Dear Contributor:

This is the third microwave spectroscopy information letter and is being sent to those who contributed.

1-- AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS
   Department of Chemistry
   (Albert W. Jache)
   SiF$_3$I about finished
   S$_2$Cl$_2$ 14 lines measured

2-- UNIVERSITY OF BIRMINGHAM
   Department of Chemistry
   (John Sheridan)

   nitramide H$_2$NNO$_2$ (J.K. Tyler), (A-C) and asymmetry parameter assigned
   cyanamide (NH$_2$CN) (J.K. Tyler) Quadrupole coupling constants assigned from H$_2$NCH$^{15}$ and H$_2$N$^{15}$CN
   FCH$_2$CN (B. Job) Assignment made of main species. Preliminary note sent for publication; other forms under investigation.

\[
\begin{align*}
\text{FC}^{13}N & \quad \text{(J.K. Tyler) B$_0$ values determined. Paper in manuscript} \\
\text{FCN}^{15} & \\
\text{Cl}^{35}\text{CC}^{13}H & \\
\text{Cl}^{35}\text{CC}^{13}CH & \\
\text{HCCCN, DCCCN} & (J.K. Tyler, A.P. Cox) D_J determined from mm-wave measurements \\
\text{CH}_3\text{CF}_3 & (A.P. Cox) D_{JK}, D_J determined from mm-wave measurements
\end{align*}
\]

\[
\begin{align*}
\text{CH}_3\text{SiF}_3 & \\
\text{SiH}_2\text{DI} & \\
\text{SiH}_2\text{DBr}^{79}, \text{SiH}_2\text{DBr}^{81} & \quad \text{B$_0$, C$_0$ evaluated} \\
\text{SiH}_2\text{DCl}^{35}, \text{SiH}_2\text{DCl}^{37} & (A.C. Turner)
\end{align*}
\]
(continued UNIVERSITY OF BIRMINGHAM)

\[
\begin{align*}
\text{Si}^{28}D_3I & : B_0, \text{DJK determined} \\
\text{Si}^{30}D_3I & : B_0 \text{ determined} \\
\text{SiH}_3\text{Cl}^{35} & : D_{\text{JK}}, D_J \text{ determined} \\
\text{SiH}_3\text{CN} & : D_{\text{JK}} \text{ determined} \\
\text{SiH}_3\text{C}^{13}N & : B_0 \text{ determined} \\
\text{SiD}_3\text{CN} & : B_0, D_{\text{JK}} \text{ determined}
\end{align*}
\]

(continued UNIVERSITY OF CALIFORNIA
Department of Chemistry
(Rollie J. Myers, W. D. Gwinn, and J. A. Howe)

1,1-dichlorocyclopropane & preprints distributed \\
sulfur tetrafluoride & preprints distributed \\
formic acid (dipole moment) & revised note in progress \\
l,1-dichloroethane & assignment including quadrupole coupling \\
ethylenimine & quadrupole coupling measured (no inversion observed) \\
trimethylene sulfide & assignment including excited states \\
cyclobutene & Q-branch assignment \\
trifluorornitromethane & assignment confirmed-work in progress on barrier determination \\
methyl nitrite & assignment confirmed-work in progress \\
tetrahydrofuran & assignment confirmed-work in progress \\
\text{IF}_5 & assignment-symmetric top \\
\text{CH}_3\text{SF}_5 & assignment-symmetric top \\
cis-1,2-dichloroethylene & preprints to be distributed \\
l,1-dichloroethylene & strong field Stark effect \\
phosgene & strong field Stark effect \\
trans-1-chloro-2-fluoroethylene & work in progress
4--COLUMBIA UNIVERSITY
Department of Chemistry
(Benjamin P. Dailey)

cyclobutylbromide
pyrimidine
quadrupole coupling patterns
in chlorobenzene

effectively complete
partially complete
nearly finished

5--COLUMBIA RADIATION LABORATORY
(L. C. Krisher)

CH$_3$COI

in progress

6--UNIVERSITY OF COPENHAGEN
Chemical Laboratory
(Børge Bak)

benzonitrile
furan
β-fluoronaphthalene
methyl ketene

5 isotopic species prepared and analyzed. Three further species being prepared (13C ring compounds).
2-13C and 3-13C furans prepared. Not yet analyzed. Same for 18O-furan
analyzed; being published
The parent compound prepared, microwave analysis in good progress. So far, no isotopic work, but planned.

