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ANGULAR DISTRIBUTION OF Pu-239 PHOTOFISSION FRAGMENTS NEAR THRESHOLD, USING NEUTRON CAPTURE GAMMA RAYS

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The angular distribution of Pu-239 photofission fragments produced by thermal neutron capture gamma rays in two targets placed in the IEA-R1 reactor are measured. The detailed experimental arrangement description can be found in references (1,2). The Pu-239 sample was supplied by the INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA) and contained a total of 51.4 mg, deposited on four titanium discs each with an active diameter of 40 mm. The isotopic analysis of the sample is: Pu-239 (99.01%); Pu-238 (0.01%) and Pu-240 (0.98%). The Makrofol KG (8μ) track detector foils were used to record the fission fragments. These foils, after being irradiated, were etched in a KOH solution (35% wt) at 60 ^{o}C, for 30 minutes, and the tracks were counted by means of an automatic sparking chamber (2). Angular distributions of the form $W(\theta) = A + B\ SIN^2(\theta)$ were observed for mean excitation energies of 5.43 MeV (Sulphur target) and 7.35 MeV (Lead target). An anisotropy, which corresponded to ($B/A = (-0.122 \pm 0.038)$) was recorded for E = 5.43 MeV, as can be seen in figure 1. From this result, the possible channels yielding this Pu-239 photofission angular anisotropy are: (K = 1/2 state) with 37% of probabilities; (K = 3/2 state) with 63% of probabilities. The angular distribution for E = 7.35 MeV was practically isotropic ($B/A = (-0.01 \pm 0.02)$). Our results are compared with the results of the other authors as can be seen in figure 2, and are in reasonable agreement.

1- L.P. GERALDO - J. Physics G-Nucl. Phys. 12 (1986) pg. 1423-31.
2- M.A.P.V. MORAES and M.T. CESAR - to be published in Nuc. Ins. Meth.
3- N.S. RABOTNOV et. al. - Nucl. Phys. 77 (1966) pg. 92-98.
4- A.P. BAERG et. al. - Can. J. Phys. 37 (1959) 148.

FIGURE 1- angular distribution of the Pu-239 photofission fragments for E = 5.43 MeV. The experimental points were normalized at 0 deg. The dotted curve is a least square fit to the function $W(\theta) = A + B\ SIN^2(\theta)$.

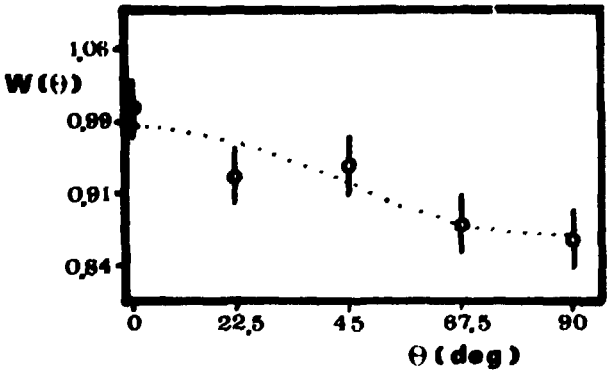

FIGURE 2- angular anisotropy of Pu-239, defined as B/A, measured by several authors as function of the excitation energy.