68)	SO_2	41(7,35)−41(6,36)	2.7	OriMC−1	CSO 10.4 m	Sch01	
	638817.792*(15)	CH_3OH	8(3,5)−7(2,6) A−−	25.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	639151.50* (10)	CH_3OH	22(4,19)−22(3,20) A−+	2.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	639646.086*(26)	$^{34}SO_2$	16(7,9)−16(6,10)	13.8[b]	OriMC−1	CSO 10.4 m	Sch01	
	639650.959*(22)	SO_2	15(4,12)−14(3,11)	13.8[b]	OriMC−1	CSO 10.4 m	Sch01	
	639765.60* (25)	$H_2{}^{13}CO$	9(3,7)−8(3,6)	1.6	OriMC−1	CSO 10.4 m	Sch01	
	639795.085*(26)	$^{34}SO_2$	15(7,9)−15(6,10)	1.4	OriMC−1	CSO 10.4 m	Sch01	
	639942.39* (13)	CH_3OH	23(4,20)−23(3,21) A−+	1.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640002.222*(28)	$^{34}SO_2$	13(7,7)−13(6,8)	1.1	OriMC−1	CSO 10.4 m	Sch01	
	640116.709*(32)	$^{34}SO_2$	11(7,5)−11(6,6)	2.5	OriMC−1	CSO 10.4 m	Sch01	
	640148.309*(35)	$^{34}SO_2$	10(7,3)−10(6,4)	[b]	OriMC−1	CSO 10.4 m	Sch01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	640167.091*(37)	$^{34}SO_2$	9(7,3)−9(6,4)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	640175.892*(40)	$^{34}SO_2$	8(7,1)−6(6,2)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	640177.273*(42)	$^{34}SO_2$	7(7,1)−7(6,2)	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	
	640287.13* (31)	$^{13}CH_3OH$	20(4,16)−20(3,17) A+−	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640297.03* (24)	$^{13}CH_3OH$	19(4,15)−19(3,16) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640297.33* (10)	$^{13}CH_3OH$	16(4,12)−16(3,13) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640298.21* (31)	$^{13}CH_3OH$	17(4,13)−17(3,14) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640298.99*(8)	$^{13}CH_3OH$	15(4,11)−15(3,12) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640299.23* (18)	$^{13}CH_3OH$	18(4,14)−18(3,15) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640304.744*(57)	$^{13}CH_3OH$	14(4,10)−14(3,11) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640376.734*(25)	$^{13}CH_3OH$	10(4,6)−10(3,7) A+−	1.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640398.548*(29)	$^{13}CH_3OH$	11(4,8)−18(3,9) A+−	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640403.485*(25)	$^{13}CH_3OH$	10(4,7)−10(3,8) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640404.884*(23)	$^{13}CH_3OH$	9(4,5)−9(3,6) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640408.779*(35)	$^{13}CH_3OH$	12(4,9)−12(3,10) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640419.323*(23)	$^{13}CH_3OH$	9(4,6)−9(3,7) A−+	2.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640435.179*(22)	$^{13}CH_3OH$	8(4,4)−8(3,5) A+−	2.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640439.119*(44)	$^{13}CH_3OH$	13(4,10)−13(3,11) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640442.415*(22)	$^{13}CH_3OH$	8(4,5)−8(3,6) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640466.374*(24)	$^{13}CH_3OH$	7(4,3)−7(3,4) A+−	2.4[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640469.670*(24)	$^{13}CH_3OH$	7(4,4)−7(3,5) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640494.244*(57)	$^{13}CH_3OH$	14(4,11)−14(3,12) A−+	3.4[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640497.184*(28)	$^{13}CH_3OH$	6(4,2)−6(3,3) A+−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640498.504*(28)	$^{13}CH_3OH$	6(4,3)−6(3,4) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640526.344*(32)	$^{13}CH_3OH$	5(4,1)−5(3,2) A+−	2.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640526.784*(32)	$^{13}CH_3OH$	5(4,2)−5(3,3) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640552.670*(36)	$^{13}CH_3OH$	4(4,0)−4(3,1) A+−	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640552.780*(36)	$^{13}CH_3OH$	4(4,1)−4(3,2) A−+	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	640882.17* (16)	CH_3OH	24(4,21)−24(3,22) A−+	0.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	640981.1	unidentified		1.6	OriMC−1	CSO 10.4 m	Sch01	
	641056.70* (12)	NH_2D	3(3,0)1(3)−3(2,2)0(3)	1.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	641119.58* (18)	$^{13}CH_3OH$	18(4,15)−18(3,16) A−+	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	641206.557*(19)	SO_2	9(3,7)−8(0,8)	1.6	OriMC−1	CSO 10.4 m	Sch01	
U	641224.8	unidentified		1.4	OriMC−1	CSO 10.4 m	Sch01	
	641324.38* (29)	$^{34}SO_2$	39(2,38)−39(1,39)	1.6	OriMC−1	CSO 10.4 m	Sch01	
	641361.791*(12)	CH_3OCH_3	20(5,15)−19(4,16) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	641361.834*(12)	CH_3OCH_3	20(5,15)−19(4,16) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	641363.653*(12)	CH_3OCH_3	20(5,15)−19(4,16) EE	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	641365.493*(14)	CH_3OCH_3	20(5,15)−19(4,16) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	641825.538*(57)	SO_2	36(0,36)−35(1,35)	4.5	OriMC−1	CSO 10.4 m	Sch01	
	641988.73* (20)	CH_3OH	25(4,22)−25(3,23) A−+	1.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	642136.2	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch01	
	642232.005*(60)	SO_2	36(7,29)−36(6,30)	1.7	OriMC−1	CSO 10.4 m	Sch01	
U	642552.7	unidentified		1.5	OriMC−1	CSO 10.4 m	Sch01	
	642670.879*(18)	CH_3CN	35(7)−34(7)	3.7	OriMC−1	CSO 10.4 m	Sch01	
U	642739.0	unidentified		6.6	OriMC−1	CSO 10.4 m	Sch01	
U	642762.1	unidentified		2.2	OriMC−1	CSO 10.4 m	Sch01	
	642806.212*(22)	SO_2	21(11,11)−22(10,12)	2.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	642807.24* (35)	^{29}SiO	15−14 v=0	2.9	OriMC−1	CSO 10.4 m	Sch01	
	642829.602*(13)	CH_3CN	35(6)−34(6)	2.6	OriMC−1	CSO 10.4 m	Sch01	
	642832.43* (47)	$^{13}CH_3OH$	22(4,19)−14(3,20) A−+	2.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	642964.014*(11)	CH_3CN	35(5)−34(5)	2.0	OriMC−1	CSO 10.4 m	Sch01	
	643074.061*(11)	CH_3CN	35(4)−34(4)	2.4	OriMC−1	CSO 10.4 m	Sch01	
	643091.069*(42)	CH_3OCHO	22(14,9)−21(13,9) E	2.4	OriMC−1	CSO 10.4 m	Sch01	Oes99
	643159.699*(12)	CH_3CN	35(3)−34(3)	1.9	OriMC−1	CSO 10.4 m	Sch01	
	643220.894*(14)	CH_3CN	35(2)−34(2)	1.8	OriMC−1	CSO 10.4 m	Sch01	
	643257.621*(15)	CH_3CN	35(1)−34(1)	4.3[b]	OriMC−1	CSO 10.4 m	Sch01	
	643269.865*(14)	CH_3CN	35(0)−34(0)	4.3	OriMC−1	CSO 10.4 m	Sch01	
	643276.738*(35)	CH_3OCHO	29(11,18)−28(10,18) E	4.3[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	643282.004*(28)	CH_3OCHO	29(11,19)−28(10,18) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	643643.050*(18)	CH_3OCH_3	17(6,12)−16(5,11) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643643.755*(20)	CH_3OCH_3	17(6,12)−16(5,11) EE	3.3[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643646.062*(20)	CH_3OCH_3	17(6,12)−16(5,11) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643646.749*(30)	CH_3OCH_3	17(6,11)−16(5,11) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643647.520*(18)	CH_3OCH_3	17(6,11)−16(5,11) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	643658.314*(52)	SO_2	35(2,34)−34(1,33)	4.0	OriMC−1	CSO 10.4 m	Sch01	
	643690.703*(30)	CH_3OCH_3	17(6,12)−16(5,12) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643692.942*(18)	CH_3OCH_3	17(6,12)−16(5,12) EE	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643694.402*(18)	CH_3OCH_3	17(6,11)−16(5,12) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643696.707*(20)	CH_3OCH_3	17(6,11)−16(5,12) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643696.853*(36)	CH_3OCH_3	17(6,11)−16(5,12) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	643697.411*(20)	CH_3OCH_3	17(6,11)−16(5,12) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
U	643728.4	unidentified		2.3	OriMC−1	CSO 10.4 m	Sch01	
U	644185.9	unidentified		3.5	OriMC−1	CSO 10.4 m	Sch01	
	644378.918 (30)	SO	14(15)−13(14)	33.9	OriMC−1	CSO 10.4 m	Sch01	COL01
	645254.933 (30)	SO	15(15)−14(14)	39.6	OriMC−1	CSO 10.4 m	Sch01	COL01
	645875.924 (30)	SO	16(15)−15(14)	39.0	OriMC−1	CSO 10.4 m	Sch01	COL01
	645924.425*(66)	CH_3OCH_3	14(7,8)−13(6,7) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645926.788*(60)	CH_3OCH_3	14(7,8)−13(6,7) EE	10.5[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645928.115*(62)	CH_3OCH_3	14(7,8)−13(6,7) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645928.211*(62)	CH_3OCH_3	14(7,7)−13(6,8) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645929.104*(62)	CH_3OCH_3	14(7,8)−13(6,7) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645929.200*(62)	CH_3OCH_3	14(7,7)−13(6,8) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645930.527*(62)	CH_3OCH_3	14(7,7)−13(6,8) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	645931.901*(66)	CH_3OCH_3	14(7,7)−13(6,8) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646089.004*(16)	CH_3OCH_3	22(4,18)−21(3,19) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646089.004*(16)	CH_3OCH_3	22(4,18)−21(3,19) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646090.950*(14)	CH_3OCH_3	22(4,18)−21(3,19) EE	2.5[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646092.896*(16)	CH_3OCH_3	22(4,18)−21(3,19) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646211.382*(50)	CH_3OCHO	20(15,6)−19(14,6) E	2.3[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	646217.151*(43)	CH_3OCHO	20(15,5)−19(14,6) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	646217.151*(43)	CH_3OCHO	20(15,6)−19(14,5) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
U	646742.0	unidentified		1.9	OriMC−1	CSO 10.4 m	Sch01	
	646762.451*(32)	CH_3OCH_3	30(4,27)−29(3,26) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646763.066*(26)	CH_3OCH_3	30(4,27)−29(3,26) EE	1.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646763.681*(30)	CH_3OCH_3	30(4,27)−29(3,26) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	646763.681*(30)	CH_3OCH_3	30(4,27)−29(3,26) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
U	646927.8	unidentified		1.8	OriMC−1	CSO 10.4 m	Sch01	
	647081.739*(25)	H_2CO	9(0,9)−8(0,8)	21.9	OriMC−1	CSO 10.4 m	Sch01	
	647196.312*(16)	CH_3OCH_3	21(3,18)−20(2,19) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647196.312*(16)	CH_3OCH_3	21(3,18)−20(2,19) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647196.433*(14)	CH_3OCH_3	21(3,18)−20(2,19) EE	2.1[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647202.553*(18)	CH_3OCH_3	21(3,18)−20(2,19) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
U	647319.8	unidentified		1.9	OriMC−1	CSO 10.4 m	Sch01	
	647403.947*(74)	CH_3OH	12(−8,9)−13(−7,6) E	3.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	647418.5	unidentified		2.8	OriMC−1	CSO 10.4 m	Sch01	
	647447.624*(42)	CH_3OCH_3	35(2,33)−34(3,32) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647447.624*(42)	CH_3OCH_3	35(2,33)−34(3,32) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647448.034*(42)	CH_3OCH_3	35(2,33)−34(3,32) EE	5.8c	OriMC−1	CSO10.4 m	Sch01	Gro02
	647448.445*(42)	CH_3OCH_3	35(2,33)−34(3,32) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647448.527*(57)	SO_2	34(7,27)−34(6,28)	5.8[b]	OriMC−1	CSO 10.4 m	Sch01	
	647546.759*(86)	$^{34}SO_2$	33(3,31)−32(2,30)	2.7	OriMC−1	CSO 10.4 m	Sch01	
