

Cy 9K38-2

A BIBLIOGRAPHY ON MICROWAVE (ROTATIONAL) SPECTROSCOPY

James E. Wollrab

August 1965

CLEARINGHOUSE
FOR FEDERAL SCIENTIFIC AND
TECHNICAL INFORMATION

Hardcopy	Microfilm		
\$4.00	\$0.75	106	as

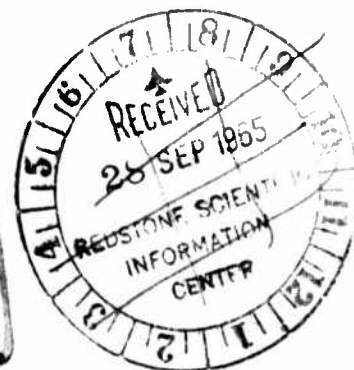
ARCHIVE COPY

Code 1

PROCESSING COPY



U S ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA



JAN 12 1966
LIBRARY
U.S. AIR FORCE

4 August 1965

Report No. RD-TM-65-14

A BIBLIOGRAPHY
ON MICROWAVE (ROTATIONAL) SPECTROSCOPY

by

James E. Wollrab

Aerodynamics Branch
Advanced Systems Laboratory
Directorate of Research and Development
U.S. Army Missile Command
Redstone Arsenal, Alabama

ABSTRACT

The references listed in this bibliography include a majority of the important papers and books that are related to the development of microwave spectroscopy. General references relating to the basic concepts of rotational and, in a limited way, vibrational spectroscopy are also included. Titles of dissertations, reports which have not been published in the open literature, and abstracts of papers presented at spectroscopy symposia generally are not given. Rather than a pure chronological listing, the references have been placed under specific topic headings whenever possible. A chronological order under these headings is maintained. Since a unique classification of each article is impossible, references which do not fall directly under one of the specific topics are listed in Section XII.

Several other bibliographies are available. Townes and Schawlow²⁸ compiled a complete listing up through 1954. In addition, Favero³⁸ has compiled a bibliography covering 1954 through 1962, and Starck³⁹ has completed one for 1945 through 1962. However, the latter two are not as generally available as might be desired. (See Section I.)

This bibliography includes a majority of the references concerning microwave spectroscopy through 1964, and a number of references from early 1965. Titles are listed to enable a better preliminary assessment of the articles. The listing is a print from IBM cards and a special notation is required in some instances. Atomic weights are given in parentheses following the atomic symbol, e. g., N(14) for N¹⁴. All letters are in the upper case, e. g., L-TYPE DOUBLING is written for *l*-type doubling. Numerical subscripts are written on the same level as the atomic symbol, e. g., H₂S is written for H₂S.

Preceding some of the reference lists are very brief resumes. These are not intended to serve as reviews of each area but merely to point out some of the more important or recent progress in each area.

CONTENTS

	Page
Section I. GENERAL AND REVIEW ARTICLES	1
Section II. INSTRUMENTATION	5
Section III. LINE SHAPE AND LINE BROADENING	15
Section IV. THE RIGID ROTOR	19
Section V(a). GENERAL VIBRATION-ROTATION INTERACTION	25
Section V(b). CENTRIFUGAL DISTORTION	27
Section V(c). CORIOLIS COUPLING	29
Section V(d). L-TYPE DOUBLING	30
Section VI. MOLECULAR STRUCTURE	33
Section VII. QUADRUPOLE COUPLING	37
Section VIII. HINDERED INTERNAL ROTATION	45
Section IX. INVERSION	55
Section X. STARK EFFECT	61
Section XI. ELECTRONIC AND MAGNETIC EFFECTS (ZEEMAN EFFECT)	65
Section XII. GENERAL MICROWAVE PAPERS AND RELATED TOPICS	71

Section I. GENERAL AND REVIEW ARTICLES

1. E.U.CONDON AND G.H.SHORTLEY,THE THEORY OF ATOMIC SPECTRA, MCGRAW-HILL BOOK COMPANY INC,NEW YORK(1935)
2. G.HERZBERG,INFRARED AND RAMAN SPECTRA,D.VAN NOSTRAND COMPANY INC., NEW YORK(1945)
3. W.GORDY,REVS.MOD.PHYS.20,668-717(1948) MICROWAVE SPECTROSCOPY
4. B.P.DAILEY,ANAL.CHEM.21,540-544(1949) MICROWAVE SPECTRA AND CHEMICAL ANALYSIS
5. H.B.G.CASIMIR,NED.TIJDSCHR.NATUURKDE 16,198-206(1950) THE INFLUENCE OF MAGNETIC AND ELECTRICAL PROPERTIES OF ATOMIC NUCLEI ON THE ENERGY LEVELS OF ATOMS AND MOLECULES
6. B.L.CRAWFORD,JR. AND D.E.MANN,ANN.REV.PHYS.CHEM.1,151-169(1950) SPECTROSCOPY
7. G.HERZBERG,SPECTRA OF DIATOMIC MOLECULES,D.VAN NOSTRAND COMPANY, NEW YORK(1950)
8. P.KISLIUK AND C.H.TOWNES,J.RESEARCH NATL.BUR.STANDARDS 44,611-641 (1950) MOLECULAR MICROWAVE SPECTRA TABLES
9. D.H.WHIFFEN,QUART.REV.4,131-152(1950) ROTATION SPECTRA
10. E.B.WILSON,JR.,ANN.REV.PHYS.CHEM.2,151-176(1951) MICROWAVE SPECTROSCOPY OF GASES
11. B.BAK,TRANS.INSTRUM.MEAS.CONF.1952,8-14(1952) A MICROWAVE SPECTROSCOPE AND A REVIEW OF MICROWAVE SPECTROSCOPY
12. P.KISLIUK AND C.H.TOWNES,CIRC.NAT.BUR.STAND.,NO.518(1952) MOLECULAR MICROWAVE SPECTRA TABLES
13. A.H.NETHERCOT,J.A.KLEIN,J.H.N.LOUBSER,AND C.H.TOWNES,NUOVO CIMENTO 9, 358-363(1952) SPECTROSCOPY NEAR THE BOUNDARY BETWEEN THE MICROWAVE AND INFRARED REGIONS
14. C.H.TOWNES,ANN.N.Y.ACAD.SCI.55,745-750(1952) THE PRESENT STATUS OF MICROWAVE SPECTROSCOPY
15. E.B.WILSON,JR.,ANN.N.Y.ACAD.SCI.55,943-954(1952) THE SIGNIFICANCE OF THE RESULTS OF MICROWAVE SPECTROSCOPY TO CHEMICAL VALENCE THEORY
16. B.P.DAILEY,ANN.REV.PHYS.CHEM.4,425-444(1953) MICROWAVES AND NUCLEAR RESONANCE
17. W.GORDY,W.V.SMITH, AND R.F.TRAMBARULO,MICROWAVE SPECTROSCOPY, JOHN WILEY AND SONS INC.,NEW YORK(1953)
18. R.J.MYERS AND W.D.GWINN,ANN.REV.PHYS.CHEM.5,385-394(1954) THE MICROWAVE SPECTRA OF GASES
19. M.W.P.STRANDBERG,MICROWAVE SPECTROSCOPY,METHUEN AND COMPANY LTD. LONDON(1954) AND JOHN WILEY AND SONS INC.,NEW YORK(1954)

20. C.H.TOWNES AND A.L.SCHAWLOW,MICROWAVE SPECTROSCOPY,MCGRAW-HILL BOOK COMPANY INC.,NEW YORK(1955)
21. E.B.WILSON,JR.,J.C.DECIUS,AND P.C.CROSS,MOLECULAR VIBRATIONS, MCGRAW-HILL COMPANY INC.,NEW YORK(1955)
22. E.B.WILSON,JR.AND D.R.LIDE,JR.,DETERMINATION OF ORGANIC STRUCTURES BY PHYSICAL METHODS,CHAPTER 12,MICROWAVE SPECTROSCOPY, ACADEMIC PRESS INC.,NEW YCRK(1955)
23. B.P.DAILEY,PHYSICAL METHODS IN CHEMICAL ANALYSIS 3,281-301 ACADEMIC PRESS INC.,NEW YORK(1956)
24. D.J.E.INGRAM,SPECTROSCOPY AT RADIO AND MICROWAVE FREQUENCIES, PHILOSOPHICAL LIBRARY INC.,NEW YORK(1956)
25. E.ROUBINE,CHIM.ANAL.38,402-409,428-431(1956) MICROWAVE SPECTROSCOPY OF GASES
26. J.H.N.LOUBSER,TYDSKR.WETENSKAP EN KUNS 17,166-174(1957) CHEMICAL ANALYSIS BY MICROWAVE SPECTROSCOPY
27. J.SHERIDAN,BOLL.SCI.FAC.CHIM.IND.BOLOGNA 16,71-79(1958) RECENT PROGRESS IN THE MICROWAVE SPECTROSCOPY OF GASES
28. J.SHERIDAN,RICERCA SCI.28,1801-1816(1958) SOME CONTRIBUTIONS OF MICROWAVE SPECTROSCOPY TO CHEMISTRY
29. L.A.BLYUMENFELD AND V.V.VOEVOFSKII,VESTNIK AKAD.NAUK.S.S.S.R. 29, 16-21(1959) RADIOSPECTROSCOPY AND ITS APPLICATION IN CHEMISTRY
30. W.ZEIL,Z.ANAL.CHEM.170,19-29(1959) POSSIBLE USES OF MICROWAVE SPECTROSCOPY FOR QUALITATIVE AND QUANTITATIVE ANALYSIS
31. D.INGRAM,DISCOVERY(LONDON)23,29-35(1962) SPECTRA IN THE MICROWAVE REGION
32. W.MAIER,PURE APPL.CHEM.4,157-174(1962) MICROWAVE SPECTROSCOPY
33. E.B.WILSON,JR.,PURE AND APPL.CHEM.4,1-13(1962) VIBRATIONAL ROTATIONAL SPECTRA
34. H.C.ALLEN,JR. AND P.C.CROSS,MOLECULAR VIB-ROTORS,JOHN WILEY AND SONS INC.,NEW YORK(1963)
35. P.G.FAVERO,MICROWAVE GAS SPECTROSCOPY BIBLIOGRAPHY,1954-1962(1963)
36. L.KELLNER,SCIENTIA(MILAN)98,51-56(1963) MICROWAVE SPECTROSCOPY
37. W.MAIER,BER.BUNSENES PHYSIK CHEM.67,539-553(1963) APPLICATIONS OF MICROWAVE SPECTROSCOPY IN PHYSICAL CHEMISTRY
38. D.J.MILLEN,CHEM.IND.(LONDON)1963,1472-1482(1963) DEVELOPMENT IN MICROWAVE SPECTROSCOPY
39. B.STARCK,BIBLIOGRAPHY OF RESEARCH IN THE MICROWAVE SPECTRA OF MOLECULES DURING THE YEARS(1945-1962),(1963)

40. E.B.WILSON, JR., PURE APPL.CHEM.7,23-31(1963) RECENT RESULTS OF CHEMICAL INTEREST FROM MICROWAVE SPECTROSCOPY
41. G.W.KING, SPECTROSCOPY AND MOLECULAR STRUCTURE, HOLT, RINEHART, AND WINSTON, INC. NEW YORK (1964)
42. D.R.LIDE, JR., ANN.REV.PHYS.CHEM.15,225-250(1964) MICROWAVE SPECTROSCOPY
43. K.SHIMODA, BEAM MASER SPECTROSCOPY AND APPLICATIONS, 349-355 IN QUANTUM ELECTRONICS, PARIS 1963 CONFERENCE, COLUMBIA UNIVERSITY PRESS, NEW YORK (1964)

Section II. INSTRUMENTATION

A majority of microwave studies have been carried out using the conventional square-wave Stark-modulated microwave spectrometer^{5, 11, 21, 24, 112} employing phase-sensitive detection and a reflex klystron source. Measurements have been extended from X-band up into the millimeter wave region through the use of harmonic generators and the development of high frequency tubes.^{45, 46, 62, 63, 89, 93, 128} Sensitivity and resolution have been improved by frequency stabilization^{1, 6-8} and to a greater degree by phase stabilization of the source.

The demonstration of maser principles led to their use in the study of rotational spectra. Very narrow line widths have been achieved with beam-maser spectrometers^{100, 113} allowing the observation of hyperfine splittings which are too small to be resolved on a conventional spectrometer. Maser action has also been used to identify weak transitions when they have levels in common with stronger lines whose quantum numbers are known.^{94, 106}

Although Stark effect spectrometers predominate, Zeeman effect studies^{32, 33, 107} have been accomplished using a variety of cell designs. Other specialized microwave spectrometers include cells with "flow-through" systems for the study of short-lived free radicals, parallel plate absorption cells for precision dipole moment measurements,⁷² radio frequency and microwave molecular beam devices,^{73, 116, 119} and high-temperature cells.^{31, 48, 51} Relative and absolute absorption intensities, as well as line width measurements, also require specialized system design.^{85, 102, 111, 141} Millimeter wave transitions are being investigated as a possible source for a millimeter frequency standard.^{122-126, 132-135}

1. R.V.POUND, REV. SCI. INSTR. 17, 490-505 (1946) ELECTRONIC FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS
2. A.ROBERTS, Y.BEERS, AND A.G.HILL, PHYS.REV. 70, 112 (1946) THE MEASUREMENT OF NUCLEAR SPIN, MAGNETIC MOMENT, AND HYPERFINE STRUCTURE SEPARATION BY A MICROWAVE FREQUENCY MODULATION METHOD
3. R.L.CARTER AND W.V.SMITH, PHYS.REV. 72, 1265-1266 (1947) MICROWAVE SPECTRUM FREQUENCY MARKERS
4. W.GORDY AND M.KESSLER, PHYS.REV. 72, 644 (1947) A NEW ELECTRONIC SYSTEM FOR DETECTING MICROWAVE SPECTRA
5. R.H.HUGHES AND E.B.WILSON, JR., PHYS.REV. 71, 562-563 (1947) A MICROWAVE SPECTROGRAPH
6. R.V.POUND, PROC. INST. RADIO ENGRS. 35, 1405-1415 (1947) FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS
7. R.V.POUND, (IN C.G.MONTGOMERY) TECHNIQUES OF MICROWAVE MEASUREMENTS, MCGRAW-HILL BOOK COMPANY, INC., PP. 58-78, NEW YORK (1947)
8. V.C.RIDEOUT, PROC. INST. RADIO ENGRS. 35, 767-771 (1947) AUTOMATIC FREQUENCY CONTROL OF MICROWAVE OSCILLATORS
9. W.V.SMITH, J.L.G.DE QUEVEDO, R.L.CARTER, AND W.S.BENNETT, J. APPL. PHYS. 18, 1112-1115 (1947) FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS BY SPECTRUM LINES
10. R.J.WATTS AND D.WILLIAMS, PHYS.REV. 72, 1122-1123 (1947) A DOUBLE MODULATION DETECTION METHOD FOR MICROWAVE SPECTRA
11. R.J.WATTS AND D.WILLIAMS, PHYS.REV. 72, 980-981 (1947) A MODIFIED STARK-EFFECT MODULATION SPECTROGRAPH FOR MICROWAVES
12. W.D.HERSCHBERGER, J. APPL. PHYS. 19, 411-419 (1948) MINIMUM DETECTABLE ABSORPTION IN MICROWAVE SPECTROSCOPY AND AN ANALYSIS OF THE STARK MODULATION METHOD
13. C.K.JEN, J. APPL. PHYS. 19, 649-653 (1948) A METHOD FOR MEASURING THE COMPLEX DIELECTRIC CONSTANT OF GASES AT MICROWAVE FREQUENCIES BY USING A RESONANT CAVITY
14. R.KARPLUS, PHYS.REV. 73, 1027-1034 (1948) FREQUENCY MODULATION IN MICROWAVE SPECTROSCOPY
15. R.KARPLUS AND J.SCHWINGER, PHYS.REV. 73, 1020-1026 (1948) A NOTE ON SATURATION IN MICROWAVE SPECTROSCOPY
16. J.L.G.DE QUEVEDO AND W.V.SMITH, J. APPL. PHYS. 19, 831-836 (1948) FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS BY SPECTRUM LINES II
17. C.H.TOWNES AND S.GESCHWIND, J. APPL. PHYS. 19, 795-796 (1948) LIMITING SENSITIVITY OF A MICROWAVE SPECTROMETER
18. W.G.TULLER, W.C.GALLOWAY, AND F.P.ZAFFARANO, PROC. INST. RADIO ENGRS. 36, 794-800 (1948) RECENT DEVELOPMENTS IN FREQUENCY STABILIZATION

OF MICROWAVE OSCILLATORS

19. R.UNTERBERGER AND W.V.SMITH,REV.SCI.INSTR.19,580-585(1948) A MICROWAVE SECONDARY FREQUENCY STANDARD
20. L.C.HEDRICK,REV.SCI.INSTR.20,781-783(1949) A FLEXIBLE HIGH VOLTAGE SQUARE WAVE GENERATOR
21. K.B.MCAFEE,JR.,R.H.HUGHES,AND E.B.WILSON,JR.,REV.SCI.INSTR.20, 821-826(1949) A STARK-EFFECT MICROWAVE SPECTROGRAPH OF HIGH SENSITIVITY
22. D.H.BAIRD,R.M.FRISTROM, AND M.H.SIRVETZ,REV.SCI.INSTR.21,881(1950) STARK EFFECT ABSORPTION CELLS FOR MICROWAVE SPECTROSCOPY
23. T.R.HARTZ AND A.VAN DER ZIEL,PHYS.REV.78,473(1950) A SQUARE-WAVE MODULATION METHOD FOR MICROWAVE SPECTRA
24. A.H.SHARBAUGH,REV.SCI.INSTR.21,120-135(1950) THE DESIGN AND CONSTRUCTION OF A STARK-MODULATION MICROWAVE SPECTROGRAPH
25. I.TAKAHASHI,A.OKAYA,T.OGAWA,AND T.HASHI,MEM.COLLEGE SCIENCE,UNIV. KYOTO 26,113-121(1950) 1.5 CM WAVELENGTH MICROWAVE SPECTROSCOPE
26. E.S.DAYHOFF,REV.SCI.INSTR.22,1025-1026(1951) A FREQUENCY CONTROLLER FOR REFLEX KLYSTRONS
27. R.FREYMAN,PHYSICA 17,328-332(1951) REMARK ON THE ROTATIONAL METHOD AND THE METHOD OF PERTURBATIONS IN THE ULTRA-HERTZIAN REGION. APPARATUS FOR MEASURING THE ABSORPTION OF VAPORS FOR FREQUENCIES NEAR 10000 MC
28. L.C.HEDRICK,REV.SCI.INSTR.22,537(1951) SYNCHRONIZER FOR 100 KC SQUARE WAVE GENERATOR
29. G.NEWELL AND R.H.DICKE,PHYS.REV.83,1064-1065(1951) A METHOD FOR REDUCING THE DOPPLER BREADTH OF MICROWAVE ABSORPTION LINES
30. E.ROUBINE,REV.TECH.C.F.T.H.16,21-44(1951) REALIZATION OF A SPECTROSCOPE FOR MILLIMETER WAVES
31. L.J.RUEGER,H.LYONS,AND R.G.NUCKOLLS,REV.SCI.INSTR.22,428(1951) A HIGH TEMPERATURE BROAD-BAND STARK CELL FOR MICROWAVE SPECTROSCOPY
32. K.SHIMODA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 6,516-520(1951) A ZEEMAN MODULATION MICROWAVE SPECTROGRAPH OF HIGH SENSITIVITY
33. J.R.ESHBACH AND M.W.P.STRANDBERG,REV.SCI.INSTR.23,623-628(1952) APPARATUS FOR ZEEMAN EFFECT MEASUREMENTS ON MICROWAVE SPECTRA
34. S.GESCHWIND,ANN.N.Y.ACAD.SCI.55,751-773(1952) HIGH-RESOLUTION MICROWAVE SPECTROSCOPY
35. W.GORDY,ANN.N.Y.ACAD.SCI.55,774-788(1952) MICROWAVE SPECTROSCOPY ABOVE 60 KMC
36. R.H.HUGHES,ANN.N.Y.ACAD.SCI.55,872-890(1952) CHEMICAL ANALYSIS WITH THE MICROWAVE SPECTROGRAPH

37. H.R. JOHNSON, PHYS. REV. 85, 764. (1952) RESOLUTION AND SENSITIVITY OF MICROWAVE SPECTROGRAPHS
38. J.A. KLEIN, J.H.N. LOUBSER, A.H. NETHERCOT, AND C.H. TOWNES, REV. SCI. INSTR. 23, 78-82 (1952) MAGNETRON HARMONICS AT MILLIMETER WAVELENGTHS
39. H. LYONS, ANN. N.Y. ACAD. SCI. 55, 831-871 (1952) SPECTRAL LINES AS FREQUENCY STANDARDS
40. L. ESSEN, PROC. INST. ELEC. ENGRS. (LONDON), PT. III 100, 19-24 (1953) A HIGHLY STABLE MICROWAVE OSCILLATOR AND ITS APPLICATION TO THE MEASUREMENT OF THE SPATIAL VARIATIONS OF REFRACTIVE INDEX IN THE ATMOSPHERE
41. D.H. BAIRD AND G.R. BIRD, REV. SCI. INSTR. 25, 319-323 (1954) A METHOD FOR THE ESTIMATION OF THE RELATIVE INTENSITIES OF MICROWAVE ABSORPTION LINES
42. G.R. BIRD, REV. SCI. INSTR. 25, 324-326 (1954) NOTE ON THE ESTIMATION OF ABSOLUTE ABSORPTION INTENSITIES WITH A STARK-MODULATED MICROWAVE SPECTROGRAPH
43. R.J. COLLIER, REV. SCI. INSTR. 25, 1205-1207 (1954) VARIABLE-FREQUENCY MICROWAVE CAVITY SPECTROMETER
44. W.A. HARDY, P. FLETCHER, AND V. SUAREZ, REV. SCI. INSTR. 25, 1135 (1954) A MICROWAVE ABSORPTION CELL FOR REACTIVE MOLECULES
45. C.M. JOHNSON, D.M. SLAGER, AND D.D. KING, REV. SCI. INSTR. 25, 213-217 (1954) MILLIMETER WAVES FROM HARMONIC GENERATORS
46. W.C. KING AND W. GORDY, PHYS. REV. 93, 407-412 (1954) ONE-TO-TWO MILLIMETER WAVE SPECTROSCOPY. IV. EXPERIMENTAL METHODS AND RESULTS FOR OCS, CH₃F, AND H₂O
47. T.M. SANDERS, JR., A.L. SCHAWLOW, G.C. DOUSMANIS, AND C.H. TOWNES, J. CHEM. PHYS. 22, 245-246 (1954) EXAMINATION OF METHODS FOR DETECTING OH
48. M.L. STITCH, A. HONIG, AND C.H. TOWNES, REV. SCI. INSTR. 25, 759-764 (1954) A HIGH-TEMPERATURE MICROWAVE SPECTROMETER
49. M.W.P. STRANDBERG AND H. DREICER, PHYS. REV. 94, 1393-1394 (1954) DOPPLER LINE-WIDTH REDUCTION
50. M.W.P. STRANDBERG, H.R. JOHNSON, AND J.R. ESHBACH, REV. SCI. INSTR. 25, 776-792 (1954) APPARATUS FOR MICROWAVE SPECTROSCOPY
51. P.A. TATE AND M.W.P. STRANDBERG, REV. SCI. INSTR. 25, 956-958 (1954) A SIMPLE HIGH-TEMPERATURE MICROWAVE SPECTROGRAPH
52. R.H. DICKE AND R.H. ROMER, REV. SCI. INSTR. 26, 915-928 (1955) PULSE TECHNIQUES IN MICROWAVE SPECTROSCOPY
53. G. ERLANDSSON, ARKIV FYSIK 9, 399-434 (1955) A MICROWAVE SPECTROMETER AND ITS APPLICATIONS TO SOME ORGANIC MOLECULES
54. J.P. GORDON, PHYS. REV. 99, 1253-1263 (1955) HYPERFINE STRUCTURE IN THE

INVERSION SPECTRUM OF $N(14)H_3$ BY A NEW HIGH-RESOLUTION MICROWAVE SPECTROMETER

55. J.P.GORDON,H.J.ZEIGER,AND C.H.TOWNES,PHYS.REV.99,1264-1274(1955) THE MASER-NEW TYPE OF MICROWAVE AMPLIFIER,FREQUENCY STANDARD AND SPECTROMETER
56. A.OKAYA,REV.SCI.INSTR.26,1024-1028(1955) SOME DEVICES FOR STARK MODULATION MILLIMETER-WAVE SPECTROGRAPH
57. M.PETER AND M.W.P.STRANDBERG,PHYS.REV.99,667 (1955) MOLECULAR-BEAM MICROWAVE ABSORPTION SPECTROSCOPE
58. M.PETER AND M.W.P.STRANDBERG,PROC.INST.RADIO ENGRS.43,869-873(1955) PHASE STABILIZATION OF MICROWAVE OSCILLATORS
59. K.SHIMODA AND T.C.WANG,REV.SCI.INSTR.26,1148-1149(1955) NEW METHOD FOR THE OBSERVATION OF HYPERFINE STRUCTURE IN NH_3 IN A --MASER-- OSCILLATOR
60. M.W.P.STRANDBERG AND M.PETER,PHYS.REV.133,963 (1955) PRECISION OF MICROWAVE SPECTROGRAPHS
61. J.BONANOMI AND J.HERRMANN,HELV.PHYS.ACTA 29,224-226(1956) AMMONIA FREQUENCY STANDARD
62. C.A.BURRUS,JR. AND W.GORDY,PHYS.REV.101,599-602(1956) MILLIMETER AND SUBMILLIMETER WAVE SPECTROSCOPY
63. M.COWAN AND W.GORDY,PHYS.REV.104,551-552(1956) FURTHER EXTENSION OF MICROWAVE SPECTROSCOPY IN THE SUB-MILLIMETER REGION
64. G.ERLANDSSON AND H.SELÉN,ARKIV FYSIK 11,391-393(1956) FREQUENCY MEASUREMENTS IN MICROWAVE SPECTROSCOPY
65. J.HERRMANN AND J.BONANOMI,HELV.PHYS.ACTA 29,448-451(1956) SPECIAL ARRANGEMENT FOR MICROWAVE SPECTROSCOPY IN A CAVITY RESONATOR
66. W.R.HOISINGTON,C.KELLNER,AND M.J.PENTZ,NATURE 178,1111-1112(1956) HIGH-RESOLUTION MICROWAVE ZEEMAN SPECTROMETER
67. J.BONANOMI,J.DE PRINS,J.HERRMANN,AND P.KARTASCHOFF,HELV.PHYS.ACTA 30,290-292(1957) MICROWAVE SPECTROGRAPH OF HIGH RESOLUTION
68. E.B.BRACKETT,P.H.KASAI,AND R.J.MYERS,REV.SCI.INSTR.28,699-702(1957) DIELECTRIC ROD WAVE-GUIDE CELLS FOR MICROWAVE SPECTROSCOPY
69. C.C.COSTAIN,CAN.J.PHYS.35,241-247(1957) A --FREE SPACE -- ABSORPTION CELL FOR MICROWAVE SPECTROSCOPY
70. E.F.DAVIS,EXTERNAL PUBLICATION NO.380,UNIV. CALIFORNIA JET PROPULSION LAB.,JUNE,1957
71. A.K.GARRISON AND W.GORDY,PHYS.REV.108,899-900(1957) HIGH TEMPERATURE MOLECULAR BEAM MICROWAVE SPECTROMETER
72. S.A.MARSHALL AND J.WEBER,REV.SCI.INSTR.28,134-137(1957) PLANE PARALLEL PLATE TRANSMISSION LINE STARK MICROWAVE SPECTROGRAPH

73. M.PETER AND M.W.P.STRANDBERG, MIT RESEARCH LAB. ELECTRONICS TECHNICAL REPORT 336(1957) THEORETICAL AND EXPERIMENTAL STUDY OF MOLECULAR-BEAM MICROWAVE SPECTROSCOPY
74. M.C.THOMPSON AND J.V.CATEORA, REV.SCI.INSTR. 28,656(1957) HIGH-ORDER HARMONICS FOR X-BAND OSCILLATOR STABILIZATION
75. I.R.HURLE AND T.M.SUGDEN, J.SCI.INSTR.35,319-323(1958) MICROWAVE SPECTROMETER FOR THE STUDY OF FREE RADICALS
76. R.D.MATTUCK AND M.W.P.STRANDBERG, REV.SCI.INSTR.29,717-721(1958) MICROMODULATOR. A DEVICE FOR MEASURING THE INTENSITIES OF MICROWAVE ABSORPTION LINES
77. J.M.RICHARDSON, J.APPL.PHYS.29,137-145(1958) EXPERIMENTAL EVALUATION OF THE OXYGEN MICROWAVE ABSORPTION AS A POSSIBLE ATOMIC FREQUENCY STANDARD
78. M.C.THOMPSON, M.J.VETTER, AND D.M.WATERS, ELECTRONICS 31,100-101(1958) SHF FREQUENCY STANDARD USES DOUBLE CONVERSION
79. P.H.VERDIER, REV.SCI.INSTR.29,646-647(1958) STARK EFFECT, RESONANT CAVITY MICROWAVE SPECTROGRAPH
80. P.H.VERDIER AND E.B.WILSON, JR., J.CHEM.PHYS.29,340-347(1958) RELATIVE INTENSITIES OF MICROWAVE ABSORPTION LINES
81. Y.BEERS, REV.SCI.INSTR.30,9-16(1959) THEORY OF THE CAVITY MICROWAVE SPECTROMETER AND MOLECULAR FREQUENCY STANDARD
82. F.BRUIN AND D.VAN LADESTEYN, PHYSICA 25,1-8(1959) FREQUENCY STABILIZATION OF A REFLEX KLYSTRON OSCILLATOR
83. H.E.BUSSY AND G.BIRNBAUM, REV.SCI.INSTR.30,800-804(1959) CAVITY RESONATORS FOR SPECTROSCOPY OF COMPRESSED GASES
84. J.H.CORN, ELECTRONICS 32,74(1959) MICROWAVE MEASUREMENT
85. A.DYMANUS, PHYSICA 25,859-888(1959) INTENSITY MEASUREMENTS IN MICROWAVE SPECTROSCOPY. THE --ANTIMODULATION-- METHOD
86. A.DYMANUS, REV.SCI.INSTR.30,191-195(1959) HIGH-Q STARK CAVITY ABSORPTION CELL FOR MICROWAVE SPECTROMETERS
87. J.J.GALLAGHER AND J.B.NEWMAN, SPECTROCHIM.ACTA 15,769(1959) A GAS MASER AT MILLIMETER WAVELENGTHS
88. L.GENZEL, H.HAPP, AND R.WEBER, Z.PHYSIK 154,1-12(1959) A GRATING SPECTROMETER FOR THE REGION OF THE FAR INFRARED AND SHORT MICROWAVES
89. W.GORDY, PROC.SYM. MILLIMETER WAVES, 1-23, INTERSCIENCE, NEW YORK, (1959) MILLIMETER AND SUBMILLIMETER WAVES IN PHYSICS
90. J.HERVE, J.PESCIA, AND M.SAUZADE, COMPT.REND.249,1486-1488(1959) FREQUENCY STABILIZATION OF A CARCINOTRON OF GREAT POWER
91. D.ILIAS, J.PHYS.RADIUM 20,653-655(1959) A RECORDING MICROWAVE SPECTROMETER FOR GAS STUDY

92. M.W.LONG,U.S.DEPT.COM.,OFFICE TECH.SERV.PB REPT.147,451,(1959)
SENSITIVITY OF MICROWAVE SPECTROMETERS AND HYPERFINE SPECTRA OF CFCL₃
93. R.S.OHL,P.P.BUDENSTEIN,AND C.A.BURRUS,REV.SCI.INSTR.30,765-774(1959)
IMPROVED DIODE FOR THE HARMONIC GENERATION OF MILLIMETER AND
SUBMILLIMETER WAVES
94. K.SHIMODA,J.PHYS.SOC.JAPAN 14,954-959(1959) RADIOFREQUENCY
SPECTROSCOPY USING THREE-LEVEL MASER ACTION
95. R.W.ZIMMER,REV.SCI.INSTR.30,1052-1053(1959) TRANSISTOR PHASE
DETECTOR FOR PHASE-LOCK STABILIZATION OF A 30000-MC KLYSTRON
96. A.DYMANUS AND A.BOUWKNEGT,PHYSICA 26,115-126(1960) MEASUREMENTS
ON POWER-CONVERSION GAIN AND NOISE RATIO OF THE 1N26
CRYSTAL RECTIFIERS
97. A.DYMANUS,H.A.DIJKERMAN,AND G.R.D.ZIJDERVELD,J.CHEM.PHYS.32,717-723
(1960) NEW METHOD FOR THE MEASUREMENT OF MICROWAVE INTEGRATED
LINE INTENSITIES AND LINE WIDTHS
98. G.ERLANDSSON AND A.RACHMAN,CIENCIA E INVEST.16,166-176(1960)
MICROWAVE SPECTROPHOTOMETER WITH STARK MODULATION
99. J.A.GIORDMAINE AND T.C.WANG,J.APPL.PHYS.31,463-471(1960) MOLECULAR
BEAM FORMATION BY LONG PARALLEL TUBES
100. J.P.GORDON,QUANTUM ELECTRONICS,COLUMBIA UNIVERSITY PRESS,PP.3-16
NEW YORK(1960) MOLECULAR BEAM MASERS
101. M.W.LONG,REV.SCI.INSTR.31,1286-1289(1960) DETECTORS FOR MICROWAVE
SPECTROMETERS
102. E.A.RINEHART,H.KLEEN,AND C.C.LIN,J.MOL.SPECTRY.5,458-473(1960)
MEASUREMENT OF THE WIDTHS OF MICROWAVE SPECTRAL LINES
103. H.D.RUDOLPH,H.DREIZLER,AND W.MAIER,Z.NATURFORSCH 15A,274-275(1960)
MICROWAVE SPECTRUM OF METHANOL BETWEEN 9 AND 16 X 10 MC BY USING
THE CARCINOTRON AS RADIATION SOURCE
104. K.SHIMODA,H.TAKUMA,AND T.SHIMIZU,J.PHYS.SOC.JAPAN 15,2036-2041(1960)
BEAM-TYPE MASERS FOR RADIOFREQUENCY SPECTROSCOPY
105. P.THADDEUS,J.LOUBSER,A.JAVAN,L.KRISHER,AND H.LECAR,QUANTUM
ELECTRONICS SYMPOSIUM,HIGH VIEW ,NEW YORK 1959,47-56(1960)
USE OF SOME NEW MOLECULES IN A BEAM-TYPE MASER FOR SPECTROSCOPY
AND FREQUENCY STANDARDS
106. T.YAJIMA AND K.SHIMODA,J.PHYS.SOC.JAPAN 15,1668-1675(1960) THE
THREE LEVEL GAS MASER AS A MICROWAVE SPECTROMETER
107. R.W.ZIMMERER, REV.SCI.INSTR.31,106-111(1960) PRECISION ZEEMAN
MODULATION SPECTROMETER
108. A.BATTAGLIA,A.GOZZINI,AND E.POLACCO,ARCH.SCI.(GENEVA) 13,171-177
(1961) A NEW METHOD FOR MODULATION OF MOLECULAR ABSORPTION
IN MICROWAVE SPECTROSCOPY. STUDY OF THE TRANSITION J=0-1 OF OCS

109. Y.BEERS,REV.SCI.INSTR.32,23-27(1961) COMPARISON OF THE SENSITIVITY OF THE BEAM MASER AND CAVITY ABSORPTION SPECTROMETERS
110. A.DYMANUS AND H.A.DIJKERMAN,PHYSICA 27,593-602(1961) THE σ -STARK EFFECT OF ROTATIONAL TRANSITIONS. I. EXPERIMENTAL ASPECTS
111. E.A.RINEHART AND C.C.LIN,REV.SCI.INSTR.32,562-563(1961) SENSITIVE TRIPLE MODULATION METHOD FOR MEASURING WIDTHS OF MICROWAVE SPECTRAL LINES
112. H.D.RUDOLPH,Z.ANGEW.PHYSIK 13,401-409(1961) STARK-EFFECT MICROWAVE SPECTROGRAPH WITH HIGH RESOLVING POWER
113. P.THADDEUS AND L.C.KRISHER,REV.SCI.INSTR.32,1083-1089(1961) A BEAM MASER SPECTROMETER
114. H.W.DE WIJN,REV.SCI.INSTR.32,735-736(1961) HIGH VOLTAGE SQUARE WAVE GENERATOR
115. J.J.GALLAGHER,J.W.DEES,R.G.STRAUCH,AND R.E.CUPP,FIRST QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1962) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
116. A.J.HEBERT,UCRL-10482(1962), A MOLECULAR-BEAM ELECTRIC-RESONANCE SPECTROMETER AND THE RADIO-FREQUENCY SPECTRA OF LITHIUM FLUORIDE
117. A.NARATH AND W.D.GWINN,REV.SCI.INSTR.33,79-82(1962) PHASE-STABILIZED KLYSTRON SYSTEM AND ITS APPLICATION TO MICROWAVE SPECTROSCOPY AND MICROWAVE FREQUENCY STANDARDS
118. T.NISHIKAWA,KAGAKU NO RYOIKI 16,657-664(1962) DEVELOPMENTS IN THE MILLIMETER AND SUBMILLIMETER WAVE TECHNIQUE AND ITS APPLICATION IN CHEMISTRY
119. J.R.RUSK AND W.GORDY,PHYS.REV.127,817-830(1962) MILLIMETER WAVE MOLECULAR BEAM SPECTROSCOPY-ALKALI BROMIDES AND IODIDES
120. J.SHERIDAN,A.P.COX,AND J.K.TYLER,U.S.DEPT.COM.,OFFICE TECH.SERV. AD 273,614, 28 PP.(1962) MICROWAVE SPECTROSCOPY
121. A.S.ESBITT AND E.B.WILSON,JR.,REV.SCI.INSTR.34,901-907(1963) RELATIVE INTENSITY MEASUREMENTS IN MICROWAVE SPECTROSCOPY
122. J.J.GALLAGHER AND R.G.STRAUCH,SECOND QUARTERLY PROGRESS REPORT, MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
123. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,THIRD QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
124. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,FOURTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
125. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,FIFTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

126. M.LICHTENSTEIN, J.J.GALLAGHER, AND R.E.CUPP, REV.SCI.INSTR.34,843-846 (1963) MILLIMETER SPECTROMETER USING A FABRY-PEROT INTERFEROMETER
127. R.L.POYNTER AND G.R.STEFFENSEN, REV.SCI.INSTR.34,77-82(1963) TUNABLE, HIGH STABILITY, MICROWAVE OSCILLATOR
128. THE MICROWAVE ENGINEERS HANDBOOK AND BUYERS GUIDE-1964, HORIZON HOUSE, MICROWAVE INC., DEDHAM, MASS., DECEMBER(1963)
129. R.W.ZIMMERER, M.V.ANDERSON, G.L.STRINE AND Y.BEERS, IEEE TRANS. MICROWAVE THEORY AND TECHNIQUES 11,142-149(1963) MILLIMETER WAVELENGTH RESONANT STRUCTURES
130. A.BENJAMINSON, MICROWAVE JOURNAL 7, NO.12, 65-69(1964) PHASE-LOCKED MICROWAVE OSCILLATOR SYSTEMS WITH 0.1 CPS STABILITY
131. P.L.CLOUSER AND W.GORDY, PHYS.REV.134,863-870(1964) MILLIMETER-WAVE MOLECULAR BEAM SPECTROSCOPY-ALKALI CHLORIDES
132. J.J.GALLAGHER, R.G.STRAUCH, AND R.E.CUPP, SIXTH QUARTERLY PROGRESS REPORT, MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
133. J.J.GALLAGHER, R.G.STRAUCH, AND R.E.CUPP, SEVENTH QUARTERLY PROGRESS REPORT, MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
134. J.J.GALLAGHER, R.G.STRAUCH, AND R.E.CUPP, EIGHTH QUARTERLY PROGRESS REPORT, MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
135. J.J.GALLAGHER, R.G.STRAUCH, AND R.E.CUPP, NINTH QUARTERLY PROGRESS REPORT, MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS
136. Y.HANYU, NIPPON KAGAKU ZASSHI 85,5-8(1964) CONSTRUCTION OF A STARK-MODULATED MICROWAVE SPECTROMETER AND THE SPECTRUM OF A HYDROGEN-BONDED SYSTEM OF ACETIC ACID AND TRIFLUOROACETIC ACID
137. H.W.HARRINGTON AND R.H.BAUHAUS, MOLECULAR SPECTROSCOPY SYMPOSIUM, OHIO STATE UNIV.(1964) ABSOLUTE INTENSITY COEFFICIENT MEASUREMENTS IN MICROWAVE SPECTROSCOPY
138. D.R.LIDE, JR., REV.SCI.INSTR.35,1226(1964) VERSATILE STARK WAVEGUIDE FOR MICROWAVE SPECTROSCOPY
139. R.G.STRAUCH, R.E.CUPP, M.LICHTENSTEIN AND J.J.GALLAGHER, SYMPOSIUM ON QUASI-OPTICS, POLYTECHNIC INST. OF BROOKLYN(1964) QUASI-OPTICAL TECHNIQUES IN MILLIMETER SPECTROSCOPY
140. F.L.WENTWORTH, J.W.DOZIER, AND J.D.RODGERS, MICROWAVE JOURNAL 7,69-75 (1964) MILLIMETER WAVE HARMONIC GENERATORS, MIXERS AND DETECTORS
141. E.A.RINEHART, R.L.LEGAN, AND C.C.LIN, REV.SCI.INSTR.36,511-517 (1965) MICROWAVE SPECTROGRAPH FOR LINEWIDTH MEASUREMENTS

Section III. LINE SHAPE AND LINE BROADENING

1. H.A. LORENTZ, PROC. AMST. AKAD. SCI. 8, 591-611 (1906) ABSORPTION AND EMISSION LINES OF GASES
2. V.F. WEISSKOPF, PHYS. ZEITS. 34, 1-24 (1933) WIDTH OF SPECTRAL LINES IN GASES
3. H. KUHN, PHIL. MAG. 18, 987-1003 (1934) PRESSURE SHIFT AND BROADENING OF SPECTRAL LINES
4. H. KUHN AND F. LONDON, PHIL. MAG. 18, 983-987 (1934) LIMITATION OF THE POTENTIAL THEORY OF BROADENING OF SPECTRAL LINES
5. H. MARGENAU AND D.T. WARREN, PHYS. REV. 51, 748-753 (1937) LONG RANGE INTERACTIONS BETWEEN DIPOLE MOLECULES
6. L. SPITZER, JR., PHYS. REV. 58, 348-357 (1940) IMPACT BROADENING OF SPECTRAL LINES
7. A. JABLONSKI, PHYS. REV. 68, 78-93 (1945) GENERAL THEORY OF PRESSURE BROADENING OF SPECTRAL LINES. ERRATA-PHYS. REV. 69, 31 (1946)
8. J.H. VAN VLECK AND V.F. WEISSKOPF, REVS. MOD. PHYS. 17, 227-236 (1945) ON THE SHAPE OF COLLISION-BROADENED LINES
9. H.M. FOLEY, PHYS. REV. 69, 616-628 (1946) THE PRESSURE BROADENING OF SPECTRAL LINES
10. H. FROHLICH, NATURE 157, 478 (1946) SHAPE OF COLLISION-BROADENED SPECTRAL LINES
11. A. JABLONSKI, PHYSICAS GRAV. 7, 541-551 (1946) PRESSURE BROADENING OF SPECTRAL LINES
12. E. LINDHOLM, ARK. MAT. ASTRON FYSIK 32A, PAPER 17 (1946) PRESSURE BROADENING OF SPECTRAL LINES
13. C.H. TOWNES, PHYS. REV. 70, 665-671 (1946) THE AMMONIA SPECTRUM AND LINE SHAPES NEAR 1.25 CM WAVE-LENGTH
14. B. BLEANEY AND R.P. PENROSE, PROC. PHYS. SOC. 59, 418-428 (1947) COLLISION BROADENING OF THE INVERSION SPECTRUM OF AMMONIA AT CENTIMETER WAVE-LENGTHS. I. SELF-BROADENING AT HIGH PRESSURE
15. T.A. POND AND W.F. CANNON, PHYS. REV. 72, 1121-1122 (1947) SATURATION EFFECT IN MICROWAVE SPECTRUM OF AMMONIA
16. B. BLEANEY AND J.H.N. LOUBSER, NATURE 161, 522-523 (1948) COLLISION BROADENING OF THE AMMONIA INVERSION SPECTRUM AT HIGH PRESSURES
17. B. BLEANEY AND R.P. PENROSE, PROC. PHYS. SOC. LONDON 60, 540-549 (1948) COLLISION BROADENING OF THE INVERSION SPECTRUM OF AMMONIA. III. THE COLLISION CROSS SECTIONS FOR SELF-BROADENING AND FOR MIXTURES WITH NON-POLAR GASES
18. H.M. FOLEY, PHYS. REV. 73, 259 (1948) THE THEORY OF THE PRESSURE BROADENING OF SPECTRAL LINES-A REPLY.

