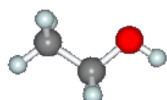
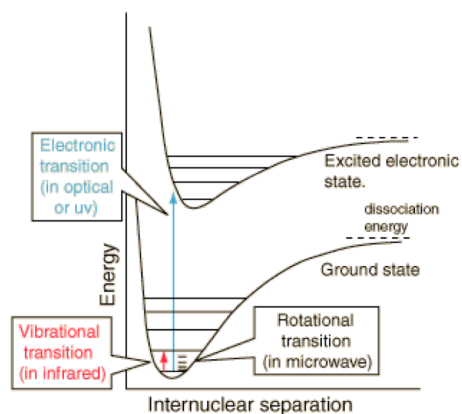


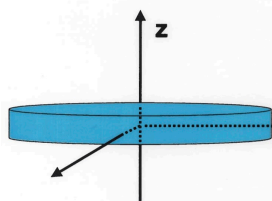
Molecular Spectroscopy



Molecular Potential Energy

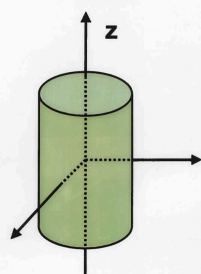


Oblate



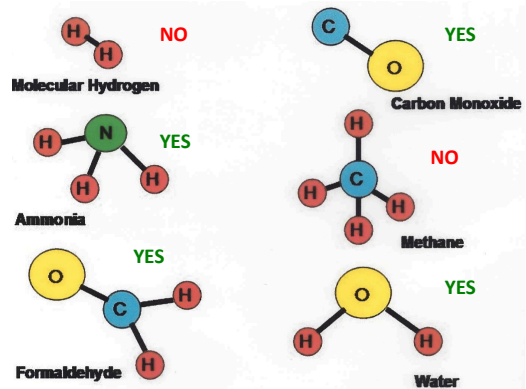
$$I_A = I_B < I_C$$

Prolate



$$I_A < I_B = I_C$$

Permanent Electric Dipole Moments



| ID Name | # Lines | Ver. | Catalog | Documentation |
|---------------------|---------|------|------------|-------------------|
| 1001 H-atom | 1 | 1 | 001001.oat | pdf or New Format |
| 1002 H-atom | 1 | 1 | 001001.oat | pdf or New Format |
| 1003 H ₂ | 1 | 1 | 001001.oat | pdf or New Format |
| 4001 H2+ | 32 | 2 | 004001.oat | pdf or New Format |
| 7001 LiH-a | 21 | 2 | 007001.oat | pdf or New Format |
| 8001 LiH-b | 53 | 2 | 008001.oat | pdf or New Format |
| 8002 LiH-c | 90 | 1 | 008002.oat | pdf or New Format |
| 9001 LiH | 90 | 1 | 009001.oat | pdf or New Format |
| 12001 C-12-atom | 2 | 2 | 012001.oat | pdf or New Format |
| 12002 C-13-atom | 2 | 2 | 012001.oat | pdf or New Format |
| 100001 CO | 500 | 2 | 010001.oat | pdf or New Format |
| 100002 CO | 9 | 2 | 010002.oat | pdf or New Format |
| 10001 N-atom | 2 | 1 | 010001.oat | pdf or New Format |
| 100005 N-atom-O= | 6 | 1 | 010005.oat | pdf or New Format |
| 10001 12CH | 648 | 1 | 010001.oat | pdf or New Format |
| 10004 O2 | 188 | 1 | 010004.oat | pdf or New Format |
| 10001 NH | 1416 | 1 | 010001.oat | pdf or New Format |
| 10001 O-atom | 2 | 2 | 010001.oat | pdf or New Format |
| 10001 OH | 1165 | 4 | 010001.oat | pdf or New Format |
| 17001 NH3 | 1716 | 5 | 017001.oat | pdf or New Format |
| 17002 NH3 | 163 | 1 | 017002.oat | pdf or New Format |
| 17003 CH3O | 4198 | 5 | 017004.oat | pdf or New Format |
| 17004 NH3-a2 | 1760 | 1 | 017004.oat | pdf or New Format |
| 17005 OH-v1,2 | 912 | 1 | 018001.oat | pdf or New Format |
| 18001 O2 | 230 | 2 | 018002.oat | pdf or New Format |
| 18001 N2 | 3986 | 4 | 018003.oat | pdf or New Format |
| 18005 N2D | 3036 | 1 | 018005.oat | pdf or New Format |
| 18006 N2D | 2982 | 4 | 018006.oat | pdf or New Format |
| 18004 12C18O | 162 | 1 | 018004.oat | pdf or New Format |
| 19001 HCN | 399 | 2 | 019001.oat | pdf or New Format |
| 19002 HCN-17 | 400 | 1 | 019002.oat | pdf or New Format |
| 19003 HCN-17 | 406 | 1 | 019003.oat | pdf or New Format |

