3. On the Beta- and Gamma-Spectrum of Cs\(^{137}\)

Toshio AZUMA and Kiichi KIMURA.

(K. Kimura Laboratory)

Using the double coil, thin lens magnetic beta-ray spectrometer, we measured the beta and gamma spectrum of Cs\(^{137}\). As the shape of its spectrum was accurately known (H.M.Agnew and H.I.Anderson, Rev.Sci.Inst. 20, 873 (1949)), we studied the Kurie-plots of the 518 kev beta-rays and the effect of the internal L-conversion line on the value of the internal conversion coefficient of 665 kev gamma-rays.

The source used was the Cesium chloride of 0.1 mc. intensity deposited on a Zapon film of about 20 \(\mu\)g./cm.\(^2\) in thickness. The detector used was an end-window type G-M counter whose mica window was 2.9 mg./cm.\(^2\) in thickness. We could resolve the internal L-conversion line of 665 kev gamma-rays, after we sputtered the aluminium of about 0.3 mm. thickness on the brass helical baffle in the spectrometer. We studied the Kurie-plots of the 518 kev beta-rays, using the correction factors (a) and (c) of Langer and Price (Phys. Rev. 76, 641 (1949)).

- first forbidden: \(a \sim (w_0^2 - 1) + (w_0 - w)^2\), \(\Delta j = \pm 2\), parity change, yes.
- second forbidden: \(c \sim 3(w_0^2 - 1)^2 + 3(w_0 - w)^4 + 10(w_0^2 - 1)(w_0 - w)^2\), \(\Delta j = \pm 2\), parity change, no.

The Kurie-plot with the correction factor of (a) was on a straight line, where \(w_0\) was 2.04. The influence of the thickness of the mica window was corrected by this straight Kurie-plot of the first forbidden. The ratio of corrected area of 518 kev beta-rays and the area of internal K-conversion line was estimated as 5720 mm\(^2\)/545 mm\(^2\) = 0.095. This value of the internal conversion coefficient corresponded to that of the former author (M.A.Waggon: Phys, Rev. 82, 906 (1951)). But the ratio of the area of L and K line was 12 percent. There seems to be some obscureness in the separation of K and L lines.


4. On the Reaction of O\(^{16}\) by Fast Neutrons. (I)

Kiichi KIMURA, Ryutaro ISHIWARA, Masakatsu SAKISAKA,
Isao KUMABE, Sukeaki YAMASHITA and Kozo MIYAKE

(K. Kimura Laboratory)

The resonances in the reactions of O\(^{16}\)