19. A.JABLONSKI, PHYS.REV.73,258-259(1948) ON THE PHASE SHIFT APPROXIMATION IN THE THEORY OF PRESSURE BROADENING OF SPECTRAL LINES
20. D.F.SMITH, PHYS.REV.74,506-507(1948) PRESSURE BROADENING IN AMMONIA AT CENTIMETER WAVE-LENGTHS
21. P.W.ANDERSON, PHYS.REV.75,1450(1949) ON THE ANOMALOUS LINE-SHAPES IN THE AMMONIA INVERSION SPECTRUM AT HIGH PRESSURES
22. P.W.ANDERSON, PHYS.REV.76,647-661(1949) PRESSURE BROADENING IN THE MICROWAVE AND INFRARED REGIONS
23. H.MARGENAU, PHYS.REV.76,121-124(1949) PRESSURE BROADENING IN THE INVERSION SPECTRUM OF AMMONIA
24. H.MARGENAU, PHYS.REV.76,1423-1429(1949) INVERSION FREQUENCY OF AMMONIA AND MOLECULAR INTERACTION
25. J.H.VAN VLECK AND H.MARGENAU, PHYS.REV.76,1211-1214(1949) COLLISION THEORIES OF PRESSURE BROADENING OF SPECTRAL LINES
26. P.W.ANDERSON, PHYS.REV.80,511-513(1950) PRESSURE BROADENING OF THE AMMONIA INVERSION LINE BY FOREIGN GASES. QUADRUPOLE-INDUCED DIPOLE INTERACTIONS
27. T.HOLSTEIN, PHYS.REV.79,744(1950) PRESSURE BROADENING OF SPECTRAL LINES
28. R.R.HOWARD AND W.V.SMITH, PHYS.REV.77,840-841(1950) TEMPERATURE DEPENDENCE OF MICROWAVE LINE WIDTHS
29. L.C.JONES, PHYS.REV.77,741 (1950) PRESSURE BROADENING AND THE LINE SHIFT IN MICROWAVE SPECTRA
30. H.MARGENAU AND S.BLOOM, PHYS.REV.79,213 (1950) PRESSURE BROADENING OF SPECTRAL LINES AND FREQUENCY MODULATION
31. W.V.SMITH AND R.R.HOWARD, PHYS.REV.79,132-136(1950) MICROWAVE COLLISION DIAMETERS. II. THEORY AND CORRELATION WITH MOLECULAR QUADRUPOLE MOMENTS
32. B.V.GOKHALE AND M.W.P.STRANDBERG, PHYS.REV.84,844(1951) LINE BREADTHS IN THE 5-MM MICROWAVE ABSORPTION OF OXYGEN
33. R.M.HILL AND W.V.SMITH, PHYS.REV.82,451(1951) MICROWAVE COLLISION DIAMETERS AND ASSOCIATED QUADRUPOLE MOMENTS
34. D.C.M.LESLIE, PHIL.MAG.42,37-55(1951) COLLISION BROADENING OF MICROWAVE FREQUENCIES
35. H.MARGENAU, PHYS.REV.82,156-158(1951) STATISTICAL THEORY OF PRESSURE BROADENING
36. M.MIZUSHIMA, PHYS.REV.83,94-103(1951) THE THEORY OF PRESSURE BROADENING AND ITS APPLICATION TO MICROWAVE SPECTRA
ERRATA-PHYS.REV.84,363(1951)
37. C.A.POTTER, A.V.BUSHKOVITCH, AND A.G.ROUSE, PHYS.REV.83,987-989(1951) PRESSURE BROADENING IN THE MICROWAVE SPECTRUM OF AMMONIA

38. R.S.ANDERSON, W.V.SMITH, AND W.GORDY, PHYS.REV.87,561-568(1952)
LINE-BREADTHS OF THE MICROWAVE SPECTRUM OF OXYGEN
39. W.V.SMITH, ANN.N.Y.ACAD.SCI.55,891-903(1952) PRESSURE BROADENING
40. R.S.ANDERSON, PHYS.REV.97,1654-1660(1955) VARIATION OF LINE WIDTH
WITH ROTATIONAL STATE AND TEMPERATURE IN THE MICROWAVE SPECTRUM
OF OCS
41. E.P.GROSS, PHYS.REV.97,395-403(1955) SHAPE OF COLLISION-BROADENED
SPECTRAL LINES
42. C.S.G.PHILLIPS, J.CHEM.PHYS.23,2388-2394(1955) LINE BROADENING AND
DIELECTRIC RELAXATION IN COMPRESSED GASES
43. W.V.SMITH, H.A.LACKNER, AND A.B.VOLKOV, J.CHEM.PHYS.23,389-396(1955)
PRESSURE BROADENING (OF MICROWAVE LINES) OF LINEAR MOLECULES.
II. THEORY ERRATA-J.CHEM.PHYS.23,1559(1955)
44. M.TINKHAM AND M.W.P.STRANDBERG, PHYS.REV.99,537-539(1955) LINE
BREADTHS IN THE MICROWAVE MAGNETIC RESONANCE SPECTRUM OF OXYGEN
45. A.A.KOLOSOV AND L.L.MYASNIKOV, OPTIKA I SPEKTROSKOPIYA 1,374-377(1956)
THE HALF-WIDTHS OF THE ABSORPTION MICROWAVE LINES OF
AMMONIA
46. W.V.SMITH, J.CHEM.PHYS.25,510-515(1956) EVALUATION OF MOLECULAR
QUADRUPOLE MOMENTS FROM MICROWAVE SPECTRAL LINE WIDTHS. I. THEORETICAL
47. V.M.FAIN, SOVIET PHYS.JETP 5,501-503(1957) NATURAL LINE WIDTHS OF
MICROWAVES
48. H.FEENY, W.MADIGOSKY, AND B.WINTERS, J.CHEM.PHYS.27,898-900(1957)
EVALUATION OF MOLECULAR QUADRUPOLE MOMENTS FROM MICROWAVE LINE
BREADTHS. II. EXPERIMENTAL
49. KRISHNAJI AND G.P.SRIVASTAVA, PROC.PHYS.SOC.(LONDON)70B,621-622
(1957) TEMPERATURE VARIATION OF MICROWAVE ABSORPTION COEFFICIENT
IN ETHYL CHLORIDE
50. K.MATSUURA, Y.SUGIURA, AND G.M.HATYAMA, J.PHYS.SOC.JAPAN 12,314(1957)
FREQUENCY SHIFT IN AMMONIA ABSORPTION DUE TO SELF-BROADENING
51. K.MATSUURA, Y.SUGIURA, AND G.M.HATYAMA, DENKI SHIKENSHO THO 21,612-621
(1957) FREQUENCY SHIFT IN THE ABSORPTION LINE OF AMMONIA IN THE
MICROWAVE REGION
52. I.TAKAHASHI, T.OGAWA, M.YAMANO, AND A.HIRAI, PHYS.REV.106,606(1957)
SHIFT OF CENTER FREQUENCY OF AN AMMONIA INVERSION SPECTRUM
53. K.TOMITA, PROGR.THEORET.PHYS.(KYOTO) 18,316-318(1957) PRESSURE
SHIFT OF THE INVERSION FREQUENCY OF AMMONIA
54. L.J.KIEFFER AND A.V.BUSHKOVITCH, J.MOL.SPECTRY. 2,558-565(1958)
CRITICAL ANALYSIS AND APPLICATIONS OF A QUASI-RESONANT THEORY OF
PRESSURE BROADENING OF LINEAR MOLECULES
55. A.BATTAGLIA, A.GOZZINI, AND E.POLACCO, NUOVO CIMENTO 14,1076-1081(1959)

SOME PHENOMENA RELATED TO THE SATURATION OF ROTATIONAL RESONANCES
IN THE MICROWAVE SPECTRUM OF COS

56. W.S.BENEDICT AND C.D.KAPLAN, J.CHEM.PHYS. 30, 388-399 (1959)
CALCULATION OF LINE WIDTHS IN H₂O-N₂ COLLISIONS
57. A.DYMANUS, PHYS.REV. 116, 351-355 (1959) POWER SATURATION OF THE
J=1-2 ROTATIONAL TRANSITION OF OCS
58. J.E.BOGGS, A.P.DEAM, AND J.M.KING, J.CHEM.PHYS. 33, 1852-1855 (1960)
TEMPERATURE VARIATION OF THE LINEWIDTH IN NONRESONANT MICROWAVE
ABSORPTION
59. J.A.FULFORD, NATURE 188, 1097-1098 (1960) LINE BREADTHS IN THE
AMMONIA SPECTRUM
60. R.G.BRENE, JR., THE SHIFT AND SHAPE OF SPECTRAL LINES, PERGAMON PRESS
NEW YORK (1961)
61. G.BIRNBAUM AND A.A.MARYOTT, J.CHEM.PHYS. 36, 2032-2036 (1962) COLLISION-
INDUCED MICROWAVE ABSORPTION IN COMPRESSED GASES II. MOLECULAR
ELECTRIC QUADRUPOLE MOMENTS
62. A.A.MARYOTT AND G.BIRNBAUM, J.CHEM.PHYS. 36, 2026-2032 (1962)
COLLISION-INDUCED MICROWAVE ABSORPTION IN COMPRESSED GASES. I.
DEPENDENCE ON DENSITY, TEMPERATURE, AND FREQUENCY IN CO₂
63. M.L.SAGE, U.S.DEPT.COM.OFFICE TECH.SERV. AD 284, 174, 14PP. (1962)
PRESSURE BROADENING AND THE ELECTRIC QUADRUPOLE MOMENT OF OCS
64. L.GALATRY, J.PHYS.RADIUM 24, 265-272 (1963) THEORY OF SPECTRAL LINE
SHAPE IN THE MICROWAVE REGION
65. KRISHNAJI AND S.CHANDRA, J.CHEM.PHYS. 38, 232-236 (1963) MOLECULAR
INTERACTION AND LINEWIDTH OF ASYMMETRIC MOLECULE SO₂. I. SO₂-N₂
COLLISIONS
66. KRISHNAJI AND S.CHANDRA, J.CHEM.PHYS. 38, 2690-2692 (1963) MOLECULAR
INTERACTION AND LINE WIDTH OF ASYMMETRIC MOLECULE SO₂. III. SO₂-CH₃BR
AND SO₂-SO₂ COLLISIONS
67. G.BIRNBAUM, OPTICAL MASERS, ACADEMIC PRESS INC., NEW YORK (1964)
68. G.BIRNBAUM AND A.A.MARYOTT, J.CHEM.PHYS. 41, 154-157 (1964) NON-RESONANT
ABSORPTION AND COLLISION DIAMETERS IN THE FOREIGN-GAS BROADENING
OF SYMMETRIC TOP MOLECULES
69. KRISHNAJI AND S.L.SRIVASTAVA, J.CHEM.PHYS. 41, 2201 (1964)
QUADRUPOLE MOMENT OF OCS
70. KRISHNAJI AND S.L.SRIVASTAVA, J.CHEM.PHYS. 41, 2266-2270 (1964)
FIRST-ORDER LONDON DISPERSION FORCES AND MICROWAVE SPECTRAL LINEWIDTH

Section IV. THE RIGID ROTOR

Calculation and characterization of the energy levels and wave functions of the rigid rotor immediately followed the introduction of the new quantum theory.¹⁻⁵ Application of group theory to the problem^{6,9} considerably simplifies the computational difficulties presented by the asymmetric rotor whose energy levels cannot be expressed in a closed form except for low J values. Since the formulation of the reduced energy $E(\kappa)$,^{8,9} the original tabulations of this parameter^{9,17,22} have been extended to high J values for smaller intervals of κ through the use of high-speed digital computers.^{19,47,49-53} Approximate methods were also developed,^{11,12} particularly for near symmetric top molecules.^{25-27,41,42} Considerable attention has also been given to the calculation of theoretical line intensities.^{10,18,32}

1. F.REICHE AND H.RADEMACHER,Z.PHYSIK 39,444-464(1926) QUANTIZATION OF A SYMMETRICAL TOP ACCORDING TO SCHROEDINGERS UNDULATION MECHANICS
2. R.L.KRONIG AND I.I.RABI,PHYS.REV.29,262-269(1927) THE SYMMETRICAL TOP IN THE UNDULATORY MECHANICS
3. H.RADEMACHER AND F.REICHE,Z.PHYSIK 41,453-492(1927) QUANTIZATION OF THE SYMMETRICAL TOP ACCORDING TO SCHROEDINGERS UNDULATION MECHANICS
4. E.E.WITMER,PROC.NAT.ACAD.SCI.13,60-65(1927) THE QUANTIZATION OF THE ROTATIONAL MOTION OF THE POLYATOMIC MOLECULE BY THE NEW WAVE MECHANICS
5. H.A.KRAMERS AND G.P.ITTSMANN,Z.PHYSIK 53,553-565(1929) ON THE QUANTIZATION OF THE ASYMMETRIC TOP
6. S.C.WANG,PHYS.REV.34,243-252(1929) ON THE ASYMMETRICAL TOP IN QUANTUM MECHANICS
7. H.B.G.CASIMIR,ROTATION OF A RIGID BODY IN QUANTUM MECHANICS, J.B.WOLTERS,THE HAGUE(1931)
8. B.S.RAY,Z.PHYSIK 78,74-91(1932) EIGENVALUES OF AN ASYMMETRICAL ROTATOR
9. G.W.KING,R.M.HAINER,AND P.C.CROSS,J.CHEM.PHYS.11,27-42(1943) THE ASYMMETRIC ROTOR. I. CALCULATION AND SYMMETRY CLASSIFICATION OF ENERGY LEVELS.
10. P.C.CROSS,R.M.HAINER,AND G.W.KING,J.CHEM.PHYS.12,210-225(1944) THE ASYMMETRIC ROTOR. II. CALCULATION OF DIPOLE INTENSITIES AND LINE CLASSIFICATION
11. G.W.KING,J.CHEM.PHYS.15,820-830(1947) THE ASYMMETRIC ROTOR. VI.CALCULATION OF HIGHER LEVELS BY MEANS OF THE CORRESPONDENCE PRINCIPLE
12. S.GOLDEN,J.CHEM.PHYS.16,78-86(1948) AN ASYMPTOTIC EXPRESSION FOR THE ENERGY LEVELS OF THE RIGID ASYMMETRIC ROTOR
13. R.KARPLUS,J.CHEM.PHYS.16,1170-1171(1948) NOTE ON THE ENERGY OF A ROTATING MOLECULE
14. E.E.WITMER,PHYS.REV.74,1247 (1948) AN EXPLICIT SOLUTION OF THE PROBLEM OF THE ASYMMETRIC ROTATOR ACCORDING TO QUANTUM MECHANICS
15. E.E.WITMER,PHYS.REV.74,1250 (1948) AN EXPLICIT FORMULA FOR THE ENERGY LEVELS OF THE ASYMMETRIC ROTATOR ACCORDING TO QUANTUM MECHANICS
16. S.GOLDEN AND J.K.BRAGG,J.CHEM.PHYS.17,439-441(1949) AN ASYMPTOTIC EXPRESSION FOR THE ENERGY LEVELS OF THE ASYMMETRIC ROTOR. III. APPROXIMATION FOR THE ESSENTIALLY DEGENERATE LEVELS OF THE RIGID ROTOR
17. R.M.HAINER,P.C.CROSS, AND G.W.KING,J.CHEM.PHYS.17,826-836(1949) THE ASYMMETRIC ROTOR. VII. EXTENSION OF THE CALCULATION OF ENERGY LEVELS

18. D.R.LIDE, JR., J.CHEM. PHYS. 20, 1761-1763 (1952) A NOTE ON ROTATIONAL LINE STRENGTHS IN SLIGHTLY ASYMMETRIC ROTORS
19. B.L.HICKS, T.E.TURNER, AND W.W.WIDULE, J.CHEM. PHYS. 21, 564 (1953) APPLICATIONS OF LARGE DIGITAL COMPUTERS TO CALCULATIONS OF MICROWAVE SPECTROSCOPY
20. D.KIVELSON, J.CHEM. PHYS. 21, 536-538 (1953) A $(K+2)$ ND ORDER FORMULA FOR ASYMMETRY DOUBLETS IN ROTATIONAL SPECTRA
21. C.VAN WINTER, PHYSICA 20, 274-292 (1954) THE ASYMMETRIC ROTATOR IN QUANTUM MECHANICS
22. G.ERLANDSSON, ARKIV FYSIK 10, 65-88 (1956) EXTENDED ENERGY LEVEL TABLES FOR THE RIGID ASYMMETRIC ROTOR
23. D.W.POSENER, J.CHEM. PHYS. 24, 546-547 (1956) ASYMMETRIC ROTOR. CONVERGENCE IN THE CONTINUED FRACTION EXPANSION OF THE REDUCED ENERGIES
24. W.GIVENS, J.ASSOC.COMP.MACH. 4, 298-307 (1957) THE CHARACTERISTIC VALUE-VECTOR PROBLEM
25. S.R.POLO, CAN.J.PHYS. 35, 880-885 (1957) ENERGY LEVELS OF SLIGHTLY ASYMMETRIC TOP MOLECULES
26. R.H.SCHWENDEMAN, J.CHEM. PHYS. 27, 986 (1957) TABLE OF COEFFICIENTS FOR THE ENERGY LEVELS OF A NEAR SYMMETRIC TOP
27. R.H.SCHWENDEMAN, A TABLE OF COEFFICIENTS FOR THE ENERGY LEVELS OF A NEAR SYMMETRIC TOP, DEPARTMENT OF CHEMISTRY, HARVARD UNIVERSITY (1957)
28. W.H.SHAFFER, J.MOL.SPECTRY 1, 69-80 (1957) OPERATIONAL DERIVATION OF WAVE FUNCTIONS FOR A SYMMETRICAL RIGID ROTATOR
29. D.G.BURKHARD, J.MOL.SPECTRY 2, 187-202 (1958) FACTORIZATION AND WAVE FUNCTIONS FOR THE SYMMETRIC RIGID ROTATOR
30. E.K.GORA, J.MOL.SPECTRY 2, 259-272 (1958) SIMPLIFIED METHODS FOR THE COMPUTATION OF ASYMMETRIC ROTOR ENERGY LEVELS AND LINE STRENGTHS
31. F.KNEUBUHL, T.GAUMANN, T.GINSBURG, AND HS.H.GUNTARD, HELV.PHYS.ACTA 31, 276-277 (1958) CALCULATION PROGRAM FOR EVALUATION OF THE ROTATIONAL SPECTRUM OF RIGID MOLECULES
32. R.H.SCHWENDEMAN AND V.W.LAURIE, TABLES OF LINE STRENGTHS, PERGAMON PRESS, NEW YORK (1958)
33. L.C.BROWN AND P.M.PARKER, TABLES OF ASYMMETRY PARAMETER FUNCTION, DEPARTMENTAL PUBLICATION, OHIO STATE UNIVERSITY (1959)
34. C.T.FIKE, J.CHEM. PHYS. 31, 568-569 (1959) ENERGY LEVELS OF AN ASYMMETRIC ROTOR
35. F.KNEUBUHL, T.GAUMANN, AND HS.H.GUNTARD, J.MOL.SPECTRY. 3, 349-362 (1959) A PROGRAM FOR AUTOMATIC DIGITAL COMPUTATION OF TRANSITION FREQUENCIES AND ANALYSIS OF MICROWAVE ROTATIONAL SPECTRA OF RIGID ASYMMETRIC TOPS

52. M.SIDRAN,F.NOLAN,AND J.W.BLAKE,GRUMMAN RESEARCH DEPT.REPORT RE-189,
OCTOBER(1964) ROTATIONAL ENERGY LEVELS OF ASYMMETRIC TOP MOLECULES,
TABLE OF REDUCED ENERGIES(PART VI- FOR J=17 TO 18)
53. M.SIDRAN,F.NOLAN, AND J.W.BLAKE,GRUMMAN RESEARCH DEPT.REPORT RE-196,
DECEMBER(1964) ROTATIONAL ENERGY LEVELS OF ASYMMETRIC TOP MOLECULES,
TABLE OF REDUCED ENERGIES(PART VII-FOR J=19 TO 20)
54. J.D.LOUCK,J.MOL.SPECTRY 15,83-99(1965) EIGENVECTORS OF A SLIGHTLY
ASYMMETRIC ROTATOR

Section V(a). GENERAL VIBRATION-ROTATION INTERACTION

1. J.L.DUNHAM, PHYS.REV.41,721-731(1932) THE ENERGY LEVELS OF A ROTATING VIBRATOR
2. D.M.DENNISON AND M.JOHNSTON, PHYS.REV.47,93-94(1935). THE INTERACTION BETWEEN VIBRATION AND ROTATION FOR SYMMETRICAL MOLECULES
3. M.JOHNSTON AND D.M.DENNISON, PHYS.REV.48,868-883(1935) THE INTERACTION BETWEEN VIBRATION AND ROTATION FOR SYMMETRICAL MOLECULES
4. E.B.WILSON, JR., J.CHEM.PHYS.4,313-316(1936) THE VIBRATION-ROTATION ENERGY LEVELS OF POLYATOMIC MOLECULES.II.PERTURBATIONS DUE TO NEARBY VIBRATIONAL STATES
5. E.B.WILSON, JR, AND J.B.HOWARD, J.CHEM.PHYS.4,260-268(1936) THE VIBRATION-ROTATION ENERGY LEVELS OF POLYATOMIC MOLECULES.I. MATHEMATICAL THEORY OF SEMI-RIGID ASYMMETRIC TOP MOLECULES
6. H.H.NIELSEN, PHYS.REV.60,794-810(1941) THE VIBRATION-ROTATION ENERGIES OF POLYATOMIC MOLECULES
7. W.H.SHAFER, J.CHEM.PHYS.10,1-9(1942) INFRA-RED SPECTRA OF AXIALLY SYMMETRIC XYZ MOLECULES. I.VIBRATION-ROTATION ENERGIES
8. S.SILVER, J.CHEM.PHYS.10,565-574(1942) VIBRATION-ROTATION ENERGIES OF PLANAR XYZ MOLECULES. PART II. THE QUANTUM-MECHANICAL HAMILTONIAN AND THE ENERGY VALUES
9. S.SILVER AND E.S.EBERS, J.CHEM.PHYS.10,559-564(1942) VIBRATION-ROTATION ENERGIES OF PLANAR XYZ MOLECULES. PART I. THE VIBRATIONAL MODES AND FREQUENCIES
10. A.H.NIELSEN, J.CHEM.PHYS.11,160-163(1943) THE VIBRATION-ROTATION ENERGIES OF THE LINEAR XYZ TYPE MOLECULE
11. H.H.NIELSEN, PHYS.REV.66,282-287(1944) THE QUANTUM MECHANICAL HAMILTONIAN FOR THE LINEAR POLYATOMIC MOLECULE TREATED AS A LIMITING CASE OF THE NON-LINEAR POLYATOMIC MOLECULE
12. H.H.NIELSEN, J.OPT.SOC.AMER.34,521-528(1944) THE ENERGIES OF POLYATOMIC MOLECULES
13. W.H.SHAFER AND R.P.SCHUMAN, J.CHEM.PHYS.12,504-513(1944) THE INFRA-RED SPECTRA OF BENT XYZ MOLECULES. PART I. VIBRATION-ROTATION ENERGIES
14. H.H.NIELSEN, PHYS.REV.68,181-191(1945) THE VIBRATION-ROTATION ENERGIES OF POLYATOMIC MOLECULES. PART II. ACCIDENTAL DEGENERACIES
15. W.H.SHAFER AND R.C.HERMAN, J.CHEM.PHYS.13,83-88(1945) THE TETRAHEDRAL X2YZ2 MOLECULAR MODEL. PART II. ROTATION-VIBRATION ENERGIES
16. R.C.HERMAN AND W.H.SHAFER, J.CHEM.PHYS. 16,453-465(1948) THE CALCULATION OF PERTURBATION ENERGIES IN VIBRATING ROTATING POLYATOMIC MOLECULES
17. H.H.NIELSEN, PHYS.REV.75,1961(1949) ANOMALIES IN THE MICROWAVE

SPECTRUM OF METHYL CYANIDE AND METHYL ISOCYANIDE

18. R.C.HERMAN AND W.H.SHAFFER,J.CHEM.PHYS.18,1207-1211(1950)
THE VIBRATION-ROTATION ENERGIES OF THE PLANE SYMMETRICAL X2Y2X2
MOLECULAR MODEL
19. W.LOW AND C.H.TOWNES,PHYS.REV.79,224 (1950) EFFECT OF FERMI
RESONANCE ON ROTATION-VIBRATION INTERACTION IN OCS AND OCSE
20. H.H.NIELSEN,PHYSICA 17,432-439(1951) ANOMALIES IN THE MICROWAVE
SPECTRA OF SYMMETRIC MOLECULES
21. H.H.NIELSEN,REV.MOD.PHYS.23,90-136(1951) THE VIBRATION-ROTATION
ENERGIES OF MOLECULES
22. S.M.FERIGLE AND A.WEBER,AM.J.PHYS.21,102-107(1953) THE ECKART
CONDITIONS FOR A POLYATOMIC MOLECULE
23. W.LOW,PHYS.REV.97,1664-1667(1955) FERMI RESONANCE IN THE
MICROWAVE SPECTRUM OF LINEAR XYZ MOLECULES
24. G.AMAT,M.GOLDSMITH,AND H.H.NIELSEN,J.CHEM.PHYS.27,838-844(1957)
HIGHER ORDER ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES.II.
25. G.AMAT AND H.H.NIELSEN,COMPT.REND. 244,2302-2304(1957) INFLUENCE
OF ROTATIONAL DISTORTIONS ON THE VIBRATION-ROTATION SPECTRUM OF
LINEAR MOLECULES
26. G.AMAT AND H.H.NIELSEN,J.CHEM.PHYS.27,845-850(1957) HIGHER
ORDER ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES. III.
27. P.R.SWAN,JR. AND M.W.P.STRANDBERG,J.MOL.SPECTRY.1,333-378(1957)
VIBRATION-INTERNAL ROTATION INTERACTIONS IN MOLECULES CONTAINING
A SYMMETRIC TOP GROUP
28. G.AMAT AND L.HENRY,J.PHYS.RADIUM 21,728-730(1960) RESONANCES AND
K-TYPE DOUBLING IN MOLECULES HAVING AXIAL SYMMETRY
29. T.OKA AND Y.MORINO,J.PHYS.SOC.JAPAN 16,1235-1242(1961) MICROWAVE
SPECTRUM OF FORMALDEHYDE III. VIBRATION-ROTATION INTERACTION
30. M.L.GRENIER-BESSON AND G.AMAT,J.MOL.SPECTRY 8,22-29(1962)
ROTATIONAL SPECTRUM OF MOLECULES WITH C3V SYMMETRY IN AN EXCITED
VIBRATIONAL STATE,VT=1.
31. M.L.GRENIER-BESSON,G.AMAT,AND H.H.NIELSEN,J.CHEM.PHYS.36,3454-3459
(1962) HIGHER-ORDER ROTATION-VIBRATION ENERGIES OF POLYATOMIC
MOLECULES VI
32. D.R.HERSCHBACH AND V.W.LAURIE,J.CHEM.PHYS.37,1668-1686(1962)
INFLUENCE OF VIBRATIONS ON MOLECULAR STRUCTURE DETERMINATIONS.
I. GENERAL FORMULATION OF VIBRATION-ROTATION INTERACTIONS.
33. S.MAES,J.MOL.SPECTRY 9,204-215(1962) SOME THIRD ORDER CORRECTIONS
TO THE ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES
34. K.T.CHUNG AND P.M.PARKER,J.CHEM.PHYS.38,8-17(1963) ASYMMETRIC-TOP
VIBRATION-ROTATION HAMILTONIANS ERRATA-J.CHEM.PHYS.39,240(1963)

35. N.JACOBI AND J.H.JAFFE, J.MOL.SPECTRY.10,1-11(1963) INFLUENCE OF VIBRATION-ROTATION INTERACTION ON SPECTRAL LINE INTENSITIES OF LINEAR MOLECULES
36. F.DORMAN AND C.C.LIN, J.MOL.SPECTRY.12,119-128(1964) DETERMINATION OF THE CUBIC ANHARMONIC POTENTIAL CONSTANTS FROM THE VIBRATION-ROTATION INTERACTION CONSTANTS OF THE OCS AND N2O MOLECULES
37. J.W.C.JOHNS, J.MOL.SPECTRY 15,473-482(1965) K-TYPE DOUBLING OF LINEAR MOLECULES IN $^1\Pi$ ELECTRONIC STATES

Section V(b). CENTRIFUGAL DISTORTION

38. E.L.HILL AND J.H.VAN VLECK, PHYS.REV. 32,250-272(1928) ON THE QUANTUM MECHANICS OF THE ROTATIONAL DISTORTION OF MULTIPLETS IN MOLECULAR SPECTRA
39. E.B.WILSON, JR., J.CHEM.PHYS.4,526-523(1936) THE EFFECT OF ROTATIONAL DISTORTION ON THE THERMODYNAMIC PROPERTIES OF WATER AND OTHER POLYATOMIC MOLECULES
40. E.B.WILSON, JR., J.CHEM.PHYS.5,617-620(1937) THE VIBRATION-ROTATION ENERGY LEVELS OF POLYATOMIC MOLECULES.III.EFFECT OF CENTRIFUGAL DISTORTION
41. Z.I.SLAWSKY AND D.M.DENNISON, J.CHEM.PHYS.7,509-521(1939) THE CENTRIFUGAL DISTORTION OF AXIAL MOLECULES
42. S.GOLDEN, J.CHEM.PHYS.16,250-253(1948) AN ASYMPTOTIC EXPRESSION FOR THE ENERGY LEVELS OF THE ASYMMETRIC ROTOR. II.CENTRIFUGAL DISTORTION CORRECTION ERRATA-J.CHEM.PHYS.17,586(1948)
43. W.S.BENEDICT, PHYS.REV.75,1317 (1949) CENTRIFUGAL STRETCHING IN H2O AND D2O
44. H.H.NIELSEN, PHYS.REV.78,415-416(1950) A NOTE ON THE CENTRIFUGAL STRETCHING IN AXIALLY SYMMETRIC MOLECULES
45. J.W.SIMMONS AND W.E.ANDERSON, PHYS.REV.80,338-342(1950) MICROWAVE DETERMINATION OF THE CENTRIFUGAL DISTORTION CONSTANTS OF CH3CL, CH3BR, CH3I, BRCN, AND ICN.
46. R.E.HILLGER AND M.W.P.STRANDBERG, PHYS.REV.83,575-581(1951) CENTRIFUGAL DISTORTION IN ASYMMETRIC MOLECULES. II. HDS
47. R.B.LAWRENCE AND M.W.P.STRANDBERG, PHYS.REV.83,363-369(1951) CENTRIFUGAL DISTORTION IN ASYMMETRIC TOP MOLECULES. I. ORDINARY FORMALDEHYDE, H2C(12)O
48. D.KIVELSON AND E.B.WILSON, JR., J.CHEM.PHYS.20,1575-1579(1952) APPROXIMATE TREATMENT OF THE EFFECT OF CENTRIFUGAL DISTORTION ON THE ROTATIONAL ENERGY LEVELS OF ASYMMETRIC-ROTOR MOLECULES
49. M.W.P.STRANDBERG, ANN.N.Y.ACAD.SCI.55,808-813(1952) CENTRIFUGAL DISTORTION

50. F.D. REDARD, J.J. GALLAGHER, AND C.M. JOHNSON, PHYS. REV. 92, 1440 (1953)
MICROWAVE MEASUREMENT OF D_0 FOR CO
51. T.S. CHANG AND D.M. DENNISON, J. CHEM. PHYS. 21, 1293 (1953) CENTRIFUGAL
DISTORTION EFFECTS IN METHYL CHLORIDE
52. D. KIVELSON AND F.B. WILSON, JR., J. CHEM. PHYS. 21, 1229-1236 (1953)
THEORY OF CENTRIFUGAL DISTORTION CONSTANTS OF POLYATOMIC ROTOR
MOLECULES
53. J. COX, W.J.O. THOMAS, AND W. GORDY, PHYS. REV. 95, 299 (1954) CENTRIFUGAL
DISTORTION IN THE METHYL HALIDES
54. D. KIVELSON, J. CHEM. PHYS. 22, 904-908 (1954) THE DETERMINATION OF THE
POTENTIAL CONSTANTS OF SO₂ FROM CENTRIFUGAL DISTORTION EFFECTS
55. D.W. POSENER AND M.W.P. STRANDBERG, PHYS. REV. 95, 374-384 (1954)
CENTRIFUGAL DISTORTION IN ASYMMETRIC TOP MOLECULES. III. H₂O, D₂O, AND HDO
56. W.J.O. THOMAS, J.T. COX, AND W. GORDY, J. CHEM. PHYS. 22, 1718-1722 (1954)
MILLIMETER WAVE SPECTRA AND CENTRIFUGAL STRETCHING CONSTANTS OF
THE METHYLHALIDES
57. G. AMAT, M. GOLDSMITH, AND H.H. NIELSEN, J. CHEM. PHYS. 24, 44-47 (1956)
INFLUENCE OF FERMI RESONANCE ON THE CENTRIFUGAL STRETCHING
CONSTANT OF A LINEAR MOLECULE
58. L. PIERCE, J. CHEM. PHYS. 24, 139-142 (1956) DETERMINATION OF THE
POTENTIAL CONSTANTS OF OZONE FROM CENTRIFUGAL DISTORTION EFFECTS
59. J.M. DOWLING, R. GOLD, AND A.G. MEISTER, J. MOL. SPECT. 1, 265-269 (1957)
CALCULATION OF ROTATIONAL DISTORTION CONSTANTS FOR SOME AXIALLY
SYMMETRIC ZX₃Y MOLECULES
60. H.H. NIELSEN, G. AMAT, AND M. GOLDSMITH, J. CHEM. PHYS. 26, 1060-1066 (1957)
ANOMALOUS CENTRIFUGAL DISTORTION COEFFICIENTS IN LINEAR POLYATOMIC
MOLECULES
61. E.B. WILSON, JR., J. CHEM. PHYS. 27, 986-987 (1957) CENTRIFUGAL DISTORTION
IN SYMMETRIC ROTOR MOLECULES
62. J.M. DOWLING, R. GOLD, AND A.G. MEISTER, J. MOL. SPECTRY. 2, 411-412 (1958)
A NOTE ON THE CALCULATION OF ROTATIONAL DISTORTION CONSTANTS FOR
AXIALLY SYMMETRIC ZX₃Y MOLECULES
63. G. ERLANDSSON, ARKIV FYSIK 16, 181-184 (1959) COMPUTER PROGRAM FOR
CENTRIFUGAL DISTORTION IN ASYMMETRIC TOP ROTATIONAL SPECTRA
64. P.M. PARKER AND L.C. BROWN, J. CHEM. PHYS. 31, 1227-1230 (1959)
COMPUTATION OF ASYMMETRIC ROTATOR CONSTANTS FROM ENERGY MOMENTS.
III. FIRST-ORDER CENTRIFUGAL STRETCHING EFFECTS
65. P. FAVERO, A.M. MIRRI, AND S.G. BAKER, NUOVO CIMENTO 17, 740-748 (1960)
CENTRIFUGAL EFFECTS IN MILLIMETER WAVE SPECTRA-FORMYL FLUORIDE
66. M.W. LONG, J. CHEM. PHYS. 32, 948 (1960) CENTRIFUGAL DISTORTION IN SYMMETRIC
TOP MOLECULES

67. J.M.DOWLING, J.MOL.SPECTRY 6,550-553(1961) CENTRIFUGAL DISTORTION IN PLANAR MOLECULES
68. H.C.ALLEN, JR. AND W.B.OLSEN, J.CHEM.PHYS.37,212-214(1962) SUM RULES FOR VIBRATIONAL-ROTATIONAL ENERGY LEVELS INCLUDING CENTRIFUGAL DISTORTION
69. R.A.HILL AND T.H.EDWARDS, J.MOL.SPECTRY 9,494-497(1962) FIRST-ORDER CENTRIFUGAL DISTORTION IN PLANAR ASYMMETRIC MOLECULES
70. R.C.JOHNSON, Q.WILLIAMS, AND T.L.WEATHERLY, J.CHEM.PHYS.36,1588-1590 (1962) CENTRIFUGAL STRETCHING OF CCLF₃ AND SOME OTHER SYMMETRIC TOPS
71. P.M.PARKER, J.CHEM.PHYS.37,1596-1599(1962) SYMMETRY PROPERTIES OF THE ASYMMETRIC-ROTATOR CENTRIFUGAL DISTORTION CONSTANTS
72. M.G.K.PILLAI AND R.F.CURL, JR., J.CHEM.PHYS.37,2921-2926(1962) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE IV. DETERMINATION OF CENTRIFUGAL DISTORTION EFFECTS AND POTENTIAL CONSTANTS
73. H.D.RUDOLPH, Z.NATURFORSCH. 17A,288-297(1962) THE CENTRIFUGAL CORRECTION IN ROTATIONAL SPECTRA OF MOLECULES WITH INTERNAL ROTATION SUCH AS (CH₃)₂S
74. P.G.FAVERO AND A.M.MIRRI, NUOVO CIMENTO 30,502-506(1963) MILLIMETER WAVE SPECTRA AND CENTRIFUGAL DISTORTION CONSTANTS OF CHCL₃ AND CFCL₃
75. R.A.HILL AND T.H.EDWARDS, J.MOL.SPECTRY.11,433-439(1963) SUM RULES FOR PLANAR ASYMMETRIC MOLECULES
76. L.PIERCE, N.DICIANNI, AND R.H.JACKSON, J.CHEM.PHYS.38,730-739(1963) CENTRIFUGAL DISTORTION EFFECTS IN ASYMMETRIC ROTOR MOLECULES I. QUADRATIC POTENTIAL CONSTANTS AND AVERAGE STRUCTURE OF OXYGEN DIFLUORIDE FROM THE GROUND STATE ROTATIONAL SPECTRUM
77. A.BAUER, J.BELLET, P.POUZET, AND A.REMY, COMPT.REND.259,761-764(1964) DETERMINATION OF THE ROTATIONAL AND CENTRIFUGAL DISTORTION CONSTANTS OF S(32)O₂ IN THE V₂ EXCITED STATE
78. M.WINNEWISSE AND R.L.COOK, J.CHEM.PHYS.41,999-1004(1964) CENTRIFUGAL DISTORTION EFFECTS AND STRUCTURE OF HYDRAZOIC ACID FROM THE MILLIMETER WAVE ROTATIONAL SPECTRA

Section V(c). CORIOLIS COUPLING

79. H.A.JAHN, PROC.ROY.SOC.LONDON 168A,469-518(1938) NEW CORIOLIS PERTURBATION IN THE METHANE SPECTRUM. PART I. VIBRATIONAL-ROTATIONAL HAMILTONIAN AND WAVE FUNCTIONS. PART II. ENERGY LEVELS
80. H.A.JAHN, PHYS.REV.56,680-683(1939) NOTE ON CORIOLIS COUPLING TERMS IN POLYATOMIC MOLECULES
81. H.H.NIELSEN, PHYS.REV.70,184-186(1946) A NOTE CONCERNING THE CORIOLIS CONTRIBUTION TO THE ENERGY OF A SYMMETRIC POLYATOMIC MOLECULE

82. D.R.J. BOYD AND H.C. LONGUET-HIGGINS, PROC. ROY. SOC., LONDON A213, 55-73 (1952) CORIOLIS INTERACTION BETWEEN VIBRATION AND ROTATION IN SYMMETRIC TOP MOLECULES
83. R.C. LORD AND R.E. MERRIFIELD, J. CHEM. PHYS. 20, 1348-1350 (1952) EVALUATION OF THE ZETA SUMS FOR ROTATION-VIBRATION INTERACTION IN AXIALLY SYMMETRICAL MOLECULES
84. J.H. MEAL AND S.R. POLO, J. CHEM. PHYS. 24, 1119-1125 (1956) VIBRATION-ROTATION INTERACTION IN POLYATOMIC MOLECULES. I. THE ZETA MATRICES
85. J.H. MEAL AND S.R. POLO, J. CHEM. PHYS. 24, 1126-1133 (1956) VIBRATION-ROTATION INTERACTION IN POLYATOMIC MOLECULES. II. THE DETERMINATION OF CORIOLIS COUPLING COEFFICIENTS
86. V.W. LAURIE AND D.T. PENCE, J. MOL. SPECTRY. 10, 155-160 (1963) MICROWAVE SPECTRUM OF F2CO-EXCITED VIBRATIONAL STATES AND CORIOLIS COUPLING

Section V(d). L-TYPE DOUBLING

87. G. HERZBERG, REVS. MOD. PHYS. 14, 219-223 (1942) L-TYPE DOUBLING IN LINEAR POLYATOMIC MOLECULES
88. H.H. NIELSEN AND W.H. SHAFFER, J. CHEM. PHYS. 11, 140-144 (1943) A NOTE CONCERNING L-TYPE DOUBLING IN LINEAR POLYATOMIC MOLECULES ERRATA- PHYS. REV. 75, 1961 (1949)
89. H.H. NIELSEN, PHYS. REV. 77, 130-135 (1950) L-TYPE DOUBLING IN POLYATOMIC MOLECULES AND ITS APPLICATION TO THE MICROWAVE SPECTRUM OF METHYL CYANIDE AND METHYL ISOCYANIDE
90. H.H. NIELSEN, PHYS. REV. 78, 296 (1950) L-TYPE DOUBLING IN OCS AND HCN
91. R.G. SHULMAN AND C.H. TOWNES, PHYS. REV. 77, 421-422 (1950) NEW TYPES OF MICROWAVE TRANSITIONS INVOLVING L-TYPE DOUBLING IN OCS AND HCN
92. J. DE HEER, PHYS. REV. 83, 741-745 (1951) A NOTE CONCERNING L-TYPE DOUBLING IN AXIALLY SYMMETRIC MOLECULES, IN PARTICULAR WITH REFERENCE TO MOLECULES BELONGING TO THE SYMMETRY GROUPS C4V AND VD
93. J. DE HEER AND H.H. NIELSEN, J. CHEM. PHYS. 20, 101-104 (1952) L-TYPE DOUBLING IN ENERGY LEVELS OF CARBON DIOXIDE COUPLED BY FERMI RESONANCE
94. T.L. WEATHERLY AND D. WILLIAMS, PHYS. REV. 87, 517-518 (1952) L-TYPE DOUBLING TRANSITIONS IN HCN AND DCN
95. R.J. COLLIER, PHYS. REV. 95, 1200-1202 (1954) DIRECT L-DOUBLET TRANSITION OF HCN IN THE 10-CENTIMETER WAVELENGTH REGION
96. J.F. WESTERKAMP, PHYS. REV. 93, 716 (1954) VARIATION OF THE L-TYPE DOUBLING CONSTANT IN HCN
97. A. MIYAHARA, H. HIRAKAWA, AND K. SHIMODA, J. PHYS. SOC. JAPAN 11, 335 (1956)

L-TYPE DOUBLING SPECTRA OF HCN AND DCN IN THE SUPERHIGH FREQUENCY REGION

98. G.AMAT, M.L.GRENIER-BESSON, AND H.Z.CUMMINS, COMPT.REND.244,2380-2381 (1957) SIGN OF THE CONSTANT Q OF L-TYPE DOUBLING
99. L.YARMUS, PHYS.REV.105,928-929(1957) DIRECT L-TYPE DOUBLING TRANSITIONS IN CLCN
100. G.AMAT AND H.H.NIELSEN, J.MOL.SPECTRY 2,152-162(1958) VIBRATIONAL L-TYPE DOUBLING AND L-TYPE RESONANCE IN LINEAR POLYATOMIC MOLECULES
101. G.AMAT AND H.H.NIELSEN, J.MOL.SPECTRY 2,163-172(1958) ROTATIONAL DISTORTION IN LINEAR MOLECULES ARISING FROM L-TYPE RESONANCE
102. T.S.JASEJA, PROC.INDIAN ACAD.SCI.504,108-128(1959) THE MICROWAVE SPECTRUM OF METHYL CYANIDE AND L-TYPE DOUBLING IN CH₃CN, CH₃NC, CH₃CCH, AND CF₃CCH
103. M.L.GRENIER-BESSON, J.PHYS.RADIUM 21,555-565(1960) ROTATIONAL L-TYPE DOUBLING AND RESONANCE IN MOLECULES HAVING AXIAL SYMMETRY
104. T.TORRING, Z.PHYSIK 161,179-189(1961) L-TYPE DOUBLET OF THE ISOTOPIC HCN MOLECULES
105. P.VENKATESWARLU, J.G.BAKER, AND W.GORDY, J.MOL.SPECTRY.6,215-228(1961) THE MILLIMETER WAVE SPECTRUM OF METHYL CYANIDE AND THE L-TYPE DOUBLING
106. G.G.WEBER, J.MOL.SPECTRY.10,321-347(1963) ON THE L-TYPE DOUBLING AND L-TYPE RESONANCE OF MOLECULES IN THE MICROWAVE REGION

Section VI. MOLECULAR STRUCTURE

Most microwave structure determinations have been carried out using the general isotopic substitution formulas in terms of the equilibrium moments of inertia developed by Kraitchman.⁷ The r_s and r_0 structures have been compared and discussed¹⁴ regarding the equilibrium structure, and a double substitution technique has been devised to treat small coordinates.^{20, 22} The effects of molecular vibrations on the molecular structure³² and, in particular, on the inertia defect^{27, 34, 37, 39, 42} determined from microwave data have received considerable attention.