	647610.50* (17)	CH_3OCH_3	11(8,4)−10(7,4) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647611.55* (18)	CH_3OCH_3	11(8,4)−10(7,4) EE	8.7[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647612.60* (18)	CH_3OCH_3	11(8,3)−10(7,4) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647612.60* (18)	CH_3OCH_3	11(8,4)−10(7,3) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647614.55* (18)	CH_3OCH_3	11(8,3)−10(7,4) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647614.55* (18)	CH_3OCH_3	11(8,4)−10(7,3) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647615.60* (18)	CH_3OCH_3	11(8,3)−10(7,3) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647618.60* (18)	CH_3OCH_3	11(8,3)−10(7,3) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	647717.214*(36)	SO_2	15(4,12)−14(3,11) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
U	648119.8	unidentified		6.4	OriMC−1	CSO 10.4 m	Sch01	
U	648134.0	unidentified		5.2	OriMC−1	CSO 10.4 m	Sch01	
	648324.397*(18)	CH_3OCHO	32(10,22)−31(9,23) A	5.8[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	648334.228*(40)	CH_3OCHO	32(8,24)−31(7,25) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	648381.517*(59)	SO_2	35(7,29)−35(6,30)	4.7	OriMC−1	CSO 10.4 m	Sch01	
	648737.545*(41)	$^{34}SO_2$	18(3,15)−17(2,16)	4.8	OriMC−1	CSO 10.4 m	Sch01	
U	648787.4	unidentified		2.7	OriMC−1	CSO 10.4 m	Sch01	
	649052.199*(42)	SO_2	38(3,35)−37(4,34)	1.7	OriMC−1	CSO 10.4 m	Sch01	
U	649104.5	unidentified		7.1	OriMC−1	CSO 10.4 m	Sch01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	649172.407*(53)	CH_3OCHO	18(16,2)−17(15,2) E	3.6	OriMC−1	CSO 10.4 m	Sch01	Oes99
	649225.606*(56)	CH_3OCHO	18(16,3)−17(15,3) E	3.2[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	649226.808*(50)	CH_3OCHO	18(16,2)−17(15,3) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	649226.808*(50)	CH_3OCHO	18(16,3)−17(15,2) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	649236.244*(60)	SO_2	43(3,41)−43(2,42)	2.7	OriMC−1	CSO 10.4 m	Sch01	
	649540.341*(28)	CH_3OH	14(1,13)−13(2,11) E	10.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	649915.23*(3)	NH_2D	2(0,2)1(1)−1(0,1)1(1)	1.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	650374.186 (70)	H_2S	4(4,1)−4(3,2)	15.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	650534.1	unidentified		3.0	OriMC−1	CSO 10.4 m	Sch01	
	650569.388*(6)	CH_3CH_2CN	34(8,27)−33(7,26)	2.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
	650595.023*(84)	CH_3CH_2CN	76(2,75)−75(2,74)	2.5[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	650595.088*(84)	CH_3CH_2CN	76(1,75)−75(1,74)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	650742.556*(13)	$^{33}SO_2$	16(7,9)−16(6,10)	4.0	OriMC−1	CSO 10.4 m	Sch01	
	650956.35* (35)	SiO	15−14 v=0	21.8	OriMC−1	CSO 10.4 m	Sch01	
	651299.877*(16)	SO_2	10(5,5)−9(4,6)	32.0	OriMC−1	CSO 10.4 m	Sch01	
	651306.305*(55)	SO_2	32(7,25)−32(6,26)	11.3	OriMC−1	CSO 10.4 m	Sch01	
	651410.117*(53)	SO_2	18(3,15)−17(2,16)	20.7	OriMC−1	CSO 10.4 m	Sch01	
	651432.658*(38)	NO	J,F=6.5,6.5−5.5,5.5 e	15.5[b]	OriMC−1	CSO 10.4 m	Sch01	COL01
	651433.023*(38)	NO	J,F=6.5,7.5−5.5,6.5 e	[b]	OriMC−1	CSO 10.4 m	Sch01	COL01
	651433.558*(38)	NO	J,F=6.5,5.5−5.5,4.5 e	[b]	OriMC−1	CSO 10.4 m	Sch01	COL01
	651494.023*(60)	SO	11(11)−11(10)	4.7	OriMC−1	CSO 10.4 m	Sch01	COL01
U	651535.9	unidentified		5.7	OriMC−1	CSO 10.4 m	Sch01	
	651565.99*(5)	DCN	9−8	5.5	OriMC−1	CSO 10.4 m	Sch01	
	651617.453*(18)	CH_3OH	10(1,9)−9(0,9) E	12.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	652534.238*(29)	CH_3CH_2CN	73(13,61)−72(13,60)	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	652534.248*(29)	CH_3CH_2CN	73(13,60)−72(13,59)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	652652.805*(38)	$^{34}SO_2$	16(4,12)−15(3,13)	6.0	OriMC−1	CSO 10.4 m	Sch01	
U	652930.	unidentified		3.4	OriMC−1	CSO 10.4 m	Sch01	
	653042.584*(12)	$^{13}CH_3OH$	17(−1,17)−16(0,16) E	2.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	653244.273*(14)	CH_3OCH_3	21(5,17)−20(4,16) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	653244.294*(14)	CH_3OCH_3	21(5,17)−20(4,16) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	653245.995*(12)	CH_3OCH_3	21(5,17)−20(4,16) EE	1.1[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	653247.706*(16)	CH_3OCH_3	21(5,17)−20(4,16) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	653320.506*(30)	CH_3CH_2CN	73(11,63)−72(11,62)	1.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	653323.786*(30)	CH_3CH_2CN	73(11,62)−72(11,61)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	653535.4	unidentified		1.3	OriMC−1	CSO 10.4 m	Sch01	
U	653572.1	unidentified		1.2	OriMC−1	CSO 10.4 m	Sch01	
U	653598.0	unidentified		0.9	OriMC−1	CSO 10.4 m	Sch01	
U	653711.0	unidentified		2.7	OriMC−1	CSO 10.4 m	Sch01	
	653882.923*(51)	SO_2	31(7,25)−31(6,26)	5.5	OriMC−1	CSO 10.4 m	Sch01	
U	653931.4	unidentified		3.2	OriMC−1	CSO 10.4 m	Sch01	
	653970.158*(22)	H_2CO	9(2,9)−8(2,8)	13.5	OriMC−1	CSO 10.4 m	Sch01	
	654030.729*(32)	CH_3CH_2CN	73(10,64)−72(10,63)	2.0	OriMC−1	CSO 10.4 m	Sch01	JPL01
	654069.929*(22)	$^{34}SO_2$	11(5,7)−10(4,6)	4.9	OriMC−1	CSO 10.4 m	Sch01	
U	654131.1	unidentified		2.3	OriMC−1	CSO 10.4 m	Sch01	
	654341.801*(43)	CH_3OH	6(3,4)−5(2,4) E v_t =1	2.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	654396.9	unidentified		1.9	OriMC−1	CSO 10.4 m	Sch01	
	654419.987*(33)	$^{13}CH_3OH$	14(1,14)−13(1,12) A++	3.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	654437.604*(48)	SO_2	30(7,23)−30(6,24)	6.6	OriMC−1	CSO 10.4 m	Sch01	
	654465.288*(74)	H_2CO	9(7,2)−8(7,1)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	654465.288*(74)	H_2CO	9(7,3)−8(7,2)	3.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	654519.549*(6)	CH_3CH_2CN	40(7,34)−39(6,33)	2.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	654533.4	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch01	
	654838.292*(45)	H_2CO	9(6,3)−8(6,2)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	654838.292*(45)	H_2CO	9(6,4)−8(6,3)	3.2	OriMC−1	CSO 10.4 m	Sch01	
U	654993.4	unidentified		3.1	OriMC−1	CSO 10.4 m	Sch01	
	655212.140*(34)	H_2CO	9(5,5)−8(5,4)	7.0[b]	OriMC−1	CSO 10.4 m	Sch01	
	655212.165*(34)	H_2CO	9(5,4)−8(5,3)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	655444.52* (15)	HNCO	10(1,10)−11(0,11)	3.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	655639.815*(25)	H_2CO	9(4,6)−8(4,5)	7.8[b]	OriMC−1	CSO 10.4 m	Sch01	
	655643.733*(25)	H_2CO	9(4,5)−8(4,4)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	656075.381*(46)	SO_2	29(7,23)−29(6,24)	4.0	OriMC−1	CSO 10.4 m	Sch01	
	656164.713*(22)	H_2CO	9(3,7)−8(3,6)	16.6	OriMC−1	CSO 10.4 m	Sch01	
	656168.882*(29)	CH_3OH	13(2,11)−12(1,11) E	16.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	656464.585*(22)	H_2CO	9(3,6)−8(3,5)	8.5	OriMC−1	CSO 10.4 m	Sch01	
	656549.72*(12)	$^{34}SO_2$	37(1,37)−36(0,36)	1.5	OriMC−1	CSO 10.4 m	Sch01	
	656593.14* (38)	HNCO	30(1,30)−29(1,29)	2.5	OriMC−1	CSO 10.4 m	Sch01	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	656656.220*(55)	SO_2	33(3,31)−32(2,30)	9.9	OriMC−1	CSO 10.4 m	Sch01	
U	656724.0	unidentified		4.1	OriMC−1	CSO 10.4 m	Sch01	
	656760.435*(43)	SO_2	28(7,21)−28(6,22)	7.2	OriMC−1	CSO 10.4 m	Sch01	
	656900.677*(24)	$^{34}SO_2$	6(6,0)−5(5,1)	4.2	OriMC−1	CSO 10.4 m	Sch01	
	657222.569*(48)	SO_2	48(3,45)−48(2,46)	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	
	657331.618*(42)	$^{33}SO_2$	36(1,35)−35(2,34)	3.4	OriMC−1	CSO 10.4 m	Sch01	
	657404.972*(38)	$^{13}CH_3OH$	14(0,14)−13(0,13) E	1.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	657455.18* (24)	$^{13}CH_3OH$	14(6,8)−13(6,7) A++ v_t =1	17.3[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	657455.18* (24)	$^{13}CH_3OH$	14(6,9)−13(6,8) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	657665.25* (13)	$H_2{}^{13}CO$	9(1,8)−8(1,7)	3.0	OriMC−1	CSO 10.4 m	Sch01	
U	657721.9	unidentified		2.9	OriMC−1	CSO 10.4 m	Sch01	
	657885.347*(41)	SO_2	27(7,21)−27(6,22)	5.4	OriMC−1	CSO 10.4 m	Sch01	
U	657933.8	unidentified		6.4	OriMC−1	CSO 10.4 m	Sch01	
	658006.55(20)	H_2O	1(1,0)−1(0,1) v_2 =1	2760[e]	VYCMa	CSO 10.4 m	Men95	Hel83
U	658031.5	unidentified		3.2	OriMC−1	CSO 10.4 m	Sch01	
	658101.932*(69)	CH_3OH	19(2,18)−18(3,15) A−−	3.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	658217.358*(43)	$^{34}SO_2$	17(4,14)−16(3,13)	5.2[b]	OriMC−1	CSO 10.4 m	Sch01	
	658218.51* (11)	SO_2	33(3,31)−32(2,30) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	658226.818*(24)	SO_2	15(10,6)−16(9,7)	5.2[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	658466.639*(42)	CH_3OCHO	21(15,6)−20(14,7) A	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	658466.639*(42)	CH_3OCHO	21(15,7)−20(14,6) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	658541.616*(38)	SO_2	26(7,19)−26(6,20)	25.0	OriMC−1	CSO 10.4 m	Sch01	
	658553.275*(12)	$C^{18}O$	6−5	25.0	OriMC−1	CSO 10.4 m	Sch01	
	658631.749*(54)	SO_2	36(1,35)−35(2,34)	10.2	OriMC−1	CSO 10.4 m	Sch01	
U	658714.7	unidentified		6.7	OriMC−1	CSO 10.4 m	Sch01	
	658742.875*(20)	$^{33}SO_2$	16(4,12)−15(3,13)	6.9[b]	OriMC−1	CSO 10.4 m	Sch01	
	658749.349*(47)	SO_2	18(3,15)−17(2,16) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
U	658928.6	unidentified		2.6	OriMC−1	CSO 10.4 m	Sch01	
	658945.76* (54)	HNCO	30(2,28)−29(2,27)	1.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
	658951.694*(35)	$^{13}CH_3OH$	14(−1,14)−13(−1,13) E	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	658973.51* (34)	HNCO	30(0,30)−29(0,29)	2.2	OriMC−1	CSO 10.4 m	Sch01	JPL01
	659065.39* (13)	$^{13}CH_3OH$	14(1,13)−13(1,12) A−− v_t =1	1.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	659188.8	unidentified		3.2	OriMC−1	CSO 10.4 m	Sch01	
	659338.285*(35)	SO_2	25(7,19)−25(6,20)	8.5	OriMC−1	CSO 10.4 m	Sch01	
	659390.067*(32)	$^{13}CH_3OH$	14(0,14)−13(0,13) A++	5.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	659421.061*(61)	SO_2	37(1,37)−36(0,36)	9.9	OriMC−1	CSO 10.4 m	Sch01	
U	659495.2	unidentified		9.9	OriMC−1	CSO 10.4 m	Sch01	
	659885.85* (11)	SO_2	40(1,39)−40(0,40)	10.1[b]	OriMC−1	CSO 10.4 m	Sch01	
	659898.524*(33)	SO_2	24(7,17)−24(6,18)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	659989.199*(14)	CH_3CH_2CN	56(6,51)−55(5,50)	2.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
	660040.22* (13)	$^{13}CH_3OH$	14(−7,7)−13(−7,6) E	3.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	660044.80* (12)	$^{13}CH_3OH$	14(7,8)−13(7,7) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	660115.139*(97)	$^{13}CH_3OH$	14(6,8)−13(6,7) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	660115.139*(97)	$^{13}CH_3OH$	14(6,9)−13(6,8) A++	3.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	660458.514*(14)	CH_3OCH_3	21(5,16)−20(4,17) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	660458.536*(14)	CH_3OCH_3	21(5,16)−20(4,17) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	660460.183*(12)	CH_3OCH_3	21(5,16)−20(4,17) EE	3.6[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	660461.841*(16)	CH_3OCH_3	21(5,16)−20(4,17) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	660472.672*(30)	SO_2	23(7,17)−23(6,18)	8.6	OriMC−1	CSO 10.4 m	Sch01	
	660593.533*(34)	CH_3CN	36(9)−35(9)	0.9	OriMC−1	CSO 10.4 m	Sch01	
	660673.637*(34)	$^{13}CH_3OH$	14(1,13)−13(1,12) E	3.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	660785.2	unidentified		2.8	OriMC−1	CSO 10.4 m	Sch01	
	660806.420*(26)	CH_3CN	36(8)−35(8)	2.2	OriMC−1	CSO 10.4 m	Sch01	
	660811.488*(46)	$^{13}CH_3OH$	14(3,11)−13(3,10) E	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	660866.698*(42)	$^{13}CH_3OH$	14(2,12)−13(2,11) A++	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	660918.280*(27)	SO_2	22(7,15)−22(6,16)	14.0	OriMC−1	CSO 10.4 m	Sch01	