7--EMORY UNIVERSITY
Department of Chemistry
(J. H. Goldstein)

excited torsional states in acrolein
α-chloroacrylonitrile

in progress
in progress

8--UNIVERSITY OF FREIBURG
Institute for Physical Chemistry, Freiburg i.BR.
(W. Maier)

(CH$_3$)$_2$S
(CH$_3$)$_2$S$_2$

in progress, publication being prepared
in progress, assignment under way
Rotational constants for CHCl\textsuperscript{35}F\textsubscript{2} and CHCl\textsuperscript{37}F\textsubscript{2} have been determined from low-J transitions. The spectrum of CDCF\textsubscript{2} will be studied in order to improve the structure determination. Dipole moment of CHCl\textsuperscript{35}F\textsubscript{2} has been measured by the Stark effect.

Many lines have been detected. An attempt is being made to identify them.

The Stark effect of the 1\textsubscript{1} \rightarrow 2\textsubscript{0} transition is being analyzed.

(I. Levine), in press
(W. Kirchhoff), in press
(P. Cahill and S. Butcher), in press
(L. Pierce and R. Jackson) (See Notre Dame), in press
(R. Jackson), in manuscript
(R. Beaudet), in manuscript
(I. Hirota), in manuscript
(R. Beaudet), work completed
(J. Rigden), analysis of several isotopes completed
(S. Butcher), analysis of several isotopes completed
(J. Rigden), analysis of several isotopes completed
(I. Hirota), partially analyzed
GeH$_3$Br
(J. Rigden), partial analysis

CF$_3$C$_6$H$_5$
(T. Sarachman), partial analysis, no further work

cyclopentene
(G. Rathjens and A. Esbitt), new analysis completed

SNF
(W. Kirchhoff), early stages

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(continued HARVARD UNIVERSITY)

11--UNIVERSITE LOUVAIN
Centre de Physique Nucléaire
(Robert Goedertier)

vinyl bromide
We have observed and attributed between 13.5 and 25.5 Gc the transition from $J = 1 \rightarrow 2$ and $J = 2 \rightarrow 3$ of 22 isotopic species (all the deuterated species, with carbon 12 and the two isotopes of bromine, and all the carbon 13 species with light hydrogen). The calculations for the determination of structure are presently in course.

sulphur dioxide
(F. Greindl) The spectrum has been observed between 13 and 25.5 Gc at normal and dry ice temperature. The spectrum is attributed for the fundamental vibrational state with $J = 40$ and some new lines for the $S_{34}O_2$. This work is carried out in view to investigate the first excited vibrational state.

ethyl alcohol
(J. Michielsen-Effinger) The spectra of C$_2$H$_5$OH and C$_2$H$_5$OD are observed in the 13 - 25.5 Gc range.

1.2 dibrom-ethylene
Earlier we tried to study this molecule, but no spectrum was observed.

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12--MICHIGAN STATE UNIVERSITY
Department of Chemistry
(R. H. Schwendeman)

ethyl chloride, CH$_3$CH$_2$Cl
complete structure by the substitution method; work completed and manuscript submitted.
chloromethylsilane, SiH₃CH₂Cl  complete structure by the substitution method, quadrupole coupling parameters, and barrier to internal rotation; work completed and manuscript submitted.

cyclopropyl chloride, CH₂CH₂CHCl  assignment made of C-type spectra of Cl-35 and Cl-37 species, work in progress on preparation of isotopic species.

isopropyl chloride, (CH₃)₂CHCl  work just getting underway.

13--NATIONAL BUREAU OF STANDARDS  (D. R. Lide, D. E. Mann, L. J. Nugent, T. N. Sarachman)

propylene (structure determination)  work completed, preprints already distributed.

(CH₃)₃CCCH and (CH₃)₃CCN  investigations substantially completed, but not yet written up.

CH₃AsF₂  problems now under active investigation on which significant progress has been made.

(CH₃)Cl₂ (structure determination)  other work in progress

CH₂CFCH:CH₂ (fluoroprene)  problems investigated during last year but dropped because results were not promising.