1. W.GORDY, J.CHEM.PHYS.15,305-310(1947) DEPENDENCE OF BOND ORDER AND OF BOND ENERGY UPON BOND LENGTH
2. W.GORDY, J.CHEM.PHYS.15,81-84(1947) A RE-EVALUATION OF THE COVALENT RADII OF SOME OF THE ELEMENTS
3. R.FREYMAN, ONDE ELECT.30,416-424(1950) CENTIMETER WAVES AND MOLECULAR STRUCTURE
4. E.B.WILSON, JR., DIS. FARADAY SOC.9,108-114(1950) DETERMINATION OF MOLECULAR STRUCTURE WITH MICROWAVE SPECTROSCOPY
5. J.N.SHOOLERY, R.G.SHULMAN, W.F.SHEEHAN, JR., V.SCHOMAKER, AND D.M.YOST J.CHEM.PHYS.19,1364-1369(1951) THE STRUCTURE OF TRIFLUOROMETHYL ACETYLENE FROM THE MICROWAVE SPECTRUM AND ELECTRON DIFFRACTION PATTERN
6. D.KIVELSON AND E.B.WILSON, JR., J.CHEM.PHYS.21,1236(1953) AN AID IN THE DETERMINATION OF INTERNAL PARAMETERS FROM ROTATIONAL CONSTANTS FOR POLYATOMIC MOLECULES
7. J.KRAITCHMAN, AM.J.PHYS.21,17-24(1953) DETERMINATION OF MOLECULAR STRUCTURE FROM MICROWAVE SPECTROSCOPIC DATA
8. L.M.SVERDLOV, DOKLADY AKAD.NAUK SSSR.88,249-252(1953) RELATIONS BETWEEN MOMENTS OF INERTIA AND ROTATION FREQUENCIES OF ISOTOPIC MOLECULES
9. W.D.GWINN, DIS.FARADAY SOC.19,43-51(1955) INFORMATION PERTAINING TO MOLECULAR STRUCTURE AS OBTAINED FROM THE MICROWAVE SPECTRA OF MOLECULES OF THE ASYMMETRIC ROTOR TYPE
10. A.ALMENNINGEN AND O.BASTIANSEN, RES.CORRES., SUPPL.TO RESEARCH(LONDON) 9,35-36(1956) ACCURACY OF THE ELECTRON DIFFRACTION METHOD FOR THE DETERMINATION OF STRUCTURAL PARAMETERS IN THE GASEOUS STATE
11. T.E.TURNER AND J.A.HOWE, J.CHEM.PHYS.24,924-925(1956) DETERMINATION OF MOLECULAR STRUCTURES FROM ROTATIONAL SPECTRA MEASUREMENTS
12. L.F.THOMAS, J.S.HEEKS, AND J.SHERIDAN, ARCH.ACI.(GENEVA)10,180-183 (1957) STUDIES OF CONJUGATION AND HYPERCONJUGATION IN SEVERAL MOLECULES BY MICROWAVE SPECTROSCOPY
13. W.ZEIL AND J.F.PEROMMER, Z.ELEKTROCHEM.61,938-940(1957) MICROWAVE SPECTROSCOPIC MEASUREMENTS CONCERNING THE KNOWLEDGE OF THE C-C DISTANCE IN THE C-CN GROUP OF NITRILES
14. C.C.COSTAIN, J.CHEM.PHYS.29,864-874(1958) DETERMINATION OF MOLECULAR STRUCTURES FROM GROUND STATE ROTATIONAL CONSTANTS
15. V.W.LAURIE, J.CHEM.PHYS.28,704-706(1958) NOTE ON THE DETERMINATION OF MOLECULAR STRUCTURE FROM SPECTROSCOPIC DATA
16. D.R.LIDE, JR. AND D.E.MANN, AM.CHEM.SOC.DIV.PETROL CHEM.PREPRINTS 3, 49-50(1958) MOLECULAR STRUCTURE STUDIES OF HYDROCARBONS BY MICROWAVE SPECTROSCOPY

17. C.C.COSTAIN AND B.P.STOICHEFF, J.CHEM.PHYS.30,777-782(1959) MICROWAVE SPECTRUM, MOLECULAR STRUCTURE OF VINYL CYANIDE, AND A SUMMARY OF CARBON-CARBON, CARBON-HYDROGEN BOND LENGTHS IN SIMPLE MOLECULES
18. V.W.LAURIE, J.CHEM.PHYS.30,1101-1102(1959) COMMENTS ON THE STRUCTURE OF 1,1,1-TRIFLUORO-2-BUTYNE
19. T.NISHIKAWA, KAGAKU NO.RYOIKI 13,385-395(1959) STUDIES OF MOLECULAR STRUCTURE BY MICROWAVE METHOD
20. L.PIERCE, J.MOL.SPECTRY.3,575-580(1959) NOTE ON THE USE OF GROUND-STATE ROTATIONAL CONSTANTS IN THE DETERMINATION OF MOLECULAR STRUCTURE
21. P.H.VERDIER AND E.B.WILSON, JR., J.CHEM.PHYS.30,1372-1373(1959) FORCE CONSTANT CALCULATIONS IN LINEAR TRIATOMIC MOLECULES FROM INFRARED AND MICROWAVE DATA
22. L.C.KRISHER AND L.PIERCE, J.CHEM.PHYS.32,1619-1625(1960) SECOND DIFFERENCES OF MOMENTS OF INERTIA IN STRUCTURAL CALCULATIONS- APPLICATION TO METHYL-FLUOROSILANE MOLECULES
23. J.K.BROWN AND A.P.COX, SPECTROCHIM.ACTA 17,1230-1239(1961) NEAR-EQUILIBRIUM BOND DISTANCES IN SIMPLE MOLECULES
24. D.R.HERSCHBACH AND V.W.LAURIE, J.CHEM.PHYS.35,458-463(1961) ANHARMONIC POTENTIAL CONSTANTS AND THEIR DEPENDENCE UPON BOND LENGTH
25. D.R.LIDE, JR. AND D.CHRISTENSEN, J.CHEM.PHYS.35,1374-1378(1961) MOLECULAR STRUCTURE OF PROPYLENE
26. D.R.LIDE, JR. AND D.CHRISTENSEN, SPECTROCHIM.ACTA 17,665-668(1961) AN IMPROVED STRUCTURE DETERMINATION FOR VINYL FLUORIDE
27. T.OKA AND Y.MORINO, J.MOL.SPECTRY.6,472-482(1961) CALCULATION OF INERTIA DEFECT PART I. GENERAL FORMULATION
28. B.BAK, D.CHRISTENSEN, W.B.DIXON, L.HANSEN-NYGAARD, AND J.RAstrup-ANDERSEN, J.CHEM.PHYS.37,2027-2031(1962) BENZENE RING DISTORTION BY ONE SUBSTITUENT . MICROWAVE DETERMINATION OF THE COMPLETE STRUCTURE OF BENZONITRILE
29. B.BAK, D.CHRISTENSEN, W.B.DIXON, L.HANSEN-NYGAARD, J.RAstrup-ANDERSEN AND M.SCHOTTLANDER, J.MOL.SPECTRY.9,124-129(1962) THE COMPLETE STRUCTURE OF FURAN
30. B.BAK, D.CHRISTENSEN, L.HANSEN-NYGAARD, AND J.RAstrup-ANDERSEN, SPECTROCHIM.ACTA 18,229-233(1962) ANALYSIS OF THE MICROWAVE SPECTRUM OF 2-FLUORO-NAPHTHALENE WITH A DISCUSSION OF STRUCTURE DETERMINATION POSSIBILITIES
31. M.JEN AND D.R.LIDE, JR., J.CHEM.PHYS.36,2525-2526(1962) MOLECULAR STRUCTURE OF CHLOROFORM
32. V.W.LAURIE AND D.R.HERSCHBACH, J.CHEM.PHYS.37,1687-1692(1962) INFLUENCE OF VIBRATIONS ON MOLECULAR STRUCTURE DETERMINATIONS. II. AVERAGE STRUCTURES DERIVED FROM SPECTROSCOPIC DATA

33. Y.MORINO,K.KUCHITSU,AND T.OKA,J.CHEM.PHYS.36,1108-1109(1962)
INTERNUCLEAR DISTANCE PARAMETERS
34. T.OKA AND Y.MORINO,J.MOL.SPECTRY.8,9-21(1962) CALCULATION OF
INERTIA DEFECT PART II. NONLINEAR SYMMETRIC XY₂MOLECULES
35. L.S.BARTELL,J.CHEM.PHYS.38,1827-1833(1963) CALCULATION OF MEAN
ATOMIC POSITIONS IN VIBRATING POLYATOMIC MOLECULES
36. U.BLUKIS,P.H.KASAI,AND R.J.MYERS,J.CHEM.PHYS.38,2753-2760(1963)
MICROWAVE SPECTRA AND STRUCTURE OF DIMETHYL ETHER
37. D.R.HERSCHBACH AND V.W.LAURIE,UCRL-11208(1963) INFLUENCE OF
VIBRATIONS ON MOLECULAR STRUCTURE DETERMINATIONS III. INERTIAL DEFECTS
38. D.R.LIDE,JR.AND M.JEN,J.CHEM.PHYS.38,1504-1507(1963) MICROWAVE
SPECTRUM OF TERTIARY BUTYL CHLORIDE. A COMPARISON OF TERTIARY
BUTYL STRUCTURES
39. T.OKA AND Y.MORINO,J.MOL.SPECTRY.11,349-367(1963) INERTIA DEFECT
PART III. INERTIA DEFECT AND PLANARITY OF FOUR-ATOMIC MOLECULES
40. A.CHUTJIAN,J.MOL.SPECTRY 14,361-370(1964) DETERMINATION OF
STRUCTURE BY ISOTOPIC SUBSTITUTION IN MOLECULES WITH SYMMETRICALLY
EQUIVALENT ATOMS
41. M.TOYAMA,T.OKA,AND Y.MORINO,J.MOL.SPECTRY.13,193-213(1964) EFFECT
OF VIBRATION AND ROTATION ON THE INTERNUCLEAR DISTANCE
42. K.KUCHITSU,T.OKA,AND Y.MORINO,J.MOL.SPECTRY 15,51-67(1965)
CALCULATION OF INERTIA DEFECT. PART IV. ETHYLENE-TYPE MOLECULES

Section VII. QUADRUPOLE COUPLING

Nuclear quadrupole interactions can perturb the rotational spectrum of a molecule which contains one or more nuclei with nonspherical nuclear charge distributions. These effects have been studied in linear, symmetric, and asymmetric top molecules^{19, 21} to provide information concerning the electric field gradient at the quadrupole nucleus. Second-order effects can become prominent when the quadrupole interaction is sizable or when an appropriate near degeneracy is present.^{100, 102, 103} In the case of an asymmetric rotor, the second-order interaction may lead to an evaluation of an off-diagonal coupling constant X_{ij} . Intensities of the hyperfine components have been adopted directly from atomic spectra.^{2, 3} Bersohn³⁷ and Misushima and Ito⁴⁸ have treated the case of three quadrupole nuclei in a symmetric rotor. Work has also been done on asymmetric rotors with two quadrupole nuclei.^{104-106, 109, 112} As experimental sensitivity is improved, coupling in excited vibrational states may be studied.^{86, 88} Interactions with an external electric field are referenced in Section X.

Excellent reviews on the subject have been written by Das and Hahn⁹⁷ and O'Konski.¹⁰⁷

1. E.L.HILL, PROC.NATL.ACAD.SCI.15,779-784(1929) RELATIVE INTENSITIES IN NUCLEAR SPIN MULTIPLETS
2. L.PAULING AND S.GOUDSMIT, THE STRUCTURE OF LINE SPECTRA, MCGRAW-HILL BOOK COMPANY, INC., NEW YORK (1930)
3. H.E.WHITE, INTRODUCTION TO ATOMIC SPECTRA, MCGRAW-HILL BOOK COMPANY, INC., NEW YORK (1934)
4. H.B.G.CASIMIR, ON THE INTERACTION BETWEEN ATOMIC NUCLEI AND ELECTRONS, TEYLLERS TWEEDE GENOOTSCHAP, E.F. BOHN, HAARLEM (1936)
5. J.M.B.KELLOGG, I.I.RABI, N.F.RAMSEY, AND H.R.ZACHARIAS
PHYS.REV.57,677-695(1940) AN ELECTRICAL QUADRUPOLE MOMENT OF THE DEUTERON. THE RADIOFREQUENCY SPECTRA OF HD AND D2 MOLECULES IN A MAGNETIC FIELD
6. A.NORDSIECK, PHYS.REV.58,310-315(1940) ON THE VALUE OF THE ELECTRIC QUADRUPOLE MOMENT OF THE DEUTERON
7. G.RACAH, PHYS.REV.61,186-197(1942) THEORY OF COMPLEX SPECTRA.I.
8. G.RACAH, PHYS.REV.62,438-462(1942) THEORY OF COMPLEX SPECTRA.II.
9. G.RACAH, PHYS.REV.63,367-382(1943) THEORY OF COMPLEX SPECTRA.III.
10. B.T.FELD AND W.E.LAMB, JR., PHYS.REV.67,15-33(1945) EFFECT OF NUCLEAR QUADRUPOLE MOMENT ON THE ENERGY LEVELS OF A DIATOMIC MOLECULE IN A MAGNETIC FIELD. PART I. HETERONUCLEAR MOLECULES
11. B.P.DAILEY, R.L.KYHL, M.W.P.STRANDBERG, J.H.VAN VLECK, AND E.B.WILSON, JR.,
PHYS.REV.70,984(1946) THE HYPERFINE STRUCTURE OF THE MICROWAVE SPECTRUM OF AMMONIA AND THE EXISTENCE OF A QUADRUPOLE MOMENT IN N(14)
12. B.T.FELD, PHYS.REV.72,1116-1117(1947) ON THE NUCLEAR ELECTRIC QUADRUPOLE INTERACTION IN MOLECULAR SPECTRA
13. H.M.FOLEY, PHYS.REV.71,747-751(1947) NOTE ON THE NUCLEAR ELECTRIC QUADRUPOLE SPECTRUM OF A HOMONUCLEAR DIATOMIC MOLECULE IN A MAGNETIC FIELD
14. C.H.TOWNES, PHYS.REV.71,909-910(1947) ELECTROSTATIC FIELD STRENGTHS IN MOLECULES AND NUCLEAR QUADRUPOLE MOMENTS
15. C.H.TOWNES, A.N.HOLDEN, J.BARDEEN, AND F.R.MERRITT, PHYS.REV.71,644-645 (1947) THE QUADRUPOLE MOMENTS AND SPINS OF BR, CL, AND N NUCLEI
ERRATA-PHYS.REV.71,829(1947)
16. J.H.VAN VLECK, PHYS.REV.71,468-469(1947) FORMULA FOR THE COUPLING OF NUCLEAR QUADRUPOLE MOMENTS IN SYMMETRICAL POLYATOMIC MOLECULES
17. R.J.WATTS AND D.WILLIAMS, PHYS.REV.72,263-265(1947) NUCLEAR QUADRUPOLE MOMENT EFFECTS IN THE INVERSION SPECTRUM OF AMMONIA
18. R.J.WATTS AND D.WILLIAMS, PHYS.REV.71,639(1947) NUCLEAR QUADRUPOLE MOMENT EFFECTS IN THE MICROWAVE SPECTRUM OF AMMONIA

19. J.BARDEEN AND C.H.TOWNES,PHYS.REV.73,97-105(1948) CALCULATION OF NUCLEAR QUADRUPOLE EFFECTS IN MOLECULES
20. J.BARDEEN AND C.H.TOWNES,PHYS.REV.73,627-629(1948) SECOND-ORDER CORRECTIONS TO QUADRUPOLE EFFECTS IN MOLECULES ERRATA-PHYS.REV. 73,1204(1948)
21. J.K.BRAGG,PHYS.REV. 74,533-538(1948) THE INTERACTION OF NUCLEAR ELECTRIC QUADRUPOLE MOMENTS WITH MOLECULAR ROTATION IN ASYMMETRIC- TOP MOLECULES.I.
22. W.GORDY,H.RING, AND A.B.BURG,PHYS.REV.74,1191(1948) NUCLEAR SPINS AND QUADRUPOLE MOMENTS OF B(10) AND B(11)
23. G.KNIGHT AND B.T.FELD,PHYS.REV.74,354 (1948) INTERACTION OF NUCLEAR QUADRUPOLE MOMENTS WITH MOLECULAR ROTATION IN SLIGHTLY ASYMMETRIC ROTOR MOLECULES
24. A.G.SMITH,H.RING,W.V.SMITH,AND W.GORDY,PHYS.REV.73,633(1948) NUCLEAR QUADRUPOLE COUPLING OF NITROGEN IN ICN AND N2O
25. C.H.TOWNES AND S.GESCHWIND,PHYS.REV.74,626-627(1948) SPIN AND QUADRUPOLE MOMENT OF S(33)
26. J.W.TRISCHKA,PHYS.REV.74,718-727(1948) NUCLEAR QUADRUPOLE INTERACTION IN CSF
27. R.T.WEIDNER,PHYS.REV.73,254(1948) NUCLEAR QUADRUPOLE INTERACTION IN THE ICL SPECTRUM
28. J.K.BRAGG AND S.GOLDEN,PHYS.REV.75,735-738(1949) THE INTERACTION OF NUCLEAR ELECTRIC QUADRUPOLE MOMENTS WITH MOLECULAR ROTATION IN ASYMMETRIC TOP MOLECULES. II.APPROXIMATE METHODS FOR FIRST-ORDER COUPLING
29. V.W.COHEN,W.S.KOSKI, AND T.WENTINK,PHYS.REV.76,703-704(1949) NUCLEAR SPIN AND QUADRUPOLE COUPLING OF S(35)
30. J.H.GOLDSTEIN AND J.K.BRAGG,PHYS.REV.75,1453-1454(1949) NUCLEAR QUADRUPOLE EFFECTS IN THE MICROWAVE SPECTRUM OF THE ASYMMETRIC TOP MOLECULE,VINYL CHLORIDE
31. P.KUSCH,PHYS.REV.75,887-888(1949) ON THE NUCLEAR QUADRUPOLE MOMENT OF LI(6)
32. R.LIVINGSTON,O.R.GILLIAM, AND W.GORDY,PHYS.REV.76,149-150(1949) THE NUCLEAR SPIN AND QUADRUPOLE MOMENT OF I(129)
33. C.H.TOWNES AND L.C.AAMODT,PHYS.REV.76,691-692(1949) NUCLEAR SPIN AND QUADRUPOLE MOMENT OF CL(36)
34. C.H.TOWNES AND B.P.DAILEY,J.CHEM.PHYS.17,782-796(1949) DETERMINATION OF ELECTRONIC STRUCTURE OF MOLECULES FROM NUCLEAR QUADRUPOLE EFFECTS
35. C.H.TOWNES,H.M.FOLEY,AND W.LOW,PHYS.REV.76,1415-1416(1949) NUCLEAR QUADRUPOLE MOMENTS AND NUCLEAR SHELL STRUCTURE

36. C.H.TOWNES, J.M.MAYS, AND B.P.DAILEY, PHYS.REV.76,700(1949) EVIDENCE ON NUCLEAR MOMENTS OF STABLE GE AND SI ISOTOPES FROM MICROWAVE SPECTRA
37. R.BERSOHN, J.CHEM.PHYS.18,1124-1125(1950) QUADRUPOLE COUPLING OF THREE NUCLEI IN A ROTATING MOLECULE
38. J.H.GOLDSTEIN AND J.K.BRAGG, PHYS.REV.78,347 (1950) DETERMINATION OF DOUBLE BOND CHARACTER FROM THE MICROWAVE SPECTRUM OF PLANAR ASYMMETRIC TOP MOLECULES WITH A QUADRUPOLE NUCLEUS
39. J.RAINWATER, PHYS.REV.79,432-434(1950) NUCLEAR ENERGY LEVEL ARGUMENT FOR A SPHEROIDAL NUCLEAR MODEL
40. N.F.RAMSEY, PHYS.REV.78,221-222(1950) QUADRUPOLE MOMENT OF THE ELECTRON DISTRIBUTION IN HYDROGEN MOLECULES
41. R.STERNHEIMER, PHYS.REV.80,102-103(1950) ON NUCLEAR QUADRUPOLE MOMENTS
42. C.H.TOWNES AND B.P.DAILEY, PHYS.REV.78,346-347 (1950) NUCLEAR QUADRUPOLE COUPLING AND IONIC CHARACTER OF MOLECULES
43. M.T.WEISS, M.W.P.STRANDBERG, R.B.LAWRENCE, AND C.C.LOOMIS, PHYS.REV.78,202-204(1950) ON THE NUCLEAR SPIN OF B(10)
44. S.GESCHWIND, R.GUNTHER-MOHR, AND C.H.TOWNES, PHYS.REV.81,288-289(1951) RATIO OF QUADRUPOLE MOMENTS OF CL(35) AND CL(37)
45. W.GORDY, J.CHEM.PHYS.19,792-793(1951) INTERPRETATION OF NUCLEAR QUADRUPOLE COUPLINGS IN MOLECULES
46. C.M.JOHNSON, W.GORDY, AND R.LIVINGSTON, PHYS.REV.83,1249(1951) ON THE SPIN AND QUADRUPOLE MOMENT OF CL(36)
47. J.M.MAYS AND C.H.TOWNES, PHYS.REV.81,940-941(1951) THE NUCLEAR SPINS AND QUADRUPOLE MOMENTS OF STABLE GERMANIUM ISOTOPES
48. M.MIZUSHIMA AND T.ITO, J.CHEM.PHYS.19,739-744(1951) ON THE HYPERFINE STRUCTURE OF THE ROTATIONAL SPECTRA OF XYZ₃-TYPE MOLECULE, WHERE NUCLEI Z HAVE ELECTRIC QUADRUPOLE MOMENTS
49. C.H.TOWNES, PHYSICA 17,354-377(1951) DETERMINATION OF NUCLEAR PROPERTIES BY MICROWAVE SPECTROSCOPY
50. L.C.BIEDENHARN, J.M.BLATT, AND M.E.ROSE, REVS.MOD.PHYS.24,249-257(1952) SOME PROPERTIES OF THE RACAH AND ASSOCIATED COEFFICIENTS
51. J.DUCHESNE, J.CHEM.PHYS.20,1804-1805(1952) NUCLEAR QUADRUPOLE COUPLING CONSTANTS AND MOLECULAR VIBRATIONS
52. S.GESCHWIND, G.R.GUNTHER-MOHR, AND G.SILVEY, PHYS.REV.85,474-477(1952) THE SPIN AND QUADRUPOLE MOMENT OF O(17)
53. D.A.GILBERT, PHYS.REV.85,716 (1952) THE NUCLEAR SPIN OF CL(36) FROM THE MICROWAVE SPECTRUM OF C(12)H₃CL(36)
54. W.A.HARDY, G.SILVEY, AND C.H.TOWNES, PHYS.REV.85,494-495(1952) THE SPIN AND QUADRUPOLE MOMENT OF SE(79)

55. A.JAVAN AND C.H.TOWNES, PHYS.REV.86,608 (1952) ANOMALIES IN THE HYPERFINE STRUCTURE OF ICN
56. R.A.LOGAN, R.F.COTE, AND P. KUSCH, PHYS.REV.86,280-287(1952) THE SIGN OF THE QUADRUPOLE INTERACTION ENERGY IN DIATOMIC MOLECULES
57. R.J.MYERS AND W.D.GWINN, J.CHEM.PHYS.20,1420-1427(1952) THE MICROWAVE SPECTRA, DIPOLE MOMENT, AND CHLORINE NUCLEAR QUADRUPOLE COUPLING CONSTANTS OF METHYLENE CHLORIDE
58. J.D.ROGERS AND D.WILLIAMS, PHYS.REV.86,654 (1952) NUCLEAR QUADRUPOLE INTERACTIONS IN THE MICROWAVE SPECTRUM OF HYDROGEN AZIDE
59. C.H.TOWNES AND B.P.DAILEY, J.CHEM.PHYS.20,35-40(1952) NUCLEAR QUADRUPOLE EFFECTS AND ELECTRONIC STRUCTURE OF MOLECULES IN THE SOLID STATE
60. T.C.WANG, C.H.TOWNES, A.L.SCHAWLOW, AND A.N.HOLDEN, PHYS.REV.86,809-810 (1952) QUADRUPOLE COUPLING RATIO OF THE CHLORINE ISOTOPES
61. H.G.DEHMELT, PHYS.REV.91,313-314(1953) NUCLEAR QUADRUPOLE RESONANCE IN RHOMBIC SULFUR AND THE QUADRUPOLE MOMENTS OF S(33) AND S(35)
62. I.I.GOLDMAN, DOKLADY AKAD.NAUK.SSSR 88,241-243(1953) ON THE SPECTROSCOPIC DETERMINATION OF THE QUADRUPOLE MOMENTS OF NUCLEI
63. W.A.HARDY, G.SILVEY, C.H.TOWNES, B.F.BURKE, M.W.P.STRANDBERG, G.W.PARKER, AND V.W.COHEN, PHYS.REV.92,1532-1537(1953) THE NUCLEAR MOMENT OF SE(79)
64. A.JAVAN, G.SILVEY, C.H.TOWNES, AND A.V.GROSSE, PHYS.REV.91,222-223 (1953) ON THE QUADRUPOLE MOMENTS OF MN(35), RE(185), AND RE(187)
65. P.KUSCH, PHYS.REV.92,268-270(1953) SIGN OF THE QUADRUPOLE INTERACTION OF LI(6) IN LiCl
66. R.LIVINGSTON, R.M.BENJAMIN, J.T.COX, AND W.GORDY, PHYS.REV.92,1271-1272 (1953) THE NUCLEAR SPIN AND QUADRUPOLE MOMENT OF I(131)
67. S.-Y.OBI, T.ISHIDZU, H.HORIE, S.YANAGAWA, Y.TANABE, AND M.SATO, ANN.TOKYO ASTRON.OBS.3,89-142(1953) TABLES OF THE RACAH COEFFICIENTS W(ABCD,EF) I. COEFFICIENTS HAVING ALL THEIR VARIABLES INTEGRAL
68. N.F.RAMSEY, PHYS.REV.89,527(1953) PSEUDO-QUADRUPOLE EFFECT FOR NUCLEI IN MOLECULES
69. G.W.ROBINSON AND C.D.CORNWELL, J.CHEM.PHYS.21,1436-1442(1953) THE INTERACTION WITH MOLECULAR ROTATION OF THE NUCLEAR ELECTRIC QUADRUPOLE MOMENTS OF TWO NUCLEI HAVING SPINS 3/2
70. R.L.WHITE, PHYS.REV.91,1014(1953) QUADRUPOLE COUPLING OF THE DEUTERON IN DCCl AND DCN
71. R.L.WHITE AND C.H.TOWNES, PHYS.REV.92,1256-1257(1953) THE SPIN OF SI(29) AND MASS RATIOS OF THE STABLE SI ISOTOPES

72. L.C.AAMODT, P.C.FLETCHER, G.SILVEY, AND C.H.TOWNES, PHYS.REV.94,789 (1954) THE SPIN AND QUADRUPOLE MOMENT OF SE(75)
73. G.R.BIRD AND C.H.TOWNES, PHYS.REV.94,1203-1208(1954) SULFUR BONDS AND THE QUADRUPOLE MOMENTS OF O,S,AND SE ISOTOPES
74. H.M.FOLEY, R.M.STERNHEIMER, AND D.TYCKO, PHYS.REV.93,734-742(1954) NUCLEAR QUADRUPOLE COUPLING IN POLAR MOLECULES
75. W.GORDY, J.CHEM.PHYS.22,1470-1471(1954) RELATION OF NUCLEAR QUADRUPOLE COUPLINGS TO THE CHEMICAL BOND
76. J.A.KRAITCHMAN AND B.P.DAILEY, J.CHEM.PHYS.22,1477-1481(1954) VARIATION IN THE QUADRUPOLE COUPLING CONSTANT WITH VIBRATIONAL STATE IN THE METHYL HALIDES
77. H.W.MORGAN AND J.H.GOLDSTEIN, J.CHEM.PHYS.22,1427-1429(1954) SECOND-ORDER QUADRUPOLE EFFECTS IN ASYMMETRIC TOPS. THE MICROWAVE SPECTRUM OF VINYL IODIDE
78. N.F.RAMSEY, NUCLEAR MOMENTS, JOHN WILEY AND SONS INC. NEW YORK (1954)
79. P.N.SCHATZ, J.CHEM.PHYS.22,755(1954) DEDUCTIONS ABOUT HYBRIDIZATION FROM NUCLEAR QUADRUPOLE COUPLING CONSTANTS
80. R.M.STERNHEIMER, PHYS.REV.95,736-750(1954) EFFECT OF THE ATOMIC CORE ON THE NUCLEAR QUADRUPOLE COUPLING
81. F.STERZER AND Y.BEERS, PHYS.REV.94,1410 (1954) PURE QUADRUPOLE SPECTRUM OF METHYL IODIDE VAPOR
82. L.C.AAMODT AND P.C.FLETCHER, PHYS.REV.98,1224-1229(1955) SPIN, QUADRUPOLE MOMENT, AND MASS OF SELENIUM-75
83. B.P.DAILEY, DIS.FARADAY SOC.19,255-259(1955) THE INTERPRETATION OF QUADRUPOLE SPECTRA
84. B.P.DAILEY AND C.H.TOWNES, J.CHEM.PHYS.23,118-123(1955) THE IONIC CHARACTER OF DIATOMIC MOLECULES
85. W.GORDY, DIS.FARADAY SOC.19,14-29(1955) QUADRUPOLE COUPLINGS, DIPOLE MOMENTS, AND THE CHEMICAL BOND
86. A.JAVAN, PHYS.REV.99,1302-1306(1955) EFFECTS OF THE BENDING MODE OF VIBRATION ON THE HYPERFINE STRUCTURE OF ICN
87. F.STERZER AND Y.BEERS, PHYS.REV.100,1174-1180(1955) PURE QUADRUPOLE SPECTRA OF CH₃I AND CF₃I VAPORS
88. R.L.WHITE, J.CHEM.PHYS.23,249-252(1955) NUCLEAR QUADRUPOLE INTERACTION IN HCN AND DCN IN THE BENDING VIBRATIONAL MODE
89. R.L.WHITE, J.CHEM.PHYS.23,253-255(1955) QUADRUPOLE COUPLING OF THE DEUTERON IN DCCCL AND DCN
90. J.H.GOLDSTEIN, J.CHEM.PHYS.24,106-109(1956) QUADRUPOLE COUPLING AND BOND CHARACTER IN THE VINYL HALIDES
91. D.R.LIDE, JR., BULL.AM.PHYS.SOC.(2) 1,13(1956) NUCLEAR QUADRUPOLE

INTERACTIONS IN THE MICROWAVE SPECTRA OF INTERNALLY ROTATING MOLECULES

92. T.OKA AND H.HIRAKAWA, J.PHYS.SOC.JAPAN 12,820-823(1957)
MICROWAVE SPECTRUM OF BRCN AND DEPENDENCE OF QUADRUPOLE COUPLING CONSTANT ON THE VIBRATIONAL STATE
93. D.W.POSENER, AUST.J.PHYS.10,376-385(1957) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF WATER. I. QUADRUPOLE COUPLING IN DEUTERATED WATER
94. M.E.ROSE, ELEMENTARY THEORY OF ANGULAR MOMENTUM, JOHN WILEY ,INC., NEW YORK(1957)
95. B.ROSENBLUM AND A.H.NETHERCOT, JR., J.CHEM.PHYS.27,828-829(1957)
QUADRUPOLE COUPLING CONSTANT AND MOLECULAR STRUCTURE OF CARBON MONOXIDE-O(17)
96. M.J.STEVENSON AND C.H.TOWNES, PHYS.REV.107,716-723(1957)
QUADRUPOLE MOMENT OF OXYGEN-17
97. T.P.DAS AND E.L.HAHN, NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY, ACADEMIC PRESS INC., NEW YORK(1958)
98. P.C.FLETCHER AND E.AMBLE, PHYS.REV.110,536-543(1958)
SPIN AND QUADRUPOLE MOMENT OF IODINE-125 AND MAGNETIC MOMENT OF IODINE-131
99. R.H.JACKSON AND D.J.MILLEN, PROC.CHEM.SOC.(LONDON)1959,10(1959)
MICROWAVE SPECTRUM AND NUCLEAR QUADRUPOLE COUPLING COEFFICIENTS FOR CHLORINE MONOXIDE
100. Y.KIKUCHI, E.HIROTA, AND Y.MORINO, J.CHEM.PHYS.31,1139-1140(1959)
SECOND ORDER QUADRUPOLE EFFECT IN THE MICROWAVE SPECTRUM OF PROPARGYL BROMIDE
101. J.K.WILMSHURST, J.CHEM.PHYS.30,561-565(1959) EMPIRICAL EXPRESSION FOR IONIC CHARACTER AND THE DETERMINATION OF S HYBRIDIZATION FROM NUCLEAR QUADRUPOLE COUPLING CONSTANTS
102. J.A.HOWE, J.CHEM.PHYS.34,1247-1249(1961) MICROWAVE SPECTRUM OF CIS-1-CHLORO-2 FLUOROETHYLENE
103. Y.KIKUCHI, E.HIROTA, AND Y.MORINO, BULL.CHEM.SOC.JAPAN 34,348-353(1961)
MICROWAVE SPECTRA OF PROPARGYL HALIDES II. MOLECULAR STRUCTURE AND SECOND ORDER QUADRUPOLE EFFECT OF PROPARGYL BROMIDE
104. W.H.FLYGARE AND W.D.GWINN, J.CHEM.PHYS.36,787-794(1962) ELECTRON DISTRIBUTION IN THE C-CL BONDS OF CH₂CL₂ AND DERIVATION OF MATRIX ELEMENTS OFF-DIAGONAL IN J FOR TWO QUADRUPOLE NUCLEI IN AN ASYMMETRIC ROTOR
105. W.H.FLYGARE AND J.A.HOWE, J.CHEM.PHYS.36,440-443(1962) MICROWAVE SPECTRUM AND QUADRUPOLE INTERACTION IN CIS-1,2-DICHLOROETHYLENE
106. W.H.FLYGARE, A.NARATH, AND W.D.GWINN, J.CHEM.PHYS.36,200-208(1962)
MICROWAVE SPECTRUM, STRUCTURE, QUADRUPOLE INTERACTION, DIPOLE MOMENT, AND BENT C-CL BONDS IN 1,1-DICHLOROCYCLOPROPANE

107. C.T.OKONSKI, DETERMINATION OF ORGANIC STRUCTURES BY PHYSICAL METHODS, VOL. II. CHAPTER 11, NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY, ACADEMIC PRESS INC. NEW YORK (1962)
108. R.A.FURMAN AND D.R.LIDE, JR., J.CHEM.PHYS. 39, 1133-1134 (1963) QUADRUPOLE COUPLING CONSTANTS FROM THE MICROWAVE SPECTRUM OF HYDRAZOIC ACID
109. W.H.FLYGARE, J.MOL.SPECTRY 14, 145-155 (1964) THE MICROWAVE SPECTRUM, PARTIAL STRUCTURE, AND QUADRUPOLE COUPLING CONSTANTS IN 1,1-DICHLOROETHANE
110. W.H.FLYGARE, J.CHEM.PHYS. 41, 206-214 (1964) EXPERIMENTAL DETERMINATION OF THE FIELD GRADIENT AT THE DEUTERON IN FORMALDEHYDE
111. J.T.LOWE AND W.H.FLYGARE, J.CHEM.PHYS. 41, 2153-2158 (1964) CALCULATION OF THE FIELD GRADIENT AT THE DEUTERIUM IN FORMALDEHYDE
112. R.H.SCHWENDEMAN, J.MOL.SPECTRY 15, 451-461 (1965) MATRIX ELEMENTS OF SOME PRODUCTS OF DIRECTION COSINES AND SECOND-ORDER QUADRUPOLE COUPLING CALCULATIONS

Section VIII. HINDERED INTERNAL ROTATION

Studies of internal rotation by microwave spectroscopy have been favored by the relative barrier heights hindering internal rotation in methyl groups and the relatively low vibrational frequencies associated with these torsional motions. Most of the barriers for $\text{CH}_3\text{-X}$ type molecules, where X represents the frame of the molecule, fall in the region from 1-4 kilocalories which allows splitting of rotational transitions by rotation-internal rotation interactions to be observed either in the ground vibrational state or in excited torsional states. The latter is usually the vibrational modes of lowest frequency and is relatively well populated.

The theoretical methods to be applied to single top molecules have been reviewed by Lin and Swalen.¹⁰⁰ In most cases the problem consists of a symmetric top attached to an asymmetric frame.^{52, 70} Extensions have been made to treat two-top molecules,¹¹⁸⁻¹²⁰ asymmetric top and frame,^{39, 136} cis-gauche-trans configurations of C-C bonds,^{122, 123, 147} and symmetric top molecules through excited states^{87, 88} and Coriolis effects.¹⁴⁰

Herschbach¹³⁴ has listed the barrier values determined through 1962 in a complete review of experimental results.