	661067.267*(8)	^{13}CO	6−5	64.0	OMC−IRc2	JCMT 15 m	Gra90	
	661157.589*(14)	CH_3CN	36(6)−35(6)	4.7	OriMC−1	CSO 10.4 m	Sch01	
	661190.803*(22)	$^{13}CH_3OH$	5(−2,4)−4(−1,4) E	2.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	661295.729*(12)	CH_3CN	36(6)−35(6)	6.2	OriMC−1	CSO 10.4 m	Sch01	
	661314.153*(33)	$^{13}CH_3OH$	14(2,12)−13(2,11) E	7.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	661332.436*(25)	SO_2	21(7,15)−21(6,16)	11.5	OriMC−1	CSO 10.4 m	Sch01	
	661389.99* (37)	HNCO	30(1,29)−29(1,28)	2.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	661408.829*(12)	CH_3CN	36(6)−35(6)	2.8	OriMC−1	CSO 10.4 m	Sch01	
	661496.843*(13)	CH_3CN	36(6)−35(6)	6.4	OriMC−1	CSO 10.4 m	Sch01	
	661510.830*(49)	SO_2	36(2,34)−35(3,33)	6.4	OriMC−1	CSO 10.4 m	Sch01	
	661559.736*(14)	CH_3CN	36(6)−35(6)	5.7	OriMC−1	CSO 10.4 m	Sch01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	661597.481*(15)	CH_3CN	36(6)−35(6)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	661610.065*(16)	CH_3CN	36(6)−35(6)	7.3[b]	OriMC−1	CSO 10.4 m	Sch01	
	661668.232*(23)	SO_2	20(7,13)−20(6,14)	11.9	OriMC−1	CSO 10.4 m	Sch01	
	661761.486*(37)	$^{13}CH_3OH$	14(−2,13)−13(−2,12) E	2.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	661961.077*(15)	$^{33}SO_2$	11(5,7)−10(4,6)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	661962.138*(20)	SO_2	19(7,13)−19(6,14)	11.2[b]	OriMC−1	CSO 10.4 m	Sch01	
	661970.519*(74)	$^{34}SO_2$	38(3,35)−37(4,34)	[b]	OriMC−1	CSO 10.4 m	Sch01	
U	662087.2	unidentified		1.6	OriMC−1	CSO 10.4 m	Sch01	
	662202.660*(18)	SO_2	18(7,11)−18(6,12)	20.1[b]	OriMC−1	CSO 10.4 m	Sch01	
	662209.155*(22)	H_2CO	9(2,7)−8(2,6)	20.1	OriMC−1	CSO 10.4 m	Sch01	
	662295.834*(58)	CH_3OH	16(−7,9)−17(−6,11) E	2.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	662319.165*(30)	CH_3OCH_3	18(6,13)−17(5,12) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662320.580*(18)	CH_3OCH_3	18(6,13)−17(5,12) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662321.570*(16)	CH_3OCH_3	18(6,13)−17(5,12) EE	4.5[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662323.350*(20)	CH_3OCH_3	18(6,13)−17(5,12) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662404.206*(17)	SO_2	17(7,11)−17(6,12)	15.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	662414.468*(18)	CH_3OCH_3	18(6,12)−17(5,13) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662415.883*(28)	CH_3OCH_3	18(6,12)−17(5,13) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662416.247*(16)	CH_3OCH_3	18(6,12)−17(5,13) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662417.234*(20)	CH_3OCH_3	18(6,12)−17(5,13) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	662566.840*(15)	SO_2	16(7,9)−16(6,10)	17.0	OriMC−1	CSO 10.4 m	Sch01	
	662697.531*(14)	SO_2	15(7,9)−15(6,10)	12.7	OriMC−1	CSO 10.4 m	Sch01	
	662799.378*(14)	SO_2	14(7,7)−14(6,8)	12.5	OriMC−1	CSO 10.4 m	Sch01	
	662876.878*(14)	SO_2	13(7,7)−13(6,8)	14.1	OriMC−1	CSO 10.4 m	Sch01	
	662933.488*(14)	SO_2	12(7,5)−12(6,6)	17.2	OriMC−1	CSO 10.4 m	Sch01	
	662972.711*(15)	SO_2	11(7,5)−11(6,6)	20.8	OriMC−1	CSO 10.4 m	Sch01	
	662997.653*(16)	SO_2	10(7,5)−10(6,4)	20.9[b]	OriMC−1	CSO 10.4 m	Sch01	
	663011.199*(17)	SO_2	9(7,3)−9(6,4)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	663014.271*(19)	SO_2	7(7,1)−7(6,2)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	663015.955*(18)	SO_2	8(7,1)−8(6,2)	20.9[b]	OriMC−1	CSO 10.4 m	Sch01	
U	663639.1	unidentified		2.2	OriMC−1	CSO 10.4 m	Sch01	
	663951.174*(8)	CH_3CH_2CN	20(11,9)−19(10,10)	2.5[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	663951.174*(9)	CH_3CH_2CN	20(11,10)−19(10,9)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	664404.656*(29)	SO_2	20(3,17)−20(0,20)	4.8	OriMC−1	CSO 10.4 m	Sch01	
	664449.276*(58)	CH_3OCHO	17(17,0)−16(16,1) A	6.5[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	664449.276*(58)	CH_3OCHO	17(17,1)−16(16,0) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	664456.345*(64)	CH_3OCHO	17(17,1)−16(16,1) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	664682.800*(9)	CH_3CH2CN	15(12,3)−14(11,4)	3.3[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	664682.800*(9)	CH_3CH2CN	15(12,4)−14(11,3)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	664760.274*(70)	SO_2	44(2,42)−44(1,43)	2.6	OriMC−1	CSO 10.4 m	Sch01	
U	664780.9	unidentified		3.5	OriMC−1	CSO 10.4 m	Sch01	
	664815.519*(62)	CH_3OCH_3	15(7,9)−14(6,8) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664817.757*(56)	CH_3OCH_3	15(7,9)−14(6,8) EE	6.7[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664818.998*(58)	CH_3OCH_3	15(7,9)−14(6,8) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664819.240*(58)	CH_3OCH_3	15(7,8)−14(6,9) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664819.880*(58)	CH_3OCH_3	15(7,9)−14(6,8) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664820.112*(58)	CH_3OCH_3	15(7,8)−14(6,9) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664821.363*(58)	CH_3OCH_3	15(7,8)−14(6,9) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	664822.720*(62)	CH_3OCH_3	15(7,8)−14(6,9) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	665203.684*(23)	SO_2	25(12,14)−26(11,15)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	665246.825*(25)	SO_2	16(4,12)−15(3,13)	20.4[b]	OriMC−1	CSO 10.4 m	Sch01	
	665393.738 (70)	H_2S	4(2,2)−4(1,3)	8.6	OriMC−1	CSO 10.4 m	Sch01	JPL01
	665442.393*(15)	CH_3OH	5(−2,4)−4(−1,4) E	19.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	665509.0*(12)	CH_3OCHO	56(7,49)−55(7,48) A	2.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	665568.7*(11)	CH_3OCHO	55(9,47)−54(9,46) A	3.0	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	665814.5	unidentified		3.4	OriMC−1	CSO 10.4 m	Sch01	
	666382.012*(15)	$^{33}SO_2$	6(6,0)−5(5,1)	5.3[b]	OriMC−1	CSO 10.4 m	Sch01	
	666417.650*(15)	CH_3CH_2CN	20(15,5)−20(14,6)	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666417.650*(15)	CH_3CH_2CN	20(15,6)−20(14,7)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666441.8*(11)	CH_3OCHO	58(5,53)−57(6,52) A	5.2[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666441.8*(11)	CH_3OCHO	58(6,53)−57(6,52) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666441.9*(11)	CH_3OCHO	58(5,53)−57(5,52) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666441.9*(11)	CH_3OCHO	58(6,53)−57(5,52) A	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666517.656*(15)	CH_3CH_2CN	22(15,7)−22(14,8)	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666517.656*(15)	CH_3CH_2CN	22(15,8)−22(14,9)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	666550.75* (17)	CH_3OCH_3	12(8,4)−11(7,5) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666555.83* (17)	CH_3OCH_3	12(8,5)−11(7,4) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666556.82* (17)	CH_3OCH_3	12(8,5)−11(7,4) EE	5.3[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666557.81* (17)	CH_3OCH_3	12(8,4)−11(7,5) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666557.81* (17)	CH_3OCH_3	12(8,5)−11(7,4) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666559.76* (17)	CH_3OCH_3	12(8,4)−11(7,5) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666559.76* (17)	CH_3OCH_3	12(8,5)−11(7,4) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666563.69* (18)	CH_3OCH_3	12(8,4)−11(7,5) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	666623.499*(14)	CH_3CH_2CN	24(15,10)−24(14,11)	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666623.499*(14)	CH_3CH_2CN	24(15,9)−24(14,10)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666706.044*(24)	$^{13}CH_3OH$	8(1,8)−7(0,7) A++	4.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	666821.3	unidentified		2.5	OriMC−1	CSO 10.4 m	Sch01	
	666907.496*(14)	CH_3CH_2CN	29(15,14)−29(14,15)	3.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	666907.496*(14)	CH_3CH_2CN	29(15,15)−29(14,16)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	667026.135*(14)	CH_3CH_2CN	31(15,16)−31(14,17)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	667026.135*(14)	CH_3CH_2CN	31(15,17)−31(14,18)	3.5[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	667146.786*(36)	CH_3OH	10(5,6)−11(4,7) A++	7.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	667147.451*(36)	CH_3OH	10(5,5)−11(4,8) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	667471.065*(37)	CH_3OCHO	24(14,10)−23(13,10) E	4.8	OriMC−1	CSO 10.4 m	Sch01	Oes99
	667498.072*(31)	CH_3OH	6(4,2)−7(3,4) E	6.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	667717.693*(12)	CH_3CH_2CN	43(15,28)−43(14,29)	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	667717.693*(12)	CH_3CH_2CN	43(15,29)−43(14,30)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	667948.102*(11)	CH_3CH_2CN	48(15,33)−48(14,34)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	667948.102*(11)	CH_3CH_2CN	48(15,33)−48(14,34)	2.7[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	668077.63* (39)	CH_3OCH_3	9(9,0)−8(8,1) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668077.63* (39)	CH_3OCH_3	9(9,1)−8(8,0) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668078.44* (39)	CH_3OCH_3	9(9,1)−8(8,1) EE	5.8[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668079.25* (39)	CH_3OCH_3	9(9,1)−8(8,1) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668081.85* (39)	CH_3OCH_3	9(9,0)−8(8,0) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668082.66* (39)	CH_3OCH_3	9(9,0)−8(8,1) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668082.66* (39)	CH_3OCH_3	9(9,1)−8(8,0) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668086.07* (40)	CH_3OCH_3	9(9,0)−8(8,0) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	668116.889*(58)	CH_3OH	18(0,18)−17(1,16) E	4.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	669407.635*(16)	CH_3OCH_3	22(5,18)−21(4,17) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669407.646*(16)	CH_3OCH_3	22(5,18)−21(4,17) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669408.150*(14)	CH_3OCH_3	22(5,18)−21(4,17) EE	2.1[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669409.660*(18)	CH_3OCH_3	22(5,18)−21(4,17) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669490.5*(11)	CH_3OCH_3	36(12,25)−36(11,26) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669491.0*(11)	CH_3OCH_3	36(12,24)−36(11,25) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669491.0*(11)	CH_3OCH_3	36(12,25)−36(11,26) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669491.5*(11)	CH_3OCH_3	36(12,25)−36(11,26) EE	2.7[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669491.6*(11)	CH_3OCH_3	36(12,24)−36(11,25) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669492.1*(11)	CH_3OCH_3	36(12,24)−36(11,25) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669492.6*(11)	CH_3OCH_3	36(12,24)−36(11,25) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	669492.6*(11)	CH_3OCH_3	36(12,25)−36(11,26) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
U	670011.3	unidentified		2.4	OriMC−1	CSO 10.4 m	Sch01	
