$$\frac{(2J)!}{[(2j-\lambda)!(2j'-\lambda)!]^2}\rho_J{}^2\sum_{\sigma=0}^{\lambda}\frac{(2j-\sigma)!(2j'-\lambda+\sigma)!}{\sigma!(\lambda-\sigma)!}=1. \quad (4)$$

The summation over σ can be carried out, either by expressing it as a hypergeometric function, or just by using properties of binomial coefficients. Its value comes out to be

$$(2j-\lambda)!(2j'-\lambda)!\binom{2j+2j'+1-\lambda}{\lambda}$$

and finally

$$\binom{2J}{2j-\lambda}\binom{2J+1+\lambda}{\lambda}\rho_J{}^2=1. \quad (5)$$

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[1] B. L. van der Waerden, *Die Gruppentheoretische Methode in der Quantenmechanik* (Julius Springer, 1932). A different method, leading to a formally different—though of course equivalent—result is given by Eugen Wigner, *Gruppentheorie und ihre Anwendung auf die Quantenmechanik der Atomspektren* (Friedr. Vieweg and Sohn, 1931).

Disintegration of Uranium

We have observed the disintegration of uranium[1] by neutrons in a cloud chamber containing air, water vapor, and alcohol vapor at a total pressure approximately 15 cm of mercury. The uranium was introduced into the cloud chamber in the form of UO_3 on thin collodion foils. On 885 stereoscopic photographs we have observed 25 examples of two tracks representing heavy particles recoiling in opposite directions, apparently from the same point in the thin foil. The uranium alpha-particle tracks on the same photographs are very faint, and so are easily distinguishable from the heavy tracks. A series of photographs made under similar conditions but with the uranium out of the cloud chamber showed no heavy tracks.

Some of the heavy tracks have short branches associated with them, presumably representing recoil carbon, nitrogen or oxygen atoms, since the tracks are too dense to be protons. In most of these cases the track of the heavy particle is deflected imperceptibly. The accompanying photograph shows two heavy tracks with three short branches. In the branch near the end of the lower track the angle of the fork is measurable when the track is reprojected. If the ratio of masses between the heavy track and the spur were as small as six the heavy track would be deflected by 10°, an easily detectable amount. Thus, assuming that the fork is the track of something at least as heavy as carbon, the mass of the particle in the main track must be greater than 75 mass units.

The maximum range observed for the heavy particles was approximately three centimeters of standard air. We have a few photographs which might be interpreted as showing more than two particles in the disintegration. However, the evidence for such a phenomenon is very meagre. We are continuing the experiments using heavier gases in the cloud chamber in order to measure the mass of the heavy particles from their collisions with the gas atoms.

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[1] O. Hahn and F. Strassmann, Naturwiss. **27**, 11 (1939).

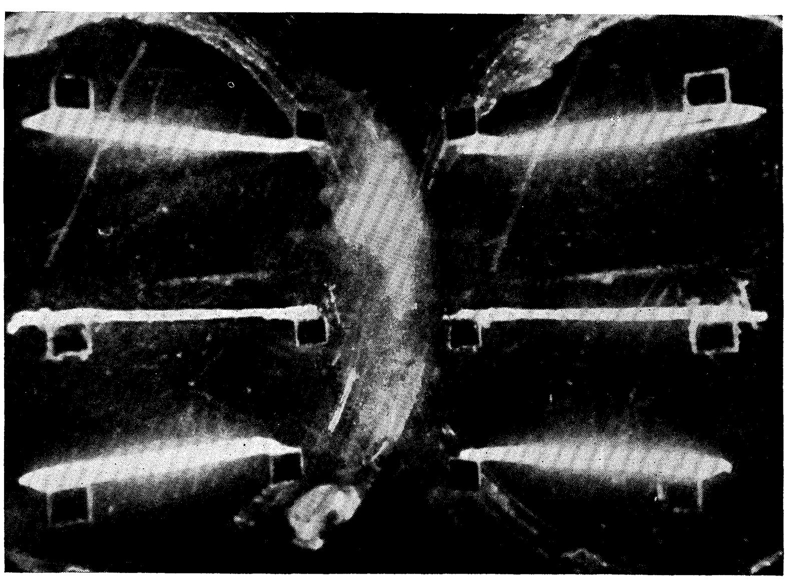

FIG. 1. Photograph showing heavy particles recoiling in opposite directions from uranium film under neutron bombardment.

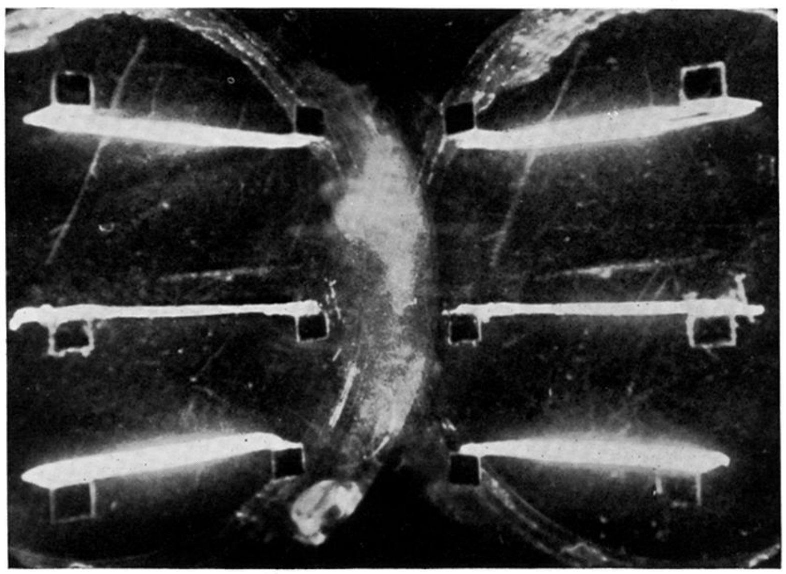

FIG. 1. Photograph showing heavy particles recoiling in opposite directions from uranium film under neutron bombardment.