1. H.H.NIELSEN,PHYS.REV.40,445-456(1932) THE TORSION OSCILLATOR-ROTATOR IN THE QUANTUM MECHANICS
2. J.B.HOWARD,J.CHEM.PHYS.5,451-459(1937) THE ROTATION-VIBRATION SPECTRUM OF C₂H₆ AND THE QUESTION OF FREE INTERNAL ROTATION
3. E.GORIN,J.WALTER,AND H.EYRING,J.AM.CHEM.SOC.61,1877-1886(1939) INTERNAL ROTATION AND RESONANCE IN HYDROCARBONS
4. B.L.CRAWFORD,J.CHEM.PHYS.8,273-281(1940) THE PARTITION FUNCTIONS AND ENERGY LEVELS OF MOLECULES WITH INTERNAL TORSIONAL MOTIONS
5. J.S.KOEHLER AND D.M.DENNISON,PHYS.REV.57,1006-1021(1940) HINDERED ROTATION IN METHYL ALCOHOL
6. D.PRICE,J.CHEM.PHYS.9,807-815(1941) THE PARTITION FUNCTIONS OF MOLECULES WITH INTERNAL TORSION. I.SINGLE ASYMMETRIC TOP ATTACHED TO RIGID FRAMEWORK. ERRATUM-J.CHEM.PHYS.10,80(1942)
7. K.S.PITZER AND W.D.GWINN,J.CHEM.PHYS.10,428-440(1942) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION . I.RIGID FRAME WITH ATTACHED TOPS
8. J.G.ASTON,S.ISSEROW,G.J.SZASZ,AND R.M.KENNEDY,J.CHEM.PHYS.12,336-344 (1944) AN EMPIRICAL CORRELATION AND METHOD OF CALCULATION OF BARRIERS HINDERING INTERNAL ROTATION
9. F.A.FRENCH AND R.S.RASMUSSEN,J.CHEM.PHYS.14,389-394(1946) A RELATION BETWEEN INTERNUCLEAR DISTANCES AND POTENTIAL BARRIERS OF METHYL GROUPS
10. K.S.PITZER,J.CHEM.PHYS.14,239-243(1946) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION. II. UNSYMMETRICAL TOPS ATTACHED TO A RIGID FRAME.
11. E.N.LASSETTRE AND L.B.DEAN,J.CHEM.PHYS.16,151-152(1948) ORIGIN OF THE POTENTIAL BARRIER HINDERING ROTATION IN ETHANE AND RELATED SUBSTANCES
12. B.P.DAILEY,H.MINDEN,AND R.G.SHULMAN,PHYS.REV.75,1319 (1949) TORSION VIBRATIONAL STATES OF CH₃CF₃
13. J.E.KILPATRICK AND K.S.PITZER,J.CHEM.PHYS.17,1064-1075(1949) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION. III. COMPOUND ROTATION
14. E.N.LASSETTRE AND L.B.DEAN,J.CHEM.PHYS.17,317-332(1949) AN ELECTROSTATIC THEORY OF THE POTENTIAL BARRIERS HINDERING ROTATION AROUND SINGLE BONDS
15. J.O.HALFORD,J.CHEM.PHYS.18,444-448(1950) ENERGY LEVELS AND THERMODYNAMIC PROPERTIES OF THE INTERNAL ROTATOR
16. D.R.LIDE,JR. AND D.K.COLES,PHYS.REV.80,911(1950) MICROWAVE SPECTROSCOPIC EVIDENCE FOR INTERNAL ROTATION IN METHYL SILANE
17. P.TORKINGTON,J.CHEM.PHYS.18,407-413(1950) THE MOMENTS OF INERTIA

OF MOLECULES WITH INTERNAL ROTATION

18. H.T.MINDEN AND R.P.DAILEY, PHYS. REV. 82, 338 (1951) HINDERED ROTATION IN CH_3CF_3 AND CH_3SiF_3
19. L.J.OOSTERHOFF, DIS. FARADAY SOC. 10, 79-87 (1951) RESTRICTED ROTATION IN ETHANE
20. K.S.PITZER, DIS. FARADAY SOC. 10, 66-73 (1951) POTENTIAL ENERGIES FOR ROTATION ABOUT SINGLE BONDS
21. TABLES RELATING TO MATHIEU FUNCTIONS, COLUMBIA UNIVERSITY PRESS, NEW YORK (1951)
22. R.P.DAILEY, ANN. N.Y. ACAD. SCI. 55, 915-927 (1952) HINDERED ROTATION AND MICROWAVE SPECTROSCOPY
23. H.T.MINDEN, J. CHEM. PHYS. 20, 1964-1965 (1952) THE COMPLETE SYMMETRY GROUP FOR INTERNAL ROTATION IN CH_3CF_3 AND LIKE MOLECULES
24. S.MIZUSHIMA, Y.MORINO, AND T.SHIMANOUCHI, PHYS. CHEM. 56, 324-326 (1952) SOME PROBLEMS OF INTERNAL ROTATION
25. J.VAN DRANEN, J. CHEM. PHYS. 20, 1982-1983 (1952) BORN REPULSION AND RESTRICTED FREE ROTATION
26. B.BAK, L.HANSEN, AND J.RAstrup-ANDERSEN, J. CHEM. PHYS. 21, 1612-1613 (1953) EXPERIMENTAL EVIDENCE OF RESTRICTED ROTATION IN CH_3CCCF_3
27. D.G.BURKHARD, J. CHEM. PHYS. 21, 1541-1549 (1953) HINDERED ROTATION INVOLVING TWO ASYMMETRIC GROUPS
28. N.W.LUFT, J. CHEM. PHYS. 21, 179 (1953) ASYMMETRIC INTERNAL ROTATIONAL BARRIERS ABOUT SINGLE BONDS
29. N.W.LUFT, TRANS. FARADAY SOC. 49, 118-121 (1953) INTERNAL POTENTIAL BARRIERS IN SATURATED HYDROCARBONS
30. A.-C.TANG, SCI. SINICA 3, 279-299 (1954) THE PROBLEM OF INTERNAL ROTATIONS OF MOLECULES
31. D.KIVELSON, J. CHEM. PHYS. 22, 1733-1739 (1954) THEORY OF THE INTERACTION OF HINDERED INTERNAL ROTATION WITH OVER-ALL ROTATIONS. I. SYMMETRIC ROTORS-METHYL SILANE
ERRATA- J. CHEM. PHYS. 27, 980 (1957)
32. D.R.LIDE, JR., J. CHEM. PHYS. 22, 1613-1614 (1954) EFFECTS OF INTERNAL MOTION IN THE MICROWAVE SPECTRUM OF METHYL AMINE
33. N.W.LUFT, J. CHEM. PHYS. 22, 155-156 (1954) ASSIGNMENT OF TORSIONAL FREQUENCIES IN SOME HALOGENATED ETHANES
34. N.W.LUFT, J. CHEM. PHYS. 22, 1814-1820 (1954) MAGNITUDES OF BARRIERS IN INTRAMOLECULAR ROTATION
35. M.MIZUSHIMA, STRUCTURE OF MOLECULES AND INTERNAL ROTATION, ACADEMIC PRESS, NEW YORK (1954)
36. A-C TANG, SCIENTIA SINICA (PEKING) 3, 279-299 (1954) INTERNAL ROTATION

IN MOLECULES

37. E.TANNENBAUM,R.D.JOHNSON,R.J.MYERS,AND W.D.GWINN,J.CHEM.PHYS.22,949 (1954) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF NITROMETHANE
38. G.BLANCH AND I.RHODES,WASH.ACAD.SCI.45,166-196(1955) TABLE OF CHARACTERISTIC VALUES OF MATHIEUS EQUATION FOR LARGE VALUES OF THE PARAMETER
39. D.G.BURKHARD AND J.C.IRVIN,J.CHEM.PHYS.23,1405-1414(1955) SOLUTION OF THE WAVE EQUATION FOR INTERNAL ROTATION OF TWO COMPLETELY ASYMMETRIC MOLECULES
ERRATUM-J.CHEM.PHYS.23,2469(1955)
40. E.V.IVASH,J.C.M.LI,AND K.S.PITZER,J.CHEM.PHYS.23,1814-1818(1955) THERMODYNAMIC PROPERTIES OF IDEAL GASEOUS METHANOL
41. R.W.KI' B,J.CHEM.PHYS.23,1736-1737(1955) INTERNAL BARRIER HEIGHT OF METHYL MERCAPTAN
42. D.KIVELSON,J.CHEM.PHYS.23,2230-2235(1955) THEORY OF INTERNAL OVER-ALL ROTATIONAL INTERACTIONS. II. HAMILTONIAN FOR THE NON-RIGID INTERNAL ROTOR
43. D.KIVELSON,J.CHEM.PHYS.23,2236-2243(1955) THEORY OF INTERNAL OVERALL ROTATIONAL INTERACTIONS. III. NON-RIGID ASYMMETRIC ROTORS
ADDENDUM-J.CHEM.PHYS.27,980(1957)
44. D.R.LIDE,JR.AND D.KIVELSON,J.CHEM.PHYS.23,2191(1955) INTERNAL ROTATION IN METHYL-TRIFLUOROMETHYL ACETYLENE
45. N.W.LUFT,Z.ELEKTROCHEM.59,46-55(1955) INTRA-MOLECULAR TORSIONAL VIBRATIONS
46. E.A.MASON AND M.M.KREEVOY,J.AM.CHEM.SOC.77,5808-5814(1955) A SIMPLE MODEL FOR BARRIERS TO INTERNAL ROTATION
47. J.T.MASSEY AND R.W.HART,J.CHEM.PHYS.23,942-946(1955) EFFECT OF A HIGH CIS-BARRIER ON THE MICROWAVE SPECTRUM OF HYDROGEN PEROXIDE
48. H.T.MINDEN,PHYS.REV.98,1160(1955) MOLECULAR DISTORTION CAUSED BY HINDERED ROTATION
49. J.D.SWALEN,J.CHEM.PHYS.23,1739-1740(1955) STRUCTURE AND POTENTIAL BARRIER TO HINDERED ROTATION IN METHYL ALCOHOL
50. P.R.SWAN AND M.W.P.STRANDBERG,PHYS.REV.99,667 (1955) EXCITED TORSIONAL STATES IN ASYMMETRIC HINDERED ROTORS
51. R.S.WAGNER AND B.P.DAILEY,J.CHEM.PHYS.23,1355(1955) PROOF OF THE STAGGERED CONFIGURATION OF ETHYL CHLORIDE
52. E.B.WILSON,JR.,C.C.LIN,AND D.R.LIDE,JR.,J.CHEM.PHYS.23,136-142(1955) CALCULATION OF ENERGY LEVELS FOR INTERNAL TORSION AND OVERALL ROTATION. I. CH3BF2 TYPE MOLECULES
53. B.BAK,J.CHEM.PHYS.24,918-919(1956) CALCULATION OF POTENTIAL BARRIERS FOR ETHANE-LIKE SYMMETRIC TOPS

54. D.G.BURKHARD, TRANS.FARADAY SOC.52,1-6(1956) HINDERED ROTATION IN SYMMETRIC-ASYMMETRIC MOLECULES
55. T.P.DAS, J.CHEM.PHYS.25,896-903(1956) TUNNELING THROUGH HIGH PERIODIC BARRIERS I.
56. D.R.HERSCHBACH, J.CHEM.PHYS.25,358-359(1956) INTERNAL BARRIER IN CH₃CH₂F AND CH₃CHF₂ FROM TORSIONAL SATELLITES
57. R.W.KILB, TABLES OF MATHIEU EIGENVALUES AND MATHIEU EIGENFUNCTIONS FOR SPECIAL BOUNDARY CONDITIONS, DEPARTMENT OF CHEMISTRY, HARVARD UNIVERSITY(1956)
58. J.C.M.LI AND K.S.PITZER, J.PHYS.CHEM.60,466-474(1956) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION. IV. EXTENDED TABLES FOR MOLECULES WITH SMALL MOMENTS OF INERTIA
59. C.C.LIN AND R.W.KILB, J.CHEM.PHYS.24,631(1956) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF ACETALDEHYDE
60. T.NISHIKAWA, J.PHYS.SOC.JAPAN 11,781-786(1956) FINE STRUCTURE OF J=1-0 TRANSITION DUE TO INTERNAL ROTATION IN METHYL ALCOHOL
61. J.D.SWALEN, J.CHEM.PHYS.24,1072-1074(1956) CALCULATION OF ENERGY LEVELS IN MOLECULES WITH INTERNAL TORSION
62. E.TANNENBAUM, R.J.MYERS, AND W.D.GWINN, J.CHEM.PHYS.25,42-47(1956) MICROWAVE SPECTRA, DIPOLE MOMENT, AND BARRIER TO INTERNAL ROTATION OF CH₃NO₂ AND CD₃NO₂
63. T.DAS, J.CHEM.PHYS.27,763-781(1957) TUNNELING THROUGH HIGH PERIODIC BARRIERS. II. APPLICATION TO NUCLEAR MAGNETIC RESONANCE IN SOLIDS
64. J.O.HALFORD, J.CHEM.PHYS.26,851-855(1957) PARTITION FUNCTION FOR INTERNAL ROTATION IN METHANOL AND SIMILAR MOLECULAR MODELS
65. K.T.HECHT AND D.M.DENNISON, J.CHEM.PHYS.26,31-47(1957) HINDERED ROTATION IN MOLECULES WITH RELATIVELY HIGH POTENTIAL BARRIERS
66. K.T.HECHT AND D.M.DENNISON, J.CHEM.PHYS.26,48-69(1957) VIBRATION-HINDERED ROTATION INTERACTIONS IN METHYL ALCOHOL. THE J=0-1 TRANSITION
67. D.R.HERSCHBACH, TABLES FOR THE INTERNAL ROTATION PROBLEM, DEPARTMENT OF CHEMISTRY, HARVARD UNIVERSITY(1957)
68. D.R.HERSCHBACH, J.CHEM.PHYS.27,975(1957) TABLES OF MATHIEU INTEGRALS FOR THE INTERNAL ROTATION PROBLEM
69. D.R.HERSCHBACH, J.CHEM.PHYS.27,1420-1421(1957) COMMENTS ON THE INTERNAL ROTATION PROBLEM
70. R.W.KILB, C.C.LIN, AND E.B.WILSON, JR., J.CHEM.PHYS.26,1695-1703(1957) CALCULATION OF ENERGY LEVELS FOR INTERNAL TORSION AND OVERALL ROTATION. II. ACETALDEHYDE-TYPE MOLECULES-ACETALDEHYDE SPECTRA
71. R.W.KILB AND L.PIERCE, J.CHEM.PHYS.27,108-112(1957) MICROWAVE

SPECTRUM, STRUCTURE, AND INTERNAL BARRIER OF METHYL SILANE

72. M.M.KREEVOY AND E.A.MASON, J.AM.CHEM.SOC. 79, 4851-4854 (1957)
A SIMPLE MODEL FOR BARRIERS TO INTERNAL ROTATION. II. ROTATIONAL ISOMERS
73. D.R.LIDE, JR. AND D.E.MANN, J.CHEM.PHYS. 27, 868-873 (1957) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION I. PROPYLENE
74. D.R.LIDE, JR. AND D.E.MANN, J.CHEM.PHYS. 27, 874-877 (1957) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. II. METHYLLALLENE
75. Y.MASHIKO, NIPPON KAGAKU ZASSHI 78, 1131-1139 (1957) POTENTIAL ENERGY SURFACE FOR TORSIONAL OSCILLATIONS IN DIMETHYL ETHER
76. R.E.NAYLOR, JR. AND E.B.WILSON, JR., J.CHEM.PHYS. 26, 1057-1060 (1957) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION IN CH_3BF_2
77. T.NISHIKAWA, J.PHYS.SOC.JAPAN 12, 668-680 (1957) MICROWAVE STUDIES OF THE INTERNAL MOTION AND STRUCTURE OF METHYLAMINE
78. S.SIEGEL, J.CHEM.PHYS. 27, 989-990 (1957) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION FOR TRANS-FLUOROPROPYLENE
79. J.D.SWALEN AND D.R.HERSCHBACH, J.CHEM.PHYS. 27, 100-108 (1957) INTERNAL BARRIER OF PROPYLENE OXIDE FROM THE MICROWAVE SPECTRUM. I.
80. W.J.TABOR, J.CHEM.PHYS. 27, 974-975 (1957) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF ACETIC ACID
81. E.B.WILSON, JR., PROC.NATL.ACAD.SCI.U.S. 43, 816-820 (1957) ON THE ORIGIN OF POTENTIAL BARRIERS TO INTERNAL ROTATION IN MOLECULES
82. H.EYRING, G.H.STEWART, AND R.P.SMITH, PROC.NATL.ACAD.SCI.U.S. 44, 259-260 (1958) PRINCIPLE OF MINIMUM BENDING OF LOCALIZED AND DELOCALIZED ORBITALS-ETHANE BARRIER AND RELATED EFFECTS
83. S.GOLDEN, J.PHYS.CHEM. 62, 74-75 (1958) EVALUATION OF THE PARTITION FUNCTION FOR RESTRICTED INTERNAL ROTATION
84. D.R.HERSCHBACH AND L.C.KRISHNER, J.CHEM.PHYS. 28, 728-729 (1958) MICROWAVE SPECTRUM OF $\text{CH}_2\text{DCH}=\text{CH}_2$ EQUILIBRIUM CONFORMATION OF PROPYLENE
85. D.R.HERSCHBACH AND J.D.SWALEN, J.CHEM.PHYS. 29, 761-776 (1958) INTERNAL BARRIER OF PROPYLENE OXIDE FROM THE MICROWAVE SPECTRUM II.
86. D.R.LIDE, JR., J.CHEM.PHYS. 29, 1426-1427 (1958) INTERNAL BARRIER IN ETHANE
87. D.R.LIDE, JR. AND D.E.MANN, J.CHEM.PHYS. 28, 572-576 (1958) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. III. TRIMETHYLAMINE
88. D.R.LIDE, JR. AND D.E.MANN, J.CHEM.PHYS. 29, 914-920 (1958) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. IV. ISOBUTANE, TERT-BUTYL FLUORIDE, AND TRIMETHYL PHOSPHINE
89. C.C.LIN, AMER.J.PHYS. 26, 319-323 (1958) ON THE CLASSICAL MECHANICS OF

THE INTERNAL ROTATION OF MOLECULES

90. L. PAULING, PROC. NATL. ACAD. SCI. U.S. 44, 211-216 (1958) THE NATURE OF BOND ORBITALS AND THE ORIGIN OF POTENTIAL BARRIERS TO INTERNAL ROTATION IN MOLECULES
91. D. G. BURKHARD AND D. M. DENNISON, J. MOL. SPECTRY. 3, 299-334 (1959) ROTATION SPECTRUM OF METHYL ALCOHOL
92. W. B. DIXON, SPECTROCHIM. ACTA 15, 767 (1959) INTERNAL ROTATION BARRIER AND DIPOLE MOMENT OF METHYL NITRATE
93. A. A. EVETT, J. CHEM. PHYS. 31, 1419-1420 (1959) COMPARISON OF EXACT AND APPROXIMATE ENERGY LEVELS FOR A HINDERED ROTATOR
94. G. M. HARRIS AND F. E. HARRIS, J. CHEM. PHYS. 31, 1450-1453 (1959) VALENCE BOND CALCULATION OF THE BARRIER TO INTERNAL ROTATION IN MOLECULES
95. D. R. HERSCHBACH, J. CHEM. PHYS. 31, 91-108 (1959) CALCULATION OF ENERGY LEVELS FOR INTERNAL TORSION AND OVERALL ROTATION. III.
96. P. H. KASAI AND R. J. MYERS, J. CHEM. PHYS. 30, 1096-1097 (1959) MICROWAVE SPECTRUM, STRUCTURE, AND INTERNAL ROTATION OF DIMETHYL ETHER
97. V. W. LAURIE, J. CHEM. PHYS. 31, 1500-1505 (1959) MICROWAVE SPECTRUM AND INTERNAL ROTATION OF ETHYL CYANIDE
98. V. W. LAURIE AND D. R. LIDE, JR., J. CHEM. PHYS. 31, 939-943 (1959) MICROWAVE SPECTRUM AND INTERNAL ROTATION OF 1-CHLORO-2-BUTYNE
99. D. R. LIDE, JR., J. CHEM. PHYS. 30, 37-39 (1959) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. V. BARRIER HEIGHT IN ETHYL CHLORIDE AND ETHYL BROMIDE
100. C. C. LIN AND J. D. SWALEN, REVS. MOD. PHYS. 31, 841-892 (1959) INTERNAL ROTATION AND MICROWAVE SPECTROSCOPY
101. L. PIERCE, J. CHEM. PHYS. 31, 547-548 (1959) INTERNAL ROTATION IN DOUBLE INTERNAL ROTOR MOLECULES-THE MICROWAVE SPECTRUM OF DIMETHYLSILANE
102. J. D. SWALEN AND C. C. COSTAIN, J. CHEM. PHYS. 31, 1562-1574 (1959) INTERNAL ROTATION IN MOLECULES WITH TWO INTERNAL ROTORS-MICROWAVE SPECTRUM OF ACETONE
103. W. WELTNER, J. CHEM. PHYS. 31, 264-265 (1959) POLYTYPISM AND THE ORIGIN OF THE POTENTIAL BARRIER HINDERING INTERNAL ROTATION IN MOLECULES
104. E. B. WILSON JR., ADVANCES IN CHEMICAL PHYSICS 2, 367-393 (1959) THE PROBLEM OF BARRIERS TO INTERNAL ROTATION IN MOLECULES
105. D. G. BURKHARD, J. OPT. SOC. AM. 50, 1214-1227 (1960) INTERNAL ANGULAR MOMENTUM IN HINDERED ROTATION
106. W. L. CLINTON, J. CHEM. PHYS. 33, 632-633 (1960) NOTE ON THE INTERNAL ROTATION PROBLEM
107. M. KARPLUS, J. CHEM. PHYS. 33, 316-317 (1960) NOTE ON THE INTERNAL-ROTATION BARRIER IN ETHANIC COMPOUNDS

108. T.KOJIMA, J. PHYS. SOC. JAPAN 15, 284-287 (1960) POTENTIAL BARRIER OF PHENOL FROM ITS MICROWAVE SPECTRUM
109. R.J.MYERS AND E.B.WILSON, JR., J. CHEM. PHYS. 33, 186-191 (1960) APPLICATION OF SYMMETRY PRINCIPLES TO THE ROTATION-INTERNAL TORSION LEVELS OF MOLECULES WITH TWO EQUIVALENT METHYL GROUPS
110. H.D.RUDOLPH, H.DREIZLER, AND W.MAIER, Z. NATURFORSCH 15A, 742 (1960) MICROWAVE SPECTRUM, STRUCTURE, AND HINDERANCE POTENTIAL OF $(CH_3)_2S$
111. H.DREIZLER, Z. NATURFORSCH 16A, 477-484 (1961) GROUP THEORETICAL CONSIDERATIONS OF THE MICROWAVE SPECTRUM OF MOLECULES CONTAINING TWO METHYL GROUPS WITH HINDERED ROTATION AND WITH DIFFERENT CARBON ISOTOPES
112. H.DREIZLER, Z. NATURFORSCH 16A, 1354-1367 (1961) GROUP THEORETICAL ANALYSIS OF THE MICROWAVE SPECTRA OF MOLECULES WITH TWO ROTATION-HINDERED TRIGONALLY SYMMETRIC MOLECULE GROUPS
113. H.DREIZLER AND H.D.RUDOLPH, Z. NATURFORSCH 17A, 712-732 (1961) THE TORSION FINE STRUCTURE IN THE ROTATIONAL SPECTRUM OF DIMETHYLSULFIDE AND THE INTERNAL HINDERANCE POTENTIAL
114. W.G.FATELEY AND F.A.MILLER, SPECTROCHIM. ACTA 17, 857-868 (1961) TORSIONAL FREQUENCIES IN THE FAR INFRARED-I. MOLECULES WITH A SINGLE METHYL ROTOR
115. M.HAYASHI AND L.PIERCE, J. CHEM. PHYS. 35, 1148-1149 (1961) TABLES FOR THE INTERNAL ROTATION PROBLEM
116. T.KOJIMA, E.L.BREIG, AND C.C.LIN, J. CHEM. PHYS. 35, 2139-2144 (1961) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF METHYL PHOSPHINE
117. W.F.LIBBY, J. CHEM. PHYS. 35, 1527 (1961) ISOTOPE SIZE EFFECT IN VAN DER WAALS RADII AND THE BARRIER TO ROTATION AROUND THE CARBON-CARBON SINGLE BOND
118. L.PIERCE, J. CHEM. PHYS. 34, 498-506 (1961) ENERGY LEVELS FOR INTERNAL AND OVERALL ROTATION OF TWO TOP MOLECULES I. MICROWAVE SPECTRUM OF DIMETHYL SILANE
119. L.PIERCE AND M.HAYASHI, J. CHEM. PHYS. 35, 479-485 (1961) MICROWAVE SPECTRUM, DIPOLE MOMENT, STRUCTURE, AND INTERNAL ROTATION OF DIMETHYL SULFIDE
120. M.L.SAGE, J. CHEM. PHYS. 35, 142-148 (1961) INTERNAL ROTATION OF CIS 2,3 EPOXYBUTANE FROM THE MICROWAVE SPECTRUM
121. W.G.FATELEY AND F.A.MILLER, SPECTROCHIM. ACTA 18, 977-993 (1962) TORSIONAL FREQUENCIES IN THE FAR INFRARED II. MOLECULES WITH TWO OR THREE METHYL ROTORS
122. E.HIROTA, J. CHEM. PHYS. 37, 283-291 (1962) ROTATIONAL ISOMERISM AND MICROWAVE SPECTROSCOPY I. THE MICROWAVE SPECTRUM OF NORMAL PROPYL FLUORIDE
123. E.HIROTA, J. CHEM. PHYS. 37, 2918-2920 (1962) ROTATIONAL ISOMERISM AND MICROWAVE SPECTROSCOPY II. THE MICROWAVE SPECTRUM OF BUTYRONITRILE

124. B.KIRTMAN, J.CHEM.PHYS.37,2516-2539(1962) INTERACTIONS BETWEEN ORDINARY VIBRATIONS AND HINDERED INTERNAL ROTATION I. ROTATIONAL ENERGIES
125. V.MAGNASCO, NUOVO CIMENTO 24,425-441(1962) AN EMPIRICAL METHOD FOR CALCULATING BARRIERS TO INTERNAL ROTATION IN SIMPLE MOLECULES
126. K.D.MOLLER AND H.G.ANDRESEN, J.CHEM.PHYS.37,1800-1807(1962) THEORY OF TORSION VIBRATIONS OF (CH₃)₂X-TYPE MOLECULES
127. Y.A.PENTIN AND V.M.TATEVSKII, IZV.AKAD.NAUK SSSR, SER.FIZ.26,1241-1246 (1962) INVESTIGATION OF INTERNAL ROTATION AND CIS-TRANS ISOMERISM OF MOLECULAR STRUCTURE BY SPECTROSCOPIC METHODS
128. C.R.QUADE, TABLES OF INTEGRALS FOR APPLICATION TO THE INTERNAL ROTATION OF CERTAIN ASYMMETRIC INTERNAL ROTORS, DEPARTMENT OF PHYSICS, UNIVERSITY OF OKLAHOMA(1962)
129. R.L.REDLINGTON, W.B.OLSEN, AND P.C.CROSS, J.CHEM.PHYS.36,1311-1326(1962) STUDIES OF HYDROGEN PEROXIDE-THE INFRARED SPECTRUM AND THE INTERNAL ROTATION PROBLEM
130. R.A.BEAUDET, J.CHEM.PHYS.38,2548-2552(1963) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION, AND DIPOLE MOMENT OF CIS CROTONONITRILE
131. H.DREIZLER AND R.PETER, J.CHEM.PHYS.39,1132(1963) TABLES FOR THE ANALYSIS OF ROTATIONAL SPECTRA CONTAINING CENTRIFUGAL DISTORTION AND TORSIONAL SPLITTING
132. H.DREIZLER, H.G.SCHIRDEWAHN, AND B.STARK, Z.NATURFORSCH 18A,670-671 (1963) NUMERICAL VALUES OF SOME DISTURBANCE SUMS FOR THE ANALYSIS OF THE TORSION FINE STRUCTURE OF ROTATION SPECTRA
133. W.G.FATELEY AND F.A.MILLER, SPECTROCHIM.ACTA 19,611-628(1963) TORSIONAL FREQUENCIES IN THE FAR INFRARED III. THE FORM OF THE POTENTIAL CURVE FOR HINDERED INTERNAL ROTATION OF A METHYL GROUP
134. D.R.HERSCHBACH, UCRL-10404(1963) BIBLIOGRAPHY FOR HINDERED INTERNAL ROTATION AND MICROWAVE SPECTROSCOPY
135. K.D.MOLLER AND H.G.ANDRESEN, J.CHEM.PHYS.38,17-22(1963) ON THE THEORY OF TORSIONAL VIBRATIONS OF (CH₃)₃-X TYPE MOLECULES
136. C.R.QUADE AND C.C.LIN, J.CHEM.PHYS.38,540-550(1963) INTERNAL ROTATION IN COMPLETELY ASYMMETRIC MOLECULES I. A GENERAL THEORY AND ANALYSIS OF THE MICROWAVE ROTATIONAL SPECTRUM OF CH₂DCOH, CD₂HCOH, AND CH₃CH₂D
137. O.L.STIEFVATER AND J.SHERIDAN, PROC.CHEM.SOC.1963,368(1963) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION IN ACETYL ACETYLENE
138. B.KIRTMAN, J.CHEM.PHYS.41,775-788(1964) INTERACTIONS BETWEEN ORDINARY VIBRATIONS AND HINDERED INTERNAL ROTATION. II. THEORY OF INTERNAL ROTATION FINE STRUCTURE IN SOME PERPENDICULAR BANDS OF ETHANE-TYPE MOLECULES
139. B.KIRTMAN, J.CHEM.PHYS.41,3262(1964) ELECTRON DISTRIBUTIONS

INVOLVED IN BARRIERS TO INTERNAL ROTATION

140. V.W.LAURIE, J.MOL.SPECTRY.13,283-287(1964) INTERNAL ROTATION AND CORIOLIS COUPLING IN SYMMETRIC TOP MOLECULES
141. I.A.MUKHTAROV, OPTIKA I SPEKTROSKOPIYA 16,910(1964) DETERMINATION THE FREQUENCY OF TORSIONAL VIBRATION FOR TRIFLUOROETHYLENE FROM THE MICROWAVE SPECTRUM
142. S.NAKAGAWA, T.KOJIMA, S.TAKAHASHI, AND C.C.LIN, J.MOL.SPECTRY 14,201 (1964) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF METHYLTHIOCYANATE
143. D.STELMAN, J.CHEM.PHYS.41,2111-2115(1964) DENOMINATOR CORRECTION TO THE VAN VLECK TRANSFORMATION-INTERNAL ROTATION PROBLEM
144. J.T.YARDLEY, J.HINZE, AND R.F.CURL, JR., J.CHEM.PHYS.41,2562-2563(1964) EQUILIBRIUM CONFORMATION OF N-METHYLENE-METHYLAMINE FROM MICROWAVE DATA
145. R.C.WOODS III. MOLECULAR SPECTROSCOPY SYMPOSIUM, OHIO STATE UNIV. (1964) A COMPUTER CALCULATION OF INTERNAL ROTATION SPLITTINGS APPLIED TO THE MICROWAVE SPECTRUM OF FLUORAL
146. R.E.WYATT AND R.G.PARR, J.CHEM.PHYS.41,3262-3263(1964) ORIGIN OF THE BARRIER HINDERING INTERNAL ROTATION IN ETHANE
147. E.HIROTA, J.CHEM.PHYS.42,2071-2089(1965) ROTATIONAL ISOMERISM AND MICROWAVE SPECTROSCOPY. III. THE MICROWAVE SPECTRUM OF 3-FLUOROPROPENE
148. R.H.HUNT, R.A.LEACOCK, C.W.PETERS AND K.T.HECHT, J.CHEM.PHYS. 42, 1931-1946(1965) INTERNAL-ROTATION IN HYDROGEN PEROXIDE. THE FAR-INFRARED SPECTRUM AND THE DETERMINATION OF THE HINDERING POTENTIAL
149. R.A.SCOTT AND H.A.SCHERAGA, J.CHEM.PHYS.42,2209-2215(1965) METHOD FOR CALCULATING INTERNAL ROTATION BARRIERS
150. M.L.UNLAND, V.WEISS, AND W.H.FLYGARE, J.CHEM.PHYS.42,2138-2149(1965) BARRIER STUDIES IN THE HALOPROPENES. I. THE MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION, QUADRUPOLE COUPLING CONSTANTS, AND MICROWAVE DOUBLE-RESONANCE SPECTRA OF 2-CHLOROPROPENE

Section IX. INVERSION

Early microwave studies of ammonia^{8-12, 14-17} led to an immediate interest in the inversion problem. A number of twofold, potential functions^{2-6, 13, 21, 52, 53} were applied to ammonia to calculate the barrier height and inversion splittings. These functions have also been adapted to inversion in asymmetric rotors.^{20, 47, 56, 58, 62} Recent interest has been directed toward near-planar molecules,^{40, 44, 50, 61} and has led to the development of matrix elements in both the harmonic oscillator and quartic oscillator representations.^{54, 55} These efforts have been aided by far-infrared vibrational data.⁴³

The J -dependence of the inversion doubling has been treated with expressions of linear^{20, 47, 59} and exponential dependence.^{18, 59} Interactions with other molecular vibrations have been of considerable interest in ammonia^{29, 53} and methylamine.^{24, 34, 35} The possibility of two coupled inversion-type motions was encountered in hydrazine.^{47, 57}

1. F.HUND,Z.PHYSIK 43,805-826(1927) SIGNIFICANCE OF MOLECULAR SPECTRA. PART III. NOTES ON THE OSCILLATION AND ROTATION SPECTRA OF MOLECULES WITH MORE THAN TWO NUCLEI
2. P.M.MORSE AND E.C.G.STUCKELBERG,HELV.PHYS.ACTA 4,337-354(1931) SOLUTION OF THE EIGENVALUE PROBLEM FOR A POTENTIAL FIELD WITH TWO MINIMA
3. D.M.DENNISON AND G.E.UHLENBECK,PHYS.REV.41,313-321(1932) THE TWO-MINIMA PROBLEM AND THE AMMONIA MOLECULE
4. N.ROSEN AND P.M.MORSE,PHYS.REV.42,210-217(1932) ON THE VIBRATIONS OF POLYATOMIC MOLECULES
5. M.F.MANNING,J.CHEM.PHYS.3,136-138(1935) ENERGY LEVELS OF A SYMMETRICAL DOUBLE MINIMA PROBLEM WITH APPLICATIONS TO THE NH₃ AND ND₃ MOLECULES
6. F.T.WALL AND G.GLOCKER,J.CHEM.PHYS.5,314-315(1937) THE DOUBLE MINIMUM PROBLEM APPLIED TO THE AMMONIA MOLECULES
7. H-Y SHENG,F.F.BARKER, AND D.M.DENNISON,PHYS.REV.60,786-794(1941) FURTHER RESOLUTION OF TWO PARALLEL BANDS OF AMMONIA AND THE INTERACTION BETWEEN VIBRATION AND ROTATION
8. B.BLEANEY AND R.P.PENROSE,PHYS.REV.70,775-776(1946) THE INVERSION SPECTRUM OF AMMONIA
9. W.E.GOOD,PHYS.REV.70,213-218(1946) THE INVERSION S ECTRUM OF AMMONIA
10. B.BLEANEY AND R.P.PENROSE,PROC.ROY.SOC.A189,358-371(1947) THE INVERSION SPECTRUM OF AMMONIA AT CENTIMETER WAVE-LENGTHS
11. H.H.NIELSEN AND D.M.DENNISON,PHYS.REV.72,1101-1108(1947) ANOMALOUS VALUES OF CERTAIN OF THE FINE STRUCTURE LINES IN THE AMMONIA MICROWAVE SPECTRUM
12. M.W.P.STRANDBERG,R.KYHL,T.WENTINK,AND R.F.HILLGER,PHYS.REV.71,326 (1947) INVERSION SPECTRUM OF AMMONIA ERRATA-PHYS.REV.71,639(1947)
13. R.R.NEWTON AND L.H.THOMAS,J.CHEM.PHYS.16,310-323(1948) INTERNAL MOLECULAR MOTIONS OF LARGE AMPLITUDE ILLUSTRATED BY THE SYMMETRICAL VIBRATION OF AMMONIA
14. J.W.SIMMONS AND W.GORDY,PHYS.REV.73,713-718(1948) STRUCTURE OF THE INVERSION SPECTRUM OF AMMONIA
15. N.CARRARA,P.LOMBARDINI,R.CINI,AND L.SACCONI,NUOVO CIMENTO 6,552-558 (1949) MOLECULAR SPECTROSCOPY. THE INVERSION SPECTRUM OF AMMONIA
16. A.H.SHARBAUGH,T.C.MADISON,AND J.K.BRAGG,PHYS.REV.76,1529(1949) INVERSION SPECTRUM OF AMMONIA
17. M.TOMASSINI,NUOVO CIMENTO 7,1-11(1950) THE INVERSION SPECTRUM OF AMMONIA

18. C.C.COSTAIN, PHYS. REV. 82, 108 (1951) AN EMPIRICAL FORMULA FOR THE MICROWAVE SPECTRUM OF AMMONIA
19. R.G. NUCKOLLS, L.J. RUEGER, AND H. LYONS, PHYS. REV. 83, 880-881 (1951) MEASUREMENT OF THE MICROWAVE INVERSION SPECTRUM OF ND₃
20. M.T. WEISS AND M.W.P. STRANDBERG, PHYS. REV. 83, 567-575 (1951) THE MICROWAVE SPECTRA OF THE DEUTERO-AMMONIAS
21. C.C. COSTAIN AND G.B.B.M. SUTHERLAND, PHYS. CHEM. 56, 321-324 (1952) A METHOD OF DETERMINING THE POTENTIAL BARRIERS RESTRICTING INVERSION IN AMMONIA, PHOSPHINE, AND ARSINE FROM VIBRATIONAL FORCE CONSTANTS
22. T. NISHIKAWA AND K. SHIMODA, J. PHYS. SOC. JAPAN 8, 426 (1953) NEW LINES OF THE INVERSION SPECTRUM OF AMMONIA
23. G.W. RATHJENS, JR., N.K. FREEMAN, W.D. GWINN, AND K.S. PITZER, J. AM. CHEM. SOC. 75, 5634-5642 (1953) INFRARED ABSORPTION SPECTRA, STRUCTURE AND THERMODYNAMIC PROPERTIES OF CYCLOBUTANE
24. K. SHIMODA, T. NISHIKAWA, AND T. ITOH, J. CHEM. PHYS. 22, 1456 (1954) MICROWAVE INVESTIGATION OF HINDERED ROTATION AND INVERSION OF METHYLAMINE
25. J. FERNANDEZ, R.J. MYERS, AND W.D. GWINN, J. CHEM. PHYS. 23, 758-759 (1955) MICROWAVE SPECTRUM AND PLANARITY OF THE RING OF TRIMETHYLENE OXIDE
26. D. KIVELSON AND D.R. LIDE, JR., PHYS. REV. 99, 667 (1955) INTERNAL MOTION IN METHYLAMINE
27. T. NISHIKAWA AND K. SHIMODA, J. PHYS. SOC. JAPAN 10, 89-92 (1955) INVERSION SPECTRUM OF AMMONIA
28. K. SHIMODA, T. NISHIKAWA, AND T. ITOH, PHYS. REV. 98, 1160 (1955) MICROWAVE SPECTRUM OF METHYLAMINE
29. W.S. BENEDICT AND E.K. PLYLER, J. CHEM. PHYS. 24, 904 (1956) INTERACTION OF STRETCHING VIBRATIONS AND INVERSION IN AMMONIA
30. J. BONANOMI AND J. HERRMANN, HELV. PHYS. ACTA 29, 451-452 (1956) DETERMINATION OF THE INVERSION FREQUENCY OF AMMONIA
31. T. ITOH, J. PHYS. SOC. JAPAN 11, 264-271 (1956) MOLECULAR STRUCTURE OF METHYLAMINE
32. G. ERLANDSSON AND W. GORDY, PHYS. REV. 106, 513-515 (1957) SUBMILLIMETER WAVE SPECTROSCOPY, ROTATION-INVERSION TRANSITIONS IN ND₃
33. H.G. FITZKY, R. HONERJAGER, AND W. WILKE, Z. PHYSIK 149, 471-479 (1957) INVERSION SPECTRUM OF AMMONIA
34. D. KIVELSON AND D.R. LIDE, JR., J. CHEM. PHYS. 27, 353-360 (1957) THEORY OF INTERNAL MOTIONS AND APPLICATION TO CD₃ND₂
35. D.R. LIDE, JR., J. CHEM. PHYS. 27, 343-352 (1957) STRUCTURE OF THE METHYL AMINE MOLECULE I. MICROWAVE SPECTRUM OF CD₃ND₂
36. G. HERRMANN, J. CHEM. PHYS. 29, 875-879 (1958) GROUND STATE INVERSION SPECTRUM OF N(14)D₃

37. E. HEILBRONNER, H. RUTISHAUSER, AND F. GERSON, HELV. CHIM. ACTA 42, 2304-2314 (1959) EIGENVALUES, EIGENFUNCTIONS, AND THERMODYNAMIC FUNCTIONS FOR THE 6-FOLD POTENTIAL OF A LINEAR OSCILLATOR
38. J. K. TYLER, L. F. THOMAS, AND J. SHERIDAN, PROC. CHEM. SOC. 1959, 155-156 (1959) MICROWAVE SPECTRUM AND STRUCTURE OF CYANAMIDE
39. A. A. VUYLSTEKE, AM. J. PHYS. 27, 554-565 (1959) MASER STATES IN AMMONIA-INVERSION
40. S. I. CHAN, J. ZINN, J. FERNANDEZ, AND W. D. GWINN, J. CHEM. PHYS. 33, 1643-1655 (1960) TRIMETHYLENE OXIDE I. MICROWAVE SPECTRUM, DIPOLE MOMENT, AND DOUBLE MINIMUM VIBRATION
41. S. I. CHAN, J. ZINN, AND W. D. GWINN, J. CHEM. PHYS. 33, 295-296 (1960) DOUBLE MINIMUM VIBRATION IN TRIMETHYLENE OXIDE
42. C. C. COSTAIN AND J. M. DOWLING, J. CHEM. PHYS. 32, 158-165 (1960) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF FORMAMIDE
43. A. DANTI, W. J. LAFFERTY, AND R. C. LORD, J. CHEM. PHYS. 33, 294-295 (1960) FAR INFRARED SPECTRUM OF TRIMETHYLENE OXIDE
44. S. I. CHAN, J. ZINN, AND W. D. GWINN, J. CHEM. PHYS. 34, 1319-1329 (1961) TRIMETHYLENE OXIDE II. STRUCTURE, VIBRATION-ROTATION INTERACTION, AND ORIGIN OF POTENTIAL FUNCTION FOR RING PUCKERING MOTION
45. F. GERSON, HELV. CHIM. ACTA 44, 471-476 (1961) THE ONE-DIMENSIONAL OSCILLATOR 6-FOLD POTENTIAL AS A BASIS FOR A SYMMETRICAL DOUBLE MINIMUM PROBLEM
46. G. P. SHIPULO, OPTICS AND SPECTROSCOPY 10, 288 (1961) ROTATIONAL SPECTRUM OF CYANAMIDE
47. T. KASUYA, SCI. PAPERS INST. PHYS. AND CHEM. RESEARCH (TOKYO, JAPAN) 56, 1-39 (1962) MICROWAVE STUDIES OF INTERNAL MOTIONS OF HYDRAZINE MOLECULE
48. D. R. LIDE, JR., J. MOL. SPECTRY. 8, 142-152 (1962) VIBRATION-ROTATION INTERACTIONS IN CYANAMIDE-THE QUESTION OF PLANARITY OF AMIDES
49. D. J. MILLEN, G. TOPPING, AND D. R. LIDE, JR., J. MOL. SPECTRY. 8, 153-163 (1962) MICROWAVE SPECTRUM AND NONPLANARITY OF CYANAMIDE
50. G. W. RATHJENS, J. CHEM. PHYS. 36, 2401-2406 (1962) MICROWAVE INVESTIGATION OF CYCLOPENTENE
51. R. L. SOMORJAI AND D. F. HORNIG, J. CHEM. PHYS. 36, 1980-1987 (1962) DOUBLE-MINIMUM POTENTIALS IN HYDROGEN-BONDED SOLIDS
52. J. D. SWALEN AND J. A. IBERS, J. CHEM. PHYS. 36, 1914-1918 (1962) POTENTIAL FUNCTION FOR THE INVERSION OF AMMONIA
53. W. T. WEEKS, K. T. HECHT, AND D. M. DENNISON, J. MOL. SPECTRY. 8, 30-57 (1962) INVERSION-VIBRATION AND INVERSION-ROTATION INTERACTIONS IN THE AMMONIA MOLECULE
54. S. I. CHAN AND D. STELMAN, J. MOL. SPECTRY. 10, 278-299 (1963) SOME ENERGY

LEVELS AND MATRIX ELEMENTS OF THE QUARTIC OSCILLATOR

55. S.I.CHAN AND D.STELMAN, J.CHEM.PHYS. 39, 545-551 (1963) OSCILLATORS PERTURBED BY GAUSSIAN BARRIERS
56. W.H.FLETCHER AND F.B.BROWN, J.CHEM.PHYS. 39, 2478-2490 (1963) VIBRATIONAL SPECTRA AND THE INVERSION PHENOMENON IN CYANAMIDE AND DEUTERATED CYANAMIDE
57. T.KASUYA AND T.KOJIMA, J.PHYS.SOC.JAPAN 18, 364-368 (1963) INTERNAL MOTIONS OF HYDRAZINE
58. V.W.LAURIE AND J.WOLLRAB, BULL.AM.PHYS.SOC. 327 (1963) MICROWAVE SPECTRUM AND INVERSION OF DIMETHYLAMINE
59. M.LICHTENSTEIN, J.J.GALLAGHER, AND V.E.DERR, J.MOL.SPECTRY. 12, 87-97 (1964) SPECTROSCOPIC INVESTIGATIONS OF THE DEUTERO-AMMONIAS IN THE MILLIMETER REGION
60. C.B.MOORE AND G.C.PIMENTEL, J.CHEM.PHYS. 40, 1529-1534 (1964) OUT-OF-PLANE CH₂ BENDING POTENTIAL FUNCTIONS OF DIAZOMETHANE, KETENE, AND RELATED MOLECULES
61. S.S.BUTCHER AND C.C.COSTAIN, J.MOL.SPECTRY 15, 40-50 (1965) VIBRATION-ROTATION INTERACTION IN THE MICROWAVE SPECTRUM OF CYCLOPENTENE
62. W.M.TOLLES AND W.D.GWINN, J.CHEM.PHYS. 42, 2253-2254 (1965) QUADRUPOLE COUPLING CONSTANTS AND LOWER LIMIT TO THE BARRIER FOR INVERSION IN ETHYLENIMINE

