by spin-orbit coupling of other states into the ground state of FeF_2; this would reduce the field gradient and increase their deduced value of Q. However the latest determination of $g_{||}=2.25\pm0.05$ by Ohlmann and Tinkham[15] from antiferromagnetic resonance leads to too small an admixture to be significant. The precise cause of the discrepancy therefore remains unknown, but we suggest that it is due to changes in the effective value of $\langle r^{-3}\rangle_{3d}$ and the internal Sternheimer factor due to the different crystal environment of the Fe^{++} ion in the two crystals. It seems likely, therefore, that the discrepancy of 25% between the results gives some measure of the uncertainty in the deduced value of Q from the two sources of error we mentioned above.

The much more serious difference between the moment deduced from measurements on Fe^{++} salts (references 4, 7, and the present work) and on Fe^{3+} salts[5] cannot be explained satisfactorily at present. Part of the discrepancy may stem from the neglect of the effect of covalent bonding in the ferric salts (Fe_2O_3 and YIG) in the calculation of the effective electric field gradient acting on the electrons of the Fe^{3+} ion.

[15] R. C. Ohlmann and M. Tinkham, Phys. Rev. **123**, 425 (1961).

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Sign of the Li^8 Magnetic Moment*

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The sign of the magnetic dipole moment of Li^8 has been found experimentally to be positive, in agreement with theoretical expectation. Rates of transition among the Zeeman levels were compared for the two senses of circular polarization of a resonant rf field (1977 kc/sec in 3139 gauss). The short half-life (0.85 sec) of Li^8 required use of the polarized neutron-activation, beta-emission anisotropy detection, method previously applied to the measurement of the Li^8 nuclear g factor.

WE have found the magnetic dipole moment of Li^8 to be positive by an experiment which compared the transition rates (among Zeeman levels) produced by resonant rf fields of alternatively positive and negative circular polarization. The short (0.85 sec) half-life of Li^8 required use of the polarized neutron-activation, beta-emission, anisotropy-detection technique by which the nuclear g factor was measured.[1]

The sign of a magnetic dipole moment is conventionally defined so that a rotating positive charge has a positive moment.[2] Taking the direction of a static magnetic field $\mathbf{H}_0$ as given by the Lorentz equation $\mathbf{F}=(e/c)(\mathbf{v}\times\mathbf{H}_0)$, an observer looking in the field direction would see the Larmor precession of a positive moment as counterclockwise.[3] It is well known that transitions among the Zeeman levels in a strong field $\mathbf{H}_0$ may be produced by a small perturbing field $\mathbf{H}_1$ which rotates synchronously with the Larmor precession. The opposite sense of rotation is less effective[4] by the factor $(H_1/H_0)^2$, usually of order 10^{-6} or less. Comparison of

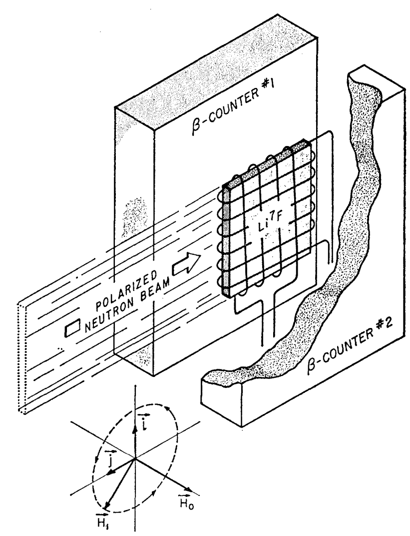

FIG. 1. Experimental geometry. Neutron and nuclear polarization are parallel to $\mathbf{H}_0$. $\mathbf{H}_1$ rotates at the Larmor frequency in the $i-j$ plane, normal to $\mathbf{H}_0$.

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[1] D. Connor, Phys. Rev. Letters **3**, 429 (1959); Argonne National Laboratory Report ANL-6263, 1960 (unpublished).

[2] H. H. Staub and E. H. Rogers, Helv. Phys. Acta **23**, 63 (1950).

[3] We apologetically use the symbol H for magnetic fields, following the nearly universal custom in the magnetic resonance literature.

[4] F. Bloch and A. Siegert, Phys. Rev. **57**, 522 (1940).

TABLE I. Beta asymmetry for various polarizations of rf field $\mathbf{H}_1$. R_1, R_2 are the counting rates for the counters shown in Fig. 1, where the unit vectors **i**, **j** are also shown. ω_L is the Larmor frequency.

H_1 (gauss)	Asymmetry $A=2(R_1-R_2)/(R_1+R_2)$ (percent)
0	10.9 ± 0.9
$0.3\ \mathbf{i}\cos\omega_L t$	0.2 ± 0.9
$0.3\ \mathbf{j}\sin\omega_L t$	0.6 ± 0.9
$0.3\ (\mathbf{i}\cos\omega_L t-\mathbf{j}\sin\omega_L t)$ (counterclockwise)	0.6 ± 0.6
$0.3\ (\mathbf{i}\cos\omega_L t+\mathbf{j}\sin\omega_L t)$ (clockwise)	5.6 ± 0.6

the transition rates for the two cases thus determines the sign of the moment.

Experimentally, we observed the left–right asymmetry in the beta decay of polarized Li^8 nuclei. Zeeman transitions reduce the (time average) nuclear polarization and therefore the magnitude of the observed asymmetry, the asymmetry decreasing monotonically (but not linearly) with the transition rate.[1] The experimental geometry is shown schematically in Fig. 1. Rotating fields of either sense could be provided by appropriate choice of the phase and relative magnitude of the rf currents through the orthogonal coils wound about the Li^7F sample. Use of either coil singly provided a linearly oscillating field (decomposable into the sum of equal rotating fields of *both* senses and therefore certain to produce transitions). The radio frequency was always 1.977 Mc/sec, the Larmor frequency in our static field of 3139 gauss. A small search coil was used to measure H_1 at the sample position. By observing the shift in phase of the search coil signal as it was rotated about $\mathbf{H}_0$, the sense of rotation of $\mathbf{H}_1$ could be checked. The direction of $\mathbf{H}_0$ was established from the deflection of a current-carrying wire in the field.

The results are given in Table I. It is clear that clockwise rotation of $\mathbf{H}_1$ is ineffective in destroying the asymmetry. (The appreciable effect even with clockwise rotation is undoubtedly due to our failure to produce *pure* circular polarization.) The Larmor procession is therefore counterclockwise and the magnetic dipole moment is positive. This result is the expected one, agreeing with estimates made for Li^8 from either the $j-j$ or LS coupling limit.