ment with that reported for V^{51} by Proctor and Yu.[4] The spin for V^{50} is as yet undetermined; however, the Mayer shell model[12] predicts both odd nucleons to be in the $^2F_{7/2}$ states. If the spins are assumed to be additive, the compound nuclear magnetic moment (uncorrected) becomes +3.898 nuclear magnetons. Using a diamagnetic correction of 0.171 percent,[13] the corrected value becomes $\mu(V^{50})=+3.905$ n.m., which may be compared with the $j-j$ coupling value of 3.85 n.m. as computed from data given by Feenberg.[14]

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Lifetime of an Excited State of Hf^{176}

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An excited state in Hf^{176} with a half-life $(1.35\pm0.10)\times10^{-9}$ sec has been observed with a delayed coincidence scintillation spectrometer using sources of Lu^{176}. The isomeric transition is classified $E2$ by a measurement of the K-shell internal conversion coefficient.

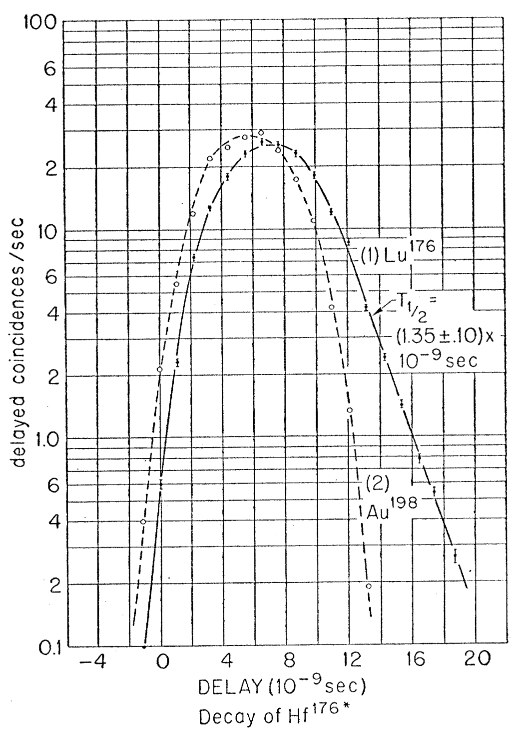

FIG. 1. Delayed coincidences as a function of the delay time.

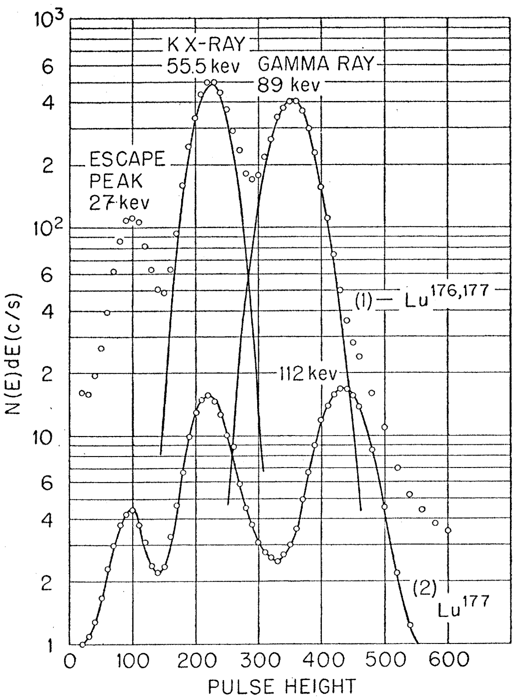

FIG. 2. Spectrum of the γ-radiation following the β^- decay of Lu^{176}.

Lu^{176} (3.75 hr) is known[1] to decay by two beta-ray groups into Hf^{176}. The softer beta-ray group is followed by an 89-kev γ-ray.

Curve (1) of Fig. 1 shows the number of coincidences as a function of the delay time with a source of Lu^{176}. This delayed coincidence resolution curve was recorded by exciting one channel of the delayed coincidence apparatus by 250- to 400-kev nuclear beta-rays and the other channel by the L, M, or N internal conversion electrons of the 89-kev transition.

A resolution curve for prompt events was obtained with a source of Au^{198}. The prompt coincidences were (a) between 50 to 110 kev nuclear beta-rays and the internal conversion electrons of the 411-kev transition, and (b) between 50- to 110-kev Compton recoil electrons and 250- to 400-kev nuclear beta-rays. Curve (2) of Fig. 1 shows the result of such a measurement. Thus, for delay $T\geqslant12\times10^{-9}$ sec the half-life of Hf^{176*} may be determined from the slope of curve (1).

The K-shell internal conversion coefficient of the 89-kev transition was obtained from a spectral measurement of the γ-radiation following the beta-decay of Lu^{176}. A typical spectrum of the K x-ray and the 89-kev γ-ray obtained with an NaI scintillation spectrometer is shown in Fig. 2. Curve (1) is the spectrum of the γ-radiation from Lu^{176} plus Lu^{177} (6.7 days) which is present in the source. Curve (2) is the contribution of Lu^{177} to the spectrum. The intensity ratio of the K x-ray to the γ-ray is obtained from the observed spectrum provided the appropriate corrections are made for fluorescent yield, effective detection efficiency, and escape peak intensities. The result for $\alpha_{exp}{}^K$ is 1.25 ± 0.15.

The extrapolated K-shell internal conversion coefficients[2] for electric dipole, quadrupole, and magnetic dipole are $\alpha_1{}^K=0.40$, $\alpha_2{}^K=1.35$, and $\beta_1{}^K=6.1$. Thus, the transition is of the $E2$ type and the spin of the metastable state is two. Scharff-Goldhaber, der Mateosian, and Mihelich[1] reached this conclusion from a measurement of the K/L conversion ratio. This is another example of the rule that the first excited state in even-even nuclei has spin 2 and even parity, assuming even parity for the ground state as seems likely by the shell model.

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