Section X. STARK EFFECT

1. R. DE L. KRONIG, PROC. NATL. ACAD. SCI. 12, 488-493 (1926) THE DIELECTRIC CONSTANT OF DIATOMIC DIPOLE-GASES ON THE NEW QUANTUM MECHANICS
2. R. DE L. KRONIG, PROC. NATL. ACAD. SCI. 12, 608-612 (1926) THE DIELECTRIC CONSTANT OF SYMMETRICAL POLYATOMIC DIPOLE-GASES ON THE NEW QUANTUM MECHANICS
3. P. DEBYE, POLAR MOLECULES, CHEMICAL CATALOG COMPANY INC. NEW YORK (1929)
4. F. BROUWER, DISSERTATION, AMSTERDAM (1930)
5. W. G. PENNEY, PHIL. MAG. 11, 602-609 (1931) THE STARK EFFECT IN BAND SPECTRA
6. R. P. BELL AND I. E. COOP, TRANS. FARADAY SOC. 34, 1209-1214 (1938) THE DIPOLE MOMENTS OF HYDROGEN AND DEUTERIUM CHLORIDES
7. T. W. DAKIN, W. E. GOOD, AND D. K. COLES, PHYS. REV. 70, 560 (1946) RESOLUTION OF A ROTATIONAL LINE OF THE OCS MOLECULE AND ITS STARK EFFECT
8. D. K. COLES AND W. E. GOOD, PHYS. REV. 72, 157 (1947) STARK AND ZEEMAN EFFECTS IN MICROWAVE SPECTROSCOPY
9. B. P. DAILEY, PHYS. REV. 72, 84-85 (1947) FIRST ORDER STARK EFFECT IN THE MICROWAVE SPECTRUM OF METHYL ALCOHOL
10. H. K. HUGHES, PHYS. REV. 72, 614-623 (1947) THE ELECTRIC RESONANCE METHOD RADIOFREQUENCY SPECTROSCOPY. THE MOMENT OF INERTIA AND ELECTRIC DIPOLE MOMENT OF CSF
11. J. M. JAUCH, PHYS. REV. 72, 715-723 (1947) THE HYPERFINE STRUCTURE AND THE STARK EFFECT OF THE AMMONIA INVERSION SPECTRUM
12. W. V. SMITH, PHYS. REV. 71, 126-127 (1947) DETERMINATION OF NUCLEAR SPIN FROM THE STARK EFFECT OF MICROWAVE ROTATIONAL SPECTRA
13. C. H. TOWNES AND F. R. MERRITT, PHYS. REV. 72, 1266-1267 (1947) STARK EFFECT IN HIGH FREQUENCY FIELDS
14. D. K. COLES, PHYS. REV. 74, 1194-1195 (1948) MICROWAVE ABSORPTION LINE FREQUENCIES OF METHYL ALCOHOL AND THEIR STARK EFFECT
15. U. FANO, J. RESEARCH NATL. BUR. STANDARDS 40, 215-223 (1948) ELECTRIC QUADRUPOLE COUPLING OF THE NUCLEAR SPIN WITH THE ROTATION OF A POLAR DIATOMIC MOLECULE IN AN EXTERNAL ELECTRIC FIELD
16. S. GOLDEN, T. WENTINK, R. HILLGER, AND M. W. P. STRANDBERG, PHYS. REV. 73, 92-93 (1948) STARK SPECTRUM OF H₂O
17. S. GOLDEN AND E. B. WILSON, JR., J. CHEM. PHYS. 16, 669-685 (1948) THE STARK EFFECT FOR A RIGID ASYMMETRIC ROTOR
18. W. A. NIERENBERG, I. I. RABI, AND M. SLOTNICK, PHYS. REV. 73, 1430-1433 (1948) A NOTE ON THE STARK EFFECT IN DIATOMIC MOLECULES
19. W. A. NIERENBERG AND M. SLOTNICK, PHYS. REV. 74, 1246 (1948) A NOTE ON

THE STARK EFFECT IN DIATOMIC MOLECULES

20. M.W.P. STRANDBERG, T. WENTINK, R.E. HILLGER, G.H. WANNIER, AND M.L. DEUTESCH, PHYS. REV. 73, 188 (1948) STARK SPECTRUM OF HDO
21. L.G. WESSON, TABLES OF ELECTRIC DIPOLE MOMENTS, TECHNOLOGY PRESS, CAMBRIDGE, MASS. (1948)
22. H.K. HUGHES, PHYS. REV. 76, 1675-1677 (1949) THE ROTATION L STARK SPECTRUM OF LINEAR MOLECULES
23. R. KARPLUS AND A.H. SHARBAUGH, PHYS. REV. 75, 889-890 (1949) SECOND-ORDER STARK EFFECT OF METHYL CHLORIDE ERRATA- PHYS. REV. 75, 1449 (1949)
24. A. LENARD, TABLES FOR CALCULATION OF STARK AND ZEEMAN EFFECTS., DEPT. OF PHYSICS, STATE UNIV. OF IOWA (1949) (OUT OF PRINT)
25. W. LOW AND C.H. TOWNES, PHYS. REV. 76, 1295-1299 (1949) MOLECULAR DIPOLE MOMENTS AND STARK EFFECTS. I. STARK EFFECTS ON SYMMETRIC TOP MOLECULES WITH NUCLEAR QUADRUPOLE COUPLING
26. J. BARRIOL, J. PHYS. RADIUM 11, 62-66 (1950) THE STUDY OF THE STARK EFFECT FOR THE CASE OF A ROTATOR POSSESSING A PERMANENT DIPOLE
27. F. COESTER, PHYS. REV. 77, 454-462 (1950) STARK-ZEEMAN EFFECTS ON SYMMETRIC TOP MOLECULES WITH NUCLEAR QUADRUPOLE COUPLING
28. R.G. SHULMAN, B.P. DAILEY, AND C.H. TOWNES, PHYS. REV. 78, 145-148 (1950) MOLECULAR DIPOLE MOMENTS AND STARK EFFECTS. III. DIPOLE MOMENT DETERMINATIONS
29. R.G. SHULMAN AND C.H. TOWNES, PHYS. REV. 77, 500-506 (1950) MOLECULAR DIPOLE MOMENTS AND STARK EFFECTS. II. STARK EFFECTS IN OCS
30. D.K. COLES, W.E. GOOD, J.K. BRAGG, AND A.H. SHARBAUGH, PHYS. REV. 82, 877-878 (1951) THE STARK EFFECT OF THE AMMONIA INVERSION SPECTRUM
31. D.W. MAGNUSON, J. CHEM. PHYS. 19, 1071 (1951) DETERMINATION OF THE TWO-DIPOLE MOMENT COMPONENTS IN NITROSYL FLUORIDE
32. J.N. SHOOLERY AND A.H. SHARBAUGH, PHYS. REV. 82, 95 (1951) SOME MOLECULAR DIPOLE MOMENTS DETERMINED BY MICROWAVE SPECTROSCOPY
33. S.N. GHOSH, R. TRAMBARULO, AND W. GORDY, J. CHEM. PHYS. 21, 308-310 (1953) ELECTRIC DIPOLE MOMENTS OF SEVERAL MOLECULES FROM THE STARK EFFECT
34. M. MIZUSHIMA, J. CHEM. PHYS. 21, 539-541 (1953) THEORY OF THE STARK EFFECT OF ASYMMETRIC ROTATOR WITH HYPERFINE STRUCTURE
35. S.H. AUTLER AND C.H. TOWNES, PHYS. REV. 100, 703-722 (1955) STARK EFFECT IN RAPIDLY VARYING FIELDS
36. C.C. LIN, BULL. AM. PHYS. SOC. (2) 1, 13 (1956) NEW METHOD FOR THE CALCULATION OF STARK EFFECT IN MICROWAVE SPECTRA
37. G. BIRNBAUM, J. CHEM. PHYS. 27, 360-368 (1957) NON-RESONANT ABSORPTION OF SYMMETRIC TOP MOLECULES. SHAPE OF THE NON-RESONANT SPECTRA ERRATA- J. CHEM. PHYS. 28, 992 (1958)

38. D.KIVELSON, J.CHEM.PHYS.26,215-216(1957) THEORY OF INTERNAL OVERALL-ROTATIONAL INTERACTIONS. IV. STARK EFFECT IN NON-RIGID INTERNAL ROTORS
39. S.A.MARSHALL AND J.WEBER, PHYS.REV.105,1502-1506(1957) MICROWAVE STARK EFFECT MEASUREMENT OF THE DIPOLE MOMENT AND POLARIZABILITY OF CARBONYL SULFIDE
40. A.A.MARYOTT AND S.J.KRYDER, J.CHEM.PHYS.27,1221-1222(1957) DIPOLE MOMENT OF PERCHLORYL FLUORIDE
41. M.PETER AND M.W.P.STRANDBERG, J.CHEM.PHYS.26,1657-1659(1957) HIGH FIELD STARK EFFECT IN LINEAR ROTORS
42. C.A.BURRUS, J.CHEM.PHYS.28,427-429(1958) STARK EFFECT FROM 1.1 TO 2.6 MILLIMETERS WAVELENGTH-PH₃,PD₃,DI, AND CO
43. C.A.BURRUS AND J.D.GRAYBEAL, PHYS.REV.109,1553-1556(1958) STARK EFFECT AT 2.0 AND 1.2 MILLIMETERS - NITRIC OXIDE
44. E.A.HALEVI, TRANS.FARADAY SOC.54,1441-1446(1958) POLARITY DIFFERENCES BETWEEN DEUTERATED AND NORMAL MOLECULES
45. M.MIZUSHIMA, PHYS.REV.109,1557-1559(1958) THEORY OF THE STARK EFFECT OF THE NO MOLECULE
46. E.L.BEESON, J.Q.WILLIAMS, AND T.L.WEATHERLY, BULL.AM.PHYS.SOC.4,291 (1959) STARK EFFECT FOR NEAR-DEGENERATE ROTATIONAL LEVELS OF NOCL
47. C.A.BURRUS, J.CHEM.PHYS.31,1270-1272(1959) STARK EFFECT AT 0.93-, 1.18-, AND 1.5 MILLIMETER WAVE LENGTH-DCL,DBR, AND DI
48. H.DREIZLER AND H.D.RUDOLPH, Z.NATURFORSCH 14A,758(1959) STARK EFFECT OF THE MICROWAVE ABSORPTION LINE OF METHANOL AT 19967.3 MC
49. D.F.EAGLE, T.L.WEATHERLY, AND J.Q.WILLIAMS, BULL.AM.PHYS.SOC.4,291(1959) THEORY OF THE STARK EFFECT AND HYPERFINE STRUCTURE FOR NEAR-DEGENERATE ENERGY LEVELS OF AN ASYMMETRIC ROTOR
50. D.F.EAGLE, T.L.WEATHERLY, AND Q.WILLIAMS, J.CHEM.PHYS.30,603-604(1959) STARK EFFECT IN THE MICROWAVE SPECTRUM OF NITROSYL BROMIDE
51. A.A.MARYOTT AND S.J.KRYDER, J.CHEM.PHYS.31,617-621(1959) NON-RESONANT MICROWAVE ABSORPTION AND ELECTRIC DIPOLE MOMENT OF NO IN THE GASEOUS STATE
52. E.B.WILSON, JR., J.PHYS.CHEM.63,1339-1340(1959) CONDITIONS REQUIRED FOR NON-RESONANT ABSORPTION IN ASYMMETRIC ROTOR MOLECULES
53. B.N.BHATTACHARYA AND W.GORDY, PHYS.REV.119,144-149(1960) OBSERVATION OF σ STARK COMPONENTS IN MICROWAVE SPECTROSCOPY-PRECISION MEASUREMENTS ON HCN
54. H.DREIZLER AND H.D.RUDOLPH, Z.NATURFORSCH 15A,1013-1014(1960) A SPECIAL STARK EFFECT OF A K DOUBLET IN THE MICROWAVE SPECTRUM OF METHANOL
55. P.FAVERO AND J.G.BAKER, NUOVO CIMENTO 17,734-739(1960) ANOMALOUS

STARK EFFECTS IN THE MILLIMETER WAVE SPECTRUM OF FORMYL FLUORIDE

56. K.KONDO AND T.OKA, J.PHYS.SOC.JAPAN 15,307-314(1960) STARK-ZEFMAN EFFECTS ON ASYMMETRIC TOP MOLECULES. HCHO
57. G.H.KWEI AND D.R.HERSCHBACH, J.CHEM.PHYS.32,1270-1271(1960) STARK EFFECT AND DIPOLE MOMENT OF CH₃CHF₂
58. D.R.LIDE, JR., J.CHEM.PHYS.33,1519-1522(1960) STRUCTURE OF ISOBUTANE MOLECULE-CHANGE OF DIPOLE MOMENT ON ISOTOPIC SUBSTITUTION
59. H.B.THOMPSON, J.PHYS.CHEM.64,280-281(1960) THE ELECTRIC MOMENTS OF MOLECULES WITH SYMMETRIC ROTATIONAL BARRIERS
60. L.WHARTON, L.P.GOLD, AND W.KLEMPERER, J.CHEM.PHYS.33,1255(1960) DIPOLE MOMENT OF LITHIUM HYDRIDE
61. R.T.MEYER AND R.J.MYERS, J.CHEM.PHYS.34,1074-1075(1961) DIPOLE MOMENT OF THE OH RADICAL FROM THE STARK EFFECT OF ITS MICROWAVE SPECTRUM
62. H.A.DIJKERMAN AND A.DYMANUS, PHYSICA 28,977-992(1962) σ -STARK EFFECT OF ROTATIONAL TRANSITIONS. II. MICROWAVE SPECTRUM OF METHYL ALCOHOL
63. H.KIM, R.KELLER, AND W.D.GWINN, J.CHEM.PHYS.37,2748-2750(1962) DIPOLE MOMENT OF FORMIC ACID, HCOOH, HCOOD
64. W.M.TOLLES, J.L.KINSEY, R.F.CURL, AND R.F.HEIDELBERG, J.CHEM.PHYS.37, 927-930(1962) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE V. STARK AND ZEEMAN EFFECTS
65. D.M.LARKIN AND W.GORDY, J.CHEM.PHYS.38,2329-2333(1963) STARK EFFECT AND DIPOLE MOMENT OF METHYL FLUORIDE
66. J.S.MUENTER AND V.W.LAURIE, MOLECULAR SPECTROSCOPY SYMPOSIUM, OHIO STATE UNIV.(1964) ISOTOPE EFFECTS ON MOLECULAR DIPOLE MOMENTS. MICROWAVE SPECTRUM OF MONODEUTEROACETYLENE
67. K.R.LINDFORS AND C.D.CORNWELL, J.CHEM.PHYS.42,149-155(1965) RATE-OF-GROWTH TECHNIQUE FOR THE MEASUREMENT OF MOLECULAR DIPOLE MOMENTS FROM MICROWAVE SPECTRA AT WEAK MODULATION FIELDS

Section XI. ELECTRONIC AND MAGNETIC EFFECTS (ZEEMAN EFFECT)

1. E.L.HILL, PHYS. REV. 34, 1507-1516 (1929) ON THE ZEEMAN EFFECT IN DOUBLET BAND SPECTRA
2. J.H.VAN VLECK, PHYS. REV. 33, 467-506 (1929) ON σ -TYPE DOUBLING AND ELECTRON SPIN IN THE SPECTRA OF DIATOMIC MOLECULES
3. R.S.MULLIKEN AND A.CHRISTY, PHYS. REV. 38, 87-119 (1931) Δ -TYPE DOUBLING AND ELECTRON CONFIGURATIONS IN DIATOMIC MOLECULES
4. F.H.CRAWFORD, REVS. MOD. PHYS. 6, 90-117 (1934) ZEEMAN EFFECT IN DIATOMIC MOLECULAR SPECTRA
5. R.RENNER, Z. PHYSIK 92, 172-193 (1934) INTERACTION OF ELECTRONIC AND NUCLEAR MOTIONS IN TRIATOMIC ROD-SHAPED MOLECULES
6. R.SCHMID, A.BUDO, AND J.ZEMPLEN, Z. PHYSIK 103, 250-262 (1936) ZEEMAN EFFECT OF ATMOSPHERIC OXYGEN BANDS
7. H.M.FOLEY, PHYS. REV. 72, 504-505 (1947) SECOND-ORDER MAGNETIC PERTURBATIONS IN NUCLEAR QUADRUPOLE SPECTRA AND THE PSEUDO-QUADRUPOLE EFFECT IN DIATOMIC MOLECULES
8. C.K.JEN, PHYS. REV. 72, 986 (1947) MICROWAVE SPECTRA AND ZEEMAN EFFECT IN A RESONANT CAVITY ABSORPTION CELL
9. R.S.HENDERSON AND J.H.VAN VLECK, PHYS. REV. 74, 106-107 (1948) COUPLING OF ELECTRON SPINS IN ROTATING POLYATOMIC MOLECULES
10. J.M.JAUCH, PHYS. REV. 74, 1262 (1948) SPIN-ORBIT EFFECT IN THE HYPERFINE STRUCTURE OF THE AMMONIA INVERSION SPECTRUM
11. C.K.JEN, PHYS. REV. 74, 1396-1406 (1948) THE ZEEMAN EFFECT IN MICROWAVE MOLECULAR SPECTRA
12. G.C.WICK, PHYS. REV. 73, 51-57 (1948) ON THE MAGNETIC FIELD OF A ROTATING MOLECULE
13. R.BERINGER AND J.G.CASTLE, JR., PHYS. REV. 75, 1963 (1949) MICROWAVE MAGNETIC RESONANCE ABSORPTION IN OXYGEN
14. R.BERINGER AND J.G.CASTLE, JR. PHYS. REV. 76, 868 (1949) MICROWAVE MAGNETIC RESONANCE ABSORPTION IN NITRIC OXIDE
15. W.GORDY, O.R.GILLIAM, AND R.LIVINGSTON, PHYS. REV. 76, 443-444 (1949) NUCLEAR MAGNETIC MOMENTS FROM MICROWAVE SPECTRA-I (127) AND I (129)
16. C.K.JEN, PHYS. REV. 76, 471 (1949) ROTATIONAL MAGNETIC MOMENTS FOR H₂O AND HDO
17. R.BERINGER AND J.G.CASTLE, JR., PHYS. REV. 78, 581-586 (1950) MAGNETIC RESONANCE ABSORPTION IN NITRIC OXIDE
18. J.H.BURKHALTER, R.S.ANDERSON, W.V.SMITH, AND W.GORDY, PHYS. REV. 79, 651-655 (1950) THE FINE STRUCTURE OF THE MICROWAVE ABSORPTION SPECTRUM OF OXYGEN
19. J.G.CASTLE, JR., AND R.BERINGER, PHYS. REV. 80, 114-115 (1950) MICROWAVE

MAGNETIC RESONANCE ABSORPTION IN NITROGEN DIOXIDE

20. A.F.HENRY,PHYS.REV.80,396-401(1950) THE ZEEMAN EFFECT IN OXYGEN
21. A.F.HENRY,PHYS.REV.80,549-552(1950) HYPERFINE STRUCTURE OF ZEEMAN LEVELS IN NITRIC OXIDE
22. H.MARGENAU AND A.HENRY,PHYS.REV.78,587-592(1950) THEORY OF MAGNETIC RESONANCE IN NITRIC OXIDE
23. K.B.MCAFEE,JR.,PHYS.REV.78,340 (1950) MAGNETIC ELECTRON SPIN-NUCLEAR SPIN INTERACTION IN THE ROTATIONAL SPECTRUM OF NO₂
24. N.F.RAMSEY,PHYS.REV.78,699-703(1950) MAGNETIC SHIELDING OF NUCLEI IN MOLECULES
25. R.S.ANDERSON,C.M.JOHNSON,AND W.GORDY,PHYS.REV.83,1061-1062(1951) RESONANT ABSORPTION OF OXYGEN AT 2.5-MILLIMETER WAVELENGTH
26. W.E.GOOD,D.K.COLES,G.R.GUNTHER-MOHR,A.L.SCHAWLOW, AND C.H.TOWNES, PHYS.REV.83,880 (1951) A NEW TYPE OF HYPERFINE STRUCTURE IN THE NH₃ MICROWAVE SPECTRUM
27. C.K.JEN,PHYS.REV. 81,197-203(1951) ROTATIONAL MAGNETIC MOMENTS IN POLYATOMIC MOLECULES
28. K.SHIMODA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 6,512-516(1951) THE HYPERFINE STRUCTURE OF SODIUM BY A MICROWAVE ABSORPTION METHOD
29. J.H.VAN VLECK,PHYS.REV.83,880 (1951) THEORY OF THE HYPERFINE SPLITTING OF THE LEVELS K=1 IN NH₃
30. J.H.VAN VLECK,REVS.MOD.PHYS.23,213-227(1951) THE COUPLING OF ANGULAR MOMENTUM VECTORS IN MOLECULES
31. R.BERINGER,ANN.N.Y.ACAD.SCI.55,814-821(1952) MICROWAVE RESONANCE ABSORPTION IN PARAMAGNETIC GASES
32. R.BERINGER AND E.B.RAWSON,PHYS.REV.86,607 (1952) LAMBDA-DOUBLING IN A MICROWAVE SPECTRUM OF NITRIC OXIDE
33. J.R.ESHBACH,R.E.HILLGER,AND M.W.P.STRANDBERG,PHYS.REV.85,532-539 (1952) THE NUCLEAR MAGNETIC MOMENT OF S(33) FROM MICROWAVE SPECTROSCOPY
34. J.R.ESHBACH AND M.W.P.STRANDBERG,PHYS.REV.85,24-34(1952) ROTATIONAL MAGNETIC MOMENTS OF ¹Σ MOLECULES
35. R.A.FROSCH AND H.M.FOLEY,PHYS.REV.88,1337-1349(1952) MAGNETIC HYPERFINE STRUCTURE IN DIATOMIC MOLECULES
36. C.K.JEN,ANN.N.Y.ACAD.SCI.55,822-830(1952) MOLECULAR AND NUCLEAR MAGNETIC MOMENTS
37. C.K.JEN,J.W.B.BORGHUSEN,AND R.W.STANLEY,PHYS.REV.85,717(1952) SIGN DETERMINATION FOR MOLECULAR MAGNETIC MOMENTS
38. R.STERNHEIMER,PHYS.REV.86,316-324(1952) EFFECT OF THE ATOMIC CORE ON THE MAGNETIC HYPERFINE STRUCTURE

39. B.F.BURKE AND M.W.P.STRANDBERG,PHYS.REV.90,303-308(1953) ZEEMAN EFFECT IN ROTATIONAL SPECTRA OF ASYMMETRIC ROTOR MOLECULES
40. J.T.COX,P.B.PEYTON, JR.,AND W.GORDY,PHYS.REV.91,222 (1953) ZEEMAN EFFECT IN THE MICROWAVE SPECTRA OF METHYL FLUORIDE AND METHYL ACETYLENE
41. S.L.MILLER AND C.H.TOWNES,PHYS.REV.90,537-541(1953) THE MICROWAVE ABSORPTION SPECTRUM OF $O(16)12$ AND $O(16)O(17)$
42. S.L.MILLER,C.H.TOWNES,AND M.KOTANI,PHYS.REV.90,542-543(1953) THE ELECTRONIC STRUCTURE OF O_2
43. N.F.RAMSEY,PHYS.REV.91,303-307(1953) ELECTRON COUPLED INTERACTIONS BETWEEN NUCLEAR SPINS IN MOLECULES
44. T.M.SANDERS,A.L.SCHAWLOW,G.C.DOUSMANIS,AND C.H.TOWNES,PHYS.REV. 89,1158-1159(1953) A MICROWAVE SPECTRUM OF THE FREE OH RADICAL
45. J.O.ARTMAN AND J.P.GORDON,PHYS.REV.96,1237-1245(1954) ABSORPTION OF MICROWAVES BY OXYGEN IN THE MILLIMETER WAVELENGTH REGION
46. B.F.BURKE,M.W.P.STRANDBERG,V.W.COHEN,AND W.S.KOSKI,PHYS.REV.93, 193-194(1954) THE NUCLEAR MAGNETIC MOMENT OF $S(35)$ BY MICROWAVE SPECTROSCOPY
47. G.C.DOUSMANIS,PHYS.REV.94,789 (1954) MICROWAVE SPECTRUM OF THE FREE OD RADICAL
48. J.P.GORDON,H.J.ZEIGER,AND C.H.TOWNES,PHYS.REV.95,282-284(1954) MOLECULAR MICROWAVE OSCILLATOR AND NEW HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF NH_3
49. G.R.GUNTHER-MOHR,C.H.TOWNES,AND J.H.VAN VLECK,PHYS.REV.94,1191-1203 (1954) HYPERFINE STRUCTURE IN THE SPECTRUM OF $N(14)H_3$. II. THEORETICAL DISCUSSION
50. M.MIZUSHIMA,PHYS.REV.94,569-574(1954) THEORY OF THE HYPERFINE STRUCTURE OF NO MOLECULE
51. M.MIZUSHIMA AND R.M.HILL,PHYS.REV.93,745-748(1954) MICROWAVE SPECTRUM OF O_2
52. G.C.DOUSMANIS,T.M.SANDERS,AND C.H.TOWNES,PHYS.REV.100,1735-1754 (1955) MICROWAVE SPECTRA OF THE FREE RADICALS OH AND OD
53. C.C.LIN,PHYS.REV.99,666-667(1955) THEORY OF THE FINE STRUCTURE OF THE MICROWAVE SPECTRUM OF NO_2
54. M.MIZUSHIMA,J.T.COX,AND W.GORDY,PHYS.REV.98,1034-1038(1955) ZEEMAN EFFECT IN THE ROTATIONAL SPECTRUM OF NITRIC OXIDE
55. M.TINKHAM AND M.W.P.STRANDBERG,PHYS.REV.97,937-951(1955) THEORY OF THE FINE STRUCTURE OF THE MOLECULAR OXYGEN GROUND STATE
56. Y.TORIZUKA,Y.KOJIMA,T.CKAMURA,AND K.KAMIRYO, J.PHYS.SOC.JAPAN 10, 417-420(1955) THE ZEEMAN EFFECT IN AMMONIA MICROWAVE SPECTRA

57. R.L.WHITE,REV.MOD.PHYS.27,276-288(1955) MAGNETIC HYPERFINE STRUCTURE DUE TO ROTATION IN Σ MOLECULES
58. J.T.COX AND W.GORDY,PHYS.REV.101,1298-1300(1956) ZEEMAN EFFECT OF SOME LINEAR AND SYMMETRIC TOP MOLECULES
59. J.J.GALLAGHER AND C.M.JOHNSON,PHYS.REV.102,1727-1737(1956) UNCOUPLING EFFECTS IN THE MICROWAVE SPECTRUM OF NITRIC OXIDE
60. A.OKAYA,J.PHYS.SOC.JAPAN 11,249-258(1956) THEORETICAL ANALYSIS OF THE MAGNETIC HYPERFINE STRUCTURE OF THE MICROWAVE SPECTRUM OF C_2V MOLECULES
61. G.F.HADLEY ,J.CHEM.PHYS.26,1482-1495(1957) THEORETICAL STUDY OF THE HYPERFINE STRUCTURE IN INVERSION SPECTRA OF THE DEUTEROAMMONIAS
62. G.F.HADLEY,PHYS.REV.108,291-293(1957) $J=3,K=2$ LINE IN THE INVERSION SPECTRUM OF $N(14)H_3$
63. F.R.INNES,PHYS.REV.111,194-202(1958) MICROWAVE ZEEMAN EFFECT AND THEORY OF COMPLEX SPECTRA
64. D.W.POSENER,AUST.J.PHYS.11,1-17(1958) COUPLING OF NUCLEAR SPINS IN MOLECULES
65. B.ROSENBLUM,A.H.NETHERCOT,JR.,AND C.H.TOWNES,PHYS.REV.109,400-412 (1958) ISOTOPIC MASS RATIOS,MAGNETIC MOMENTS,AND THE SIGN OF THE ELECTRIC DIPOLE MOMENT IN CARBON MONOXIDE
66. J.C.BAIRD AND G.R.BIRD,BULL.AM.PHYS.SOC.4,68(1959) MAGNETIC HYPERFINE STRUCTURE IN THE ROTATIONAL SPECTRUM OF NITROGEN DIOXIDE
67. J.G.BAKER,BULL.AM.PHYS.SOC.4,290(1959) HYPERFINE STRUCTURE IN THE ROTATIONAL SPECTRA OF FREE RADICALS
68. C.A.BURRUS,J.CHEM.PHYS.30,976-983(1959) ZEEMAN EFFECT IN THE 1- TO 3-MILLIMETER WAVE REGION- MOLECULAR G FACTORS OF SEVERAL LIGHT MOLECULES
69. G.EHRENSTEIN,C.H.TOWNES,AND M.J.STEVENSON,PHYS.REV.LETTERS 3,40-41 (1959) GROUND STATE LAMBDA DOUBLING TRANSITIONS OF OH RADICAL
70. P.FAVERO,A.M.MIRRI,AND W.GORDY,PHYS.REV.114,1534-1537(1959) MILLIMETER-WAVE ROTATIONAL SPECTRUM OF NITRIC OXIDE IN THE STATE
71. C.C.LIN,PHYS.REV.116,903-910(1959) THEORY OF THE FINE STRUCTURE OF THE MICROWAVE SPECTRUM OF NITROGEN DIOXIDE
72. D.W.POSENER,SPECTROCHIM.ACTA 15,783 (1959) CONTRIBUTIONS OF HIGH-RESOLUTION MICROWAVE SPECTROSCOPY TO THE ELECTRONIC STRUCTURE OF THE WATER MOLECULE
73. H.E.RADFORD AND V.W.HUGHES,PHYS.REV.114,1274-1279(1959) MICROWAVE ZEEMAN SPECTRUM OF ATOMIC OXYGEN
74. H.TAKUMA,T.SHIMIZU,AND K.SHIMODA,J.PHYS.SOC.JAPAN 14,1595-1599(1959) MAGNETIC HYPERFINE SPECTRUM OF H_2CO BY A MASER

75. P.THADDEUS AND J.LOUBSER,NUOVO CIMENTO 13,1060-1064(1959) BEAM MASER SPECTROSCOPY ON HDO
76. P.THADDEUS,J.LOUBSER,L.KRISHER,AND H.LECAR,J.CHEM.PHYS.31,1677-1678 (1959) BEAM MASER SPECTROSCOPY ON FORMALDEHYDE
77. K.KONDO,H.HIRAKAWA,A.MIYAHARA,T.OKA,AND K.SHIMODA,J.PHYS.SOC. JAPAN 15,303-306(1960) MICROWAVE ZEEMAN EFFECT OF HCHO
78. B.D.OSIPOV,OPTIKA I SPEKTROSKOPIYA 8,581-582(1960) I-J INTERACTION IN THE METHYL IODIDE MOLECULE
79. D.W.POSNER,AUST.J.PHYS.13,168-185(1960) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF WATER II. EFFECTS OF MAGNETIC INTERACTIONS
80. M.S.CHILD AND H.C.LONGUET-HIGGINS,PHIL.TRANS.ROY.SOC.LONDON,254, 259-294(1961) STUDIES OF THE JAHN-TELLER EFFECT. III. THE ROTATIONAL AND VIBRATIONAL SPECTRA OF SYMMETRIC-TOP MOLECULES IN ELECTRONICALLY DEGENERATE STATES
81. R.F.CURL,JR. AND J.L.KINSEY,J.CHEM.PHYS.35,1758-1765(1961) CALCULATION OF INTERACTION MATRIX ELEMENTS FOR ASYMMETRIC ROTORS WITH RESULTANT ELECTRONIC SPIN AND NUCLEAR SPIN
82. H.E.RADFORD,PHYS.REV.122,114-130(1961) MICROWAVE ZEEMAN EFFECT OF FREE HYDROXYL RADICALS
83. H.TAKUMA,J.PHYS.SOC.JAPAN 16,309-317(1961) MAGNETIC HYPERFINE STRUCTURE IN THE ROTATIONAL SPECTRUM OF H₂CO
84. A.GUARNIERI,P.FAVERO,A.M.MIRRI,AND G.SEMERANO,BOLL.SCI.FAC.CHIM. IND.BOLOGNA 20,105-109(1962) THE ZEEMAN EFFECT OF FORMYL FLUORIDE IN THE MILLIMETER WAVES REGION
85. H.E.RADFORD,PHYS.REV.126,1035-1045(1962) MICROWAVE ZEEMAN EFFECT OF FREE HYDROXYL RADICALS
86. E.B.TREACY AND Y.BEERS,J.CHEM.PHYS.36,1473-1480(1962) HYPERFINE STRUCTURE OF THE ROTATIONAL SPECTRUM OF HDO
87. G.EHRENSTEIN,PHYS.REV.130,669-674(1963) HYPERFINE STRUCTURE IN O(17)H AND THE OH DIPOLE MOMENT
88. L.PIERCE AND N.DICIANNI,J.CHEM.PHYS.38,2029-2030(1963) SPIN-ROTATIONAL HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF OXYGEN DIFLUORIDE
89. G.R.BIRD,J.C.BAIRD,A.W.JACHE,J.A.HODGESON,R.F.CURL JR.,A.C.KUNKLE, J.W.BRANSFORD,J.RAstrup-ANDERSEN,AND J.ROSENTHAL,J.CHEM.PHYS.40, 3378-3390(1964) MICROWAVE SPECTRUM OF NO₂- FINE STRUCTURE AND MAGNETIC COUPLING
90. S.I.CHAN,D.IKENBERRY, AND T.P.DAS, J.CHEM.PHYS.41,2107-2110(1964) REMARKS ON THE DETERMINATION OF ELECTRIC DIPOLE MOMENTS FROM ROTATIONAL MAGNETIC MOMENTS. THE DIPOLE MOMENT OF HYDROGEN FLUORIDE
91. Y.CHIU,J.CHEM.PHYS.41,3235-3249(1964) ROTATION-ELECTRONIC INTERACTION IN THE RYDBERG STATES OF DIATOMIC MOLECULES

92. K.M.EVENSON, J.L.DUNN, AND H.P.BROIDA, PHYS.REV.136,1566-1571(1964)
OPTICAL DETECTION OF MICROWAVE TRANSITIONS BETWEEN EXCITED
ELECTRONIC STATES OF CN AND THE IDENTIFICATION OF THE TRANSITIONS
INVOLVED
93. F.X.POWELL AND D.R.LIDE, JR., J.CHEM.PHYS.41,1413-1419(1964)
MICROWAVE SPECTRUM OF THE SO RADICAL
94. H.E.RADFORD, PHYS.REV.136,1571-1575(1964) HYPERFINE STRUCTURE OF
THE B $^2\Sigma^+$ STATE OF CN
95. W.T.RAYNES, J.CHEM.PHYS.41,3020-3032(1964) SPIN SPLITTINGS AND
ROTATIONAL STRUCTURES OF NONLINEAR MOLECULES IN DOUBLET AND
TRIPLET ELECTRONIC STATES
96. P.THADDEUS, L.C.KRISHER, AND P.CAHILL, J.CHEM.PHYS.41,1542-1547(1964)
HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF NH₂D
97. P.THADDEUS, L.C.KRISHER, AND J.H.N.LOUBSER, J.CHEM.PHYS.40,257-273
(1964) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF HDO, HDS,
CH₂O, AND CHDO- BEAM-MASER SPECTROSCOPY ON ASYMMETRIC-TOP MOLECULES

Section XII. GENERAL MICROWAVE PAPERS AND RELATED TOPICS

1. H.A.KRAMERS,Z.PHYSIK 39,828-840(1926) WAVE MECHANICS AND SEMI-NUMERICAL QUANTIZATION
2. M.BORN AND J.R.OPPENHEIMER,ANN.PHYSIK 4-84,457-484(1927) QUANTUM THEORY OF MOLECULES
3. B.PODOLSKY, PHYS.REV. 32,812-816(1928) QUANTUM-MECHANICALLY CORRECT FORM OF HAMILTONIAN FUNCTION FOR CONSERVATIVE SYSTEMS
4. P.M.MORSE,PHYS.REV.34,57-64(1929) DIATOMIC MOLECULES ACCORDING TO THE WAVE MECHANICS II.VIBRATIONAL LEVELS
5. C.ECKART,REV.MOD.PHYS.2,305-380(1930) THE APPLICATION OF GROUP THEORY TO THE QUANTUM DYNAMICS OF MONATOMIC SYSTEMS
6. R.S.MULLIKEN,REVS.MOD.PHYS.2,60-115(1930) THE INTERPRETATION OF BAND SPECTRA PARTS I,IIA,IIB
7. D.M.DENNISON,REVS.MOD.PHYS.3,280-345(1931) THE INFRARED SPECTRA OF POLYATOMIC MOLECULES. PART I.
8. E.FERMI,Z.PHYSIK 71,250-259(1931) ON THE RAMAN EFFECT IN CARBON DIOXIDE
9. R.S.MULLIKEN,REVS.MOD.PHYS.3,89-155(1931) THE INTERPRETATION OF BAND SPECTRA.PART IIC.EMPIRICAL BAND TYPES
10. E.WIGNER, GROUP THEORY AND ITS APPLICATION TO THE QUANTUM MECHANICS OF ATOMIC SPECTRA,BRAUNSCHWEIG(1931)
11. H.EYRING,J.AM.CHEM.SOC.54,3191-3203(1932) STERIC HINDERANCE AND COLLISION DIAMETERS
12. R.DE L. KRONIG,PHYSICA 1,617-622(1933) NOTE ON THE DETERMINATION OF ISOTOPIC MASSES FROM BAND SPPECTRA
13. G.PLACZEK AND E.TELLER,Z.PHYSIK 81,209-258(1933) ROTATION STRUCTURE OF THE RAMAN BANDS OF POLYATOMIC MOLECULES
14. N.WRIGHT AND H.M.RANDALL,PHYS.REV.44,391-398(1933) THE FAR INFRARED ABSORPTION SPECTRA OF AMMONIA AND PHOSPHINE GASES UNDER HIGH RESOLVING POWER
15. C.E.CLEETON AND N.H.WILLIAMS,PHYS.REV.45,234-237(1934) ELECTROMAGNETIC WAVES OF 1.1 CM WAVE-LENGTH AND THE ABSORPTION SPECTRUM OF AMMONIA
16. G.H.DIEKE AND G.B.KISTIAKOWSKY,PHYS.REV.45,4-28(1934) THE STRUCTURE OF THE ULTRAVIOLET ABSORPTION SPECTRUM OF FORMALDEHYDE. I
17. C.ECKART,PHYS.REV.46,383-387(1934) THE KINETIC ENERGY OF POLYATOMIC MOLECULES
18. G.HERZBERG,F.PATAT,AND J.W.T.SPINKS,Z.PHYSIK 92,87-99(1934) ROTATION VIBRATION SPECTRA OF MOLECULES CONTAINING DEUTERIUM. PART I. SPECTRUM OF C₂H₂D AND THE C-C AND C-H DISTANCES IN ACETYLENE

19. O.M.JORDAHL,PHYS.REV.45,87-97(1934) THE EFFECT OF CRYSTALLINE ELECTRIC FIELDS ON THE PARAMAGNETIC SUSCEPTIBILITY OF CUPRIC SALTS
20. C.L.PEKERIS,PHYS.REV.45,98-103(1934) THE ROTATION-VIBRATION COUPLING IN DIATOMIC MOLECULES
21. P.F.BARTUNEK AND E.F.BARKER,PHYS.REV.48,516-521(1935) THE INFRARED ABSORPTION SPECTRA OF THE LINEAR MOLECULES CARBONYL SULFIDE AND DEUTERIUM CYANIDE
22. F.H.CRAWFORD AND T.JORGENSEN,JR.,PHYS.REV.47,358-366(1935) THE BAND SPECTRA OF THE HYDRIDES OF LITHIUM.PART I. LI(7)D
23. F.H.CRAWFORD AND T.JORGENSEN,JR.,PHYS.REV.47,932-941(1935) THE BAND SPECTRA OF THE HYDRIDES OF LITHIUM
24. C.ECKART,PHYS.REV.47,552-558(1935) SOME STUDIES CONCERNING ROTATING AXES AND POLYATOMIC MOLECULES
25. L.PAULING AND E.B.WILSON,JR.,INTRODUCTION TO QUANTUM MECHANICS, MCGRAW-HILL BOOK COMPANY INC,NEW YORK(1935)
26. J.H.VAN VLECK,PHYS.REV.47,487-494(1935) THE ROTATIONAL ENERGY OF POLYATOMIC MOLECULES
27. E.B.WILSON,JR.,J.CHEM.PHYS.3,276-285(1935) THE STATISTICAL WEIGHTS OF THE ROTATIONAL LEVELS OF POLYATOMIC MOLECULES,INCLUDING METHANE, AMMONIA,BENZENE,CYCLOPROPANE,AND ETHYLENE
28. E.B.WILSON,JR.,J.CHEM.PHYS.3,818-821(1935) SYMMETRY CONSIDERATIONS CONCERNING THE SPLITTING OF VIBRATION-ROTATION LEVELS IN POLYATOMIC MOLECULES
29. F.H.CRAWFORD AND T.JORGENSEN,JR.,PHYS.REV.49,745-752(1936) THE BAND SPECTRA OF THE HYDRIDES OF LITHIUM.PART III.POTENTIAL CURVES AND ISOTOPE RELATIONS.
30. C.GILBERT,PHYS.REV.49,619-624(1936) THE THEORY OF THE BAND SPECTRA OF PH AND NH
31. J.H.VAN VLECK,J.CHEM.PHYS.4,327-338(1936) ON THE ISOTOPE CORRECTIONS IN MOLECULAR SPECTRA
32. A.BUDO,Z.PHYSIK 105,73-80(1937) ROTATIONAL STRUCTURE OF $^4\Sigma \rightarrow ^4\Pi$ BANDS
33. B.L.CRAWFORD AND P.C.CROSS,J.CHEM.PHYS.5,621-625(1937) ELEMENTS OF THE FACTORED SECULAR EQUATION FOR THE SEMI-RIGID WATER TYPE ROTATOR WITH APPLICATION TO THE HYDROGEN SULFIDE BAND AT 10,000 A
34. J.B.HOWARD,J.CHEM.PHYS.5,442-450(1937) THE NORMAL VIBRATIONS AND THE VIBRATIONAL SPECTRUM OF C₂H₆
35. E.C.KEMBLE,FUNDAMENTAL PRINCIPLES OF QUANTUM MECHANICS,MCGRAW-HILL BOOK COMPANY INC.,NEW YORK(1937)
36. T.E.NEVIN,NATURE 140,1101(1937) ROTATIONAL ANALYSIS OF THE VISIBLE O₂⁺ BANDS

37. T.E.NEVIN, PHIL. TRANS. ROY. SOC. LONDON 237, 471-507 (1938) ROTATIONAL ANALYSIS OF THE FIRST NEGATIVE BAND SPECTRUM OF OXYGEN
38. E.B.WILSON, JR., J. CHEM. PHYS. 6, 740-745 (1938) NUCLEAR SPIN AND SYMMETRY EFFECTS IN THE HEAT CAPACITY OF ETHANE GAS
39. H.MARGENAU, REVS. MOD. PHYS. 11, 1-35 (1939) VAN DER WAALS FORCES
40. T.Y.WU, VIBRATIONAL SPECTRA AND STRUCTURE OF POLYATOMIC MOLECULES, NATIONAL UNIVERSITY OF PEKING, KUN-MING, CHINA (1939)
41. B.T.DARLING AND D.M.DENNISON, PHYS. REV. 57, 128-139 (1940) THE WATER VAPOR MOLECULE
42. D.M.DENNISON, REVS. MOD. PHYS. 12, 175-214 (1940) INFRA-RED SPECTRA OF POLYATOMIC MOLECULES. PART II.
43. I.SANDEMAN, PROC. ROY. SOC. EDINBURGH 60, 210-223 (1940) ENERGY LEVELS OF A ROTATING VIBRATOR
44. E.B.WILSON, JR., CHEM. REVS. 27, 17-38 (1940) THE PRESENT STATUS OF THE STATISTICAL METHOD OF CALCULATING THERMODYNAMIC FUNCTIONS
45. H.M.HULBURT AND J.O.HIRSCHFELDER, J. CHEM. PHYS. 9, 61-69 (1941) POTENTIAL ENERGY FUNCTIONS FOR DIATOMIC MOLECULES
46. V.SCHOMAKER AND D.P.STEVENSON, J. AM. CHEM. SOC. 63, 37-40 (1941) SOME REVISIONS OF THE COVALENT RADIUS AND THE ADDITIVITY RULE FOR THE LENGTHS OF PARTIALLY IONIC SINGLE COVALENT BONDS
47. H.EYRING, J.WALTER, AND G.E.KIMBALL, QUANTUM CHEMISTRY, JOHN WILEY AND SONS INC., NEW YORK (1944)
48. G.E.RECKER AND S.H.AUTLER, PHYS. REV. 70, 300-307 (1946) WATER VAPOR ABSORPTION OF ELECTROMAGNETIC RADIATION IN THE CENTIMETER WAVELENGTH RANGE
49. R.BERINGER, PHYS. REV. 70, 53-57 (1946) THE ABSORPTION OF ONE -HALF CENTIMETER ELECTROMAGNETIC WAVES IN OXYGEN
50. B.BLEANEY AND R.P.PENROSE, NATURE 157, 339-340 (1946) AMMONIA SPECTRUM IN THE 1 CM WAVELENGTH REGION
51. D.K.COLES AND W.E.GOOD, PHYS. REV. 70, 979 (1946) STARK AND ZEEMAN EFFECTS IN THE INVERSION SPECTRUM OF AMMONIA
52. D.TER HAAR, PHYS. REV. 70, 222-223 (1946) THE VIBRATIONAL LEVELS OF AN ANHARMONIC OSCILLATOR
53. L.N.HADLEY AND D.M.DENNISON, PHYS. REV. 70, 780-781 (1946) THE MICROWAVE SPECTRUM OF AMMONIA
54. W.D.HERSCHBERGER, J. APPL. PHYS. 17, 495-500 (1946) THE ABSORPTION OF MICROWAVES BY GASES
55. C.I.BEARD AND B.P.DAILEY, J. CHEM. PHYS. 15, 762 (1947) MICROWAVE SPECTRUM AND STRUCTURE OF ISOTHIOCYANIC ACID

