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October 25, 1945

ENERGY OF FISSION FRAGMENTS OF 25, 28, 49 - T. Snyder

A foil containing 50 micrograms of α -stage 25 per square centimeter was mounted in a parallel-plate pressure ionization chamber with a guard ring. A long-time-constant amplifier fed fission pulses from this chamber into two discriminator circuits with a differential output. Pulses from a standard pulse generator fed onto the high voltage electrode of the chamber were used to calibrate the discriminator settings for ion chamber input pulse size. The response was quite linear over the region of fission pulses. The fission pulse distribution curve obtained for thermal neutrons from the graphite block incident on the 25 consisted of two peaks. The sum of the energies of the two peaks was 170 Mev, the same within experimental error as that found by Kanner and Barschall¹⁾ for 28. The striking difference however, was that the minimum between the two peaks in this case went to zero whereas for 28 Barschall found it only goes down to about half the peak heights.

To study 49, electron collection was necessary to eliminate α pile ups. The chamber was rebuilt with a grid for this purpose between the plates.

Visually the particle pulse heights looked extremely uniform. Instead of the single differential channel used for 25, a ten channel discriminator was employed. The α 's fell easily in one channel. However, this circuit was not yet entirely debugged and the channel limits tended to jump around thereby smearing out the pulse size resolution by an undefined amount. A trial run with 25 showed this clearly. The interpeak minimum was one-third the peak height instead of zero as before.

A depleted or 28 foil gave similar total energy of fragment when bombarded by fast neutrons through a cadmium box. This time the minimum-maximum ratio was .5 and the peaks were closer together than those of 25.

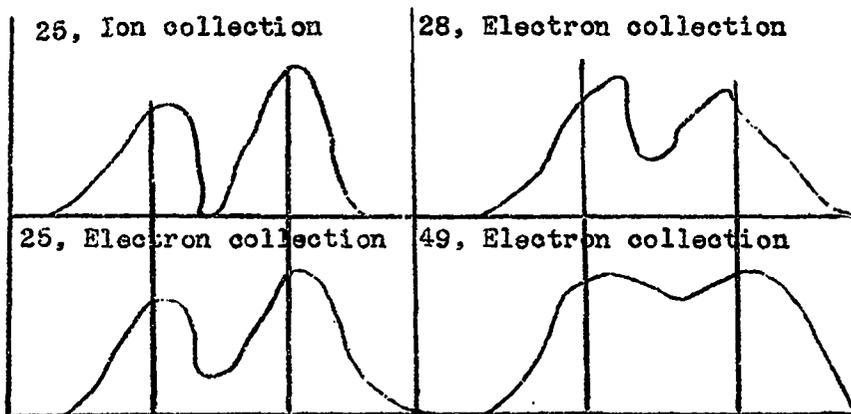
Barschall, Phys. Rev. 57, 372 (1940)



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Finally a one-gamma foil of 49 was put in the chamber and thermal neutrons were used again. The total energy obtained was again the same within 5 Mev but the peaks were much broader than in either of the other cases and the minimum-maximum ratio was about .75. In conclusion, the following sketches show the general nature of the results obtained in the four measurements.

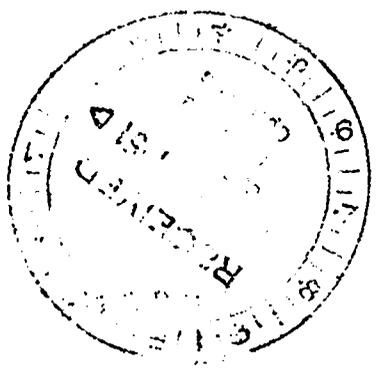
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