(CH₃)₂CC(Ch₃)CH:CH₂ (isoprene)  

CH₃CH₂CH₂Cl  

CH₂ClO₃  

NF₂ (spectrum not yet detected)  

(CF₃NSF₂ (tentative assignment)  

CH₃CCl₃ (isotopic species)  

C₃F₈ (perfluoropropane)  

C₃F₆ (perfluoropropylene)  

1,3 butadiene (unsuccessful attempt made to detect spectrum of cis form)
acrolein, CH$_2$CHCHO
H-bonding, CF$_3$COOH-HCOOH
and deuterated species
CF$_3$COOH-CH$_3$COOH
measurements completed on normal
three C$^{13}$ and O$^{18}$ species. Search
for isomers not successful.

measurements of "symmetric-top"
spectrum completed.

1,2,5 thiadiazole
ethyl bromide
propyl silane
ethyl methyl sulfide
ethyl methyl ether
dimethyl sulfide and
dimethyl silane
(V. Dobynes), Common, d$_2$, $^{34}$S, and
13C species assigned. H.F.S.
partially resolved.

(N. DiCianni, collaborating with
R. Jackson of Harvard University),
17 ground state transitions
assigned.

(C. Flanagan), Common species re-
measured, isotopic species (13C,
13C, and 2 deuterated) prepared.

(J. Flood), Ground-state a-type
and b-type transitions of trans
species assigned.

(L. Pierce), Ground-state assigned
(b-type) for both trans and gauche
form.

(L. Pierce), Ground-state and
several excited states assigned
(b-type) for trans form.

(L. Pierce), Measurements on first-
excited torsional state in progress.

PCl$_3^{35}$CO
spectrum has been completed, paper to be
submitted.
FCI\textsuperscript{37}CO almost complete and will shortly analyze the centrifugal distortion effect on relatively high J lines in the millimetre wave region.

17--RICE UNIVERSITY
Department of Chemistry
(R. F. Curl)

chlorine dioxide manuscript submitted
formaldoxime manuscript submitted

18--STANFORD UNIVERSITY
Department of Chemistry
(Victor W. Laurie)

F\textsubscript{2}CO assignment made

cyclobutanone spectra measured, partially analyzed
2-iodopropene spectra measured, not analyzed
2-bromopropene spectra measured, not analyzed
2-chloropropene isotopes made
nitroethylene spectra measured
azulene spectra measured

19--Swiss Federal Institute of Technology
Zurich, Switzerland
(Hs. H. Gunthard)

20--TECHNISCHEN HOCHSCHULE KARLSRUHE, Germany
(Werner Zeil)

(CH\textsubscript{3})\textsubscript{3}CCl isotopes made and spectra measured
(CH\textsubscript{3})\textsubscript{3}CBr normal species partially analyzed
(CH\textsubscript{3})\textsubscript{3}SiCCH and compounds prepared
(CH\textsubscript{3})\textsubscript{3}SiCCOD
(CH\textsubscript{3})\textsubscript{3}CCCl normal species investigated
(CH\textsubscript{3})\textsubscript{3}CCBr and (CH\textsubscript{3})\textsubscript{3}CCl prepared but no spectra yet
C\textsubscript{6}H\textsubscript{5}CCH normal species investigated
Papers for the molecules in the ground vibrational state have been published. Spectroscopy for the molecules in the vibrationally excited state is in progress. The spectra for the excited states of $v_3$, $v_5$, and $v_6$ modes have been assigned.

Spectral lines for the excited state of the $v_2$ mode have been found. A number of lines of isotopic species have been assigned.

Vibrationally excited lines were assigned. Anomaly of the $v_7$ excited state was explained by the near degeneracy of $v_4$ and $v_7$.

Spectral lines of several vibrationally excited states have been found. $^{13}C_1$ and $^{18}O$ species were observed with the natural abundances and the structure of the ring has been determined.

I appreciate your cooperation and hope this list will prove useful.

Sincerely,

E. Bright Wilson, Jr.
FORMULA INDEX
(Arrangement as in Townes and Schawlow.
Numbers refer to institution)

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<td>C₉H₁₀S₁</td>
<td>((CH₃)₃CCI)</td>
<td>20</td>
</tr>
<tr>
<td>C₉H₁₀S₁</td>
<td>((CH₃)₃CCN)</td>
<td>13</td>
</tr>
</tbody>
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