	670096.4*(12)	CH_3OCH_3	34(12,23)−34(11,24) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.0*(12)	CH_3OCH_3	34(12,22)−34(11,23) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.0*(12)	CH_3OCH_3	34(12,23)−34(11,24) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.1*(12)	CH_3OCH_3	34(12,23)−34(11,24) EE	5.5[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.6*(12)	CH_3OCH_3	34(12,22)−34(11,23) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.7*(12)	CH_3OCH_3	34(12,22)−34(11,23) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.8*(12)	CH_3OCH_3	34(12,22)−34(11,23) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670097.8*(12)	CH_3OCH_3	34(12,23)−34(11,24) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	670365.886*(17)	SO_2	11(5,7)−10(4,6)	17.8	OriMC−1	CSO 10.4 m	Sch01	
	670422.699*(13)	CH_3OH	14(1,14)−13(1,13) A++	9.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	670499.623*(6)	CH_3CH_2CN	31(9,23)−30(8,22)	2.6[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	670499.648*(6)	CH_3CH_2CN	31(9,22)−30(8,23)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	670756.616*(24)	$^{13}CH_3OH$	4(2,3)−3(1,2) A−−	3.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	670852.2	unidentified		5.3	OriMC−1	CSO 10.4 m	Sch01	
U	670894.5	unidentified		3.3	OriMC−1	CSO 10.4 m	Sch01	
U	671408.4	unidentified		3.1	OriMC−1	CSO 10.4 m	Sch01	
	671480.79*(10)	CH_3OH	18(8,10)−19(7,13) A++	4.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	671480.79*(10)	CH_3OH	18(8,11)−19(7,12) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
U	671716.8	unidentified		1.7	OriMC−1	CSO 10.4 m	Sch01	
	671912.639*(16)	CH_3OH	10(0,10)−9(1,9) E v_t =1	2.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	672184.351*(27)	$^{13}CH_3OH$	11(0,11)−10(−1,10) E	1.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	672360.692*(67)	CH_3OH	19(2,17)−18(3,16) A++	2.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	672447.3	unidentified		1.9	OriMC−1	CSO 10.4 m	Sch01	
	672564.481*(27)	SO_2	17(4,14)−16(3,13)	13.5	OriMC−1	CSO 10.4 m	Sch01	
	672902.595*(31)	CH_3OH	17(−1,17)−16(0,16) E	6.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	672903.763*(18)	CH_3OCH_3	23(4,19)−22(3,20) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	672903.763*(18)	CH_3OCH_3	23(4,19)−22(3,20) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	672905.587*(16)	CH_3OCH_3	23(4,19)−22(3,20) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	672907.411*(18)	CH_3OCH_3	23(4,19)−22(3,20) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
U	673072.1	unidentified		4.0	OriMC−1	CSO 10.4 m	Sch01	
	673101.436*(25)	$^{34}SO_2$	12(5,7)−11(4,8)	5.0	OriMC−1	CSO 10.4 m	Sch01	
	673415.979*(10)	CH_3OH	14(0,14)−13(0,13) E	8.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	673559.9	unidentified		2.5	OriMC−1	CSO 10.4 m	Sch01	
	673675.449*(40)	CH_3OH	14(6,9)−13(6,8) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	673676.690*(48)	CH_3OH	14(3,12)−13(3,11) E v_t =1	4.3[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	673712.993*(50)	CH_3OCHO	20(16,4)−19(15,4) E	2.7	OriMC−1	CSO 10.4 m	Sch01	Oes99
	673746.070*(18)	CH_3OH	4(2,3)−3(1,2) A−−	9.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	673969.6*( )	CH_3OH	14(−4)−13(−4) E v_t =2	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	Sch01
	673991.85* (12)	$^{34}SO_2$	38(0,38)−37(1,37)	6.6[b]	OriMC−1	CSO 10.4 m	Sch01	
	673997.113*(92)	$^{34}SO_2$	35(3,33)−34(2,32)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	674009.290*(12)	$C^{17}O$	6−5	6.6	OriMC−1	CSO 10.4 m	Sch01	
	674016.903*(23)	CH_3OH	14(1,14)−13(1,13) A++ v_t =1	6.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674143.586*(37)	CH_3OH	14(−7,8)−13(−7,7) E v_t =1	1.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674162.1*( )	CH_3OH	14(−2)−13(−2) E v_t =2	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	Sch01
	674162.4*( )	CH_3OH	14(4)−13(4) A−− v_t =2	[b]	OriMC−1	CSO 10.4 m	Sch01	Sch01
	674196.5*( )	CH_3OH	14(0)−13(0) A++ v_t =2	1.4[b]	OriMC−1	CSO 10.4 m	Sch01	Sch01
	674201.8*( )	CH_3OH	14(3)−13(3) E v_t =2	[b]	OriMC−1	CSO 10.4 m	Sch01	Sch01
	674254.4*( )	CH_3OH	14(−1)−13(−1) E v_t =2	1.2	OriMC−1	CSO 10.4 m	Sch01	Sch01
U	674284.5	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch01	
	674473.75* (12)	$C^{34}S$	14−13	3.9	OriMC−1	CSO 10.4 m	Sch01	
	674513.023*(26)	CH_3OH	14(−2,12)−13(−2,11) E v_t =1	3.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674597.336*(36)	CH_3OH	14(7,7)−13(7,6) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674597.336*(36)	CH_3OH	14(7,8)−13(7,7) A++ v_t =1	1.4[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674617.103*(33)	CH_3OH	14(5,10)−13(5,9) A++ v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674617.103*(33)	CH_3OH	14(5,9)−13(5,8) A−− v_t =1	2.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674659.227*(24)	CH_3OH	14(4,11)−13(4,10) E v_t =1	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674667.793*(28)	$^{34}SO_2$	11(3,9)−10(0,10)	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	
	674710.166*(22)	CH_3OH	14(2,12)−13(2,11) A++ v_t =1	4.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674717.329*(21)	CH_3OH	14(−3,11)−13(−3,10) E v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674743.033*(23)	CH_3OH	14(0,14)−13(0,13) E v_t =1	6.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674762.330*(23)	CH_3OH	14(1,14)−13(1,13) E v_t =1	7.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674791.038*(22)	CH_3OH	14(2,13)−13(2,12) A−− v_t =1	6.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	674809.776*(24)	H_2CO	9(1,8)−8(1,7)	16.2	OriMC−1	CSO 10.4 m	Sch01	
	674990.446*(19)	CH_3OH	8(1,8)−7(0,7) A++	17.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675034.787*(23)	CH_3OH	14(3,12)−13(3,11) A++ v_t =1	3.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675049.360*(27)	CH_3OH	14(2,13)−13(2,12) E v_t =1	3.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675097.889*(36)	CH_3OH	14(−1,13)−13(−1,12) E v_t =1	4.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675134.556*(10)	CH_3OH	14(−1,14)−13(−1,13) E	12.9[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675134.994*(32)	$^{13}CH_3OH$	3(3,0)−2(2,0) E	12.9[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675145.256*(29)	CH_3OH	14(−4,10)−13(−4,9) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675176.196*(53)	CH_3OH	14(0,14)−13(0,13) A++ v_t =1	4.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675232.847*(44)	CH_3OH	14(−5,10)−13(−5,9) E v_t =1	2.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675312.868 (50)	^{34}SO	17(16)−16(15)	6.6	OriMC−1	CSO 10.4 m	Sch01	Mul01
	675347.374*(32)	CH_3OH	14(1,13)−13(1,12) A−− v_t =1	4.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675555.336*(24)	$^{13}CH_3OH$	4(2,2)−3(1,3) A++	4.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675612.646*(10)	CH_3OH	14(0,14)−13(0,13) E	8.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675654.3*(13)	CH_3OCHO	56(8,48)−55(9,47) A	2.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	675773.382*(20)	CH_3OH	3(3,0)−2(2,0) E	8.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675779.760*(56)	CH_3OH	14(4,11)−13(4,19) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675779.771*(56)	CH_3OH	14(4,10)−13(4,9) A++ v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675888.668*(62)	CH_3OH	14(5,9)−13(5,8) E v_t =1	5.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	675959.046*(37)	CH_3OH	14(−10,4)−13(−10,3) E	3.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	675984.0	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
	676010.725*(23)	$^{34}SO_2$	7(6,2)−6(5,1)	5.5[b]	OriMC−1	CSO 10.4 m	Sch01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	676015.716*(38)	CH_3OH	14(9,6)−13(9,5) E	5.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676021.454*(53)	SO_2	22(7,15)−22(6,16) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	676031.965*(27)	CH_3OH	14(−9,5)−13(−9,4) E	4.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676112.113*(29)	CH_3OCHO	27(13,15)−26(12,14) A	4.2[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	676112.121*(29)	CH_3OCHO	27(13,14)−26(12,15) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	676120.180*(27)	CH_3OH	14(9,5)−13(9,4) A−−	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676120.180*(27)	CH_3OH	14(9,6)−13(9,5) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676138.986*(25)	CH_3OH	14(−8,6)−13(−8,5) E	4.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676205.311*(21)	CH_3OH	14(8,6)−13(8,5) A−−	14.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676205.311*(21)	CH_3OH	14(8,7)−13(8,6) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676215.016*(11)	CH_3OH	14(2,13)−13(2,12) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676250.436*(21)	CH_3OH	14(8,7)−13(8,8) E	4.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676269.636*(19)	CH_3OH	14(7,7)−13(7,6) A−−	7.3[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676269.636*(19)	CH_3OH	14(7,8)−13(7,7) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676349.551*(17)	CH_3OH	14(−7,7)−13(−7,6) E	6.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676361.695*(17)	CH_3OH	14(7,8)−13(7,7) E	6.9[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676416.064*(15)	CH_3OH	14(6,9)−13(6,8) E	10.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676425.685*(15)	CH_3OH	14(6,8)−13(6,7) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676425.685*(15)	CH_3OH	14(6,9)−13(6,8) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676484.356*(16)	SO_2	6(6,0)−5(5,1)	20.0[b]	OriMC−1	CSO 10.4 m	Sch01	
	676494.608*(13)	CH_3OH	14(5,10)−13(5,9) E	20.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676496.553*(15)	CH_3OH	14(−6,8)−13(−6,7) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676499.322*(63)	CH_3OH	19(0,19)−18(1,18) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676585.326*(11)	CH_3OH	14(−4,11)−13(−4,10) E	11.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676591.277*(13)	CH_3OH	14(−5,9)−13(−5,8) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676604.244*(13)	CH_3OH	14(5,10)−13(5,9) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676604.250*(13)	CH_3OH	14(5,9)−13(5,8) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676677.658*(12)	CH_3OH	14(5,10)−13(5,9) E	9.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676712.384*(11)	CH_3OH	14(−3,12)−13(−4,11) E	10.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676749.459*(10)	CH_3OH	14(3,12)−13(3,11) A++	13.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676823.527*(11)	CH_3OH	14(4,10)−13(4,9) A++	14.9[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676829.563*(10)	CH_3OH	14(3,11)−13(3,10) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	676926.632*(64)	SO_2	38(0,38)−37(1,37)	7.7	OriMC−1	CSO 10.4 m	Sch01	
	677012.842*(11)	CH_3OH	14(1,13)−13(1,12) E	12.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	677112.4	unidentified		2.8	OriMC−1	CSO 10.4 m	Sch01	
	677190.542*(10)	CH_3OH	14(3,11)−13(3,10) E	12.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	677233.266*(11)	CH_3OH	14(2,12)−13(2,11) A++	12.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	677273.0	unidentified		3.6	OriMC−1	CSO 10.4 m	Sch01	
	677417.5*( )	CH_3OH	18(1)−17(0) E v_t =2	3.5	OriMC−1	CSO 10.4 m	Sch01	Sch01
	677509.53* (38)	^{30}SiO	15−14 v=0	3.5	OriMC−1	CSO 10.4 m	Sch01	
U	677567.6	unidentified		3.6	OriMC−1	CSO 10.4 m	Sch01	
	677709.778*(11)	CH_3OH	14(2,12)−13(2,11) E	14.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	677885.802*(33)	SO_2	14(7,7)−14(6,8) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
