ANGULAR ANISOTROPY OF SCATTERING OF FRAGMENTS IN FISSION OF Am^{241} *BY 14.7-Mev NEUTRONS*

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To explain the influence of nuclear structure on the angular anisotropy of fission it is necessary to study the angular distribution of the fission products of as many nuclei as possible. To extend the investigations[1-3] to include the heavier elements, we studied in the present work the angular distribution of the fragments of Am^{241} fission induced by 14.7-Mev neutrons.

The method previously described[2] was used to determine the relative amount of fragments in directions parallel and perpendicular to the direction of the incident neutrons. Taking into account the effect of the motion of the center of mass, the finite nature of the angular resolution, and the background of scattered neutrons, we found that the degree of angular anisotropy of Am^{241} is 1.08 ± 0.06.

The small anisotropy of Am^{241}, which has a spin $^5/_2$ and which forms an odd-odd nucleus upon capture of a neutron, is not in contradiction with the ideas of O. Bohr.[4] However, within the framework of these ideas, it is difficult to understand why the anisotropy is weaker in Am^{241} than in Np^{237} (for which the degree of anisotropy is 1.16 ± 0.02, see reference 1), although both nuclei have equal spins and parities.

The value obtained for the degree of anisotropy of Am^{241} confirms the previously noted[1-3] tendency towards reduced anisotropy with increasing value of Z^2/A of the fissioned nucleus. Yet, comparing the anisotropies in the fission of Np^{237}, Tu^{239}, and Am^{241}, with values of 1.16 ± 0.02 (reference 1), 1.15 ± 0.05 (reference 2), and 1.08 ± 0.06 respectively, it is noted that the degree of anisotropy varies relatively slowly in the region of transuranic elements.*

It is possible that the observed reduction in the anisotropy with increasing Z^2/A can be understood within the framework of Strutinskiĭ's statistical theory.[5]

In conclusion, the authors express their gratitude to G. I. Khlebnikov for precipitating the americium on an aluminum foil.

*It appears that the small difference in the value of the energies of the neutrons causing the fission (14.3, 14.8 and 14.7 Mev respectively for the fission of Mp^{237}, Tu^{239} and Am^{241}) is not very significant in this case.

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MEASUREMENT OF THE MASS OF COSMIC-RAY PARTICLES UNDERGROUND

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The present note describes the results of experiments to measure the mass of cosmic-ray particles underground by means of a magnetic spectrometer, which was simultaneously used for the measurement of the momentum spectrum and the positive excess of μ mesons at a depth of ~ 40 m. water equivalent.

The diagrams showing the apparatus, and a short description of it, are given in reference 1. A block of lead 6 cm thick was placed above the instrument to screen it from electrons. A system of lead absorbers separated by trays of hodoscope counters was placed under the telescope. For particles stopping in the absorbers, it was possible to determine the value of the mass from their momentum and range. The purpose of the experiment was not to conduct precision measurements of the particle mass and therefore thick absorbers were used. The absorbers, (V, VI, VII in Fig. 1[1]) were each of 4 cm thickness.