Nucleus	Sr^{90}	Sr^{91}	Y^{90}	Y^{91}	Sb^{125}	Cs^{137}
$(W_0^2-1)ft\times 10^{10}$	0.4	0.7	0.3	0.8	1.1	1.8

The criterion fits Sr^{89} and K^{42}; in both cases shell model considerations support the assignment $\Delta I=\pm 2$ and change in parity. An excellent measurement of K^{42} has already been made by Siegbahn.[9] It disintegrates (Fig. 1) by negatron emission to the ground state of Ca^{42} and also to an excited state followed by a gamma-ray. We have analyzed Siegbahn's data for the high energy component with results shown in Fig. 2 both for an allowed FK plot and again as a forbidden FK plot wherein the factor G is included. The bulging curvature of the one and the near-straightness of the other confirm the above-stated criterion as well as those aspects of the shell model and of the Fermi theory of beta-decay which are involved in this example.

The shell model associates the odd configuration $(3d)^{-1}(4f)^3$ with the ground state of K^{42}. Similarly the even configuration $(4f)^2$ may be associated with the ground state of Ca^{42} (probably $I=0$) and with low excited states ($I=2$, 4, and 6). We suggest $I=2$ and even parity for the excited state of Ca^{42} observed in the K^{42} decay. The low energy transition is thus interpreted as first-forbidden with $\Delta I=0$.

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The Magnetic Moment of Be^9 *

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THE ratio of the frequency of the nuclear magnetic resonance of Be^9 to that of the proton has been measured at 7000 gauss by the magnetic-resonance-absorption method of Pound, Purcell, and Torrey.[1] The magnet and radiofrequency bridges employed were those used by both Bitter[2] and Poss[3] in their recent nuclear-magnetic-moment determinations. However, the accuracy of the present measurement exceeds that of previous measurements with this equipment by about a factor of ten. This was accomplished by taking advantage of the almost integral ratio of the two frequencies and heterodyning the seventh harmonic of the Be^9 frequency with the fundamental of the proton frequency.

Both the proton and Be^9 resonances were obtained from a single sample consisting of an aqueous solution of beryllium fluoride. The sample container was a cylindrical section $\frac{1}{2}$-in. long and $\frac{1}{2}$ in. in diameter. The coil for the 4.2-Mc (Be^9 resonant frequency) bridge was wound around the cylinder, and the coil for the 30-Mc (proton resonant frequency) bridge was wound at right angles over the first. This technique has previously been used by F. Bitter and assures that the external magnetic field seen by the two types of nuclei is the same. The two resonances were traced on separate recording milliammeters as the magnetic field was slowly varied. The frequencies were adjusted so that the resonances occurred nearly simultaneously. From a calibration of the rate of change of magnetic field, a correction was made, when necessary, to take into account the small field differences separating the two resonances. This correction never exceeded 0.003 percent of the observed frequency ratio.

A total of ten determinations was made. From these the following value for the ratio of the resonant frequencies in the same magnetic field was obtained:

$$\nu(Be^9)/\nu(H^1)=0.1405187\pm 0.000002.$$

All ten values fall well within the above limits which were determined entirely by the uncertainty in locating the exact centers of the resonance curves.

Applying the Lamb[4] diamagnetic correction, and using the Millman and Kusch[5] value of the proton moment (2.7896 ±0.0008) μ_N, the Be^9 magnetic moment is found to be

$$\mu(Be^9)=(-)(1.17619\pm 0.00034)\mu_N.$$

If, in agreement with more recent experiments, the more accurate value[6] of $(2.7926\pm 0.0006)\mu_N$, is taken for the proton moment, the following value is obtained:

$$\mu(Be^9)=(-)(1.17747\pm 0.00027)\mu_N.$$

It is to be noted that the uncertainties indicated for the Be^9 magnetic moment are determined by the uncertainty in the proton moment and not by that of the above frequency ratio.

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Paramagnetic Resonance Absorption in Crystals Colored by Irradiation

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PARAMAGNETIC resonance absorption at 9350 mc produced by the irradiation of LiF with neutrons has been observed. Single crystals of LiF, which showed no resonance, were irradiated in a flux of approximately 10^{12} neutrons cm^{-2} for periods of time varying from 1 to 24 hrs. After irradiation, these crystals showed the resonance absorption described in Fig. 1, when placed at the midpoint of a resonant section of

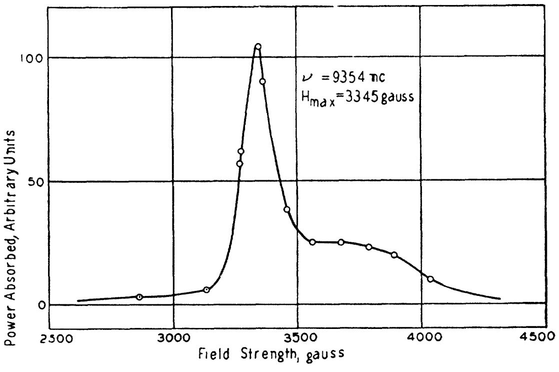

FIG. 1. Resonance absorption of LiF crystals after irradiation with neutrons.