U	677919.9	unidentified		2.9	OriMC−1	CSO 10.4 m	Sch01	
	677961.696*(35)	SO_2	13(7,7)−13(6,6) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	677984.726*(13)	SO_2	41(2,40)−41(1,41)	3.4	OriMC−1	CSO 10.4 m	Sch01	
	678005.984*(32)	CH_3OCHO	32(11,21)−31(10,22) A	2.9	OriMC−1	CSO 10.4 m	Sch01	Oes99
	678054.630*(40)	SO_2	11(7,5)−11(6,6) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	678128.276*(57)	SO_2	37(2,36)−36(1,35)	6.7	OriMC−1	CSO 10.4 m	Sch01	
	678237.50*(15)	HNCO	9(1,9)−10(0,10)	12.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
	678252.591*(11)	CH_3OH	14(−2,13)−13(−2,12) E	12.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	678358.0	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch01	
U	678417.7	unidentified		4.3	OriMC−1	CSO 10.4 m	Sch01	
	678452.00* (42)	HNCO	31(1,31)−30(1,30)	1.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	678546.9	unidentified		3.6	OriMC−1	CSO 10.4 m	Sch01	
U	678676.	unidentified		6.1	OriMC−1	CSO 10.4 m	Sch01	
U	678710.4	unidentified		3.3	OriMC−1	CSO 10.4 m	Sch01	
	678785.460*(17)	CH_3OH	4(2,2)−3(1,3) A++	21.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	679341.014*(52)	CH_3OH	9(6,4)−10(5,5) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	679341.015*(52)	CH_3OH	9(6,3)−10(5,6)A++	9.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	679392.977*(6)	CH_3CH_2CN	32(9,24)−31(8,23)	3.4[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	679393.020*(6)	CH_3CH_2CN	32(9,23)−31(8,24)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	679482.315*(15)	CH_3CN	37(6)−36(6)	3.6	OriMC−1	CSO 10.4 m	Sch01	
	679554.483*(23)	$^{13}CH_3OH$	9(3,7)−8(2,6)A++	6.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	679683.926*(34)	CH_3OCHO	25(14,11)−24(13,12)A	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	679683.926*(34)	CH_3OCHO	25(14,12)−24(13,11)A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	679683.962*(37)	CH_3OCHO	25(14,12)−24(13,12)E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	679740.320*(13)	CH_3CN	37(4)−36(4)	4.5	OriMC−1	CSO 10.4 m	Sch01	
U	679760.8	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
	679790.951*(16)	CH_3OCH_3	22(5,17)−21(4,18)AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	679790.962*(16)	CH_3OCH_3	22(5,17)−21(4,18)EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	679792.422*(14)	CH_3OCH_3	22(5,17)−21(4,18)EE	4.4[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	679793.837*(18)	CH_3OCH_3	22(5,17)−21(4,18)AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	679830.703*(14)	CH_3CN	37(3)−36(3)	4.7	OriMC−1	CSO 10.4 m	Sch01	
	679895.289*(15)	CH_3CN	37(2)−36(2)	5.7	OriMC−1	CSO 10.4 m	Sch01	
	679934.051*(16)	CH_3CN	37(1)−36(1)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	679946.974*(17)	CH_3CN	37(0)−36(0)	7.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	680000.110*(22)	$^{13}CH_3OH$	9(3,6)−8(2,7)A−−	9.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	680026.757*(38)	CN	6−5 J,F=11/2,11/2−9/2,11/2	0.41	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	680247.8	unidentified		4.4	OriMC−1	CSO 10.4 m	Sch01	
	680264.1(3)	CN	6−5 J,F=11/2,11/2−9/2,9/2	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680264.1(3)	CN	6−5 J,F=11/2,13/2−9/2,11/2	0.41[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680264.1(3)	CN	6−5 J,F=11/2,9/2−9/2,7/2	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680480.820*(77)	CH_3CH_2CN	78(4,75)−77(4,74)	2.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680506.930*(77)	CH_3CH_2CN	78(3,75)−77(3,74)	2.4	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680575.04* (54)	HNCO	31(3,29)−30(3,28)	1.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680575.42* (54)	HNCO	31(3,28)−30(3,27)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680787.00* (64)	HNCO	31(2,30)−30(2,29)	8.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680800.48* (14)	CH_3OH	22(1,21)−21(2,20) A−−	8.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	680841.350*(6)	CH_3CH_2CN	43(7,36)−42(6,37)	2.4	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680889.64* (59)	HNCO	31(2,29)−30(2,28)	4.2	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680906.12* (38)	HNCO	31(0,31)−30(0,30)	7.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	680923.690*(22)	CH_3OCH_3	19(6,14)−18(5,13) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	680924.383*(18)	CH_3OCH_3	19(6,14)−18(5,13) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	680925.462*(14)	CH_3OCH_3	19(6,14)−18(5,13) EE	7.2[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	680926.899*(20)	CH_3OCH_3	19(6,14)−18(5,13) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	680967.554*(50)	CH_3OCHO	36(10,27)−35(9,26) A	3.5	OriMC−1	CSO 10.4 m	Sch01	Oes99
	681012.756*(15)	$^{33}SO_2$	12(5,7)−11(4,8)	2.8	OriMC−1	CSO 10.4 m	Sch01	
	681089.871*(18)	CH_3OCH_3	19(6,13)−18(5,14) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	681090.564*(22)	CH_3OCH_3	19(6,13)−18(5,14) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	681091.304*(16)	CH_3OCH_3	19(6,13)−18(5,14) EE	5.5	OriMC−1	CSO 10.4 m	Sch01	Gro02
	681092.379*(20)	CH_3OCH_3	19(6,13)−18(5,14) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	681674.029*(59)	SO_2	35(3,33)−34(2,32)	7.8	OriMC−1	CSO 10.4 m	Sch01	
	681789.670*(78)	CH_3OH	3(−2,1)−4(−3,1) E v_t =1	14.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	681913.128*(8)	CH_3CH_2CN	22(11,11)−21(10,12)	1.5[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	681913.128*(8)	CH_3CH_2CN	22(11,12)−21(10,11)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	681946.108*(59)	CH_3CH_2CN	76(9,68)−75(9,67)	3.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
	681989.818*(11)	CH_3OH	14(1,13)−13(1,12) A−−	20.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	682092.3	unidentified		3.0	OriMC−1	CSO 10.4 m	Sch01	
	682370.93* (97)	$^{13}CH_3OH$	26(2,24)−25(3,22) E	4.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	682436.0*(4)	HCS^+	16−15	0.9	OriMC−1	CSO10.4m	Sch01	
	682583.747*(61)	CH_3CH_2CN	76(9,69)−75(9,68)	3.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
	682901.025*(42)	CH_3OCHO	23(15,8)−22(14,8) E	1.7	OriMC−1	CSO 10.4 m	Sch01	Oes99
	682938.629*(37)	CH_3OCHO	23(15,8)−22(14,9) E	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	682938.629*(37)	CH_3OCHO	23(15,9)−22(14,8) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	682938.890*(43)	CH_3OCHO	23(15,9)−22(14,9) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
U	683170.8	unidentified		2.8	OriMC−1	CSO 10.4 m	Sch01	
	683407.59* (41)	HNCO	31(1,30)−30(1,29)	3.6	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	683476.8	unidentified		4.4	OriMC−1	CSO 10.4 m	Sch01	
U	683510.6	unidentified		4.6	OriMC−1	CSO 10.4 m	Sch01	
	683686.228*(58)	CH_3OCH_3	16(7,10)−15(6,9) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683688.326*(54)	CH_3OCH_3	16(7,10)−15(6,9) EE	11.1[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683689.409*(54)	CH_3OCH_3	16(7,10)−15(6,9) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683689.972*(54)	CH_3OCH_3	16(7,9)−15(6,10) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683690.176*(54)	CH_3OCH_3	16(7,10)−15(6,9) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683690.740*(54)	CH_3OCH_3	16(7,9)−15(6,10) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683691.823*(54)	CH_3OCH_3	16(7,9)−15(6,10) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683693.153*(58)	CH_3OCH_3	16(7,9)−15(6,10) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	683749.819*(21)	CH_3OH	12(−2,11)−11(1,10) E	6.2[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	683761.077*(37)	CH_3OCHO	30(12,18)−29(11,18) E	3.9[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	683770.816*(28)	CH_3OCHO	30(12,19)−29(11,18) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	683773.681*(28)	CH_3OCHO	30(12,18)−29(11,19) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	683961.110*(16)	CH_3CH_2CN	80(1,79)−79(1,78)	2.0	OriMC−1	CSO 10.4 m	Sch01	JPL01

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	684261.68* (16)	CH_3OH	25(−3,23)−24(−4,21) E	6.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	684296.1	unidentified		3.9	OriMC−1	CSO 10.4 m	Sch01	
U	684430.0	unidentified		6.6	OriMC−1	CSO 10.4 m	Sch01	
	684677.95* (12)	$H_2{}^{13}CO$	10(1,10)−9(1,9)	4.9	OriMC−1	CSO 10.4 m	Sch01	
	684839.641*(18)	CH_3OCH_3	23(5,19)−22(4,18) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	684839.646*(18)	CH_3OCH_3	23(5,19)−22(4,18) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	684840.937*(16)	CH_3OCH_3	23(5,19)−22(4,18) EE	4.4[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	684842.231*(18)	CH_3OCH_3	23(5,19)−22(4,18) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	684928.743*(81)	SO_2	45(3,43)−45(2,44)	3.7	OriMC−1	CSO 10.4 m	Sch01	
	685336.603*(18)	CH_3OCH_3	22(3,19)−21(2,20) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685336.603*(18)	CH_3OCH_3	22(3,19)−21(2,20) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685339.833*(16)	CH_3OCH_3	22(3,19)−21(2,20) EE	1.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685343.063*(20)	CH_3OCH_3	22(3,19)−21(2,20) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685436.00* (10)	CS	14−13	25.0	OriMC−1	JCMT 15 m	Har95	
	685494.47* (16)	CH_3OCH_3	13(8,6)−12(7,6) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685495.40* (16)	CH_3OCH_3	13(8,6)−12(7,6) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685496.33* (16)	CH_3OCH_3	13(8,5)−12(7,6) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685496.33* (16)	CH_3OCH_3	13(8,6)−12(7,5) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685498.27* (16)	CH_3OCH_3	13(8,5)−12(7,6) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685498.27* (16)	CH_3OCH_3	13(8,6)−12(7,5) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685499.20* (16)	CH_3OCH_3	13(8,5)−12(7,5) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685502.07* (16)	CH_3OCH_3	13(8,5)−12(7,5) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	685505.010*(19)	CH_3OH	11(0,11)−10(−1,10) E	18.0	OriMC−1	JCMT 15 m	Har95	Xu_97
	685505.010*(19)	CH_3OH	11(0,11)−10(−1,10) E	19.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	685603.25* (38)	^{29}SiO	16−15 v=0	2.5	OriMC−1	CSO 10.4 m	Sch01	
	685611.201*(6)	CH_3CH_2CN	38(8,30)−37(7,31)	3.0	OriMC−1	CSO 10.4 m	Sch01	JPL01
	685976.069*(48)	CH_3OCHO	21(16,5)−20(15,5) E	3.8	OriMC−1	CSO 10.4 m	Sch01	Oes99
	686019.616*(43)	CH_3OCHO	21(16,5)−20(15,6) E	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	686019.616*(43)	CH_3OCHO	21(16,6)−20(15,5) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	686022.823*(50)	CH_3OCHO	21(16,6)−20(15,6) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	686678.926*(53)	$^{34}SO_2$	19(4,16)−18(3,15)	3.6	OriMC−1	CSO 10.4 m	Sch01	
	686731.459*(15)	CH_3OH	9(3,7)−8(2,6) A++	21.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	686731.459*(15)	CH_3OH	9(3,7)−8(2,6) A++	24.5	OriMC−1	JCMT 15 m	Har95	Xu_97