CO – JPL Line Catalog

Species Tag: 28001
Version: 4
Date: Aug. 1997
Contributor: H. S. P. Müller

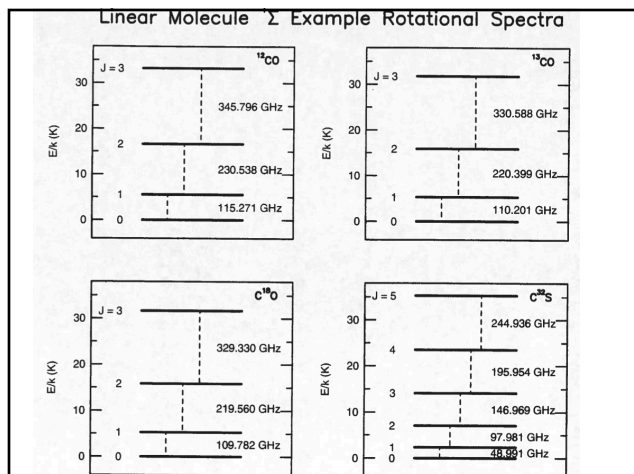
Species Name: CO
Carbon monoxide

Lines Listed: 91 Q(300.0)= 198.965
 Freq. (GHz) < 9043 Q(225.0)= 81.718
 Max. J: 91 Q(150.0)= 54.581
 LOGSTR0= -36.5 Q(75.00)= 27.455
 LOGSTR1= -36.5 Q(37.50)= 13.897
 Isotope Corr.: 0.0 Q(18.75)= 7.122
 Egv. (cm⁻¹) > 0.0 Q(9.375)= 3.744

μ_B = 0.11011 A=
 μ_N = B= 57635.968
 μ_S = C=

The experimental measurements were reported by (1) G. Winnewisser, S. P. Belov, Th. Klaus and R. Schieder, 1997, J. Mol. Spect. 184, . The dipole moment and dipole centrifugal corrections are taken from (2) D. Goorvitch, 1994, Astrophys. J. Suppl. 95, 535.

| Frequency | Unc. | Log(Int.) | Ei (cm ⁻¹) | g _u | Tag | J _u | J _l | |
|--------------|-------|-----------|------------------------|----------------|-----|----------------|----------------|---|
| 115271.2018 | .0005 | -5.0105 | 2 | .0000 | 3 | -28001 | 101 1 | 0 |
| 230538.0000 | .0005 | -4.1197 | 2 | 3.8450 | 5 | -28001 | 101 2 | 1 |
| 345795.9899 | .0005 | -3.6118 | 2 | 11.5350 | 7 | -28001 | 101 3 | 2 |
| 461040.7682 | .0005 | -3.2657 | 2 | 23.0695 | 9 | -28001 | 101 4 | 3 |
| 576267.9305 | .0005 | -3.0118 | 2 | 38.4481 | 11 | -28001 | 101 5 | 4 |
| 691473.0763 | .0005 | -2.8193 | 2 | 57.4704 | 13 | -28001 | 101 6 | 5 |
| 806651.8060 | .0050 | -2.6716 | 2 | 80.7354 | 15 | -28001 | 101 7 | 6 |
| 921799.7000 | .0050 | -2.5590 | 2 | 107.6424 | 17 | -28001 | 101 8 | 7 |
| 1036912.3930 | .0050 | -2.4751 | 2 | 138.3904 | 19 | -28001 | 101 9 | 8 |
| 1151985.4520 | .0110 | -2.4156 | 2 | 172.9780 | 21 | -28001 | 10110 | 9 |



Angular Momentum Expansion

Accounts for molecular potential, centrifugal stretching, etc.

$$E = B [J(J+1)]^1 - D [J(J+1)]^2 + H [J(J+1)]^3 + \dots$$

Table 2
Molecular constants for C₃N⁻.

| | This work ^a | Ref. [16] |
|---------|------------------------|----------------|
| B/MHz | 4851.62155(27) | 4851.62153(17) |
| D/Hz | 686.06(16) | 685.78(9) |
| H/μHz | 98.(30) | |
| eQq/MHz | -3.2483(72) | -3.248(5) |

^a The numbers in parentheses indicate one standard deviation to the last significant digits.

Amano 2010, Journal of Molecular Spectroscopy 259, 16