VI. MOLECULAR BEAM RESEARCH

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An experiment comparing the gyromagnetic ratios of K^{39} and H^1 has been performed on the second atomic beam apparatus. The results indicate that

$$\frac{g_J(K)}{g_J(H)} = 1.00015 \pm 0.00006 \quad .$$

Since $g_J(H)$ can be assumed to be very nearly equal to g_S, the gyromagnetic ratio of the electron, and since $g_J(K)$ has been measured carefully by Kusch[1] and co-workers this gives us a new value for g_S. We find $g_S = 2(1.00098 \pm 0.00008)$. This value is lower than the calculated value by 15 parts in 10^5.

A fuller discussion of these results with a description of the method used in this experiment has been submitted as a Letter to the Editor of the Physical Review.

References

1. P. Kusch, H. M. Foley: Phys. Rev. 74, 250, 1948; P. Kusch, H. Taub: Phys. Rev. 75, 1477, 1949; H. Taub, P. Kusch: Phys. Rev. 76, 1262, 1949

2. J. Schwinger: Phys. Rev. 73, 416, 1948; H. Karplus, N. M. Kroll: Phys. Rev. 77, 536, 1950

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Remeasurement of the hyperfine structure of the stable chlorine isotopes has resolved the nuclear magnetic dipole (1) and electric quadrupole moment (2) discrepancies that had existed between results obtained by atomic beam work and by other methods. We have found the previous work done in this Laboratory on chlorine to be partly in error. A detailed report of our work has been submitted as a Letter to the Editor of the Physical Review. Further experiments are being undertaken to examine the hyperfine structure in greater detail.

References

1. W. G. Proctor, F. C. Yu: Phys. Rev. 82, 20, 1951

2. R. Livingston: Phys. Rev. 82, 289, 1951; S. Geschwind, R. Gunther-Mohr, C. H. Townes: Phys. Rev. 81, 288, 1951

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