	687035.02* (38)	CH_3OCH_3	10(9,1)−9(8,2) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687035.02* (38)	CH_3OCH_3	10(9,2)−9(8,1) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687035.84* (38)	CH_3OCH_3	10(9,2)−9(8,2) EE	12.4[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687036.65* (38)	CH_3OCH_3	10(9,2)−9(8,2) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687038.15* (38)	CH_3OCH_3	10(9,1)−9(8,1) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687039.97* (38)	CH_3OCH_3	10(9,1)−9(8,1) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687039.97* (38)	CH_3OCH_3	10(9,2)−9(8,2) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687043.28* (38)	CH_3OCH_3	10(9,1)−9(8,1) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	687224.558*(15)	CH_3OH	9(3,6)−8(2,7) A−−	23.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	687224.558*(15)	CH_3OH	9(3,6)−8(2,7) A−−	26.9	OriMC−1	JCMT 15 m	Har95	Xu_97
	687303.468 (70)	H_2S	2(0,2)−1(1,1)	20.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	687303.84* (52)	H_2S	2(0,2)−1(1,1)	14.9	OriMC−1	JCMT 15 m	Har95	Hel73
	687457.694 (30)	SO	15(16)−14(15)	35.1	OriMC−1	JCMT 15 m	Har95	COL01
U	687544.7	unidentified		5.1	OriMC−1	CSO 10.4 m	Sch01	
U	687580.7	unidentified		4.8	OriMC−1	CSO 10.4 m	Sch01	
U	687696.7	unidentified		3.0	OriMC−1	CSO 10.4 m	Sch01	
U	687718.3	unidentified		3.1	OriMC−1	CSO 10.4 m	Sch01	
	688204.630 (30)	SO	16(16)−15(15)	40.6	OriMC−1	JCMT 15 m	Har95	COL01
	688273.83* (11)	$HC^{15}N$	8−7	11.1	OriMC−1	JCMT 15 m	Har95	
	688611.746*(31)	$^{13}CH_3OH$	11(1,10)−10(0,10) E	2.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	688735.700 (30)	SO	17(16)−16(15)	54.1	OriMC−1	JCMT 15 m	Har95	COL01
U	689070.	unidentified		7.1	OriMC−1	CSO 10.4 m	Sch01	
	689120.170 (70)	H_2S	9(7,2)−9(6,3)	5.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	689233.781*(28)	SO_2	6(6,0)−5(5,1) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
U	689289.6	unidentified		2.3	OriMC−1	CSO 10.4 m	Sch01	
	689438.686*(18)	SO_2	12(5,7)−11(4,8)	19.3	OriMC−1	CSO 10.4 m	Sch01	
	689438.686*(18)	SO_2	12(5,7)−11(4,8)	20.2	OriMC−1	JCMT 15 m	Har95	
	689522.618*(21)	SO_2	11(3,9)−10(0,10)	2.7	OriMC−1	CSO 10.4 m	Sch01	
	690465.163*(13)	SO_2	52(8,44)−52(7,45)	1.7	OriMC−1	CSO 10.4 m	Sch01	
	690552.089*(15)	$H^{13}CN$	8−7	16.3	OriMC−1	JCMT 15 m	Har95	
	690629.327*(44)	$^{13}CH_3OH$	14(2,12)−13(1,12) E	3.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	690672.9	unidentified		4.3	OriMC−1	CSO 10.4 m	Sch01	
	691473.076*(1)	CO	6−5	100.	OriMC−1	IRTF 3 m	Gol81a	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	691649.326*(9)	CH_3CH_2CN	18(12,6)−17(11,7)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	691649.326*(9)	CH_3CH_2CN	18(12,7)−17(11,6)	12.0[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	691815.729*(37)	CH_3OCHO	26(14,12)−25(13,12) E	1.6	OriMC−1	CSO 10.4 m	Sch01	Oes99
	691842.216*(32)	CH_3OCHO	26(14,13)−25(13,12) A	2.8[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	691842.217*(32)	CH_3OCHO	26(14,12)−25(13,13) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	691844.853*(37)	CH_3OCHO	26(14,13)−25(13,13) A	[b]	OriMC−1	CSO 10.4 m	Sch01	Oes99
	691991.776*(28)	$^{34}SO_2$	13(5,9)−12(4,8)	2.3	OriMC−1	CSO 10.4 m	Sch01	
	692079.14(60)	$H_2{}^{18}O$	5(3,2)−4(4,1)	1.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	692674.4	unidentified		2.5	OriMC−1	CSO 10.4 m	Sch01	
U	692726.2	unidentified		4.0	OriMC−1	CSO 10.4 m	Sch01	
	693270.259*(67)	SO	12(12)−12(11)	3.2	OriMC−1	CSO 10.4 m	Sch01	COL01
	693420.43* (21)	SO_2	39(1,39)−38(0,38) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	693468.986*(48)	$^{34}SO_2$	18(4,14)−17(3,15)	5.6	OriMC−1	CSO 10.4 m	Sch01	
U	693790.3	unidentified		3.1	OriMC−1	CSO 10.4 m	Sch01	
	693876.6*(20)	$H^{13}CO^+$	8−7	14.0	OriMC−1	CSO10.4m	Sch01	
	694138.233*(59)	SO_2	38(1,37)−37(2,36)	5.3	OriMC−1	CSO 10.4 m	Sch01	
	694294.16* (34)	SiO	16−15 v=0	12.1	OriMC−1	JCMT 15 m	Har95	
	694494.068*(68)	SO_2	39(1,39)−38(0,38)	6.8	OriMC−1	CSO 10.4 m	Sch01	
U	694726.2	unidentified		6.8	OriMC−1	CSO 10.4 m	Sch01	
U	695067.1	unidentified		4.7	OriMC−1	CSO 10.4 m	Sch01	
	695119.253*(22)	$^{34}SO_2$	8(6,2)−7(5,3)	7.1[b]	OriMC−1	CSO 10.4 m	Sch01	
U	695525.3	unidentified		2.1	OriMC−1	CSO 10.4 m	Sch01	
	695632.506*(15)	SO_2	7(6,2)−6(5,1)	22.8	OriMC−1	CSO 10.4 m	Sch01	
U	695773.7	unidentified		2.1	OriMC−1	CSO 10.4 m	Sch01	
U	696258.	unidentified		1.4	OriMC−1	CSO 10.4 m	Sch01	
	696527.111*(26)	SO_2	13(10,4)−14(9,5)	2.8[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	696534.36* (25)	$HN^{13}C$	8−7	2.8	OriMC−1	CSO 10.4 m	Sch01	
	696958.879*(50)	CH_3CN	38(10)−37(10)	2.1	OriMC−1	CSO 10.4 m	Sch01	
U	697061.3	unidentified		3.5	OriMC−1	CSO 10.4 m	Sch01	
	697146.279*(29)	CH_3OH	15(1,14)−14(2,12) E	9.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	697209.301*(39)	CH_3CN	38(9)−37(9)	1.5	OriMC−1	CSO 10.4 m	Sch01	
U	697297.5	unidentified		1.9	OriMC−1	CSO 10.4 m	Sch01	
	697433.636*(30)	CH_3CN	38(8)−37(8)	1.5	OriMC−1	CSO 10.4 m	Sch01	
U	697500.6	unidentified		2.1	OriMC−1	CSO 10.4 m	Sch01	
	697631.792*(22)	CH_3CN	38(7)−37(7)	2.5	OriMC−1	CSO 10.4 m	Sch01	
U	697660.7	unidentified		1.7	OriMC−1	CSO 10.4 m	Sch01	
U	697761.5	unidentified		2.6	OriMC−1	CSO 10.4 m	Sch01	
	697803.689*(16)	CH_3CN	38(6)−37(6)	5.6	OriMC−1	CSO 10.4 m	Sch01	
	697949.259*(13)	CH_3CN	38(5)−37(5)	2.9	OriMC−1	CSO 10.4 m	Sch01	
	698068.441*(13)	CH_3CN	38(4)−37(4)	3.7	OriMC−1	CSO 10.4 m	Sch01	
	698161.189*(15)	CH_3CN	38(3)−37(3)	6.6	OriMC−1	CSO 10.4 m	Sch01	
	698227.464*(16)	CH_3CN	38(2)−37(2)	5.7	OriMC−1	CSO 10.4 m	Sch01	
	698267.239*(17)	CH_3CN	38(1)−37(1)	7.5	OriMC−1	CSO 10.4 m	Sch01	
	698280.500*(18)	CH_3CN	38(0)−37(0)	6.0	OriMC−1	CSO 10.4 m	Sch01	
	698494.86* (24)	CH_3OH	13(5,8)−14(4,11) E v_t =1	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	698544.78(15)	C_2H	8−717/2,15/2−15/2,13/2	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	698544.78(15)	C_2H	8−717/2,17/2−15/2,15/2	2.2[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	698607.46(10)	C_2H	8−715/2,13/2−13/2,11/2	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	698607.46(10)	C_2H	8−715/2,15/2−13/2,13/2	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	698787.600*(7)	CH_3CH_2CN	29(10,19)−28(9,20)	0.8[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	698787.600*(7)	CH_3CH_2CN	29(10,20)−28(9,19)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	698931.092*(30)	CH_3OH	3(1,2)−2(2,1) A−− v_t =1	2.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	699071.6	unidentified		3.5	OriMC−1	CSO 10.4 m	Sch01	
	699430.994*(18)	CH_3OCH_3	24(5,20)−23(4,19) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699430.997*(18)	CH_3OCH_3	24(5,20)−23(4,19) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699432.054*(18)	CH_3OCH_3	24(5,20)−23(4,19) EE	3.3	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699433.113*(20)	CH_3OCH_3	24(5,20)−23(4,19) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699436.952*(20)	CH_3OCH_3	20(6,15)−19(5,14) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699437.264*(18)	CH_3OCH_3	20(6,15)−19(5,14) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699438.309*(14)	CH_3OCH_3	20(6,15)−19(5,14) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699439.512*(20)	CH_3OCH_3	20(6,15)−19(5,14) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699452.811*(18)	CH_3OCH_3	23(5,18)−22(4,19) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699452.816*(18)	CH_3OCH_3	23(5,18)−22(4,19) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699454.075*(16)	CH_3OCH_3	23(5,18)−22(4,19) EE	2.5[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699454.843*(18)	CH_3OCH_3	23(5,18)−22(4,19) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699719.558*(18)	CH_3OCH_3	20(6,14)−19(5,15) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699719.870*(18)	CH_3OCH_3	20(6,14)−19(5,15) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	699720.755*(14)	CH_3OCH_3	20(6,14)−19(5,15) EE	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699721.795*(20)	CH_3OCH_3	20(6,14)−19(5,15) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	699828.892*(24)	SO_2	12(5,7)−11(4,8) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	699874.85* (18)	$H_2{}^{13}CO$	10(0,10)−9(0,9)	3.4	OriMC−1	CSO 10.4 m	Sch01	
	700308.15* (47)	HNCO	32(1,32)−31(1,31)	3.1	OriMC−1	CSO 10.4 m	Sch01	JPL01
	700312.979*(25)	SO_2	18(11,7)−19(10,10)	3.1[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	700638.908*(9)	CH_3CH_2CN	19(12,7)−18(11,8)	1.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	700638.908*(9)	CH_3CH_2CN	19(12,8)−18(11,7)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	700950.33* (16)	HNCO	8(1,8)−9(0,9)	2.4	OriMC−1	CSO 10.4 m	Sch01	JPL01
	701022.039*(44)	$^{13}CH_3OH$	15(1,15)−14(1,14) A++	1.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	701366.722*(20)	CH_3OH	11(1,10)−10(0,10) E	22.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	701370.474*(27)	H_2CO	10(1,10)−9(1,9)	22.6	OriMC−1	CSO 10.4 m	Sch01	
	702069.89* (15)	$^{13}CH_3OH$	18(−1,18)−17(0,17) E	23.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	702103.748*(32)	SO_2	19(4,16)−18(3,15)	23.7[b]	OriMC−1	CSO 10.4 m	Sch01	
	702293.419*(55)	SO_2	38(2,36)−37(3,35)	5.2	OriMC−1	CSO 10.4 m	Sch01	
	702417.399*(41)	CH_3OH	7(3,5)−6(2,5) E v_t =1	3.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	702479.99* (15)	NH_2D	4(2,3)1(5)−3(3,1)0(4)	1.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	702501.79* (60)	HNCO	32(3,30)−31(3,29)	2.6[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	702501.98* (42)	$^{34}SO_2$	46(2,44)−46(1,45)	2.6[b]	OriMC−1	CSO 10.4 m	Sch01	
	702502.23* (60)	HNCO	32(3,29)−31(3,28)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	702532.848*(56)	CH_3OCH_3	17(7,11)−16(6,10) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702534.763*(50)	CH_3OCH_3	17(7,11)−16(6,10) EE	5.2[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702535.583*(50)	CH_3OCH_3	17(7,11)−16(6,10) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702536.230*(50)	CH_3OCH_3	17(7,11)−16(6,10) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702536.822*(50)	CH_3OCH_3	17(7,10)−16(6,11) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702537.469*(50)	CH_3OCH_3	17(7,10)−16(6,11) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702538.288*(50)	CH_3OCH_3	17(7,10)−16(6,11) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702539.557*(54)	CH_3OCH_3	17(7,10)−16(6,11) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	702718.58* (71)	HNCO	32(2,31)−31(2,30)	3.0	OriMC−1	CSO 10.4 m	Sch01	JPL01
	702831.45* (65)	HNCO	32(2,30)−31(2,29)	4.9[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	702835.47* (42)	HNCO	32(0,32)−31(0,31)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	702895.676*(34)	SO_2	18(4,14)−18(1,17)	5.8	OriMC−1	CSO 10.4 m	Sch01	
	703889.646*(51)	$^{13}CH_3OH$	15(0,15)−14(0,14) E	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	704270.307*(29)	SO_2	16(4,12)−16(1,15)	3.5	OriMC−1	CSO 10.4 m	Sch01	
	704288.757*(86)	CH_3OH	20(2,19)−19(3,16) A−−	5.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	704424.67* (16)	CH_3OCH_3	14(8,7)−13(7,7) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704425.53* (16)	CH_3OCH_3	14(8,7)−13(7,7) EE	5.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704426.40* (16)	CH_3OCH_3	14(8,6)−13(7,7) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704426.40* (16)	CH_3OCH_3	14(8,7)−13(7,6) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704428.32* (16)	CH_3OCH_3	14(8,7)−13(7,6) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704428.33* (16)	CH_3OCH_3	14(8,6)−13(7,7) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704429.19* (16)	CH_3OCH_3	14(8,6)−13(7,6) EE	7.4[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704431.98* (16)	CH_3OCH_3	14(8,6)−13(7,6) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	704638.105*(14)	$^{33}SO_2$	8(6,2)−7(5,3)	1.9	OriMC−1	CSO 10.4 m	Sch01	