56. D.K.COLES, E.S.ELYASH, AND J.G.GORMAN, PHYS.REV.72,973(1947)
MICROWAVE ABSORPTION SPECTRA OF N₂O
57. B.P.DAILEY, S.GOLDEN, AND E.B.WILSON, JR., PHYS.REV.72,871-872(1947)
PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF SO₂
58. B.P.DAILEY AND E.B.WILSON, JR., PHYS.REV.72,522 (1947)
MICROWAVE SPECTRA OF SEVERAL POLYATOMIC MOLECULES
59. T.W.DAKIN, W.E.GOOD, AND D.K.COLES, PHYS.REV.71,640-641(1947) BOND
DISTANCES IN OCS FROM MICROWAVE ABSORPTION LINES
60. W.E.GOOD AND D.K.COLES, PHYS.REV.71,383-384(1947) MICROWAVE
ABSORPTION FREQUENCIES OF N(14)H₃ AND N(15)H₃
61. W.E.GOOD AND D.K.COLES, PHYS.REV.72,157 (1947) PRECISION
FREQUENCY MEASUREMENTS OF MICROWAVE ABSORPTION LINES AND THEIR
FINE STRUCTURE
62. W.GORDY AND M.KESSLER, PHYS.REV.71,640(1947) MICROWAVE SPECTRA-
THE HYPERFINE STRUCTURE OF AMMONIA
63. W.GORDY, J.W.SIMMONS, AND A.G.SMITH, PHYS.REV.72,344-345(1947)
NUCLEAR AND MOLECULAR CONSTANTS FROM MICROWAVE SPECTRA- METHYL
CHLORIDE AND METHYL BROMIDE
64. W.GORDY, A.G.SMITH, AND J.W.SIMMONS, PHYS.REV.71,917(1947)
MICROWAVE SPECTRA-METHYL IODIDE
65. W.GORDY, A.G.SMITH, AND J.W.SIMMONS, PHYS.REV.72,249-250(1947)
ANALYSIS OF THE HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF
THE SYMMETRIC TOP MOLECULE CH₃I
66. W.GORDY, W.V.SMITH, A.G.SMITH, AND H.RING, PHYS.REV.72,259-260(1947)
MILLIMETER-WAVE SPECTRA HYPERFINE STRUCTURE OF BRCN AND ICN
67. W.D.HERSCHBERGER AND J.TURKEVICH, PHYS.REV.71,554(1947) ABSORPTION
OF METHYL ALCOHOL AND METHYLAMINE FOR 1.25-CM WAVES
68. R.E.HILLGER, M.W.P.STRANDBERG, T.WENTINK, AND R.KYHL, PHYS.REV.72,157
(1947) THE MICROWAVE ABSORPTION SPECTRUM OF CARBONYL SULFIDE
69. G.W.KING AND R.M.HAINER, PHYS.REV.71,135 (1947) INTERPRETATION OF
THE MICROWAVE ABSORPTION OF HDO AT 1.3 CENTIMETERS
70. G.W.KING, R.M.HAINER, AND P.C.CROSS, PHYS.REV.71,433-443(1947)
EXPECTED MICROWAVE ABSORPTION COEFFICIENTS OF WATER AND RELATED
MOLECULES
71. H.RING, H.EDWARDS, M.KESSLER, AND W.GORDY, PHYS.REV.72,1262-1263(1947)
MICROWAVE SPECTRA-METHYL CYANIDE AND METHYL ISOCYANIDE
72. W.V.SMITH AND R.L.CARTER, PHYS.REV.72,638-639(1947) SATURATION
EFFECT IN MICROWAVE SPECTRUM OF AMMONIA
73. C.H.TOWNES, A.N.HOLDEN, AND F.R.MERRITT, PHYS.REV.71,64(1947)
ROTATIONAL SPECTRA OF SOME LINEAR MOLECULES NEAR 1-CM WAVE-LENGTH
74. C.H.TOWNES, A.N.HOLDEN, AND F.R.MERRITT, PHYS.REV.72,513-514(1947)

MICROWAVE SPECTRA OF LINEAR MOLECULES

75. R.T.WEIDNER,PHYS.REV.72,1268-1269(1947) THE MICROWAVE SPECTRUM OF IODINE MONOCHLORIDE AT 4.5 CENTIMETERS WAVE-LENGTH
76. D.WILLIAMS,PHYS.REV.72,974(1947) FURTHER WORK ON SATELLITES IN THE MICROWAVE SPECTRUM OF AMMONIA
77. G.L.CUNNINGHAM,W.I.LEVAN, AND W.D.GWINN,PHYS.REV.74,1537(1948) THE ROTATIONAL SPECTRUM OF ETHYLENE OXIDE
78. B.P.DAILEY,K.RUSINOW,R.G.SHULMAN,AND C.H.TOWNES,PHYS.REV.74,1245-1246 (1948) PURE ROTATIONAL SPECTRUM OF ASF_3
79. W.F.EDGEELL AND A.ROBERTS,J.CHEM.PHYS.16,1002(1948) THE MOMENT OF INERTIA OF CF_3CH_3
80. A.FLETCHER,MATH.TABLES AND OTHER AIDS TO COMPUTATION 3,27-29(1948) G.W.KING PUNCHED -CARD METHODS IN ANALYZING INFRA-RED SPECTRA
81. O.R.GILLIAM,H.D.EDWARDS, AND W.GORDY,PHYS.REV.73,635-636(1948) ANOMALIES IN THE HYPERFINE STRUCTURE OF CH_3I AND ICN
82. W.GORDY,J.W.SIMMONS,AND A.G.SMITH,PHYS.REV.74,243-249(1948) MICROWAVE DETERMINATION OF THE MOLECULAR STRUCTURES AND NUCLEAR COUPLINGS OF THE METHYL HALIDES
83. R.S.HENDERSON,PHYS.REV.74,107(1948) ON THE FINE STRUCTURE IN THE INVERSION SPECTRUM OF AMMONIA ERRATUM-PHYS.REV.74,626(1948)
84. M.KESSLER AND W.GORDY,PHYS.REV.74,123 (1948) METHODS IN MICROWAVE SPECTROSCOPY
85. M.MIZUSHIMA,PHYS.REV.74,705-706(1948) ON THE AMMONIA MOLECULE
86. A.ROBERTS,PHYS.REV.73,1405(1948) ROTATIONAL SPECTRUM OF $OC(14)S$ AND THE NUCLEAR SPIN OF $C(14)$
87. A.H.SHARBAUGH,PHYS.REV.74,1870(1948) MICROWAVE DETERMINATION OF THE MOLECULAR STRJCTURE OF CHLOROSILANE
88. R.G.SHULMAN,B.P.DAILEY,AND C.H.TOWNES,PHYS.REV.74,846(1948) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF ETHYLENE OXIDE
89. H.A.SKINNER,J.CHEM.PHYS.16,553-554(1948) THE GEOMETRY OF CH_3X MOLECULES
90. A.G.SMITH,H.RING,W.V.SMITH, AND W.GORDY,PHYS.REV.74,370-372(1948) INTERATOMIC DISTANCES AND NUCLEAR QUADRUPOLE COUPLINGS IN $CLCN$, BRN , AND ICN
91. M.W.P.STRANDBERG,PHYS.REV.74,1245 (1948) MICROWAVE ROTATIONAL ABSORPTION IN D_2O
92. C.H.TOWNES,A.N.HOLDEN,AND F.R.MERRITT,PHYS.REV.74,1113-1133(1948) MICROWAVE SPECTRA OF SOME LINEAR XYZ MOLECULES
93. C.H.TOWNES,F.R.MERRITT,AND R.D.WRIGHT,PHYS.REV.73,1334-1337(1948) THE PURE ROTATIONAL SPECTRUM OF ICl

94. B.BAK, E.S.KNUDSEN, AND E.MADSEN, PHYS.REV.75,1622-1623(1949) MICROWAVE ABSORPTION OF SOME ORGANIC VAPORS
95. C.I.BEARD AND B.P.DAILEY, J.AM.CHEM.SOC.71,929-936(1949) THE MICROWAVE SPECTRA OF CH₃NCS AND CH₃SCN
96. D.BIANCO, G.MATLACK, AND A.ROBERTS, PHYS.REV.76,473 (1949) ISOTOPIC FREQUENCIES IN THE MICROWAVE SPECTRA OF OCS AND CH₃CL
97. J.K.BRAGG AND A.H.SHARBAUGH, PHYS.REV.75,1774-1775(1949) MICROWAVE SPECTRUM OF FORMALDEHYDE
98. D.K.COLES AND R.H.HUGHES, PHYS.REV.76,178 (1949) MICROWAVE SPECTRA OF NITROUS OXIDE
99. D.K.COLES AND R.H.HUGHES, PHYS.REV.76,858(1949) MICROWAVE SPECTRUM OF CF₃CL
100. G.L.CUNNINGHAM, A.W.BOYD, W.D.GWINN, AND W.I.LEVAN, J.CHEM.PHYS.17, 211-212(1949) STRUCTURE OF ETHYLENE OXIDE
101. B.P.DAILEY, J.M.MAYS, AND C.H.TOWNES, PHYS.REV.76,136-137(1949) MICROWAVE ROTATIONAL SPECTRA AND STRUCTURES OF GEH₃CL, SIH₃CL, AND CH₃CL
102. H.D.EDWARDS, O.R.GILLIAM, AND W.GORDY, PHYS.REV.76,196 (1949) MICROWAVE SPECTRUM OF METHYL ALCOHOL AND OF METHYL AMINE
103. D.A.GILBERT, A.ROBERTS, AND P.A.GRISWOLD, PHYS.REV.76,1723(1949) NUCLEAR AND MOLECULAR INFORMATION FROM THE MICROWAVE SPECTRUM OF FCL
104. O.R.GILLIAM, H.D.EDWARDS, AND W.GORDY, PHYS.REV.75,1014-1016(1949) MICROWAVE INVESTIGATIONS OF METHYL FLUORIDE, FLUOROFORM, AND PHOSPHORUS TRI-FLUORIDE
105. W.LOW AND C.H.TOWNES, PHYS.REV.75,529-530(1949) O(17) AND S(36) IN THE ROTATIONAL SPECTRUM OF OCS
106. M.MIZUSHIMA, J.PHYS.SOC.JAPAN 4,191-196(1949) ON THE AMMONIA MOLECULE II.
107. W.J.PIETENPOL AND J.D.ROGERS, PHYS.REV.76,690-691(1949) MICROWAVE ABSORPTION SPECTRUM OF METHYLENE BROMIDE
108. A.ROBERTS AND W.F.EDGELL, J.CHEM.PHYS.17,742-743(1949) THE MICROWAVE SPECTRUM OF CF₂=CH₂
109. A.H.SHARBAUGH, J.K.BRAGG, T.C.MADISON, AND V.G.THOMAS, PHYS.REV.76,1419 (1949) THE DETERMINATION OF THE MOLECULAR STRUCTURE OF BROMOSILANE BY MICROWAVE MEASUREMENTS
110. A.H.SHARBAUGH AND J.MATTERN, PHYS.REV.75,1102(1949) MICROWAVE SPECTRUM OF METHYL BROMIDE
111. J.W.SIMMONS, PHYS.REV.76,686(1949) THE MICROWAVE SPECTRA OF CD₃CL AND CD₃I
112. W.V.SMITH AND R.R.UNTERBERGER, J.CHEM.PHYS.17,1348(1949) MICROWAVE

INVESTIGATIONS OF CHLOROFORM

113. M.W.P.STRANDBERG,J.CHEM.PHYS.17,901-904(1949) ROTATIONAL ABSORPTION SPECTRUM OF HDO
114. M.W.P.STRANDBERG,C.Y.MENG,AND J.G.INGERSOLL,PHYS.REV.75,1524-1528 (1949) THE MICROWAVE ABSORPTION SPECTRUM OF OXYGEN
115. M.W.P.STRANDBERG,C.S.PEARSALL,AND M.T.WEISS,J.CHEM.PHYS.17,429(1949) ON THE ELECTRIC DIPOLE MOMENT AND VIBRATIONAL STATES OF H3B(10)CO
116. M.W.P.STRANDBERG,T.WENTINK,JR., AND A.G.HILL,PHYS.REV.75,827-832 (1949) THE MICROWAVE SPECTRUM OF CARBONYL SELENIDE
117. M.W.P.STRANDBERG,T.WENTINK,JR., AND R.L.KYHL,PHYS.REV.75,270-278 (1949) ROTATIONAL ABSORPTION SPECTRUM OF OCS
118. A.A.WESTENBERG,J.H.GOLDSTEIN, AND E.B.WILSON,JR.,J.CHEM.PHYS.17, 1319-1321(1949) THE MICROWAVE SPECTRUM OF CHLOROACETYLENE AND DEUTEROCHLOROACETYLENE
119. E.AMBLE AND B.P.DAILEY,J.CHEM.PHYS.18,1422(1950) THE STRUCTURE AND DIPOLE MOMENT OF HYDRAZOIC ACID
120. B.BAK,E.S.KNUDSEN,E.MADSEN,AND J.RAstrup-ANDERSEN,PHYS.REV.79,190 (1950) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF KETENE
121. B.BAK,R.SLOAN,AND D.WILLIAMS,PHYS.REV.80,101-102(1950) MICROWAVE INVESTIGATION OF SCSE
122. C.I.BEARD AND B.P.DAILEY,J.CHEM.PHYS.18,1437-1441(1950) THE STRUCTURE AND DIPOLE MOMENT OF ISOTHIOCYANIC ACID
ERRATA-J.CHEM.PHYS.19,975(1951)
123. H.J.BERNSTEIN,J.CHEM.PHYS.18,1514(1950) THE STRUCTURE OF NITROSYL CHLORIDE FROM THE MICROWAVE ABSORPTION SPECTRUM
124. J.K.BRAGG,T.C.MADISON,AND A.H.SHARBAUGH,PHYS.REV.77,148-149(1950) MICROWAVE SPECTRUM OF CH2CFCL ERRATA-PHYS.REV.77,571(1950)
125. D.K.COLES,W.E.GOOD, AND R.H.HUGHES,PHYS.REV.79,224 (1950) MICROWAVE SPECTRUM OF METHYL CYANIDE AND ITS ISOTOPIC MODIFICATIONS
126. C.D.CORNWELL,J.CHEM.PHYS.18,1118-1119(1950) MICROWAVE SPECTRA OF BROMODIBORANE AND VINYL BROMIDE
127. S.GESCHWIND,H.MINDEN, AND C.H.TOWNES,PHYS.REV.78,174-175(1950) MICROWAVE MEASUREMENTS ON THE STABLE SELENIUM ISOTOPES IN OCSE
128. O.R.GILLIAM,C.M.JOHNSON, AND W.GORDY,PHYS.REV.78,140-144(1950) MICROWAVE SPECTROSCOPY IN THE REGION FROM TWO TO THREE MILLIMETERS
129. B.M.GIRDWOOD,CAN.J.RESEARCH 28A,180-189(1950) THE MICROWAVE ABSORPTION SPECTRUM OF METHANOL
130. W.GORDY,H.RING,AND A.B.BURG,PHYS.REV.78,512-517(1950) MICROWAVE DETERMINATION OF THE STRUCTURE OF BORINE CARBONYL AND OF THE NUCLEAR MOMENTS OF THE STABLE BORON ISOTOPES

131. W.GORDY AND J.SHERIDAN, PHYS. REV. 79, 224 (1950) MICROWAVE SPECTRA OF THE METHYL MERCURIC HALIDES
132. L.H. JONES, J.N. SHOOLERY, R.G. SHULMAN, AND D.M. YOST, J. CHEM. PHYS. 18, 990-991 (1950) THE MOLECULAR STRUCTURE OF ISOCYANIC ACID FROM MICROWAVE AND INFRARED ABSORPTION SPECTRA
133. W. KESSLER, H. RING, R. TRAMBARULO, AND W. GORDY, PHYS. REV. 79, 54-56 (1950) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF METHYL CYANIDE AND METHYL ISOCYANIDE
134. P. KISLIUK AND C.H. TOWNES, J. CHEM. PHYS. 18, 1109-1111 (1950) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURE OF PHOSPHORUS AND ARSENIC TRICHLORIDE
135. J.H.N. LOUBSER AND J.A. KLEIN, PHYS. REV. 78, 348 (1950) ABSORPTION OF MILLIMETER WAVES IN ND₃
136. W. LOW AND C.H. TOWNES, PHYS. REV. 80, 608-611 (1950) EVIDENCE FROM NUCLEAR MASSES ON PROPOSED CLOSED SHELLS AT 20 NUCLEONS
137. G. MATLACK, G. GLOCKER, D.R. BIANCO, AND A. ROBERTS, J. CHEM. PHYS. 18, 332-334 (1950) THE MICROWAVE SPECTRA OF ISOTOPIC METHYL CHLORIDE
138. H.T. MINDEN, J.M. MAYS, AND B.P. DAILEY, PHYS. REV. 78, 347 (1950) THE MICROWAVE SPECTRUM OF CH₃SIF₃
139. W.J. PIETENPOL, J.D. ROGERS, AND D. WILLIAMS, PHYS. REV. 78, 480-481 (1950) MICROWAVE SPECTRA OF ASYMMETRIC TOP MOLECULES
140. S.J. SENATORE, PHYS. REV. 78, 293-294 (1950) MICROWAVE ABSORPTION SPECTRA OF POF₃
141. A.H. SHARBAUGH, B.S. PRITCHARD, AND T.C. MADISON, PHYS. REV. 77, 302 (1950) MICROWAVE SPECTRUM OF CF₃BR
142. A.H. SHARBAUGH, B.S. PRITCHARD, V.G. THOMAS, J.M. MAYS, AND B.P. DAILEY, PHYS. REV. 79, 189 (1950) THE MICROWAVE ROTATIONAL SPECTRUM AND STRUCTURE OF BROMOGERMANE
143. A.H. SHARBAUGH, V.G. THOMAS, AND B.S. PRITCHARD, PHYS. REV. 78, 64-65 (1950) A DETERMINATION OF THE DIPOLE MOMENT AND MOLECULAR STRUCTURE OF FLUOROSILANE
144. J. SHERIDAN AND W. GORDY, PHYS. REV. 77, 292-293 (1950) INTERATOMIC DISTANCES IN CF₃BR, CF₃I, AND CF₃CN
145. J. SHERIDAN AND W. GORDY, PHYS. REV. 77, 719 (1950) MICROWAVE SPECTRA AND MOLECULAR CONSTANTS OF TRIFLUOROSILANE DERIVATIVES. SIF₃H, SIF₃CH₃, SIF₃CL, AND SIF₃BR
146. J. SHERIDAN AND W. GORDY, PHYS. REV. 79, 224 (1950) MICROWAVE SPECTRUM OF METHYL BROMOACETYLENE
147. J. SHERIDAN AND W. GORDY, PHYS. REV. 79, 513-515 (1950) THE NUCLEAR QUADRUPOLE MOMENT OF N(14) AND THE STRUCTURE OF NITROGEN TRIFLUORIDE FROM MICROWAVE SPECTRA

148. J.W.SIMMONS, W.E.ANDERSON, AND W.GORDY, PHYS.REV.77,77-79(1950)
MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF HYDROGEN CYANIDE
ERRATA-PHYS.REV.86,1055(1952)
149. J.W.SIMMONS AND W.O.SWAN, PHYS.REV.80,289-290(1950) THE STRUCTURE
OF METHYL BROMIDE FROM MICROWAVE SPECTRA
150. D.F.SMITH, M.TIDWELL, AND D.V.P.WILLIAMS, PHYS.REV.77,420-421(1950)
THE MICROWAVE SPECTRUM OF BROMINE MONOFLUORIDE
151. D.F.SMITH, M.TIDWELL, AND D.V.P.WILLIAMS, PHYS.REV.79,1007-1008(1950)
THE MICROWAVE SPECTRUM OF BRCL
152. A.L.SOUTHERN, H.W.MORGAN, G.W.KEILHOLTZ, AND W.V.SMITH, PHYS.REV.78,
639 -(1950) THE ISOTOPIC ANALYSIS OF NITROGEN BY MEANS OF A
MICROWAVE MASS SPECTROGRAPH
153. R.TRAMBARULO AND W.GORDY, PHYS.REV.79,224-225 (1950) MICROWAVE
SPECTRA AND MOLECULAR CONSTANTS OF CD₃NC AND CD₃CN
154. R.TRAMBARULO AND W.GORDY, J.CHEM.PHYS.18,1613-1616(1950) THE
MICROWAVE SPECTRUM AND STRUCTURE OF METHYL ACETYLENE
155. R.R.UNTERBERGER, R.TRAMBARULO, AND W.V.SMITH, J.CHEM.PHYS.18,565-566
(1950) MICROWAVE DETERMINATION OF THE STRUCTURE OF CHLOROFORM
156. A.A.WESTENBERG AND E.B.WILSON, JR., J.AM.CHEM.SOC.72,199-200(1950)
THE MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF CYANOACETYLENE
157. J.Q.WILLIAMS AND W.GORDY, J.CHEM.PHYS.18,994-995(1950) MICROWAVE
SPECTRA AND MOLECULAR CONSTANTS OF TERTIARY BUTYL CHLORIDE, BROMIDE,
AND IODIDE
158. J.Q.WILLIAMS AND W.GORDY, PHYS.REV.79,225 (1950) MICROWAVE
SPECTRUM OF BROMOFORM AND PHOSPHORUS TRIBROMIDE
159. E.AMBLE, PHYS.REV.83,210 (1951) THE STRUCTURE AND DIPOLE MOMENT
OF TRIOXANE
160. W.E.ANDERSON, J.SHERIDAN, AND W.GORDY, PHYS.REV.81,819-821(1951)
MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF GEF₃CL
161. W.E.ANDERSON, R.TRAMBARULO, J.SHERIDAN, AND W.GORDY, PHYS.REV.82,58-60
(1951) THE MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF
TRIFLUOROMETHYL ACETYLENE
162. D.G.BURKHARD AND D.M.DENNISON, PHYS.REV.84,408-417(1951) THE
MOLECULAR STRUCTURE OF METHYL ALCOHOL
163. R.O.CARLSON, C.A.LEE, AND B.P.FABRICAND, PHYS.REV.85,784-787(1951)
THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD STUDY OF THALLIUM
MONOCHLORIDE
164. G.F.CRABLE AND W.V.SMITH, J.CHEM.PHYS.19,502(1951) THE STRUCTURE
AND DIPOLE MOMENT OF SO₂ FROM MICROWAVE SPECTRA
165. G.L.CUNNINGHAM, JR., A.W.BOYD, R.J.MYERS, W.D.GWINN, AND W.F.LEVAN,
J.CHEM.PHYS.19,676-685(1951) THE MICROWAVE SPECTRA, STRUCTURE,
AND DIPOLE MOMENTS OF ETHYLENE OXIDE AND ETHYLENE SULFIDE

166. S.GESCHWIND AND R.GUNTHER-MOHR, PHYS.REV.81,882-883(1951) MICROWAVE STUDY OF GF, SI, AND S MASSES
167. R.H.HUGHES, W.E.GOOD, AND D.K.COLES, PHYS.REV.84,418-425(1951) MICROWAVE SPECTRUM OF METHYL ALCOHOL
168. F.K.HURD AND W.D.HERSCHBERGER, PHYS.REV.82,95-96(1951) MICROWAVE SPECTRUM OF METHYL MERCAPTAN
169. C.M.JOHNSON, R.TRAMBARULO, AND W.GORDY, PHYS.REV.84,1178-1180(1951) MICROWAVE SPECTROSCOPY IN THE REGION FROM TWO TO THREE MILLIMETERS. PART II.
170. P.KISLIUK AND C.H.TOWNES, PHYS.REV.83,210 (1951) NEW MICROWAVE DATA ON TRICHLORIDES OF ELEMENTS OF THE FIFTH COLUMN
171. D.R.LIDE, JR., J.CHEM.PHYS.19,1605-1606(1951) THE MICROWAVE SPECTRUM OF METHYL STANNANE
172. C.C.LOOMIS AND M.W.P.STRANDBERG, PHYS.REV.81,798-807(1951) MICROWAVE SPECTRUM OF PHOSPHINE, ARSINE, AND STILBINE
173. R.G.LUCE AND J.W.TRISCHKA, PHYS.REV.83,851-852(1951) MOLECULAR CONSTANTS OF CS(133)CL(35)
174. N.W.LUFT, DIS. FARADAY SOC.10,117-118(1951) GENERAL DISCUSSION
175. H.LYONS, L.J.RUEGER, R.G.NUCKOLLS, AND M.KESSLER, PHYS.REV.81,630-631 (1951) MICROWAVE SPECTRA OF DEUTERO-AMMONIAS
176. K.B.MCAFEE, JR., PHYS.REV.82,971(1951) MICROWAVE SPECTRUM OF NO2
177. S.L.MILLER, A.JAVAN, AND C.H.TOWNES, PHYS.REV.82,454-455(1951) THE SPIN OF O(18)
178. J.D.ROGERS, W.J.PIETENPOL, AND D.WILLIAMS, PHYS.REV.83,431-434(1951) THE MICROWAVE ABSORPTION SPECTRUM OF NITROSYL CHLORIDE NOCL
179. J.D.ROGERS AND D.WILLIAMS, PHYS.REV.82,131 (1951) MICROWAVE ABSORPTION SPECTRUM OF HYDROGEN AZIDE
180. J.D.ROGERS AND D.WILLIAMS, PHYS.REV.83,210 (1951) MICROWAVE ABSORPTION SPECTRUM OF FORMIC ACID VAPOR
181. T.F.ROGERS, PHYS.REV.83,881 (1951) FAR WING ABSORPTION OF ATMOSPHERIC SPECTRUM LINES
182. T.M.SHAW AND J.J.WINDLE, J.CHEM.PHYS.19,1063-1064(1951) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF METHYL MERCAPTAN
183. J.SHERIDAN AND W.GORDY, J.CHEM.PHYS.19,965-970(1951) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF TRIFLUOROSILANE DERIVATIVES
184. J.N.SHOOLERY, R.G.SHULMAN, AND D.M.YOST, J.CHEM.PHYS. 19,250-251(1951) DIPOLE MOMENT AND ELECTRIC QUADRUPOLE EFFECTS IN HNCO AND HNCS
185. M.H.SIRVETZ, J.CHEM.PHYS.19,938-941(1951) THE MICROWAVE SPECTRUM OF

SULFUR DIOXIDE

186. M.H.SIRVETZ, J.CHEM.PHYS.19,1609-1610(1951) THE MICROWAVE SPECTRUM OF FURAN
187. D.F.SMITH, M.TIDWELL, D.V.P.WILLIAMS, AND S.J.SENATORE, PHYS.REV.83, 485 (1951) THE MICROWAVE SPECTRUM OF CARBONYL FLUORIDE
188. R.M.TALLEY AND A.H.NIELSEN, J.CHEM.PHYS.19,805-806(1951) VIBRATION ROTATION TRANSITIONS OF C2D2 IN THE MICROWAVE REGION
189. E.AMBLE, S.L.MILLER, A.L.SCHAWLOW, AND C.H.TOWNES, J.CHEM.PHYS.20-192 (1952) MICROWAVE SPECTRUM AND STRUCTURE OF REO3CL
190. R.O.CARLSON, C.A.LEE, AND B.P.FABRICAND, PHYS.REV.85,784-787(1952) THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD STUDY OF THALLIUM MONOCHLORIDE
191. V.W.COHEN, ANN.N.Y.ACAD.SCI.55,904-914(1952) SPECTROSCOPY OF RADIOACTIVE MOLECULES
192. R.M.FRISTROM, J.CHEM.PHYS.20,1-5(1952) THE MICROWAVE SPECTRUM OF A SLIGHTLY ASPHERICAL TOP-THE STRUCTURE AND DIPOLE MOMENT OF SULFURY FLUORIDE
193. S.N.GHOSH, R.TRAMBARULO, AND W.GORDY, J.CHEM.PHYS.20,605-607(1952) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF FLUOROFORM, CHLOROFORM, AND METHYL CHLOROFORM
194. N.J.HAWKINS, V.W.COHEN, AND W.S.KOSKI, J.CHEM.PHYS.20,528(1952) THE MICROWAVE SPECTRA OF POF3 AND PSF3
195. H.J.HROSTOWSKI, R.J.MYERS, AND G.C.PIMENTEL, J.CHEM.PHYS.20,518(1952) THE MICROWAVE SPECTRA AND DIPOLE MOMENT OF STABLE PENTABORANE
196. A.JAVAN AND A.V.GROSSE, PHYS.REV.87,227 (1952) MICROWAVE SPECTRUM OF MNO3F
197. H.R.JOHNSON AND M.W.P.STRANDBERG, J.CHEM.PHYS.20,687-695(1952) THE MICROWAVE SPECTRUM OF KETENE
198. P.KISLIUK AND G.A.SILVEY, J.CHEM.PHYS.20,517(1952) THE MICROWAVE SPECTRUM OF CF3SF3
199. S.KOJIMA, K.TSUKADA, S.HAGIWARA, M.MIZUSHIMA, AND T.ITO, J.CHEM.PHYS.20, 804-808(1952) MICROWAVE SPECTRA OF CHBR3 IN THE REGION FROM 11 TO 12.5 CENTIMETERS
200. D.R.LIDE, JR., J.CHEM.PHYS.20,1812(1952) PRELIMINARY ANALYSIS OF THE PURE-ROTATIONAL SPECTRUM OF METHYL AMINE ERRATA-J.CHEM.PHYS.21, 571(1953)
201. D.R.LIDE, JR., J.AM.CHEM.SOC.74,3548-3552(1952) THE MICROWAVE SPECTRUM AND STRUCTURE OF METHYLENE FLUORIDE
202. J.T.MASSEY AND D.R.BIANCO, PHYS.REV.85,717-718 (1952) MICROWAVE ABSORPTION SPECTRUM OF H2O2
203. J.M.MAYS, ANN.N.Y.ACAD.SCI.55,787-799(1952) SPECTROSCOPIC

MEASUREMENTS ON HIGH-BOILING, REACTIVE, AND UNSTABLE MOLECULES

204. J.M.MAYS AND B.P.DAILEY, J.CHEM.PHYS.20,1695-1703(1952)
MICROWAVE SPECTRA AND STRUCTURES OF XYH_3 MOLECULES
205. S.L.MILLER, L.C.AAMODT, G.DOUSMANIS, C.H.TOWNES, AND J.KRAITCHMAN,
J.CHEM.PHYS.20,1112-1114(1952) STRUCTURE OF METHYL HALIDES
206. R.MOCKLER, J.H.BAILEY, AND W.GORDY, PHYS.REV.87,172 (1952)
MICROWAVE INVESTIGATIONS OF HSICl_3 AND CH_3SiCl_3
207. H.W.MORGAN AND J.H.GOLDSTEIN, J.CHEM.PHYS.20,1981(1952) THE MICROWAVE
SPECTRUM OF VINYLACETATE
208. A.H.NETHERCOT, J.A.KLEIN, AND C.H.TOWNES, PHYS.REV.86,798-799(1952)
THE MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF HYDROGEN CYANIDE
209. N.F.RAMSEY, PHYS.REV.87,1075-1079(1952) VIBRATIONAL AND
CENTRIFUGAL EFFECTS ON NUCLEAR INTERACTIONS AND ROTATIONAL
MOMENTS IN MOLECULES
210. A.L.SCHAWLOW, ANN.N.Y.ACAD.SCI.55,955-965(1952) SIGNIFICANCE OF THE
RESULTS OF MICROWAVE SPECTROSCOPY FOR NUCLEAR THEORY
211. J.SHERIDAN AND W.GORDY, J.CHEM.PHYS.20,591-595(1952) THE MICROWAVE
SPECTRA AND MOLECULAR STRUCTURES OF TRIFLUOROMETHYL BROMIDE, IODIDE,
AND CYANIDE
212. J.SHERIDAN AND W.GORDY, J.CHEM.PHYS.20,735-738(1952) THE MICROWAVE
SPECTRA AND MOLECULAR STRUCTURES OF METHYL BROMOACETYLENE AND
METHYL IODOACETYLENE
213. G.SILVEY, W.A.HARDY, AND C.H.TOWNES, PHYS.REV.87,236 (1952) MASSES
OF THE STABLE TELLURIUM ISOTOPES FROM THE MICROWAVE SPECTRUM OF TeCS
214. J.W.SIMMONS AND J.H.GOLDSTEIN, J.CHEM.PHYS.20,122-124(1952)
THE MICROWAVE SPECTRA OF THE DEUTERATED METHYL HALIDES
215. D.F.SMITH AND D.W.MAGNUSON, PHYS.REV.87,226-227 (1952) THE
MICROWAVE SPECTRUM OF NITRIL FLUORIDE
216. S.J.TETENBAUM, PHYS.REV.86,440-446(1952) MICROWAVE SPECTRUM OF
 BrCN AT SIX MILLIMETERS
217. S.J.TETENBAUM, PHYS.REV.88,772-774(1952) SIX-MILLIMETER SPECTRA
OF OCS AND N_2O
218. T.L.WEATHERLY AND D.WILLIAMS, J.CHEM.PHYS.20,755(1952) THE
MICROWAVE ABSORPTION SPECTRUM OF ACETONE VAPOR
219. W.S.WILCOX AND J.H.GOLDSTEIN, J.CHEM.PHYS.20,1656-1657(1952)
EVIDENCE FOR A COMPLETELY PLANAR STRUCTURE OF PYRROLE FROM ITS
MICROWAVE SPECTRUM
220. W.S.WILCOX, J.H.GOLDSTEIN, AND J.W.SIMMONS, PHYS.REV.87,172(1952)
THE MICROWAVE SPECTRUM OF VINYL CYANIDE
221. Q.WILLIAMS, J.T.COX, AND W.GORDY, J.CHEM.PHYS.20,1524-1525(1952)
MOLECULAR STRUCTURE OF BROMOFORM

222. Q.WILLIAMS, J.SHERIDAN, AND W.GORDY, J.CHEM.PHYS.20,164-167(1952)
MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF POF_3 , PSF_3 , POCL_3 ,
AND PSCL_3
223. F.ANDERSON, J.R.ANDERSEN, B.BAK, O.BASTIENSEN, E.RISBERG, AND L.SMEDVIK,
J.CHEM.PHYS.21,373(1953) ELECTRON DIFFRACTION AND MICROWAVE
INVESTIGATION OF TERTIARY BUTYL FLUORIDE
224. W.F.ARENDALE AND W.H.FLETCHER, J.CHEM.PHYS.21,1898(1953) THE
GEOMETRY OF KETENE
225. B.BAK, J.BRUHN, AND J.RAstrup-ANDERSEN, J.CHEM.PHYS.21,752-753(1953)
MICROWAVE SPECTRUM AND STRUCTURE OF SiD_3F
226. B.BAK, J.BRUHN, AND J.RAstrup-ANDERSEN, J.CHEM.PHYS.21,753-754(1953)
MICROWAVE SPECTRUM AND STRUCTURE OF SiD_3Cl
227. B.BAK AND J.RAstrup-ANDERSEN, J.CHEM.PHYS.21,1305-1306(1953)
MICROWAVE INVESTIGATION OF PYRIDINE
228. Y.BEERS AND S.WEISBAUM, PHYS.REV.91,1014(1953) AN ULTRA-HIGH
FREQUENCY ROTATIONAL LINE OF HDO
229. R.BIRD AND R.C.MOCKLER, PHYS.REV.91,222 (1953) THE MICROWAVE
SPECTRUM OF THE UNSTABLE MOLECULE CARBON MONOSULFIDE
230. G.BIRNBAUM AND A.A.MARYOTT, PHYS.REV.92,270-273(1953) CHANGE IN THE
INVERSION SPECTRUM OF ND_3 FROM RESONANT TO NONRESONANT ABSORPTION
231. C.A.BURRUS AND W.GORDY, PHYS.REV.92,1437-1439(1953) ONE-TO-TWO
MILLIMETER WAVE SPECTROSCOPY. III. NO AND DI
232. C.A.BURRUS AND W.GORDY, PHYS.REV.92,274-277(1953) ONE-TO-TWO
MILLIMETER WAVE SPECTROSCOPY. II. H_2S
233. H.D.CRAWFORD, J.CHEM.PHYS.21,2099(1953) TWO NEW LINES IN THE
MICROWAVE SPECTRUM OF HEAVY WATER
234. B.P.DAILEY, PHYS.REV.90,337-338 (1953) THE ROTATIONAL SPECTRUM AND
MOLECULAR STRUCTURE OF CYCLOPROPYL CHLORIDE
235. G.C.DOUSMANIS, T.M.SANDERS, C.H.TOWNES, AND H.J.ZEIGER, J.CHEM.PHYS.21,
1416-1417(1953) STRUCTURE OF HNCS FROM MICROWAVE SPECTRA
236. G.ERLANDSSON, ARKIV.FYSIK 6,477-478(1953) MICROWAVE SPECTRUM OF
 FLUOROBENZENE
237. G.ERLANDSSON, ARKIV FYSIK 6,69-71(1953) MEASUREMENTS OF THE
MICROWAVE SPECTRA OF METHYL ALCOHOL AND NITROMETHANE
238. G.ERLANDSSON, ARKIV FYSIK 6,491-495(1953) PRELIMINARY
ANALYSIS OF THE MICROWAVE SPECTRUM OF FORMIC ACID
239. R.C.FERGUSON AND E.B.WILSON, JR., PHYS.REV.90,338(1953) THE
MICROWAVE SPECTRUM AND STRUCTURE OF THIONYL FLUORIDE
240. A.HONIG, M.L.STITCH, AND M.MANDEL, PHYS.REV.92,901-902(1953)
MICROWAVE SPECTRA OF CSF , CSCL , AND CSBR

241. R.H.HUGHES, J.CHEM.PHYS.21,959-960(1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF OZONE
242. E.V.IVASH AND D.M.DENNISON, J.CHEM.PHYS.21,1804-1816(1953) THE METHYL ALCOHOL MOLECULE AND ITS MICROWAVE SPECTRUM
243. C.K.JEN, D.R.BIANCO, AND J.T.MASSEY, J.CHEM.PHYS.21,520-525(1953) SOME HEAVY WATER ROTATIONAL ABSORPTION LINES
244. R.D.JOHNSON, R.J.MYERS, AND W.D.GWINN, J.CHEM.PHYS.21,1425(1953) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF ETHYLENIMINE
245. W.C.KING AND W.GORDY, PHYS.REV.90,319-320(1953) ONE TO TWO MILLIMETER WAVE SPECTROSCOPY. I.
246. P.KISLIUK AND S.GESCHWIND, J.CHEM.PHYS.21,828-829(1953) THE MICROWAVE SPECTRUM OF ARSENIC TRIFLUORIDE
247. J.A.KLEIN AND A.H.NETHERCOT, PHYS.REV.91,1018(1953) MICROWAVE SPECTRUM OF DI AT 1.5 MM WAVELENGTH
248. J.H.N.LOUBSER, J.CHEM.PHYS.21,2231-2232(1953) PRELIMINARY WORK ON THE MICROWAVE SPECTRUM OF ACETIC ACID
249. K.E.MCCULLOH AND G.F.POLLNOW, J.CHEM.PHYS.21,2082(1953) MICROWAVE SPECTRUM OF PYRIDINE
250. M.MIZUSHIMA, J.CHEM.PHYS.21,1222-1224(1953) THEORY OF THE ROTATIONAL SPECTRA OF ALLENE-TYPE MOLECULES
251. M.MIZUSHIMA AND P.VENKATESWARLU, J.CHEM.PHYS.21,705-709(1953) THE POSSIBLE MICROWAVE ABSORPTION IN THE MOLECULES BELONGING TO THE POINT GROUPS $D_{2D}=VD$ AND TD
252. R.C.MOCKLER, J.H.BAILEY, AND W.GORDY, J.CHEM.PHYS.21,1710-1713(1953) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF $HSiCl_3$, CH_3SiCl_3 , AND $(CH_3)_3SiCl$
253. R.C.MOCKLER AND W.GORDY, PHYS.REV.91,222 (1953) MICROWAVE SPECTRUM OF TRIMETHYL CHLOROSILICANE
254. N.MULLER, J.AM.CHEM.SOC.75,860-863(1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF CHLOROFLUOROMETHANE
255. A.H.NETHERCOT AND A.JAVAN, J.CHEM.PHYS.21,363-364(1953) THE MICROWAVE SPECTRUM OF $C_8H_{13}Br$ AND $C_8H_{13}Cl$
256. H.H.NIELSEN, J.CHEM.PHYS.21,142-144(1953) THE INFRARED SPECTRA AND THE MOLECULAR STRUCTURE OF PYRAMIDAL MOLECULES
257. R.G.NUCKOLLS, L.J.RUEGER, AND H.LYONS, PHYS.REV.89,1101(1953) MICROWAVE ABSORPTION SPECTRUM OF ND_3
258. D.W.POSENER AND M.W.P.STRANDBERG, J.CHEM.PHYS.21,1401-1402(1953) MICROWAVE SPECTRUM OF HDO
259. G.W.ROBINSON, J.CHEM.PHYS.21,1741-1745(1953) THE MICROWAVE SPECTRUM OF PHOSGENE

