The time of slowing of the Li particles in FeB is smaller by a factor of about 0.5 than in B_4C. A further experiment using this compound as a γ-ray source together with an improved spectrometer resolving power may make it possible to give a definite value for the mean life of this excited state in Li^7 rather than only an upper limit.

The angular momentum of Li^7 in the ground state is $\frac{3}{2}$ and the 478.5-kev excited state is commonly supposed[5] to have angular momentum $\frac{1}{2}$ forming with the ground state a doublet, $^2P_{3/2}$ and $^2P_{1/2}$. On this basis the transition takes place by magnetic dipole radiation. The transition probability for this case may be calculated closely by considering the interaction of the magnetic moment $(e/2Mc)(L+5.6S)$ of the $2p$ proton in Li^7 with the radiation field. The square of the matrix element[6] representing this interaction is

$$\frac{8}{3}\left(\frac{2.3eh}{4\pi Mc}\right)^2,$$

which together with the energy 478.5 kev available for the transition gives a calculated mean life for the Li^7 excited state of 1.5×10^{-13} sec. This is seen to be consistent with the experimental upper limit of 2.0×10^{-13} sec.

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Microwave Determination of the Molecular Structure of Chlorosilane

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THE second rotational transition, $J=1$ to $J=2$, of SiH_3Cl^{35} and SiH_3Cl^{37} has been measured and analyzed. The Hughes-Wilson Stark modulation technique was used for detection of the absorption lines, and absorption frequencies were determined by comparison with a crystal-controlled secondary frequency standard.

In Fig. 1 is shown the theoretical hyperfine pattern for a nuclear spin of $\frac{3}{2}$ for chlorine which is in satisfactory agreement with the observed spectrum. No lines caused by excited vibrational states were observed. The unperturbed transition frequency ν_0 is 26,695.2_4 Mc for SiH_3Cl^{35} and 26,049.6_0 Mc for SiH_3Cl^{37}. From these frequencies, the I_B and B_0 values were calculated and listed in Table I. Since the quadrupole moments of Cl^{35} and Cl^{37} have been measured to be $-7.921\pm0.05\times10^{-26}$ and $-6.189\pm0.05\times10^{-26}$ cm^2,[1] respectively, we may evaluate $\partial^2V/\partial Z^2$ at

TABLE I. Nuclear and molecular constants of chlorosilane.

	ν_0(Mc/sec.)	I_B(g-cm^2) $\times10^{40}$	$eQ\left(\frac{\partial^2V}{\partial Z^2}\right)$(Mc)	B_0(cm^{-1})
SiH_3Cl^{35}	26,695.2_4	125.7_1	−40.0_0	0.2226$_3$
SiH_3Cl^{37}	26,049.6_0	128.8_3	−30.3_3	0.2172$_3$

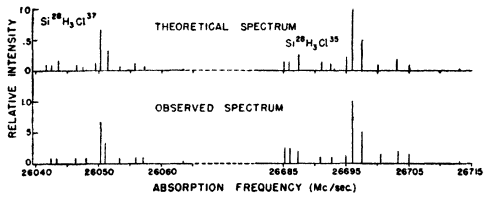

FIG. 1. Microwave absorption spectrum of monochlorsilane (SiH_3Cl).

the chlorine nucleus of chlorosilane to be about 7×10^{15} e.s.u. This is to be compared with the value 13×10^{15} e.s.u. as determined by Gordy[2] and his co-workers for methyl chloride.

Assuming the value of 1.456A for the Si−H distance determined from infra-red measurements on silane,[3] we may calculate from the I_B values in Table I, the Si−Cl internuclear distance to be 2.035A, and the H−Si−H angle to be 103° 57′. These are to be compared with the value 2.16A for Si−Cl computed from Pauling's covalent single-bond radii and the tetrahedral angle of 109° 28′. Electron diffraction measurements[4] on this compound yield a value of 2.06±0.05A for the Si−Cl distance.

The lines arising from $K=0\rightarrow0$ and $K=1\rightarrow1$ transitions were expected from theory to show second- and first-order Stark effect, respectively. This was strikingly observed in the experiment when only the $K=1\rightarrow1$ lines appeared at field of 10–20 volts/cm, being augmented by the $K=0\rightarrow0$ lines when the field was increased to several hundred volts/cm. The determination of the quadrupole coupling constants, $eQ(\partial^2V/\partial Z^2)$, was based on the frequencies of the $K=0\rightarrow0$ lines only, since these could be measured more accurately than the $K=1\rightarrow1$ lines because of experimental considerations.

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Argon and Neon (pn) Thresholds

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FROM mass values[1] one calculates a $Q=-1.1\pm1.1$ Mev for the reaction $A^{40}(pn)K^{40}$. Observation of the neutron threshold should give precisely the mass difference between the important isobars A^{40} and K^{40}. A gas target was recently available on the Wisconsin electrostatic generator so a quick search was made for this threshold. A BF_3 counter surrounded by paraffin served as neutron detector. The high resolution electrostatic analyzer[2] was