	704919.7*(11)	$^{13}CH_3OH$	15(7,8)−14(7,7) E v_t =1	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	705182.279*(31)	CH_3OH	14(2,12)−13(1,12) E	12.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	705422.36* (45)	HNCO	32(1,31)−31(1,30)	2.4	OriMC−1	CSO 10.4 m	Sch01	JPL01
	705464.91* (11)	$^{13}CH_3OH$	15(2,14)−14(2,13) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	705672.104*(30)	SO_2	18(4,14)−17(3,15)	25.3	OriMC−1	CSO 10.4 m	Sch01	
	705724.979*(47)	$^{13}CH_3OH$	15(−1,15)−14(−1,14) E	2.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	705990.15* (37)	CH_3OCH_3	11(9,2)−10(8,3) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705990.15* (37)	CH_3OCH_3	11(9,3)−10(8,2) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705990.97* (37)	CH_3OCH_3	11(9,3)−10(8,3) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705991.79* (37)	CH_3OCH_3	11(9,3)−10(8,3) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705994.19* (37)	CH_3OCH_3	11(9,2)−10(8,2) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705995.01* (38)	CH_3OCH_3	11(9,2)−10(8,3) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705995.01* (38)	CH_3OCH_3	11(9,3)−10(8,2) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	705998.22* (38)	CH_3OCH_3	11(9,2)−10(8,2) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	706082.965*(59)	CH_3OH	15(7,9)−16(6,11) E	2.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	706256.332*(42)	$^{13}CH_3OH$	15(0,15)−14(0,14) A++	4.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	706411.753*(48)	SO_2	40(3,37)−39(4,36)	3.2	OriMC−1	CSO 10.4 m	Sch01	
U	706631.8	unidentified		5.7	OriMC−1	CSO 10.4 m	Sch01	
	706923.442*(54)	$^{13}CH_3OH$	15(2,14)−14(2,13) A−−	2.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707114.45* (16)	$^{13}CH_3OH$	15(7,9)−14(7,8) E	1.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707168.426*(12)	$^{13}CH_3OH$	15(6,10)−14(6,9) E	2.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	707173.34* (13)	$^{13}CH_3OH$	15(6,10)−14(6,9) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707173.34* (13)	$^{13}CH_3OH$	15(6,9)−14(6,8) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707245.448*(97)	$^{13}CH_3OH$	15(5,11)−14(5,10) E	1.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707342.923*(74)	$^{13}CH_3OH$	15(−4,12)−14(−4,11) E	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707368.092*(99)	$^{13}CH_3OH$	15(5,10)−14(5,9) A++	3.6[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707368.102*(99)	$^{13}CH_3OH$	15(5,10)−14(5,9) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707443.637*(78)	$^{13}CH_3OH$	15(4,11)−14(4,10) E	1.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707478.304*(62)	$^{13}CH_3OH$	15(−3,13)−14(−3,12) E	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707518.662*(58)	$^{13}CH_3OH$	15(3,13)−14(3,12) A++	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707604.031*(75)	$^{13}CH_3OH$	15(4,12)−14(4,11) A−−	3.8[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707609.667*(75)	$^{13}CH_3OH$	15(4,11)−14(4,10) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707615.417*(59)	$^{13}CH_3OH$	15(3,12)−14(3,11) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	707727.944*(7)	CH_3CH_2CN	30(10,20)−29(9,21)	1.8[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	707727.944*(7)	CH_3CH_2CN	30(10,21)−29(9,20)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	707812.226*(45)	$^{13}CH_3OH$	15(1,14)−14(1,13) E	2.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	708010.448*(59)	$^{13}CH_3OH$	15(3,12)−14(3,11) E	2.4	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	708055.354*(54)	$^{13}CH_3OH$	15(2,13)−14(2,12) A++	2.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	708216.1	unidentified		2.8	OriMC−1	CSO 10.4 m	Sch01	
	708269.32* (20)	$H_2{}^{13}CO$	10(2,9)−9(2,8)	4.1	OriMC−1	CSO 10.4 m	Sch01	
	708392.421*(20)	SO_2	13(5,9)−12(4,8)	26.6	OriMC−1	CSO 10.4 m	Sch01	
	708470.430 (70)	H_2S	3(1,2)−3(0,3)	23.9	OriMC−1	CSO 10.4 m	Sch01	JPL01
	708546.213*(22)	$^{13}CH_3OH$	6(−2,5)−5(−1,5) E	4.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	708654.2	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
	708785.861*(24)	HCN	8−7 v_2 =1 ℓ=1 e	13.4	OriMC−1	CSO 10.4 m	Sch01	Mak02
	708811.374*(78)	CH_3OH	19(0,19)−18(1,17) E	16.3[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	708877.004*(4)	HCN	8−7	48.7	OriMC−1	CSO 10.4 m	Sch01	Mak02
	708979.327*(40)	SO_2	20(4,16)−20(1,19)	4.5	OriMC−1	CSO 10.4 m	Sch01	
U	709006.3	unidentified		4.1	OriMC−1	CSO 10.4 m	Sch01	
	709201.735*(48)	$^{13}CH_3OH$	15(−2,14)−14(−2,13) E	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	709308.3	unidentified		6.7	OriMC−1	CSO 10.4 m	Sch01	
U	709466.2	unidentified		5.1	OriMC−1	CSO 10.4 m	Sch01	
	709510.736*(62)	SO_2	37(3,35)−36(2,34)	5.7	OriMC−1	CSO 10.4 m	Sch01	
	710385.894*(25)	$^{13}CH_3OH$	9(1,9)−8(0,8) A++	4.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	710386.96* (65)	$H_2{}^{13}CO$	10(4,7)−9(4,6)	4.5[b]	OriMC−1	CSO 10.4 m	Sch01	
	710393.82* (65)	$H_2{}^{13}CO$	10(4,6)−9(4,5)	[b]	OriMC−1	CSO 10.4 m	Sch01	
	710572.657*(64)	$^{34}SO_2$	21(4,18)−20(3,17)	3.8	OriMC−1	CSO 10.4 m	Sch01	
	710918.690*(25)	SO_2	14(4,10)−14(1,13)	3.4	OriMC−1	CSO 10.4 m	Sch01	
	711020.908*(32)	$^{34}SO_2$	14(5,9)−13(4,10)	5.2	OriMC−1	CSO 10.4 m	Sch01	
	711302.032*(19)	CH_3CH_2CN	18(16,2)−18(15,3)	1.7[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	711302.032*(19)	CH_3CH_2CN	18(16,3)−18(15,4)	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	711316.9	unidentified		1.7	OriMC−1	CSO 10.4 m	Sch01	
	711416.38* (31)	$H_2{}^{13}CO$	10(3,7)−9(3,6)	3.6	OriMC−1	CSO 10.4 m	Sch01	
	712010.528*(72)	SO_2	40(0,40)−39(1,39)	7.2	OriMC−1	CSO 10.4 m	Sch01	
	712372.048*(25)	HCN	8−7 v_2 =1 ℓ=1 f	11.6	OriMC−1	CSO 10.4 m	Sch01	Mak02
U	712527.	unidentified		2.6	OriMC−1	CSO 10.4 m	Sch01	
U	712747.	unidentified		4.0	OriMC−1	CSO 10.4 m	Sch01	
	712808.013*(44)	$^{13}CH_3OH$	15(1,14)−14(1,13) A−−	2.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	712825.714*(62)	SO_2	39(2,38)−38(1,37)	6.3	OriMC−1	CSO 10.4 m	Sch01	
	713341.37* (16)	HCO^+	8−7	24.7	OriMC−1	CSO10.4m	Sch01	
U	713409.6	unidentified		3.6	OriMC−1	CSO10.4m	Sch01	
	714223.757*(22)	$^{34}SO_2$	9(6,4)−8(5,3)	2.7	OriMC−1	CSO 10.4 m	Sch01	
U	714375.3	unidentified		2.0	OriMC−1	CSO 10.4 m	Sch01	
U	714455.9	unidentified		3.2	OriMC−1	CSO 10.4 m	Sch01	
	714505.5*(16)	NS	J,F=31/2,31/2−29/2,29/2 e	2.8[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	714505.6*(16)	NS	J,F=31/2,29/2−29/2,25/2 e	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	714505.6*(16)	NS	J,F=31/2,33/2−29/2,31/2 e	[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
U	714617.5	Unidentified		2.8	OriMC−1	CSO 10.4 m	Sch01	
	714747.08*(6)	NH_2D	3(0,3)0(4)−2(1,1)1(3)	1.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	714779.476*(15)	SO_2	8(6,2)−7(5,3)	7.9	OriMC−1	CSO 10.4 m	Sch01	
U	714971.8	unidentified		4.4	OriMC−1	CSO 10.4 m	Sch01	
U	714984.0	unidentified		5.2	OriMC−1	CSO 10.4 m	Sch01	
U	715195.9	unidentified		3.9	OriMC−1	CSO 10.4 m	Sch01	
	715237.95* (42)	CH_3OH	9(−1,8)−8(2,7) E v_t =1	5.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	715407.1	unidentified		2.9	OriMC−1	CSO 10.4 m	Sch01	
U	715446.0	unidentified		3.7	OriMC−1	CSO 10.4 m	Sch01	
U	715767.2	unidentified		3.3	OriMC−1	CSO 10.4 m	Sch01	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	716121.622*(17)	CH_3CN	39(6)−38(6)	3.7	OriMC−1	CSO 10.4 m	Sch01	
U	716167.5	unidentified		5.1	OriMC−1	CSO 10.4 m	Sch01	
	716194.543 (50)	^{34}SO	16(17)−15(16)	4.7	OriMC−1	CSO 10.4 m	Sch01	COL01
	716270.891*(14)	CH_3CN	39(5)−38(5)	4.0	OriMC−1	CSO 10.4 m	Sch01	
	716393.103*(14)	CH_3CN	39(4)−38(4)	3.1	OriMC−1	CSO 10.4 m	Sch01	
	716488.208*(15)	CH_3CN	39(3)−38(3)	5.2	OriMC−1	CSO 10.4 m	Sch01	
	716556.167*(17)	CH_3CN	39(2)−38(2)	1.7	OriMC−1	CSO 10.4 m	Sch01	
	716596.954*(18)	CH_3CN	39(1)−38(1)	4.4	OriMC−1	CSO 10.4 m	Sch01	
	716860.67*(5)	NH_2D	2(1,1)1(3)−1(1,0)1(2)	1.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	716938.368*(28)	H_2CO	10(0,10)−9(0,9)	18.1	OriMC−1	CSO 10.4 m	Sch01	
U	717308.3	unidentified		3.1	OriMC−1	CSO 10.4 m	Sch01	
	717334.402 (50)	^{34}SO	18(17)−17(16)	9.7	OriMC−1	CSO 10.4 m	Sch01	COL01
	717837.274*(18)	CH_3OCH_3	21(6,16)−20(5,15) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	717837.408*(18)	CH_3OCH_3	21(6,16)−20(5,15) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	717839.358*(16)	CH_3OCH_3	21(6,16)−20(5,15) EE	1.8[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	717839.376*(20)	CH_3OCH_3	21(6,16)−20(5,15) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	718158.806*(15)	CH_3OH	15(1,15)−14(1,14) A++	16.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	718209.190*(41)	$^{13}CH_3OH$	4(−4,1)−3(−3,1) E	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	718304.947*(18)	CH_3OCH_3	21(6,15)−20(5,16) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	718305.082*(18)	CH_3OCH_3	21(6,15)−20(5,16) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	718305.956*(16)	CH_3OCH_3	21(6,15)−20(5,16) EE	4.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	718306.898*(20)	CH_3OCH_3	21(6,15)−20(5,16) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	718436.178*(25)	CH_3OH	4(−4,1)−3(−3,1) E	17.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	718764.144*(38)	$^{33}SO_2$	21(4,18)−20(3,17)	3.0[b]	OriMC−1	CSO 10.4 m	Sch01	
	718771.450*(28)	SO_2	13(5,9)−12(4,8) v_2 =1	n.r.	OriMC−1	CSO 10.4 m	Sch01	
	718830.574*(51)	$^{34}SO_2$	20(3,17)−19(2,18)	1.9	OriMC−1	CSO 10.4 m	Sch01	
	719178.410*(10)	CH_3CH_2CN	16(13,3)−15(12,4)	2.3[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	719462.614*(26)	SO_2	17(11,7)−18(10,8)	1.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
	719664.775*(20)	CH_3OH	9(1,9)−8(0,8) A++	12.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	719790.03* (41)	^{30}SiO	15−14 v=0	3.5	OriMC−1	CSO 10.4 m	Sch01	
U	719948.0	unidentified		2.7	OriMC−1	CSO 10.4 m	Sch01	
	720069.340*(18)	CH_3OH	11(0,11)−10(1,10) E v_t =1	2.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	720441.548*(18)	CH_3OH	5(2,4)−4(1,3) A−−	6.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	720723.670*(33)	SO_2	20(3,17)−19(2,18)	13.2	OriMC−1	CSO 10.4 m	Sch01	
	720812.0*( )	CH_3OH	15(1)−14(1) A++ v_t =2	2.1	OriMC−1	CSO 10.4 m	Sch01	Sch01