260. A.H. SHARBAUGH, G.A. HEATH, L.P. THOMAS, AND J. SHERIDAN, NATURE 171, 87 (1953) MICROWAVE SPECTRUM AND STRUCTURE OF IODOSILANE
261. K. SHIMODA AND T. NISHIKAWA, J. PHYS. SOC. JAPAN 8, 133-134 (1953) MICROWAVE SPECTRUM OF METHYLAMINE
262. K. SHIMODA AND T. NISHIKAWA, J. PHYS. SOC. JAPAN 8, 425-426 (1953) MICROWAVE SPECTRUM OF METHYLAMINE
263. M.E. SIRVETZ AND R.E. WESTON, J. CHEM. PHYS. 21, 898-902 (1953) THE STRUCTURE OF PHOSPHINE
264. D.F. SMITH, J. CHEM. PHYS. 21, 609-614 (1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF CHLORINE TRIFLUORIDE
265. N. SOLIMENE AND B.P. DAILEY, PHYS. REV. 91, 464 (1953) THE ROTATIONAL SPECTRUM AND MOLECULAR STRUCTURE OF METHYL MERCAPTAN
266. T.E. TURNER, V.C. FIORA, W.M. KENDRICK, AND B.L. HICKS, J. CHEM. PHYS. 21, 564-565 (1953) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF ETHYLENIMINE
267. P. VENKATESWARLU, R.C. MOCKLER, AND W. GORDY, J. CHEM. PHYS. 21, 1713-1715 (1953) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF TRICHLOROGERMANE
268. S. WEISBAUM, Y. BEERS, AND G. HERRMANN, PHYS. REV. 90, 338 (1953) S-BAND SPECTRUM OF HDO
269. W.S. WILCOX, K.C. BRANNOCK, W. DEMORE, AND J.H. GOLDSTEIN, J. CHEM. PHYS. 21, 563-564 (1953) THE MICROWAVE SPECTRUM AND GENERAL PROPERTIES OF ETHYLENE IMINE
270. B. BAK, L. HANSEN, AND J. RASTRUP-ANDERSEN, J. CHEM. PHYS. 22, 565 (1954) MICROWAVE SPECTRUM OF PYRIDINE
271. B. BAK, L. HANSEN, AND J. RASTRUP-ANDERSEN, J. CHEM. PHYS. 22, 2013-2017 (1954) MICROWAVE DETERMINATION OF THE STRUCTURE OF PYRIDINE
272. C.A. BURRUS AND W. GORDY, PHYS. REV. 93, 897-898 (1954) SUBMILLIMETER WAVE SPECTROSCOPY
273. C.A. BURRUS, A. JACHE, AND W. GORDY, PHYS. REV. 95, 706-708 (1954) ONE-TO-TWO MILLIMETER WAVE SPECTROSCOPY. V. PH₃ AND PD₃
274. C.D. CORNWELL AND R.L. POYNTER, J. CHEM. PHYS. 22, 1257 (1954) THE MICROWAVE SPECTRUM OF VINYL IODIDE
275. B.B. DEMORE, W.S. WILCOX, AND J.H. GOLDSTEIN, J. CHEM. PHYS. 22, 876-880 (1954) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF PYRIDINE
276. G. ERLANDSSON, ARKIV FYSIK 7, 189-192 (1954) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF FLUOROBENZENE
277. G. ERLANDSSON, J. CHEM. PHYS. 22, 563-564 (1954) MICROWAVE SPECTRUM OF CYCLOPENTANONE
278. G. ERLANDSSON, ARKIV FYSIK 8, 341-342 (1954) MICROWAVE SPECTRUM OF CHLOROBENZENE

279. G.ERLANDSSON,J.CHEM.PHYS.22,1152(1954) MICROWAVE SPECTRUM OF BENZONITRILE
280. R.C.FERGUSON,J.AM.CHEM.SOC.76,850-853(1954) THE MICROWAVE SPECTRUM ,STRUCTURE,AND DIPOLE MOMENT OF THIONYL FLUORIDE
281. W.GORDY,J.PHYS.RADIUM 15,521-523(1954) SPECTROSCOPY FROM 1 TO 5 MM WAVELENGTH
282. W.GORDY AND C.A.BURRUS,PHYS.REV.93,419-420(1954) SPECTRUM OF DBR IN THE ONE-MILLIMETER WAVE REGION
283. W.GORDY AND J.SHERIDAN,J.CHEM.PHYS.22,92-95(1954) MICROWAVE SPECTRA AND STRUCTURES OF METHYL MERCURY CHLORIDE AND BROMIDE
284. G.R.GUNTHER-MOHR,R.L.WHITE,A.L.SCHAWLOW,W.E.GOOD,AND D.K.COLES, PHYS.REV.94,1184-1191(1954) HYPERFINE STRUCTURE IN THE SPECTRUM OF N(14)H3. I. EXPERIMENTAL RESULTS
285. R.C.GUNTON,J.F.OLLOM,AND H.N.REXROAD,J.CHEM.PHYS.22,1942(1954) THE MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF (CH3)3SIF
286. W.A.HARDY AND G.SILVEY,PHYS.REV.95,385-388(1954) MICROWAVE SPECTRUM OF TECS AND MASSES OF THE STABLE TELLURIUM ISOTOPES
287. G.A.HEATH,L.F.THOMAS,AND J.SHERIDAN,TRANS.FARADAY SOC.50,779-783 (1954) THE STRUCTURE OF TRIFLUOROSILANE FROM MICROWAVE SPECTRA
288. A.HONIG,M.MANDEL,M.L.STITCH,AND C.H.TOWNES,PHYS.REV.96,629-642(1954) MICROWAVE SPECTRA OF THE ALKALI HALIDES
289. H.J.HROSTOWSKI AND R.J.MYERS,J.CHEM.PHYS.22,262-265(1954) THE MICROWAVE SPECTRA,STRUCTURE,AND DIPOLE MOMENT OF STABLE PENTABORANE
290. A.JACHE,G.BLEVINS,AND W.GORDY,PHYS.REV.95,299 (1954) MILLIMETER WAVE SPECTRUM OF ARSINE
291. A.JAVAN AND A.ENGELBRECHT,PHYS.REV.96,649-658(1954) MICROWAVE ABSORPTION SPECTRA OF MNO3F AND REO3CL
292. P.KISLIUK,J.CHEM.PHYS.22,86-92(1954) DIPOLE MOMENTS,NUCLEAR QUADRUPOLE COUPLINGS, AND THE BONDING ORBITALS IN GROUP V- TRIHALIDES
293. S.KOJIMA AND K.TSUKADA,J.CHEM.PHYS.22,2093-2094(1954) ON THE INTERPRETATION OF THE SPECTRUM OF BROMOFORM
294. J.A.KRAITCHMAN AND B.P.DAILEY,PHYS.REV.94,788 (1954) THE MICROWAVE SPECTRUM OF ETHYL FLUORIDE
295. D.R.LIDE,JR.,J.CHEM.PHYS.22,1577-1578(1954) MICROWAVE SPECTRUM AND STRUCTURE OF BENZONITRILE
296. R.J.LOVELL AND E.A.JONES,PHYS.REV.95,300 (1954) POTENTIAL CONSTANTS FOR CARBONYL FLUORIDE
297. J.F.LOTSPEICH,A.JAVAN,AND A.ENGELBRECHT,PHYS.REV.94,789 (1954)

THE MICROWAVE SPECTRUM OF REO3F

298. J.T.MASSEY,C.I.BEARD,AND C.K.JEN,PHYS.REV.95,622 (1954)
A MICROWAVE SPECTRAL SERIES OF DEUTERATED HYDROGEN PEROXIDE
299. J.T.MASSEY AND D.R.BIANCO,J.CHEM.PHYS.22,442-448(1954) THE
MICROWAVE SPECTRUM OF HYDROGEN PEROXIDE
300. M.MATRICON AND BONNET,J.PHYS.RADIUM 15,647-648(1954) SPECTRUM OF
ETHYLAMINE
301. K.E.MCCULLOH AND G.F.POLLNOW,J.CHEM.PHYS.22,681-682(1954) AN
INVESTIGATION OF THE MICROWAVE SPECTRUM OF PYRIDINE
302. M.PETER AND M.W.P.STRANDBERG,PHYS.REV.95,622 (1954) MICROWAVE
SPECTRUM OF OCS
303. J.SHERIDAN AND L.F.THOMAS,NATURE 174,798(1954) MICROWAVE SPECTRUM OF
METHYLCYANOACETYLENE
304. K.SHIMODA,T.NISHIKAWA,AND T.ITOH,J.PHYS.SOC.JAPAN 9,974-991(1954)
MICROWAVE SPECTRUM OF METHYLAMINE
305. G.R.SLAYTON,J.W.SIMMONS,AND J.H.GOLDSTEIN,J.CHEM.PHYS.22,1678-1679
(1954) MICROWAVE SPECTRUM AND PROPERTIES OF VINYLENE CARBONATE
306. N.SOLIMENE AND B.P.DAILEY,J.CHEM.PHYS.22,2042-2044(1954)
MICROWAVE SPECTRUM OF 1,1 DIFLUOROETHANE
307. F.STERZER,J.CHEM.PHYS.22,2094(1954) J=0-1 ROTATIONAL TRANSITION OF
TRIFLUOROIODOMETHANE
ERRATUM- J.CHEM.PHYS.23,762(1955)
308. R.TRAMBARULO AND P.M.MOSER,J.CHEM.PHYS.22,1622-1623(1954)
MICROWAVE SPECTRUM OF FORMIC ACID
309. R.S.WAGNER AND B.P.DAILEY,J.CHEM.PHYS.22,1459(1954) MICROWAVE
SPECTRUM OF ETHYL CHLORIDE
310. W.S.WILCOX,J.H.GOLDSTEIN, AND J.W.SIMMONS,J.CHEM.PHYS.22,516-518
(1954) THE MICROWAVE SPECTRUM OF VINYL CYANIDE
311. B.BAK,L.HANSEN,AND J.RAstrup-ANDERSEN,DIS.FARADAY SOC.19,30-38
(1955) MICROWAVE SPECTRA OF DEUTERATED FURANS-STRUCTURE OF THE
FURAN MOLECULE
312. A.I.BARCHUKOV,T.M.MINAEVA,AND A.M.PROKHOROV,ZHUR.EKSPTL.I
TEORET.FIZ.29,892(1955) MICROWAVE ROTATION SPECTRUM OF THE ETHYL
CHLORIDE,C2H5CL,MOLECULE
313. A.H.BARRETT AND M.MANDEL,PHYS.REV.99,666 (1955) MICROWAVE
SPECTRA OF INDIUM CHLORIDE AND BROMIDE
314. N.G.BASOV AND A.M.PROKHOROV,ZHUR.EKSPTL.I TEORET.FIZ.28,249-250
(1955) POSSIBLE METHOD FOR OBTAINING ACTIVE MOLECULES FOR A
MOLECULAR GENERATOR
315. G.S.BLEVINS,A.W.JACHE,AND W.GORDY,PHYS.REV.97,684-686(1955)
MILLIMETER WAVE SPECTRA OF ASH3 AND ASD3

316. J.H.BURKHALTER, J.CHEM.PHYS.23,1172(1955) MICROWAVE SPECTRUM OF CYCLOPENTANONE
317. C.A.BURRUS, JR. AND W.GORDY, PHYS.REV.97,1661-1664(1955) ONE-TO-TWO MILLIMETER WAVE SPECTRA OF TCL AND TBR
318. C.C.COSTAIN, J.CHEM.PHYS.23,2037-2041(1955) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF METHYL-CHLOROACETYLENE
319. J.T.COX, T.GAUMANN, AND W.J.O.THOMAS, DIS.FARADAY SOC.19,52-55(1955) MILLIMETER WAVE SPECTRUM OF METHYL MERCURY CHLORIDE
320. G.ERLANDSSON, ARKIV FYSIK 9,341-343(1955) MICROWAVE SPECTRUM OF CYCLOPENTENE OXIDE
321. J.FINE, J.H.GOLDSTEIN, AND J.W.SIMMONS, J.CHEM.PHYS.23,601(1955) MICROWAVE SPECTRUM OF S-TRANS-ACROLEIN
322. J.P.FRIEND, R.F.SCHNEIDER, AND B.P.DAILEY, J.CHEM.PHYS.23,1557(1955) MICROWAVE SPECTRUM OF CYCLOPROPYL CHLORIDE
323. J.J.GALLAGHER, W.C.KING, AND AND C.M.JOHNSON, PHYS.REV.98,1551(1955) THE MICROWAVE SPECTRUM OF N(15)O(16)
324. E.K.GORA, PHYS.REV.99,666(1955) MICROWAVE SPECTRUM OF THE OZONE MOLECULE
325. G.A.HEATH, L.F.THOMAS, E.I.SHERRARD, AND J.SHERIDAN, DIS.FARADAY SOC.19, 38-43(1955) THE MICROWAVE SPECTRUM AND STRUCTURE OF METHYL DIACETYLENE
326. J.A.HOWE AND J.H.GOLDSTEIN, J.CHEM.PHYS.23,1223-1225(1955) MICROWAVE SPECTRUM OF PROPIOLIC ALDEHYDE
327. T.ITO, J.PHYS.SOC.JAPAN 10,56-59(1955) MICROWAVE SPECTRUM OF SPCL3, THEORETICAL
328. A.W.JACHE, G.S.BLEVINS, AND W.GORDY, PHYS.REV.97,680-683(1955) MILLIMETER WAVE SPECTRA OF SBH3 AND SBD3
329. T.KOJIMA AND T.NISHIKAWA, J.PHYS.SOC.JAPAN 10,240-241(1955) MICROWAVE SPECTRUM OF METHYL MERCAPTAN I.
330. J.KRAITCHMAN AND B.P.DAILEY, J.CHEM.PHYS.23,184-190(1955) THE MICROWAVE SPECTRUM OF ETHYL FLUORIDE
331. R.J.KURLAND, J.CHEM.PHYS.23,2202-2203(1955) MICROWAVE SPECTRUM AND PLANARITY OF FORMAMIDE
332. N.KWAK, J.W.SIMMONS, AND J.H.GOLDSTEIN, J.CHEM.PHYS.23,2450(1955) MICROWAVE SPECTRUM OF PROPIOLACTONE
333. R.G.LERNER, J.P.FRIEND, AND B.P.DAILEY, J.CHEM.PHYS.23,210(1955) STRUCTURE AND BARRIER TO INTERNAL ROTATION OF FORMIC ACID FROM MICROWAVE DATA
334. M.MANDEL AND A.H.BARRETT, PHYS.REV.98,1159(1955) PURE ROTATION SPECTRA OF THE THALLIUM HALIDES

335. A.A.MARYOTT AND G.BIRNBAUM, PHYS. REV. 99, 1886 (1955) MICROWAVE ABSORPTION IN COMPRESSED OXYGEN
336. D.J.MILLEN AND K.M.SINNOTT, CHEMISTRY AND INDUSTRY 1955, 538 (1955) THE MICROWAVE SPECTRUM AND STRUCTURE OF NITRYL CHLORIDE
337. R.C.MOCKLER AND G.R.BIRD, PHYS. REV. 98, 1837-1839 (1955) MICROWAVE SPECTRUM OF CARBON MONOSULFIDE
338. Y.MORINO AND E.HIROTA, J.CHEM.PHYS. 23, 737-747 (1955) MEAN AMPLITUDES OF THERMAL VIBRATIONS IN POLYATOMIC MOLECULES. III. THE GENERALIZED MEAN AMPLITUDES
339. T.NISHIKAWA, T.ITOH, AND K.SHIMODA, J.CHEM.PHYS. 23, 1735-1736 (1955) MOLECULAR STRUCTURE OF METHYLAMINE FROM ITS MICROWAVE SPECTRUM
340. D.W.POSENER, J.CHEM.PHYS. 23, 1728-1729 (1955) NOTE ON THE X-BAND MICROWAVE SPECTRUM OF HEAVY WATER
341. B.ROSENBLUM AND A.H.NETHERCOT, JR., PHYS. REV. 97, 84-85 (1955) MICROWAVE SPECTRA OF TRITIUM IODIDE AND TRITIUM BROMIDE
342. N.SOLIMENE AND B.P.DAILEY, J.CHEM.PHYS. 23, 124-129 (1955) STRUCTURE AND BARRIER HEIGHT OF METHYL MERCAPTAN FROM MICROWAVE DATA
343. L.F.THOMAS, E.I.SHERRARD, AND J.SHERIDAN, TRANS.FARADAY SOC. 51, 619-625 (1955) MICROWAVE SPECTRA OF SOME PARTIALLY DEUTERIATED METHYL DERIVATIVES. I. METHYL CYANIDE AND METHYL ACETYLENE
344. K.TSUKADA, J.PHYS.SOC.JAPAN 10, 60-64 (1955) MICROWAVE SPECTRA OF SPCL_3 , EXPERIMENTAL
345. T.E.TURNER, V.C.FIORA, AND W.M.KENDRICK, J.CHEM.PHYS. 23, 1966 (1955) MICROWAVE SPECTRUM OF IMINE-DEUTERIATED ETHYLENIMINE
346. P.VENKATESWARLU, H.D.EDWARDS, AND W.GORDY, J.CHEM.PHYS. 23, 1195-1199 (1955) METHYL ALCOHOL I. MICROWAVE SPECTRUM
347. P.VENKATESWARLU, H.D.EDWARDS, AND W.GORDY, J.CHEM.PHYS. 23, 1200-1202 (1955) METHYL ALCOHOL. II. MOLECULAR STRUCTURE
348. R.S.WAGNER, N.SOLIMENE, AND B.P.DAILEY, J.CHEM.PHYS. 23, 599 (1955) MICROWAVE SPECTRUM OF ETHYL BROMIDE
349. S.WEISBAUM, Y.BEERS, AND G.HERRMANN, J.CHEM.PHYS. 23, 1601-1605 (1955) LOW FREQUENCY ROTATIONAL SPECTRUM OF H_2O
350. Q.WILLIAMS AND T.L.WEATHERLY, PHYS. REV. 98, 1159 (1955) THE MICROWAVE SPECTRUM OF NITROSYL BROMIDE
351. F.A.ANDERSEN, B.BAK, AND S.BRODERSEN, J.CHEM.PHYS. 24, 989-992 (1956) NORMAL VIBRATION FREQUENCIES OF CD_3F . STRUCTURE OF CH_3F AND CD_3F FROM INFRARED AND MICROWAVE SPECTRA
352. B.BAK, D.CHRISTENSEN, L.HANSEN, AND J.RAstrup-ANDERSEN, J.CHEM.PHYS. 24, 720-725 (1956) MICROWAVE DETERMINATION OF THE STRUCTURE OF PYRROLE
353. B.BAK, D.CHRISTENSEN, J.RAstrup-ANDERSEN, AND E.TANNENBAUM, J.CHEM.

PHYS. 25, 892-896 (1956) MICROWAVE SPECTRA OF THIOPHENE, 2- AND 3-MONODEUTERIC, 2,3-DIDEUTERO, AND TETRADEUTERIO THIOPHENE. STRUCTURE OF THE THIOPHENE MOLECULE

354. A.I. BARCHUKOV, T.M. MINAEVA, AND A.M. PROKHOROV, SOVIET PHYS. JETP 2, 760 (1956) MICROWAVE ROTATION SPECTRUM OF THE ETHYL CHLORIDE MOLECULE
355. G.R. BIRD, J. CHEM. PHYS. 25, 1040-1043 (1956) MICROWAVE SPECTRUM OF NO₂ - A RIGID ROTOR ANALYSIS
356. G. ERLANDSSON, J. CHEM. PHYS. 25, 379 (1956) MILLIMETER WAVE SPECTRUM OF FORMIC ACID
357. G. ERLANDSSON, J. CHEM. PHYS. 25, 579-580 (1956) MILLIMETER WAVE SPECTRUM OF FORMALDEHYDE
358. G. ERLANDSSON AND J. COX, J. CHEM. PHYS. 25, 778-779 (1956) MILLIMETER WAVE LINES OF HEAVY WATER
359. H.G. FITZKY AND H. HAPP, Z. NATURFORSCH 11A, 957-958 (1956) THE MICROWAVE SPECTRUM OF METHYL ALCOHOL
360. H. HIRAKAWA, A. MIYAHARA, AND K. SHIMODA, J. PHYS. SOC. JAPAN 11, 334-335 (1956) MICROWAVE SPECTRA OF FORMALDEHYDE AND METHYL AMINE IN THE SUPERHIGH-FREQUENCY REGION
361. H. HIRAKAWA, T. OKA, AND K. SHIMODA, J. PHYS. SOC. JAPAN 11, 1207 (1956) MICROWAVE SPECTRA OF HCHO-D₁, D₂
362. R.H. HUGHES, J. CHEM. PHYS. 24, 131-138 (1956) STRUCTURE OF OZONE FROM THE MICROWAVE SPECTRUM BETWEEN 9000 AND 45000 MC/SEC
363. A.W. JACHE, P.W. MOSER, AND W. GORDY, J. CHEM. PHYS. 25, 209-210 (1956) MILLIMETER WAVE SPECTRUM, MOLECULAR STRUCTURE, AND DIPOLE MOMENT OF HYDROGEN SELENIDE
364. N. KWAK, J.H. GOLDSTEIN, AND J.W. SIMMONS, J. CHEM. PHYS. 25, 1203-1205 (1956) MICROWAVE SPECTRUM OF BETA-PROPIOLACTONE
365. V.W. LAURIE, J. CHEM. PHYS. 24, 635-636 (1956) MICROWAVE SPECTRUM AND AND DIPOLE MOMENT OF CYCLOPENTADIENE
366. A.A. MARYOTT AND G. BIRNBAUM, J. CHEM. PHYS. 24, 1022-1026 (1956) MICROWAVE ABSORPTION IN COMPRESSED GASES-SATURATED HYDROCARBONS
367. D.J. MILLEN AND J.R. MORTON, CHEMISTRY AND INDUSTRY 1956, 954 (1956) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF NITRIC ACID
368. A. OKAYA, J. PHYS. SOC. JAPAN 11, 258-263 (1956) MICROWAVE HYPERFINE SPECTRUM OF FORMALDEHYDE
369. J.F. OLLOM, A.A. SINISGALLI, H.N. REXROAD, AND R.C. GUNTON, J. CHEM. PHYS. 24, 487-488 (1956) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF (CH₃)₃SiBr
370. H.N. REXROAD, D.W. HOWGATE, R.C. GUNTON, AND J.F. OLLOM, J. CHEM. PHYS. 24, 625 (1956) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF (CH₃)₃SiI

371. P. SWARUP, Z. PHYSIK 144, 632-636 (1956) ABSORPTION AND DISPERSION OF MICROWAVES IN METHYL BROMIDE
372. P. SWARUP, PHYS. REV. 104, 89-90 (1956) DISPERSION OF MICROWAVES IN ND₃
373. V. G. VESELAGO AND A. M. PROKHOROV, ZHUR. EKSP. I. TEORET. FIZ. 31, 731 (1956) THE HDSE MICROWAVE SPECTRUM
374. T. L. WEATHERLY AND G. WILLIAMS, J. CHEM. PHYS. 25, 717-721 (1956) MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF NITROSYL BROMIDE
375. R. WERTHEIMER, COMPT. REND. 242, 243-244 (1956) ABSORPTION SPECTRUM OF FORMIC ACID VAPOR IN THE VICINITY OF 3 MM.
376. R. WERTHEIMER, ARCH. SCI. (GENEVA) 9, 47-48 (1956) ABSORPTION SPECTRUM OF FORMIC ACID VAPOR BETWEEN THE WAVELENGTHS OF 4.5 AND 2.5 MM
377. R. WERTHEIMER, COMPT. REND. 242, 1591-1593 (1956) THE ROTATIONAL SPECTRUM AND INERTIAL CONSTANTS OF THE FORMIC ACID MOLECULE
378. P. N. WOLFE, J. CHEM. PHYS. 25, 976-981 (1956) MICROWAVE SPECTRUM OF CHLOROFORM
379. L. YARMUS, PHYS. REV. 104, 365-367 (1956) HYPERFINE STRUCTURE IN THE L-TYPE DOUBLING SPECTRUM OF HYDROGEN CYANIDE
380. W. ZEIL, Z. ELEKTROCHEM. 60, 752-755 (1956) THE MICROWAVE SPECTRUM OF TRICHLOROACETONITRILE AND OF 1,1,1-TRICHLOROETHANE FROM 23,500 TO 25,500 MC
ERRATA-Z. ELEKTROCHEM. 60, 1204 (1956)
381. W. ZEIL, Z. NATURFORSCH 11A, 677-678 (1956) THE MICROWAVE SPECTRUM OF 1,1,1-TRICHLOROETHANE
382. B. BAK, D. CHRISTENSEN, L. HANSEN-NYGAARD, AND E. TANNENBAUM, J. CHEM. PHYS. 26, 134-137 (1957) MICROWAVE DETERMINATION OF THE STRUCTURE OF FLUOROBENZENE
383. B. BAK, D. CHRISTENSEN, L. HANSEN-NYGAARD, AND E. TANNENBAUM, J. CHEM. PHYS. 26, 241-243 (1957) MICROWAVE DETERMINATION OF THE STRUCTURE OF TRIFLUOROBUTYNE
384. J. G. BAKER, D. R. JENKINS, C. N. KENNEY, AND T. M. SUGDEN, TRANS. FARADAY SOC. 53, 1397-1401 (1957) MICROWAVE SPECTRUM AND STRUCTURE OF TRICHLOROACETONITRILE
385. H. H. BLAU, JR. AND H. H. NIELSEN, J. MOL. SPECTRY. 1, 124-132 (1957) INFRARED ABSORPTION SPECTRUM OF FORMALDEHYDE VAPOR
386. C. A. BURRUS AND W. GORDY, J. CHEM. PHYS. 26, 391-394 (1957) SPECTRA OF SOME SYMMETRIC TOP MOLECULES IN THE ONE-TO -FOUR MILLIMETER WAVE REGION
387. W. F. EDGELL, P. A. KINSEY, AND J. W. AMY, J. AM. CHEM. SOC. 79, 2691-2693 (1957) THE MICROWAVE SPECTRA AND STRUCTURE OF CF₂=CH₂, CF₂=CHD, AND CF₂=CD₂
388. W. F. EDGELL, G. B. MILLER, AND J. W. AMY, J. AM. CHEM. SOC. 79, 2391-2393 (1957) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURE OF 1,1,1-TRIFLUOROETHANE AND ITS MONO-, DI-, AND TRIDEUTERO DERIVATIVES

389. P.GOEDEERTIER AND K.L.LEE, ANN.SOC.SCI.BRUXELLES 71,128-133(1957)
PURE ROTATION SPECTRA OF LIGHT AND HEAVY VINYL BROMIDE BY MICROWAVE METHOD
390. P.GOEDEERTIER AND K.L.LEE, ANN.SOC.SCI.BRUXELLES 71,184-188(1957)
PURE ROTATION SPECTRA OF VINYL BROMIDE
391. H.HAPP,Z.PHYSIK 147,567-572(1957) MICROWAVE SPECTRUM OF
THALLIUM(I) IODIDE AND BISMUTH CHLORIDE IN THE 3 CM AND 1.5 CM BAND
392. T.KOJIMA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 12,680-686(1957)
POTENTIAL BARRIER AND MOLECULAR STRUCTURE OF METHYL MERCAPTAN
FROM ITS MICROWAVE SPECTRA
393. KRISHNAJI AND G.P.SRIVASTAVA,PHYS.REV.106,1186-1189(1957)
MICROWAVE ABSORPTION IN ETHYL CHLORIDE
394. R.J.KURLAND AND E.B.WILSON,JR.,J.CHEM.PHYS.27,585-590(1957)
MICROWAVE SPECTRUM,STRUCTURE,DIPOLE MOMENT,AND QUADRUPOLE COUPLING
CONSTANTS OF FORMAMIDE
395. V.W.LAURIE,J.CHEM.PHYS.26,1359-1362(1957) MICROWAVE SPECTRUM,
DIPOLE MOMENT,AND STRUCTURE OF DIFLUOROSILANE
396. R.G.LERNER AND B.P.DAILEY,J.CHEM.PHYS.26,678-680(1957) MICROWAVE
SPECTRUM AND STRUCTURE OF PROPIONITRILE
397. R.G.LERNER ,B.P.DAILEY,AND J.P.FRIEND,J.CHEM.PHYS.26,680-683(1957)
MICROWAVE SPECTRUM AND STRUCTURE OF FORMIC ACID
398. D.R.LIDE,JR.,D.E.MANN, AND R.M.FRISTROM,J.CHEM.PHYS.26,734-739(1957)
MICROWAVE SPECTRUM AND STRUCTURE OF SULFURYL FLUORIDE
399. D.W.MAGNUSON,J.CHEM.PHYS.27,223-226(1957) MICROWAVE SPECTRUM AND
MOLECULAR STRUCTURE OF BROMINE TRIFLUORIDE
400. K.MATSUURA,Y.SUGIURA,AND G.M.HATOYAMA,PHYS.REV.106,607(1957)
FREQUENCY OF THE AMMONIA (3,3) LINE
401. I.A.MUKHTAROV,SOVIET PHYSICS-DOKLADY-2,357-358(1957) MICROWAVE
SPECTRA OF 1,2-FLUOROCHLOROETHANE
402. B.D.OSIPOV,OPTIKA I SPEKTROSKOPIYA 3,94-95(1957) HYPERFINE
STRUCTURE OF ROTATIONAL TRANSITION $J=3 \rightarrow 4$ OF THE MEI(127) MOLECULE
403. E.D.PALIK AND E.F.BELL,J.CHEM.PHYS.26,1093-1101(1957) PURE
ROTATIONAL SPECTRA OF THE PARTIALLY DEUTERATED AMMONIAS IN THE
FAR INFRARED SPECTRAL REGION
404. S.SEKINO AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 12,43-48(1957) MICROWAVE
SPECTRUM OF VINYLIDENE CHLORIDE
405. H.SELÉN,ARKIV. FYSIK 13,81-83(1957) MICROWAVE SPECTRUM OF
CHLOROBENZENE
406. K.SHIMODA,J.PHYS.SOC.JAPAN 12,558(1957) PRECISE FREQUENCY OF THE
3,3 INVERSION LINE OF NH_3

407. T.SPARSTAD AND E.AMBLE,J.CHEM.PHYS.27,317(1957) MICROWAVE SPECTRUM AND STRUCTURE OF $(CH_3)_3CCN$
408. L.F.THOMAS,J.S.HEFKS,AND J.SHERIDAN,Z.ELEKTROCHEM.61,935-937(1957) MICROWAVE SPECTRA OF SOME MOLECULES CONTAINING $-CF_3$ AND SIF_3 GROUPS
409. V.G.VESELAGO AND A.M.PROKHOROV,SOVIET PHYS.JETP 4,751(1957) THE HDSE MICROWAVE SPECTRUM
410. R.S.WAGNER AND B.P.DAILEY,J.CHEM.PHYS.26,1588-1593(1957) MICROWAVE SPECTRUM OF ETHYL CHLORIDE
411. R.S.WAGNER,B.P.DAILEY,AND N.SOLIMENE,J.CHEM.PHYS.26,1593-1596(1957) MICROWAVE SPECTRUM OF ETHYL BROMIDE
412. R.WAGNER,J.FINE,J.W.SIMMONS,AND J.H.GOLDSTEIN,J.CHEM.PHYS.26, 634-637(1957) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF S-TRANS-ACROLEIN
413. R.WERTHEIMER,ARCH.SCI.(GENEVA)10,184-186(1957) MOLECULAR CONSTANTS OF FORMIC ACID FROM THE ROTATIONAL SPECTRUM
414. R.WERTHEIMER AND M.CLOUARD,COMPT.REND.245,1793-1794(1957) ABSORPTION OF SULFURIC ANHYDRIDE(SO_2) IN THE MILLIMETER WAVE REGION
415. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND J.RAstrup-ANDERSEN, SPECTROCHIM.ACTA 13,120-124(1958) THE STRUCTURE OF VINYL FLUORIDE
416. B.BAK,L.HANSEN-NYGAARD,AND J.RAstrup-ANDERSEN,J.MOL.SPECTRY.2,54-57 (1958) THE STRUCTURE OF TERTIARY BUTYL ISOCYANIDE
417. B.BAK,L.HANSEN-NYGAARD,AND J.RAstrup-ANDERSEN,J.MOL.SPECTRY.2, 361-368(1958) COMPLETE DETERMINATION OF THE STRUCTURE OF PYRIDINE BY MICROWAVE SPECTRA
418. A.I.BARCHUKOV AND N.G.BASOV,OPTIKA I SPEKTROSKOPIYA 4,532(1958) FREQUENCIES AND INTENSITIES OF HYPERFINE STRUCTURE LINES OF CH_3I (THE TRANSITION $I=0-1$)
419. A.I.BARCHUKOV,T.M.MURINE,AND A.M.PROKHOROV,OPTIKA I SPEKTROSKOPIYA 4,521-523(1958) MICROWAVE SPECTRUM AND ROTATION CONSTANTS OF ETHYL CHLORIDE MOLECULE
420. A.I.BARCHUKOV AND A.M.PROKHOROV,OPTIKA I SPEKTROSKOPIYA 5,530-534 (1958) QUADRUPOLE BOND,DIPOLE MOMENT,AND THE INTERNAL ROTATION BARRIER IN THE CH_3GEH_3 MOLECULE,DETERMINED FROM ITS ROTATIONAL SPECTRUM
421. A.I.BARCHUKOV AND A.M.PROKHOROV,OPTIKA I SPEKTROSKOPIYA 4,799(1958) MICROWAVE SPECTRUM OF CH_3GEH_3
422. A.H.BARRETT AND M.MANDEL,PHYS.REV.109,1572-1589(1958) MICROWAVE SPECTRA OF THALLIUM,INDIUM,AND GALLIUM MONOHALIDES
423. M.COWAN AND W.GORDY,PHYS.REV.111,209-211(1958) PRECISION MEASUREMENTS OF MILLIMETER AND SUBMILLIMETER WAVE SPECTRA-DEUTERIUM CHLORIDE ,DEUTERIUM BROMIDE,AND DEUTERIUM IODIDE

424. A.P.COX,L.F.THOMAS,AND J.SHERIDAN,NATURE 181,1000-1001(1958)
MICROWAVE SPECTRA OF DIAZOMETHANE AND ITS DEUTERIO DERIVATIVES
425. A.P.COX,L.F.THOMAS,AND J.SHERIDAN,NATURE 181,1157-1158(1958)
MICROWAVE SPECTRUM OF NICKEL CYCLOPENTADIENYL NITROSYL AND THE
CONFIGURATION OF THE MOLECULE
426. C.W.N.CUMPER,TRANS.FARADAY SOC.54,1266-1270(1958) STRUCTURE OF
SOME HETEROCYCLIC MOLECULES
427. G.ERLANDSSON,J.CHEM.PHYS.28,71-75(1958) MILLIMETER WAVE SPECTRUM
OF FORMIC ACID
428. G.ERLANDSSON AND H.SELEN,ARKIV FYSIK 14,61-64(1958) DIPOLE MOMENT
OF FORMIC ACID
429. J.P.FRIEND AND B.P.DAILEY,J.CHEM.PHYS.29,577-582(1958) MICROWAVE
STUDIES OF THE STRUCTURE OF CYCLOPROPYL DERIVATIVES
430. H.G.FRITZKY,Z.PHYSIK 151,351-364(1958) THE MICROWAVE
ROTATION SPECTRUM OF THALLIUM(I) HALIDES
431. E.HIROTA,J.CHEM.PHYS.28,839-846(1958) ROTATIONAL STRUCTURE OF THE
INFRARED ABSORPTION SPECTRUM OF HYDROGEN PEROXIDE VAPOR
432. E.HIROTA,T.OKA,AND Y.MORINO,J.CHEM.PHYS.29,444-445(1958)
MICROWAVE SPECTRUM,STRUCTURE,DIPOLE MOMENT,AND QUADRUPOLE COUPLING
CONSTANT OF PROPARGYL CHLORIDE
433. N.A.IRISOVA,IZVEST.AKAD.NAUK.SSSR.SER.FIZ. 22,1307(1958)
DETERMINATION OF ROTATIONAL CONSTANTS OF CH₃GECL₃ FROM ITS SUPER-HIGH
FREQUENCY ABSORPTION SPECTRUM
434. T.KOJIMA,H.HIRAKAWA,AND T.OKA,J.PHYS.SOC.JAPAN 13,321(1958)
MICROWAVE SPECTRUM OF HYDRAZINE
435. KRISHNAJI AND G.P.SRIVASTAVA,PHYS.REV.109,1560-1563(1958)
MICROWAVE ABSORPTION IN METHYL HALIDES
436. J.MATTAUCH,Z.NATURFORSCH 13A,572-596(1958) MASS UNITS FOR ATOMIC
WEIGHTS AND NUCLEIC MASSES
437. D.J.MILLEN AND K.M.SINNOTT,J.CHEM.SOC.1958,350-355(1958) THE
MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF NITRYL CHLORIDE
438. I.A.MUKHTAROV,IZVEST.AKAD.NAUK SSSR SER.FIZ.22,1154-1156(1958)
ROTATIONAL CONSTANTS OF THE MOLECULE OF FH₂CCH₂CL(35)
439. L.PIERCE,J.CHEM.PHYS.29,383-388(1958) MICROWAVE SPECTRUM,
INTERNAL BARRIER,STRUCTURE,EQUILIBRIUM CONFORMATION,AND DIPOLE
MOMENT OF METHYL MONOFLUOROSILANE
440. J.SHERIDAN,AUTOMATIC MEASUREMENT QUALITY PROCESS PLANTS,PROC.CONF.
SWANSEA 1957,185-194(1958) MICROWAVE SPECTROSCOPY IN ANALYSIS
AND PROCESS CONTROL
441. G.H.STEWART AND H.EYRING,J.CHEM.ED.35,550-557(1958) THE PRINCIPLE
OF MINIMUM BENDING OF ORBITALS

442. J.D.SWALEN AND B.P.STOICHEFF, J.CHEM.PHYS.28,671-674(1958) MICROWAVE SPECTRUM OF METHYL DIFLUOROSILANE
443. R.TRAMBARULO, A.CLARK, AND C.HEARNS, J.CHEM.PHYS.28,736-737(1958) PLANARITY OF THE FORMIC ACID MONOMER
444. V.G.VESLAGO, IZVEST.AKAD.NAUK SSSR SER.FIZ.22,1150-1153(1958) DETERMINATION OF THE STRUCTURE OF THE HD³⁵F MOLECULE FROM THE ROTATIONAL MICROWAVE SPECTRUM
445. J.E.ROGGS AND H.C.AGNEW, J.PHYS.CHEM.63,1127-1129(1959) NONRESONANT MICROWAVE ABSORPTION IN CERTAIN HALOGEN SUBSTITUTED METHANES
446. D.CHRISTENSEN, SPECTROCHIM.ACTA 15,767(1959) PRELIMINARY INVESTIGATION OF THE MICROWAVE ABSORPTION OF ALPHA-FLUORONAPHTHALENE
447. L.CLAYTON, O.WILLIAMS, AND T.L.WEATHERLY, J.CHEM.PHYS.30,1328-1334(1959) NITRIL CHLORIDE MOLECULAR CONSTANTS FROM MICROWAVE SPECTRUM ANALYSIS
ERRATA- J.CHEM.PHYS.31,554(1959)
448. C.C.COSTAIN AND J.R.MORTON, J.CHEM.PHYS.31,389-393(1959) MICROWAVE SPECTRUM AND STRUCTURE OF PROPYNAL(HCCCHO)
449. A.P.COX, L.F.THOMAS, AND J.SHERIDAN, SPECTROCHIM.ACTA 15,542-543(1959) INTERNUCLEAR DISTANCES IN KETENE FROM SPECTROSCOPIC MEASUREMENTS
450. R.F.CURL, JR., J.CHEM.PHYS.30,1529-1536(1959) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION, AND STRUCTURE OF METHYL FORMATE
451. A.DANTI AND J.L.WOOD, J.CHEM.PHYS.30,582-584(1959) FAR INFRARED SPECTRUM AND THE BARRIER TO INTERNAL ROTATION IN 1,1,1,2-TETRAFLUOROETHANE
452. V.E.DERR AND J.J.GALLAGHER, BULL.AM.PHYS.SOC.4,455(1959) NITRIC OXIDE CONSTANTS FROM MICROWAVE SPECTROSCOPY
453. P.FAVERO, A.M.MIRRI, AND J.G.BAKER, J.CHEM.PHYS.31,566-567(1959) MILLIMETER WAVE SPECTRUM AND STRUCTURE OF FORMYL FLUORIDE
454. A.GIACOMO, NUOVO CIMENTO 14,1082-1092(1959) ON SOME PHENOMENA RELATED TO THE SATURATION OF ROTATIONAL RESONANCES
455. K.E.GORA, J.MOL.SPECTRY 3,78-99(1959) THE ROTATIONAL SPECTRUM OF OZONE
456. D.R.JENKINS AND T.M.SUGDEN, TRANS.FARADAY SOC.55,1473-1479(1959) MICROWAVE SPECTRUM AND STRUCTURE OF 1,1 DIFLUOROVINYL CHLORIDE
457. P.H.KASAI, R.J.MYERS, D.F.EGGERS, JR., AND K.B.WIBERG, J.CHEM.PHYS.30,512-516(1959) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF CYCLOPROPA
458. T.KASUYA AND T.OKA, J.PHYS.SOC.JAPAN 14,980-981(1959) MICROWAVE SPECTRUM OF ETHYL IODIDE
459. P.G.KOKERITZ AND H.SELFN, ARKIV FYSIK 16,197-198(1959) MICROWAVE SPECTRUM AND ELECTRIC DIPOLE MOMENT OF CYCLOPENTANONE
460. D.G.KOWALEWSKI, P.KOKERITZ, AND H.SELFN, J.CHEM.PHYS.31,1438(1959) MICROWAVE SPECTRUM AND ELECTRIC DIPOLE MOMENT OF FLUOROBENZENE

461. L.C.KRISHER AND E.B.WILSON, JR., J.CHEM.PHYS. 31, 882-889 (1959) MICROWAVE SPECTRUM OF ACETYL CYANIDE
462. V.W.LAURIE, J.CHEM.PHYS. 30, 1210-1214 (1959) MICROWAVE SPECTRUM OF METHYL GERMANE
463. D.R.LIDE, JR., SPECTROCHIM. ACTA 15, 473-476 (1959) MICROWAVE SPECTRUM OF TRIMETHYLARSINE
464. D.R.LIDE, JR. AND D.E.MANN, J.CHEM.PHYS. 31, 1129-1130 (1959) MICROWAVE SPECTRUM AND STRUCTURE OF N₂F₄
465. D.R.LIDE, JR., R.W.TAFT, JR., AND P.LOVE, J.CHEM.PHYS. 31, 561-562 (1959) MICROWAVE ABSORPTION IN THE TRIMETHYLAMINE TRIMETHYLBORON ADDITION COMPLEX
466. J.F.LOTSPEICH, A.JAVAN, AND A.ENGELBRECHT, J.CHEM.PHYS. 31, 633-643 (1959) MICROWAVE SPECTRUM AND STRUCTURE OF PERRHENYL FLUORIDE
467. K.MATSUURA, J.PHYS.SOC.JAPAN 14, 1826 (1959) FREQUENCY SHIFT IN AMMONIA ABSORPTION LINES OTHER THAN (3,3)
468. D.J.MESCHI AND R.J.MYERS, J.MOL.SPECTRY. 3, 405-416 (1959) THE MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF DISULFUR MONOXIDE
469. H.W.MORGAN AND J.H.GOLDSTEIN, J.CHEM.PHYS. 30, 1025-1028 (1959) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF VINYL FLUORIDE
470. I.A.MUKHTAROV, OPTIKA I SPEKTROSKOPIYA 6, 260 (1959) MICROWAVE SPECTRUM OF THE FH₂CCH₂CL (37) MOLECULE
471. L.PEKAREK, POKROKY MAT.FYS.ASTRON. 4, 42-53, 162-179 (1959) RADIOSPECTROSCOPY-A NEW BRANCH OF MODERN PHYSICS
472. L.PIERCE AND L.C.KRISHER, J.CHEM.PHYS. 31, 875-882 (1959) MICROWAVE SPECTRUM, INTERNAL BARRIER, STRUCTURE, CONFORMATION, AND DIPOLE MOMENT OF ACETYL FLUORIDE
473. L.PIERCE AND J.M.O-REILLY, J.MOL.SPECTRY. 3, 536-547 (1959) MICROWAVE SPECTRUM, DIPOLE MOMENT, AND INTERNAL BARRIER OF 2-FLUOROPROPENE
474. W.E.SMITH, AUSTRALIAN J.PHYS. 12, 109-112 (1959) THE MICROWAVE SPECTRA OF ISOTOPIC MOLECULES OF SULFUR DIOXIDE
475. G.P.SRIVASTAVA, PROC.PHYS.SOC.(LONDON) 74, 401-407 (1959) MICROWAVE ABSORPTION IN ETHYL CHLORIDE
476. K.K.SVIDZINSKII, OPTICS AND SPECTROSCOPY 6, 163-164 (1959) ON THE HYPERFINE STRUCTURE OF THE ROTATIONAL SPECTRA OF MOLECULES OF THE SYMMETRIC ROTOR TYPE
477. K.TAKAYANAGI, J.PHYS.SOC.JAPAN 14, 1458-1459 (1959) ROTATIONAL TRANSITIONS IN HYDROGEN AND DEUTERIUM
478. J.K.TYLER, A.P.COX, AND J.SHERIDAN, NATURE 183, 1182-1183 (1959) MOLECULAR SYMMETRY IN CYCLOPENTADIENYL THALLIUM AND SOME RELATED COMPOUNDS FROM THEIR MICROWAVE SPECTRA