	721010.717*(12)	CH_3OH	15(0,15)−14(0,14) E	11.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	721351.258*(52)	CH_3OCH_3	18(7,12)−17(6,11) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721352.872*(46)	CH_3OCH_3	18(7,12)−17(6,11) EE	2.3[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721353.361*(46)	CH_3OCH_3	18(7,12)−17(6,11) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721353.881*(46)	CH_3OCH_3	18(7,12)−17(6,11) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721355.948*(46)	CH_3OCH_3	18(7,11)−17(6,12) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721356.467*(46)	CH_3OCH_3	18(7,11)−17(6,12) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721356.956*(48)	CH_3OCH_3	18(7,11)−17(6,12) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721358.051*(50)	CH_3OCH_3	18(7,11)−17(6,12) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	721522.342*(59)	CH_3OH	15(3,13)−14(3,12) E v_t =1	1.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	721541.230*(51)	CH_3OH	15(6,10)−14(6,9) A−− v_t =1	2.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	721541.230*(51)	CH_3OH	15(6,9)−14(6,8) A++ v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	721792.693*(82)	CH_3OH	20(2,18)−19(3,17) A++	2.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722039.105*(29)	CH_3OH	15(1,15)−14(1,14) A++ v_t =1	1.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722075.4*( )	CH_3OH	15(6)−14(6) E v_t =2	0.9	OriMC−1	CSO 10.4 m	Sch01	Sch01
	722161.50* (51)	HNCO	33(1,33)−32(1,32)	3.4	OriMC−1	CSO 10.4 m	Sch01	JPL01
	722316.438*(30)	$^{13}CH_3OH$	4(3,1)−3(2,1) E	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722545.711*(33)	CH_3OH	15(−2,13)−14(−2,12) E v_t =1	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722582.97* (14)	$C^{34}S$	15−14	8.1	OriMC−1	CSO 10.4 m	Sch01	
	722602.147*(41)	CH_3OH	15(−8,8)−14(−8,7) E v_t =1	7.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722615.905*(25)	SO_2	18(2,16)−17(1,17)	9.4	OriMC−1	CSO 10.4 m	Sch01	
	722703.936*(39)	CH_3OH	15(5,10)−14(5,9) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722703.936*(39)	CH_3OH	15(5,11)−14(5,10) A++ v_t =1	2.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722704.97* (20)	SO_2	22(12,10)−23(11,13)	2.7[b]	OriMC−1	CSO 10.4 m	Sch01	JPL01
	722742.811*(30)	CH_3OH	15(4,12)−14(4,11) E v_t =1	1.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722789.490*(29)	CH_3OH	15(2,13)−14(2,12) A++ v_t =1	2.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722805.033*(27)	CH_3OH	15(−3,12)−14(−3,11) E v_t =1	3.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722823.979*(30)	CH_3OH	15(0,15)−14(0,14) E v_t =1	2.7	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722849.297*(29)	CH_3OH	15(1,15)−14(1,14) E v_t =1	3.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	722888.917*(28)	CH_3OH	15(2,14)−14(2,13) A−− v_t =1	2.1	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723040.392*(12)	CH_3OH	15(−1,15)−14(−1,14) E	8.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723193.004*(29)	CH_3OH	15(3,13)−14(3,12) A++ v_t =1	5.0[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

	Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
	723194.756*(30)	CH_3OH	15(3,12)−14(3,11) A−− v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723204.977*(33)	CH_3OH	15(2,14)−14(3,13) E v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723251.959*(42)	CH_3OH	15(−1,14)−14(−1,13) E v_t =1	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723279.970*(35)	CH_3OH	18(−1,18)−17(0,17) E	5.3	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723334.995*(60)	CH_3OH	15(0,15)−14(0,14) A++ v_t =1	6.1[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723338.273*(36)	CH_3OH	15(−4,11)−14(−4,10) E v_t =1	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	723344.48* (15)	CH_3OCH_3	15(8,8)−14(7,8) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723345.28* (15)	CH_3OCH_3	15(8,8)−14(7,8) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723346.07* (15)	CH_3OCH_3	15(8,8)−14(7,7)AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723346.08* (15)	CH_3OCH_3	15(8,7)−14(7,8)AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723347.99* (15)	CH_3OCH_3	15(8,7)−14(7,8)AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723347.99* (15)	CH_3OCH_3	15(8,8)−14(7,7)AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723348.79* (15)	CH_3OCH_3	15(8,7)−14(7,7)EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723351.50* (16)	CH_3OCH_3	15(8,7)−14(7,7)EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	723582.73* (17)	HNCO	7(1,7)−8(0,8)	1.7	OriMC−1	CSO 10.4 m	Sch01	JPL01
	723619.288*(12)	CH_3OH	15(0,15)−14(0,14)A++	7.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
U	723866.6	unidentified		1.5	OriMC−1	CSO 10.4 m	Sch01	
	724121.610*(19)	CH_3OH	4(3,1)−3(2,1) E	8.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724153.938*(35)	CH_3OH	15(−10,5)−14(−10,4) E	1.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724345.382*(13)	CH_3OH	15(2,14)−14(2,13) A−−	2.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724482.235*(21)	CH_3OH	15(7,8)−14(7,7) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724482.235*(21)	CH_3OH	15(7,9)−14(7,8) A++	4.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724506.193*(46)	SO_2	22(4,18)−22(1,21)	4.5	OriMC−1	CSO 10.4 m	Sch01	
	724565.107*(19)	CH_3OH	15(−7,8)−14(−7,7) E	7.0	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724594.444*(20)	CH_3OH	15(7,9)−14(7,8) E	4.5	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724644.726*(17)	CH_3OH	15(6,10)−14(6,9) A−−	6.5[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724644.736*(17)	CH_3OH	15(6,9)−14(6,8) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724647.37* (78)	HNCO	33(2,32)−32(2,31)	6.5	OriMC−1	CSO 10.4 m	Sch01	JPL01
	724648.350*(18)	CH_3OH	15(6,10)−14(6,9) E	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724719.257*(15)	CH_3OH	15(5,11)−14(5,10) E	4.6	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724740.442*(17)	CH_3OH	15(−6,9)−14(−6,8) E	3.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724761.45* (37)	HNCO	33(0,33)−32(0,32)	4.3	OriMC−1	CSO 10.4 m	Sch01	JPL01
	724823.472*(13)	CH_3OH	15(−4,12)−14(−4,11) E	4.9	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724851.142*(15)	CH_3OH	15(−5,10)−14(−5,9) E	5.7[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724855.173*(15)	CH_3OH	15(5,11)−14(5,10) A++	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724855.185*(15)	CH_3OH	15(5,10)−14(5,9) A−−	[b]	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	724942.05* (36)	CH_3OCH_3	12(9,3)−11(8,4) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724942.05* (36)	CH_3OCH_3	12(9,4)−11(8,3) AA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724942.88* (36)	CH_3OCH_3	12(9,4)−11(8,4) EE	5.9[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724943.70* (36)	CH_3OCH_3	12(9,4)−11(8,4) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724945.98* (36)	CH_3OCH_3	12(9,3)−11(8,3) EE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724946.81* (36)	CH_3OCH_3	12(9,3)−11(8,4) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724946.81* (36)	CH_3OCH_3	12(9,4)−11(8,3) AE	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724949.91* (36)	CH_3OCH_3	12(9,3)−11(8,3) EA	[b]	OriMC−1	CSO 10.4 m	Sch01	Gro02
	724962.880*(13)	CH_3OH	15(−3,13)−14(−3,12) E	5.8	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	725013.110*(12)	CH_3OH	15(3,13)−14(3,12) A++	6.2	OriMC−1	CSO 10.4 m	Sch01	Xu_97
	752033.23(49)	H_2O	2(1,1)−2(0,2)	0.002	IRAS10214+4724	IRAM 30 m	Enc93	DeL74
	796982.613*(19)	SO_2	7(7,1)−6(6,0)	7.2	OriMC−1	IRTF 3 m	Stu89	
	797330.308*(26)	HCN	9−8 v_2 =1 ℓ=1 e	11.0	GL2591	JCMT 15 m	Boo01	Mak02
	797433.263*(4)	HCN	9−8	55.	OriMC−1	IRTF 3 m	Stu88	Mak02
U	802270.	unidentified		9.	OriMC−1	IRTF 3 m	Stu89	
	802458.40* (21)	HCO^+	9−8	13.2	OriIRc2	UKIRT 3.8 m	Jaf92	
	804751.188*(50)	HCN	9−8 (0,4,0) ℓ=0	1400[e]	IRC+10216	CSO 10.4 m	Sch00	Mak02
	806651.801*(1)	CO	7−6	110.	OriMC−1	IRTF 3 m	Sch85a	
U	809583.	unidentified		3.5	OriMC−1	IRTF 3 m	Stu89	
	848869.35* (10)	$^{33}SO_2$	21(9,13)−21(8,14)	1.0	OriIRc2	CSO 10.4 m	Par01	JPL01
	848961.73* (50)	HDO	2(1,2)−1(1,1)	5.0	OriIRc2	CSO 10.4 m	Par01	Mes84
	885970.689*(10)	HCN	10−9	15.0	OriIRc2	CSO 10.4 m	Par01	Mak02
	890443.998*(43)	CH_3OH	6(6,1)−6(5,2) E	n.r.	OriIRc2	CSO 10.4 m	Par01	Xu_97
	893638.71* (50)	HDO	1(1,1)−0(0,0)	4.0	OriIRc2	CSO 10.4 m	Par01	Mes84
	991329.295*(12)	^{13}CO	9−8	3.0	W3(IRS5)	KAO 1 m	Bor91	
	1036912.385*(1)	CO	9−8	17.5	W3(IRS5)	KAO 1 m	Bor91	
	1267014.482*(1)	CO	11−10	65.	OriMC−1	KAO 1 m	Ros89	
	1370085.3( )	H_2D^+	1(0,1)−0(0,0)	−0.5	OriMC−1	KAO 1 m	Bor93	Bor93
	1381995.102*(2)	CO	12−11	65.	OriMC−1	KAO 1 m	Ros89	
	1611793.508*(3)	CO	14−13	n.r.	M17	KAO 1 m	Har87	

TABLE 4. Recommended rest frequencies for observed interstellar molecular lines—Continued

Frequency (Unc.) (MHz)	Formula	Quantum numbers	T_r (K)/T_a (K)	Source	Telescope	Astr. Ref.	Lab. Ref.
1646398.143(39)	$H_2{}^{18}O$	2(2,1)−2(1,2)	14[f]	OriMC−1	KAO 1 m	Tim96	Mat99
1655833.9(15)	H_3O^+	1(1)−−1(1)+	n.r.	SgrB2(M)	ISO 0.6 m	Goi01	Ver89
1834746.874*(35)	OH	$^2\Pi_{1/2}$ J=3/2−1/2 F=2−−1+	2.2[aa]	SgrAWest	KAO 1 m	Gen85	Var93
1837816.342*(35)	OH	$^2\Pi_{1/2}$ J=3/2−1/2 F=2+−1−	2.3[aa]	SgrAWest	KAO 1 m	Gen85	Var93
1841345.512*(3)	CO	16−15	2.6[aa]	SgrAWest	KAO 1 m	Gen85	
1956018.137*(4)	CO	17−16	0.7[q]	OriMC−1	KAO 1 m	Sta82	
1968595.39(10)	C_3	J=3−2 v_2 =1−0 ℓ=1−0	−1.5	Sgr B2(M)	KAO 1 m	Gie01	Gie01
1979726.375*(47)	^{13}CO	18−17	2.3[e]	OriMC−1	KAO 1 m	Gen90	
2413917.113*(5)	CO	21−20	0.85[q]	OriMC−1	KAO 1 m	Wat80	
2463428.11(21)	HF	2−1	n.r.	SgrB2(MN)	ISO 0.6 m	Neu97	Jen87
2509948.662*(30)	OH	$^2\Pi_{3/2}$ J=5/2−3/2 F=3+−2−	n.r.	Sgr B2(M)	KAO 1 m	Sto81	Var93
2514316.386*(30)	OH	$^2\Pi_{3/2}$ J=5/2−3/2 F=3−−2+	n.r.	Sgr B2(M)	KAO 1 m	Sto81	Var93
2528172.068*(5)	CO	22−21	1.4[q]	OriMC−1	KAO1 m	Wat80	
2972100.*(99)	H_3O^+	2(0)−−1(0)+	n.r.	SgrB2(M)	I SO 0.6 m	Goi01	Goi01
2980725.*(99)	H_3O^+	2(1)−−1(1)+	n.r.	SgrB2(M)	ISO 0.6 m	Goi01	Goi01
3097909.377*(6)	CO	27−26	0.43[q]	OriMC−1	KAO 1 m	Sto81a	
3438364.643*(7)	CO	30−29	0.16[q]	OriMC−1	KAO 1 m	Sto81a	

[a]The asterisk(*) following a rest frequency indicates that the frequency is a calculated value. The symbol n.r., in the intensity column, means that the intensity was not reported. Abreviations: LSB = lower sideband and USB = upper sideband.
[b]Blended with adjacent transitions, see astronomical reference.
[c]Line−to−continuum ratio(T_L/T_c) = 0.0095.
[d]Blended with a recombination line.
[e]In flux units(f.u.). 1 fu = 10^{-26} W m^{-2} Hz^{-1} = Jansky(Jy).
[f]Integrated intensity, $\int T_{a\delta}\, v$, (K km s^{-1}).
[g]Beam brightness temperature.
[h]Assignment questionable.
[i]Intensity varies with time.
[j]Astronomical reference shows partially resolved hyperfine structure.
[k]Blended with $CH_3{}^{13}CN$.
[l]Peak line radiation temperature.
[m]Only the strongest of several velocity components is listed.
[n]Reported as unidentified in astronomical reference.
[o]The acetaldehyde and formamide lines were observed in different sidebands and are blended in this observation.
[p]The frequency for this unidentified line reported by Clark *et al.* (1979) was in error. The correct frequency is 93.780 GHz as shown here.
[q]Units are 10^{-16} W/cm^2.
[r]Blended with HCO^+ J=3−2.
[s]Originally attributed to NH_2CHO, however this assignment seems inconsistent with other observations.(Cum86)
[t]Assignment from Cum84.
[u]Not observed in Orion survey by Sutton et al. (Sut85).
[v]This line may be blended with NS J= 11/2−9/2.
[w]This line may be blended with NO J= 5/2−3/2.
[x]Confirmed in Tur90.
[y]Although this line is reported in a table of Lor84, it is not apparent in Fig. 2 of this reference.
[z]The J= 54−53 of HC_5N is calculated at 143764.97(10) MHz.
[aa]Units are 10^{-4} erg s^{-1} cm−2 sr^{-1}.

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