479. V.G.VESELAGO,OPTICS AND SPECTROSCOPY 6,286-289(1959) DETERMINATION OF THE STRUCTURE AND DIPOLE MOMENT OF HDSE FROM ITS MICROWAVE SPECTRUM
480. R.WERTHEIMER,COMPT.REND.248,1640-1641(1959) ABSORPTION SPECTRUM OF SULFURIC ANHYDRIDE IN THE MILLIMETER WAVE REGION
481. B.BAK,S.DETONI,L.HANSEN-NYGAARD,J.T.NIELSEN,AND J.RAstrup-ANDERSEN, SPECTROCHIM.ACTA 16,376-383(1960) MICROWAVE DETERMINATION OF THE STRUCTURE OF ETHYL FLUORIDE
482. B.F.BURKE,ASTROPHYS.J.132,514-515(1960) THE RADIO-FREQUENCY SPECTRUM OF H₂⁺
483. J.D.GRAYBEAL,J.CHEM.PHYS.32,1258-1260(1960) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF MONOCHLOROACETONITRILE
484. E.HIROTA AND Y.MORINO,BULL.CHEM.SOC.JAPAN 33,158-162(1960) MICROWAVE SPECTRUM OF MALONONITRILE,CH₂(CH)₂ I. THE MOLECULAR STRUCTURE IN THE GROUND VIBRATIONAL STATE
485. N.A.IRISOVA AND E.M.DIANOV,OPTIKA I SPEKTROSKOPIYA 9,261(1960) ULTRAHIGH FREQUENCY ABSORPTION OF CH₃GEF₃
486. T.S.JASEJA,J.MOL.SPECTRY.5,445-457(1960) MICROWAVE SPECTRUM OF IBr AND THE DETERMINATION OF THE MOLECULAR AND NUCLEAR PARAMETERS
487. D.R.JENKINS,R.KEWLEY,AND T.M.SUGDEN,PROC.CHEM.SOC.1960,220(1960) THE MICROWAVE SPECTRUM AND STRUCTURE OF Silyl ISOTHIOCYANATE
488. L.G.JOHNSON,J.CHEM.PHYS.33,949-950(1960) THE MICROWAVE SPECTRUM OF QUINUCRIDINE
489. T.KASUYA,J.PHYS.SOC.JAPAN 15,1273-1277(1960) MICROWAVE SPECTRUM OF ETHYL IODIDE II.
490. T.KASUYA AND T.OKA,J.PHYS.SOC.JAPAN 15,296-303(1960) MICROWAVE SPECTRUM OF ETHYL IODIDE I.
491. R.KEWLEY,K.S.R.MURTY,AND T.M.SUGDEN,TRANS.FARADAY SOC.56,1732-1736 (1960) MICROWAVE SPECTRUM OF SULFUR CHLORIDE PENTAFLUORIDE
492. D.KIVELSON,E.B.WILSON,JR.,AND D.R.LIDE,JR.,J.CHEM.PHYS.32,205-209 (1960) MICROWAVE SPECTRUM,STRUCTURE,DIPOLE MOMENT,AND NUCLEAR QUADRUPOLE EFFECTS IN VINYL CHLORIDE
493. T.KOJIMA,J.PHYS.SOC.JAPAN 15,1284-1291(1960) MICROWAVE SPECTRUM OF METHYL MERCAPTAN
494. L.C.KRISHER,J.CHEM.PHYS.33,304(1960) MICROWAVE SPECTRUM OF ACETYL CYANIDE
495. L.C.KRISHER,J.CHEM.PHYS.33,1237-1241(1960) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION,AND QUADRUPOLE COUPLING OF ACETYL BROMIDE
496. G.H.KWEI AND R.F.CURL,J.CHEM.PHYS.32,1592(1960) MICROWAVE SPECTRUM OF O(18) FORMIC ACID AND THE STRUCTURE OF FORMIC ACID

497. V.W.LAURIE, J.CHEM.PHYS.32,1588-1589(1960) MICROWAVE SPECTRUM OF TRANS-CROTONONITRILE
498. O.H.LEBLANC, JR., V.W.LAURIE, AND W.D.GWINN, J.CHEM.PHYS.33,598-600 (1960) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF FORMYL FLUORIDE
499. D.R.LIDE, JR., J.CHEM.PHYS.33,1514-1518(1960) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF PROPANE
500. C.C.LIN, PHYS.REV.119,1027-1028(1960) HYPERFINE STRUCTURE OF THE MICROWAVE SPECTRA OF THE NO MOLECULE AND THE NUCLEAR QUADRUPOLE MOMENT OF NITROGEN
501. M.W.LONG, O.WILLIAMS, AND T.L.WEATHERLY, J.CHEM.PHYS.33,508-516(1960) MICROWAVE SPECTRUM OF CFCL₃
502. A.A.MARYOTT AND G.BIRNBAUM, J.CHEM.PHYS.32,686-691(1960) MICROWAVE ABSORPTION IN COMPRESSED OXYGEN
503. J.T.MASSEY, C.I.BEARD, AND C.K.JEN, J.MOL.SPECTRY.5,405-415(1960) MICROWAVE SPECTRAL SERIES OF DEUTERIATED HYDROGEN PEROXIDE
504. D.J.MILLEN AND J.R.MORTON, J.CHEM.SOC.1960,1523-1528(1960) THE MICROWAVE SPECTRUM OF NITRIC ACID
505. A.M.MIRRI, NUOVO CIMENTO 18,849-855(1960) MILLIMETER WAVE SPECTRUM OF DEUTERIO DERIVATIVES OF FORMIC ACID
506. M.MIZUSHIMA, ASTROPHYS.J. 132,493-501(1960) THEORY OF THE RADIO-FREQUENCY SPECTRA OF THE H₂⁺ MOLECULE-ION
507. M.MIZUSHIMA, J.CHEM.PHYS.32,691-697(1960) THEORY OF MICROWAVE ABSORPTION BY COMPRESSED OXYGEN GAS
508. H.MOON, J.H.GOLDSTEIN, AND J.W.SIMMONS, SPECTROCHIM.ACTA 16,1267 (1960) THE MICROWAVE SPECTRUM OF CHLOROALLENE
509. N.MULLER AND R.C.BRACKEN, J.CHEM.PHYS.32,1577-1578(1960) MICROWAVE SPECTRUM AND STRUCTURE OF H₃SICN AND D₃SICN
510. T.OKA, J.PHYS.SOC.JAPAN 15,2274-2279(1960) MICROWAVE SPECTRUM OF FORMALDEHYDE II. MOLECULAR STRUCTURE IN THE GROUND STATE
511. T.OKA, H.HIRAKAWA, AND K.SHIMODA, J.PHYS.SOC.JAPAN 15,2265-2273(1960) MICROWAVE SPECTRUM OF FORMALDEHYDE I. K-TYPE DOUBLING SPECTRA
512. L.PIERCE AND D.H.PETERSEN, J.CHEM.PHYS.33,907-913(1960) MICROWAVE SPECTRUM, STRUCTURE, DIPOLE MOMENT, AND INTERNAL ROTATION OF TRIMETHYLSILANE
513. A.M.PROKHOROV AND G.P.SHIPULO, OPTICS AND SPECTROSCOPY 8,218-219(1960) MICROWAVE INVESTIGATION OF THE MOLECULES F₃BNH₃ AND F₃BN(CH₃)₃
514. K.E.REINERT, Z.NATURFORSCH 15A,85-86(1960) MICROWAVE SPECTRUM AND PLANAR CHARACTER OF THE NITROBENZENE MOLECULE
515. K.V.L.N.SASTRY, PROC.INDIAN ACAD.SCI.51A,301-309(1960) MICROWAVE SPECTRUM OF METHYL AMINE I. EXPERIMENTAL DETAILS AND SPECTRUM OF

CD₃NH₂

516. J. SHERIDAN, J. K. TYLER, E. E. AYNLEY, R. E. DODD, AND R. LITTLE, NATURE 185, 96 (1960) MICROWAVE SPECTRUM OF FLUORINE CYANIDE
517. T. SHIMIZU AND H. TAKUMA, J. PHYS. SOC. JAPAN 15, 646-650 (1960) MICROWAVE SPECTRUM OF CIS 1,2 DICHLOROETHYLENE
518. J. K. TYLER AND J. SHERIDAN, PROC. CHEM. SOC. 1960, 119-120 (1960) MICROWAVE SPECTRUM AND STRUCTURE OF FLUOROACETYLENE
519. W. ZEIL, M. WINNEWISSER, H. K. BODENSEH, AND H. BUCHERT, Z. NATURFORSCH 15A, 1011-1013 (1960) MICROWAVE SPECTRA OF SUBSTITUTED ACETYLENES
520. B. BAK, U. S. DEPT. COM., OFFICE TECH. SERV., AD 262, 113, 26 PP. (1961) DETERMINATION OF THE STRUCTURE OF α - AND β -FLUORONAPHTHALENES AND OTHER SELECTED MOLECULES BY INFRARED AND MICROWAVE TECHNIQUES
521. B. BAK, D. CHRISTENSEN, L. HANSEN-NYGAARD, AND J. RASTRUP-ANDERSEN, J. MOL. SPECTRY. 7, 58-63 (1961) THE STRUCTURE OF THIOPHENE
522. P. CAHILL AND S. BUTCHER, J. CHEM. PHYS. 35, 2255-2256 (1961) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF METHYL STANNANE
523. C. C. COSTAIN AND G. P. SRIVASTAVA, J. CHEM. PHYS. 35, 1903-1904 (1961) STUDY OF HYDROGEN BONDING. THE MICROWAVE ROTATIONAL SPECTRUM OF CF₃COOH-HCOOH
524. R. F. CURL, JR., J. L. KINSEY, J. G. BAKER, J. C. BAIRD, G. R. BIRD, R. F. HEIDELBERG, T. M. SUGDEN, D. R. JENKINS, AND C. N. KENNEY, PHYS. REV. 121, 1119-1123 (1961) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE. I. ROTATIONAL ASSIGNMENT
525. W. B. DIXON AND E. B. WILSON, JR., J. CHEM. PHYS. 35, 191-198 (1961) MICROWAVE SPECTRUM OF METHYL NITRATE
526. R. E. GOEDERTIER, ANN. SOC. ACI. BRUXELLES 75, 174-182 (1961) ROTATIONAL SPECTRUM OF C(13) ENRICHED VINYL BROMIDE
527. J. E. GRIFFITHS AND K. B. MCAFEE, PROC. CHEM. SOC. 1961, 456 (1961) MICROWAVE SPECTRUM OF GERMANYL FLUORIDE
528. S. DE HEPCEE, ANN. SOC. SCI. BRUXELLES 75, 194-211 (1961) ROTATIONAL SPECTRA OF VINYL BROMIDES IN THE GROUND STATE AND A VIBRATIONALLY EXCITED STATE IN THE MICROWAVE REGION
529. A. R. HILTON, JR., A. W. JACHE, J. B. BEAL, JR., W. D. HENDERSON, AND R. J. ROBINSON, J. CHEM. PHYS. 34, 1137-1141 (1961) MILLIMETER WAVE SPECTRUM AND MOLECULAR STRUCTURE OF OXYGEN DIFLUORIDE
530. E. HIROTA, J. MOL. SPECTRY. 7, 242-260 (1961) MICROWAVE SPECTRUM IN THE EXCITED VIBRATIONAL STATES OF MALONONITRILE, CH₂(CN)₂. A POSSIBLE ASSIGNMENT OF CCN BENDING MODES
531. E. HIROTA AND Y. MORINO, BULL. CHEM. SOC. JAPAN 34, 341-348 (1961) MICROWAVE SPECTRA OF PROPARGYL HALIDES. I. MOLECULAR STRUCTURE, DIPOLE MOMENT, AND QUADRUPOLE COUPLING CONSTANT OF PROPARGYL CHLORIDE
532. J. HOEFT, Z. PHYSIK 163, 262-276 (1961) THE MICROWAVE ROTATION SPECTRUM OF INDIUM MONOCHLORIDE

533. L.M. IMANOV AND CH.O. KADZHAR, DOKLADY AKAD. NAUK. AZERBAIDZHAN SSR. 17, 861-863 (1961) THE Q BRANCH IN THE MICROWAVE SPECTRA OF C_2H_5OH
534. B.E. JOB AND J. SHERIDAN, NATURE 192, 160-161 (1961) MICROWAVE SPECTRUM OF FLUOROACETONITRILE
535. L.C. KRISHER AND E.B. WILSON, JR., U.S. DEPT. COMMERCE, OFFICE TECH. SERV. PB REPT. 145746 (1961) MICROWAVE SPECTRUM OF ACETYL CYANIDE
536. V.W. LAURIE, J. CHEM. PHYS. 34, 291-294 (1961) MICROWAVE SPECTRUM OF CIS-DIFLUOROETHYLENE STRUCTURES AND DIPOLE MOMENTS OF FLUOROETHYLENES
537. V.W. LAURIE, J. CHEM. PHYS. 34, 1516-1519 (1961) MICROWAVE SPECTRUM OF ISOBUTYLENE. DIPOLE MOMENT, INTERNAL BARRIER, EQUILIBRIUM CONFORMATION, AND STRUCTURE
538. D.J. MILLEN AND J. PANNELL, J. CHEM. SOC. 1961, 1322-1328 (1961) THE MICROWAVE SPECTRUM, STRUCTURE, AND NUCLEAR QUADRUPOLE COUPLING COEFFICIENTS OF NITROSYL CHLORIDE
539. R.F. MILLER AND R.F. CURL, JR., J. CHEM. PHYS. 34, 1847-1848 (1961) MICROWAVE SPECTRUM OF $O(18)$ FORMYL F AND THE STRUCTURE OF FORMYL F
540. A.M. MIRRI, A. GUARNIERI, AND P. FAVERO, NUOVO CIMENTO 19, 1189-1194 (1961) MILLIMETER WAVE SPECTRUM AND DIPOLE MOMENT OF VINYL FLUORIDE
541. J.M. O'REILLY AND L. PIERCE, J. CHEM. PHYS. 34, 1176-1181 (1961) MICROWAVE SPECTRUM, STRUCTURE, DIPOLE MOMENT, AND INTERNAL BARRIER OF VINYL SILANE
542. L. PIERCE, R. JACKSON, AND N. DICIANNI, J. CHEM. PHYS. 35, 2240-2241 (1961) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF F_2O
543. A.S. RAJAN, PROC. INDIAN ACAD. SCI. 53A, 89-94 (1961) MICROWAVE SPECTRUM OF TRICHLOROACETONITRILE
544. J.D. ROGERS AND D. WILLIAMS, J. CHEM. PHYS. 34, 2195-2196 (1961) NITROSYL CHLORIDE STRUCTURE
545. K.M. SINNOTT, J. CHEM. PHYS. 34, 851-861 (1961) MICROWAVE SPECTRUM OF ACETYL CHLORIDE
546. K. WADA, Y. KIKUCHI, C. MATSUMURA, E. HIROTA, AND Y. MORINO, BULL. CHEM. SOC. JAPAN 34, 337-341 (1961) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF CH_2ClCN
547. J.F. WESTERKAMP, BOL. ACAD. NACL. CIENC. 42, 191-200 (1961) ASYMMETRIC TOP MOLECULES IN THE MICROWAVE REGION II. CARBONYL CYANIDE AND PERFLUORODIMETHYL ETHER
548. W. ZEIL, M. WINNEWISSE, AND W. HUETTNER, Z. NATURFORSCH 16A, 1248-1249 (1961) THE MICROWAVE SPECTRUM OF $(CH_3)_3CBR$ IN THE 20,000 MC RANGE
549. W. ZEIL, M. WINNEWISSE, AND K. MUELLER, Z. NATURFORSCH 16A, 1250 (1961) MICROWAVE SPECTROSCOPIC INVESTIGATIONS OF $(CH_3)_3CCl$ AND $(CD_3)_3CCl$
550. R.W. ZIMMERER AND M. MIZUSHIMA, PHYS. REV. 121, 152-155 (1961) PRECISE MEASUREMENT OF THE MICROWAVE ABSORPTION FREQUENCIES OF THE

OXYGEN MOLECULE AND THE VELOCITY OF LIGHT

551. B.BAK, D.CHRISTENSEN, J.CHRISTIANSEN, L.HANSEN-NYGAARD, AND J.RAstrup-ANDERSEN, SPECTROCHIM.ACTA 18,1421-1424(1962) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF ROTATION OF METHYL KETENE
552. B.BAK, D.CHRISTENSEN, L.HANSEN-NYGAARD, AND J.RAstrup-ANDERSEN, J.MOL.SPECTRY.9,222-224(1962) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF THIAZOLF
553. B.BAK, D.CHRISTENSEN, L.HANSEN-NYGAARD, L.LIPSCHITZ, AND J.RAstrup-ANDERSEN, J.MOL.SPECTRY.9,225-227(1962) MICROWAVE SPECTRA OF 1,3,4-THIADIAZOLE AND (S(34)) 1,3,4-THIADIAZOLE. DIPOLE MOMENT OF 1,3,4-THIADIAZOLE
554. R.A.BEAUDET, J.CHEM.PHYS.37,2398-2402(1962) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION, AND QUADRUPOLE COUPLING CONSTANTS OF TRANS-1-CHLOROPROPYLENE
555. R.A.BEAUDET AND E.B.WILSON, JR., J.CHEM.PHYS.37,1133-1138(1962) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF CIS-1-FLUOROPROPYLENE
556. E.L.BEESON, T.L.WEATHERLY, AND Q.WILLIAMS, J.CHEM.PHYS.37,2926-2929 (1962) MOLECULAR CONSTANTS OF CHLORODIFLUOROMETHANE FROM MICROWAVE SPECTRUM ANALYSIS
557. J.C.CHAUFFOUREAUX, BULL.CLASSE SCI., AKAD.ROY.BELG.48,1297-1307(1962) MICROWAVE ROTATIONAL SPECTRA OF VINYLIDENE FLUORIDE
558. C.C.COSTAIN, J.MOL.SPECTRY.9,317-336(1962) ANOMALIES IN THE PURE ROTATION SPECTRUM OF FLUOROFORM IN EXCITED VIBRATIONAL STATES
559. R.F.CURL, JR., J.CHEM.PHYS.37,779-784(1962) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE III. INTERPRETATION OF THE HYPERFINE COUPLING CONSTANTS OBTAINED IN TERMS OF THE ELECTRONIC STRUCTURE
ERRATUM- J.CHEM.PHYS.38,1446(1963)
560. J.D.GRAYBEAL AND D.W.ROE, J.CHEM.PHYS.37,2503(1962) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF MONOFLUOROACETONITRILE
561. M.L.GRENIER-BESSON AND S.MAES, PUBL.GROUP.AVAN.METHODS SPECTROG. 1962,29(1962) INTERPRETATION OF MICROWAVE SPECTRA OF PURE ROTATION
562. M.DE HEMPTINNE, F.GREINDL, AND R.RIET, BULL .CLASSE SCI.ACAD.ROY. BELGE.48,397-410(1962) ROTATION SPECTRUM OF SO2
563. R.H.JACKSON, J.CHEM.SOC.1962,4585-4592(1962) THE MICROWAVE SPECTRUM STRUCTURE, AND DIPOLE MOMENT OF DIOXYGEN DIFLUORIDE
564. D.R.JENKINS, R.KEWLEY, AND T.M.SUGDEN, TRANS.FARADAY SOC.58,1284-1290 (1962) MICROWAVE SPECTRUM AND STRUCTURE OF SILYL ISOTHIOCYANATE
565. B.E.JOB AND J.SHERIDAN, NATURE 193,677(1962) PROPARGYL FLUORIDE AND ITS MICROWAVE SPECTRUM
566. W.H.KIRCHHOFF AND E.B.WILSON, JR., J.AM.CHEM.SOC.84,334-336(1962) THE MICROWAVE SPECTRUM AND STRUCTURE OF NSF3

567. V.W. LAURIE, D.T. PENCE, AND R.H. JACKSON, J. CHEM. PHYS. 37, 2995-2999 (1962) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF CARBONYL FLUORIDE
568. D.R. LIDE, JR., J. CHEM. PHYS. 37, 2074-2079 (1962) MICROWAVE STUDIES OF BUTADIENE DERIVATIVES I. SPECTRUM OF FLUOROPRENE
569. J.H.N. LOUBSER, J. CHEM. PHYS. 36, 2808-2809 (1962) MICROWAVE SPECTRUM AND STRUCTURE OF TRICHLOROFUOROMETHANE
570. C. MATSUMURA, E. HIROTA, T. OKA, AND Y. MORINO, J. MOL. SPECTRY. 9, 366-380 (1962) MICROWAVE SPECTRUM OF ACETONITRILE-D₃ CD₃CN
571. D.B. MCLAY AND C.R. MANN, CAN. J. PHYS. 40, 61-73 (1962) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF CHF₂CL
572. J. MICHELSEN-EFFINGER, BULL. CLASSE SCI., ACAD. ROY. BELG. 48, 438-452 (1962) ROTATION SPECTRUM OF ETHYL ALCOHOL BY MICROWAVES
573. A.M. MIRRI, P. FAVERO, A. GUARNIERI, AND G. SEMERANO, ROLL. SCI. FAC. CHIM. IND. BOLOGNA 20, 110-114 (1962) MILLIMETER SPECTRUM OF ASYMMETRIC TRIATOMIC NITROSYL CHLORIDE MOLECULES
574. A. MOZUMDER, PROC. NATL. INST. SCI. INDIA 28, 57-73 (1962) THE MICROWAVE SPECTRUM OF METHYL ALCOHOL I, GENERAL THEORY
575. A. MOZUMDER, PROC. NATL. INST. SCI. INDIA 28, 74-88 (1962) THE MICROWAVE SPECTRUM OF METHYL ALCOHOL II. NUMERICAL PART
576. I.A. MUKHTAROV, IZV. AKAD. NAUK. AZERB. SSSR SER. FIZ. MAT. I TEKH. NAUK 1962, 59-63 (1962) MICROWAVE SPECTRUM OF 1,1,2-TRIFLUOROETHANE
577. L.J. NUGENT AND C.D. CORNWELL, J. CHEM. PHYS. 37, 523-534 (1962) MICROWAVE SPECTRUM OF METHYLDIFLUOROARSINE
578. L.J. NUGENT, D.E. MANN, AND D.R. LIDE, JR., J. CHEM. PHYS. 36, 965-971 (1962) MICROWAVE STRUCTURE DETERMINATIONS ON TERTIARY BUTYL ACETYLENES AND TERTIARY BUTYL CYANIDE
579. T. OKA AND Y. MORINO, J. MOL. SPECTRY 8, 300-314 (1962) ANALYSIS OF THE MICROWAVE SPECTRUM OF HYDROGEN SELENIDE
580. L. PIERCE AND SR. V. DOBYNS, J. AM. CHEM. SOC. 84, 2651-2652 (1962) MOLECULAR STRUCTURE, DIPOLE MOMENT, AND QUADRUPOLE COUPLING CONSTANTS OF DIAZIRINE
581. M.G.K. PILLAI, J. PHYS. CHEM. 66, 179-180 (1962) MICROWAVE SPECTRUM OF FORMALDOXIME
582. A. RACHMAN, ARKIV FYSIK 23, 291-299 (1962) ANALYSIS OF THE MICROWAVE SPECTRUM OF M-FLUOROCHLOROBENZENE
583. W.G. ROTHSCHILD AND B.P. DAILEY, J. CHEM. PHYS. 36, 2931-2940 (1962) MICROWAVE SPECTRUM OF BROMOCYCLOBUTANE
584. R.H. SCHWENDEMAN AND G.D. JACOBS, J. CHEM. PHYS. 36, 1245-1250 (1962) MOLECULAR STRUCTURE OF ETHYL CHLORIDE
585. R.H. SCHWENDEMAN AND G.D. JACOBS, J. CHEM. PHYS. 36, 1251-1257 (1962)

MICROWAVE SPECTRUM, STRUCTURE, QUADRUPOLE COUPLING CONSTANTS,
AND BARRIER TO INTERNAL ROTATION OF CHLOROMETHYLSILANE

586. G. SEMERANO, U.S. DEPT. COM. OFFICE TECH. SERV. PB REPT. 149,450 (1962)
THE ELECTRONIC AND MICROWAVE SPECTRUM OF FORMYL FLUORIDE
587. K. SHIMODA, MASER SPECTROSCOPY, PROCEEDINGS OF THE INTERNATIONAL
SCHOOL OF PHYSICS ENRICO FERMI. XVII COURSE. TOPICS ON RADIOFREQUENCY
SPECTROSCOPY
588. G. P. SHIPULO, OPTIKA I SPEKTROSKOPIYA 13, 593-594 (1962) MICROWAVE
SPECTRUM OF THE HDNCN AND D₂NCN MOLECULES
589. G. A. SOBOLEV, A. M. SHCHERBAKOV, AND P. A. AKISHIN, OPTIKA I SPEKTROSKOPIYA
12, 147 (1962) ROTATIONAL SPECTRUM AND THE DIPOLE MOMENT OF THE
VINYL ACETYLENE MOLECULE
590. W. M. TOLLES AND W. D. GWINN, J. CHEM. PHYS. 36, 1119-1121 (1962) STRUCTURE
AND DIPOLE MOMENT OF SF₄
591. J. K. TYLER, L. F. THOMAS, AND J. SHERIDAN, J. OPT. SOC. AM. 52, 581 (1962)
ROTATIONAL SPECTRUM OF THE CYANAMIDE MOLECULE
592. R. VAN RIET, BULL. CLASSE SCI., ACAD. ROY. BELG. 48, 659-667 (1962)
ROTATIONAL SPECTRUM OF THE S(33)O₂ MOLECULE AT THE FIRST EXCITED
STATE
593. R. VAN RIET, BULL. CLASSE SCI., ACAD. ROY. BELG. 48, 1291-1296 (1962)
ROTATIONAL SPECTRUM OF S(32)O₂ AND S(33)O₂ MOLECULES IN THE
GROUND STATE AND IN THE EXCITED STATE OF THE V₂ VIBRATION (INTERVAL
27,500-30,500 MC.)
594. V. F. VOLKOV, N. N. VYSHINSKII, AND N. K. RUDNEVSKII, IZV. AKAD. NAUK SSSR,
SER. FIZ. 26, 1282-1285 (1962) VIBRATIONAL AND ROTATIONAL SPECTRA OF
TRIMETHYLCHLOROSILANE, TRIETHYLCHLOROSILANE, AND TRIETHYLCHLOROSTANNANE
595. W. ZEIL, W. HUETTNER, AND W. PLEIN, Z. NATURFORSCH 17A, 823-824 (1962)
MICROWAVE SPECTRUM AND QUADRUPOLE COUPLING CONSTANT OF (CH₃)₃CCl (35)
596. A. BAUDER, F. TANK, AND HS. H. GUENTHARD, HELV. CHIM. ACTA 46, 1453-1463 (1963)
MICROWAVE SPECTRUM, DIPOLE MOMENT, AND STRUCTURE OF CYCLOBUTANONE
597. S. S. BUTCHER, J. CHEM. PHYS. 38, 2299-2311 (1963) MICROWAVE SPECTRUM OF
PROPYLENE SULFIDE
598. J. C. CHAUFFOUREAUX, ANN. SOC. SCI. BRUXELLES 77, 171-176 (1963) GROUND
STATE OF VINYLIDENE FLUORIDE. DATA ON THE FIRST EXCITED STATE
599. A. P. COX AND A. S. ESBITT, J. CHEM. PHYS. 38, 1636-1643 (1963) FUNDAMENTAL
VIBRATIONAL FREQUENCIES IN KETENE AND THE DEUTEROKETENES
600. R. F. CURL, JR., V. M. RAO, K. V. L. N. SASTRY, AND J. A. HODGESON, J. CHEM. PHYS.
39, 3335-3340 (1963) MICROWAVE SPECTRUM OF METHYL ISOCYANATE
601. E. A. V. EBSWORTH, D. R. JENKINS, M. J. MAYS, AND T. M. SUGDEN, J. CHEM. SOC.
1963, 21 (1963) THE PREPARATION AND STRUCTURE OF SILYL AZIDE
602. L. ESTEROWITZ, J. CHEM. PHYS. 39, 247-248 (1963) ROTATIONAL TRANSITIONS
AND CENTRIFUGAL DISTORTION IN THE UHF SPECTRUM OF FORMALDEHYDE

603. C.FLANAGAN AND L.PIERCE, J.CHEM.PHYS.38,2963-2969(1963) MICROWAVE SPECTRUM, STRUCTURE, AND QUADRUPOLE COUPLING TENSOR OF ETHYL BROMIDE
604. R.E.GOEDERTIER, J.PHYS.(PARIS)24,633-637(1963) ROTATION SPECTRA, QUADRUPOLE COUPLING, AND STRUCTURE OF VINYL BROMIDE
605. L.M.IMANOV AND A.A.ABDURAKHMANOV, IZV.AKAD.NAUK AZERB.SSR SER. FIZ.-MAT. I TEKH.NAUK 1963,79-82(1963) MICROWAVE SPECTRUM OF $\text{CD}_3\text{CH}_2\text{OH}$
606. L.M.IMANOV AND CH.O.KADZHAR, OPTIKA I SPEKTROSKOPIYA 14,300-301(1963) THE SUPERHIGH-FREQUENCY SPECTRUM AND DIPOLE MOMENT OF THE ETHANOL MOLECULE
607. R.KEWLEY, K.V.L.N.SASTRY, AND M.WINNEWISSER, J.MOL.SPECTRY.10,418-441 (1963) THE MILLIMETER WAVE SPECTRA OF ISOCYANIC AND ISOTHIOCYANIC ACIDS
608. R.KEWLEY, K.V.L.N.SASTRY, M.WINNEWISSER, AND W.GORDY, J.CHEM.PHYS.39, 2856-2860(1963) MILLIMETER WAVE SPECTROSCOPY OF UNSTABLE MOLECULAR SPECIES I. CARBON MONOSULFIDE
609. W.H.KIRCHHOFF AND E.B.WILSON JR., J.AM.CHEM.SOC.85,1726-1729(1963) THE MICROWAVE SPECTRUM AND STRUCTURE OF NSF
610. R.L.KUCZKOWSKI, J.AM.CHEM.SOC.85,3047-3048(1963) SULFUR MONOFLUORIDE- MICROWAVE SPECTRUM OF A SECOND ISOMER
611. R.L.KUCZKOWSKI AND E.B.WILSON, JR., J.CHEM.PHYS.39,1030-1034(1963) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF CIS- N_2F_2
612. R.L.KUCZKOWSKI AND E.B.WILSON, JR., J.AM.CHEM.SOC.85,2028-2029(1963) MICROWAVE AND MASS SPECTRA OF SULFUR MONOFLUORIDE
613. V.W.LAURIE AND D.T.PENCE, J.CHEM.PHYS.38,2693-2697(1963) MICROWAVE SPECTRA AND STRUCTURES OF DIFLUOROLENYLES
614. I.N.LEVINE, J.CHEM.PHYS.38,2326-2328(1963) STRUCTURE OF FORMALDOXIME
615. D.R.LIDE, JR., J.CHEM.PHYS.38,456-460(1963) MICROWAVE SPECTRUM AND STRUCTURE OF DIFLUOROAMINE
616. D.R.LIDE, JR., J.CHEM.PHYS.38,2027(1963) MICROWAVE SPECTRUM OF ALUMINUM MONOFLUORIDE
617. J.S.MUENTER AND V.W.LAURIE, J.CHEM.PHYS.39,1181-1182(1963) MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF SILYL ACETYLENE
618. I.A.MUKHTAROV, DOKL.AKAD.NAUK SSSR 148,566-568(1963) MICROWAVE SPECTRUM OF THE F_2HCCDHf MOLECULE
619. I.A.MUKHTAROV, OPTIKA I SPEKTROSKOPIYA 15,563-564(1963) MICROWAVE SPECTRUM OF $\text{CF}_2=\text{CHF}$
620. I.A.MUKHTAROV, DOKL.AKAD.NAUK SSSR 151,1076-1078(1963) MICROWAVE SPECTRUM OF THE $\text{F}_2\text{HC}-\text{CH}_2\text{F}$ MOLECULE
621. I.A.MUKHTAROV, FIZ.PROBL.SPEKTROSKOPII, AKAD.NAUK SSSR, MATERIALY

- 13-GO (TRINADTSATOGO) SOVESHCH., LENINGRAD, 1960 2, 85-87 (1963)
THE MICROWAVE SPECTRUM OF TRIFLUOROETHANE
622. R. NELSON, J. CHEM. PHYS. 39, 2382-2383 (1963) MICROWAVE SPECTRUM, MOLECULAR STRUCTURE, AND DIPOLE MOMENT OF DIMETHYLPHOSPHINE
 623. E. W. NEUVAR AND A. W. JACHE, J. CHEM. PHYS. 39, 596-599 (1963) MICROWAVE SPECTRUM AND STRUCTURE OF PENTAFLUOROSULFUR BROMIDE
 624. R. L. POYNTER, J. CHEM. PHYS. 39, 1962-1966 (1963) MICROWAVE SPECTRUM, QUADRUPOLE COUPLING CONSTANTS, AND DIPOLE MOMENT OF CHLOROBENZENE
 625. T. N. SARACHMAN, J. CHEM. PHYS. 39, 469-473 (1963) MICROWAVE SPECTRUM OF NORMAL PROPYL CHLORIDE
 626. L. H. SCHARPEN AND V. W. LAURIE, J. CHEM. PHYS. 39, 1732-1733 (1963) STRUCTURE OF ISOBUTYLENE
 627. T. SHIGENARI, S. KOBAYASHI, AND H. TAKUMA, J. PHYS. SOC. JAPAN 18, 312-313 (1963) (6.3) ROTATIONAL SPECTRUM OF FORMALDEHYDE BY A RADIO-FREQUENCY BEAM-TYPE MASER
 628. K. K. SVIDZINSKII, FIZ. PROBL. SPEKTROSKOPII, AKAD. NAUK SSSR, MATERIALY 13-GO (TRINADTSATOGO) SOVESHCH., LENINGRAD, 1960 2, 83-85 (1963) CALCULATION OF THE HYPERFINE STRUCTURE OF THE INVERSION SPECTRA OF THE ND₃ MOLECULE
 629. K. TAKAGI AND T. OKA, J. PHYS. SOC. JAPAN 18, 1174-1180 (1963) MILLIMETER WAVE SPECTRUM OF FORMALDEHYDE
 630. K. TAKAGI AND S. SAITO, J. PHYS. SOC. JAPAN 18, 1840 (1963) MILLIMETER WAVE SPECTRUM OF SO₂
 631. J. K. TYLER, J. MOL. SPECTRY. 11, 39-46 (1963) MICROWAVE SPECTRUM OF NITRAMIDE
 632. J. K. TYLER AND J. SHERIDAN, TRANS. FARADAY SOC. 59, 2661-2670 (1963) STRUCTURAL STUDIES OF LINEAR MOLECULES BY MICROWAVE SPECTROSCOPY
 633. R. VAN RIET, ANN. SOC. SCI. BRUXELLES 77, 18-29 (1963) ROTATIONAL SPECTRUM OF THE S(34)O₂ MOLECULE IN THE FIRST VIBRATIONAL EXCITED STATE (12,800-30,000 MC.) AND COMPLIMENTARY STUDY OF THE S(32)O₂ AND S(33)O₂ MOLECULES IN THE RANGE 25,000-27,500 MC.
 634. L. WHARTON AND W. KLEMPERER, J. CHEM. PHYS. 38, 2705-2708 (1963) MICROWAVE SPECTRUM OF BAO
 635. L. WHARTON, W. KLEMPERER, L. P. GOLD, R. STRAUCH, J. J. GALLAGHER, AND V. E. DERR, J. CHEM. PHYS. 38, 1203-1210 (1963) MICROWAVE SPECTRUM, SPECTROSCOPIC CONSTANTS, AND ELECTRIC DIPOLE MOMENT OF LI(6)F(19)
 636. A. YARIV AND J. P. GORDON, PROC. IEEE 51, 4-29 (1963) THE LASER
 637. A. BAUER AND J. BELLET, J. PHYS. (PARIS) 25, 805-808 (1964) ROTATION SPECTRA OF SO₂ IN THE MILLIMETER REGION
 638. A. BAUER AND J. BELLET, COMPT. REND. 258, 873-876 (1964) ROTATION SPECTRUM OF SO₂ IN MILLIMETER WAVELENGTHS (6 MM. AND 2.2 MM.)

639. R.A.BEAUDET, J.CHEM.PHYS.40,2705-2715(1964) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION, AND QUADRUPOLE COUPLING CONSTANTS OF CIS-1-CHLOROPROPYLENE
640. S.S.BUTCHER AND E.B.WILSON, JR., J.CHEM.PHYS.40,1671-1677(1964) MICROWAVE SPECTRUM OF PROPIONALDEHYDE
641. C.C.COSTAIN AND G.P.SRIVASTAVA, J.CHEM.PHYS.41,1620-1627(1964) MICROWAVE ROTATION SPECTRA OF HYDROGEN-BONDED MOLECULES
642. P.A.CURNUCK AND J.SHERIDAN, NATURE 202,591-592(1964) MICROWAVE SPECTRUM OF FLUOROBROMOETHANE
643. L. ESTEROWITZ AND J.ROSENTHAL, J.CHEM.PHYS.40,1986-1987(1964) DIPOLE MOMENT OF N(15)O(16)2
644. A.J.HEBERT, F.W.BREIVOGEL, JR., AND K.STREET, JR., J.CHEM.PHYS.41, 2368-2376(1964) RADIO-FREQUENCY AND MICROWAVE SPECTRA OF LiBr BY THE MOLECULAR-BEAM ELECTRIC-RESONANCE METHOD
645. C.D.HOLLOWELL, A.J.HEBERT, AND K.STREET, JR., J.CHEM.PHYS.41,3540-3545 (1964) RADIO-FREQUENCY AND MICROWAVE SPECTRA OF NaF BY THE MOLECULAR BEAM ELECTRIC-RESONANCE METHOD
646. L.M.IMANOV, A.A.ABDURAKHMANOV, AND R.A.RAGIMOVA, OPTIKA I SPEKTROKOPIYA 17,306-307(1964) MICROWAVE SPECTRUM AND EFFECTIVE ROTATIONAL CONSTANTS OF THE CD3CH2OH MOLECULE
647. G.JONES AND W.GORDY, PHYS.REV.135,295-296(1964) EXTENSION OF SUBMILLIMETER WAVE SPECTROSCOPY BELOW A HALF MILLIMETER WAVELENGTH
648. G.JONES AND W.GORDY, PHYS.REV.136,1229-1232(1964) SUBMILLIMETER-WAVE SPECTRA OF HCL AND HBR
649. R.KEWLEY, K.V.L.N.SASTRY, AND M.WINNEWISSER, J.MOL.SPECTRY.12,387-401 (1964) MICROWAVE AND MILLIMETER WAVE SPECTRA OF HYDRAZOIC ACID
650. W.J.LAFFERTY AND D.R.LIDE, JR., J.MOL.SPECTRY 14,407-408(1964) ROTATIONAL CONSTANTS OF EXCITED VIBRATIONAL STATES OF N(14)2O(16)
651. D.R.LIDE, JR., PROC.MEETING INTERAGENCY CHEM.ROCKET PROPULSION GROUP THERMOCHEM., 1ST, NEW YORK, 1963 1,1-2(1964) RECENT MICROWAVE SPECTRAL STUDIES OF HIGH-TEMPERATURE SPECIES
652. D.R.LIDE, JR., P.CAHILL, AND L.P.GOLD, J.CHEM.PHYS.40,156-159(1964) MICROWAVE SPECTRUM OF LITHIUM CHLORIDE
653. D.R.LIDE, JR. AND M.JEN, J.CHEM.PHYS.40,252-253(1964) MICROWAVE STUDIES OF BUTADIENE DERIVATIVES II. ISOPRENE
654. J.MARTINS AND E.B.WILSON, JR., J.CHEM.PHYS.41,570-571(1964) MICROWAVE SPECTRUM OF XENON OXYTETRAFLUORIDE
655. D.B.MCLAY, CAN.J.PHYS.42,720-730(1964) MICROWAVE SPECTRUM OF DICHLOROFLUOROETHANE
656. Y.MORINO, Y.KIKUCHI, S.SAITO, AND E.HIROTA, J.MOL.SPECTRY.13,95-118 (1964) EQUILIBRIUM STRUCTURE AND POTENTIAL FUNCTION OF SULFUR DIOXIDE FROM THE MICROWAVE SPECTRUM IN THE EXCITED

VIBRATIONAL STATE

657. I.A.MUKHTAROV,OPTIKA I SPEKTROSKOPIYA 16,360(1964) MICROWAVE SPECTRUM OF THE MOLECULE F2DCCD2F
658. T.OKA,K.TAKAGI,AND Y.MORINO,J.MOL.SPECTRY.14,27-52(1964) MICROWAVE SPECTRUM OF FORMALDEHYDE IN VIBRATIONALLY EXCITED STATES
659. T.OKA,K.TSUCHIYA,S.IWATA,AND Y.MORINO,BULL.CHEM.SOC.JAPAN 37,4-7 (1964) MICROWAVE SPECTRUM OF S-TRIOXANE
660. H.E.RADFORD,J.CHEM.PHYS.40,2732-2733(1964) SYNTHESIS OF DIATOMIC MOLECULFS
661. V.M.RAO AND R.F.CURL,JR.,J.CHEM.PHYS.40,3688-3690(1964) MICROWAVE SPECTRUM OF VINYL FORMATE
662. J.S.RIGDEN AND S.S.BUTCHER,J.CHEM.PHYS.40,2109-2114(1964) MICROWAVE SPECTRUM OF METHYL HYPOCHLORITE
663. K.V.L.N.SASTRY AND R.F.CURL,JR.,J.CHEM.PHYS.41,77-80(1964) MICROWAVE SPECTRUM OF N-METHYL METHYLENIMINE
664. R.H.SCHWENDEMAN,G.D.JACOBS,AND T.M.KRIGAS,J.CHEM.PHYS.40,1022-1028 (1964) MOLECULAR STRUCTURE OF CYCLOPROPYLCHLORIDE
665. G.P.SRIVASTAVA,PHYSICA 30,1913-1916(1964) MICROWAVE SPECTRUM OF MONOFLUORO ACETIC ACID
666. F.L.TOBIASON AND R.H.SCHWENDEMAN,J.CHEM.PHYS.40,1014-1021(1964) MICROWAVE SPECTRUM,MOLECULAR STRUCTURE,AND QUADRUPOLE COUPLING CONSTANTS OF 2-CHLOROPROPANE
667. J.K.TYLER,J.CHEM.PHYS.40,1170-1171(1964) MICROWAVE SPECTRUM OF METHINOPHOSPHIDE,HCP
668. M.WINNEWISSER,K.V.L.N.SASTRY,R.L.COOK ,AND W.GORDY,J.CHEM.PHYS.41, 1687-1691(1964) MILLIMETER WAVE SPECTROSCOPY OF UNSTABLE MOLECULAR SPECIES. II. SULFUR MONOXIDE
669. D.R.LIDE,JR.,D.E.MANN AND J.J.COMEFORD,SPECTROCHIM.ACTA 21,497-501 (1965) THE VIBRATIONAL ASSIGNMENT OF SULFURYL FLUORIDE
670. V.M.RAO,J.T.YARDLEY,AND R.F.CURL,JR.,J.CHEM.PHYS.42,284-288(1965) MICROWAVE SPECTRUM OF METHYL THIONYLAMINE