tor feeding SC_1 and SC_2 [6].

The useful events were selected in accordance with their ranges in SC_2, the pion emission angles (determined in SC_1), the neutron emission angle, by setting of the n-detector to a corresponding kinematic angle for the reaction $\gamma p \to \pi^+ n$, and also in accordance with the time of flight of the pion and neutron, determined by the fast triple coincidences.

In the measurements, the counters with the spark chambers were placed in planes parallel and perpendicular to the photon polarization plane. In each such measurement, the background events from the carbon nuclei present in the polyethylene target, were taken into account by taking the neutron counter out of the reaction plane [7], and ranged from 30 to 10%.

On the basis of the selected 2500 out of 11000 scanned events, we calculated the values of the asymmetry, which are listed in the following table for $\theta_{c.m.} = 106°$.

E_γ, MeV	229 ± 19	241 ± 13	250 ± 13	258 ± 13
P- photon beam polarization	0,122±0,011	0,129±0,0075	0,134±0,0085	0,137±0,0063
$A = \frac{(d\sigma_\perp - d\sigma_\parallel)}{(d\sigma_\perp + d\sigma_\parallel)}$	0,020±0,19	0.17±0.26	0.17±0,2	0,34±0,22

Here $d\sigma_\perp$ and $d\sigma_\parallel$ are the cross sections for the photoproduction of π^+ mesons in planes perpendicular and parallel to the photon polarization plane.

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SUBBARRIER FISSION OF Am^{241} BY NEUTRONS

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The dependence of the fission cross section σ_f of Am^{241} on the neutron energy E_n has a clearly pronounced "threshold character" [1 - 3]. The fission threshold determined from these data amounts to approximately 0.9 MeV, below which $\sigma_f(Am^{241})$ decreases steeply (exponentially) to 9 mb at E_n = 0.4 - 0.5 MeV. Recent measurements of this cross section, performed by the time of flight method using an underground nuclear explosion as the neutron source [4], have made it possible to investigate a wider range of lower energies. The investigations have shown that below 50 keV, σ_f again increases sharply by approximately 100 times, reaching approximately 1 b, a value comparable with the cross section above the threshold. The aggregate of the published measurement results [1 - 4] is shown in the figure, and the data of [4] are represented by the histogram. To exclude the systematic discrepancies of the values of σ_f, the data of [1] were multiplied by 1.39 and those of [2] by 1.05.

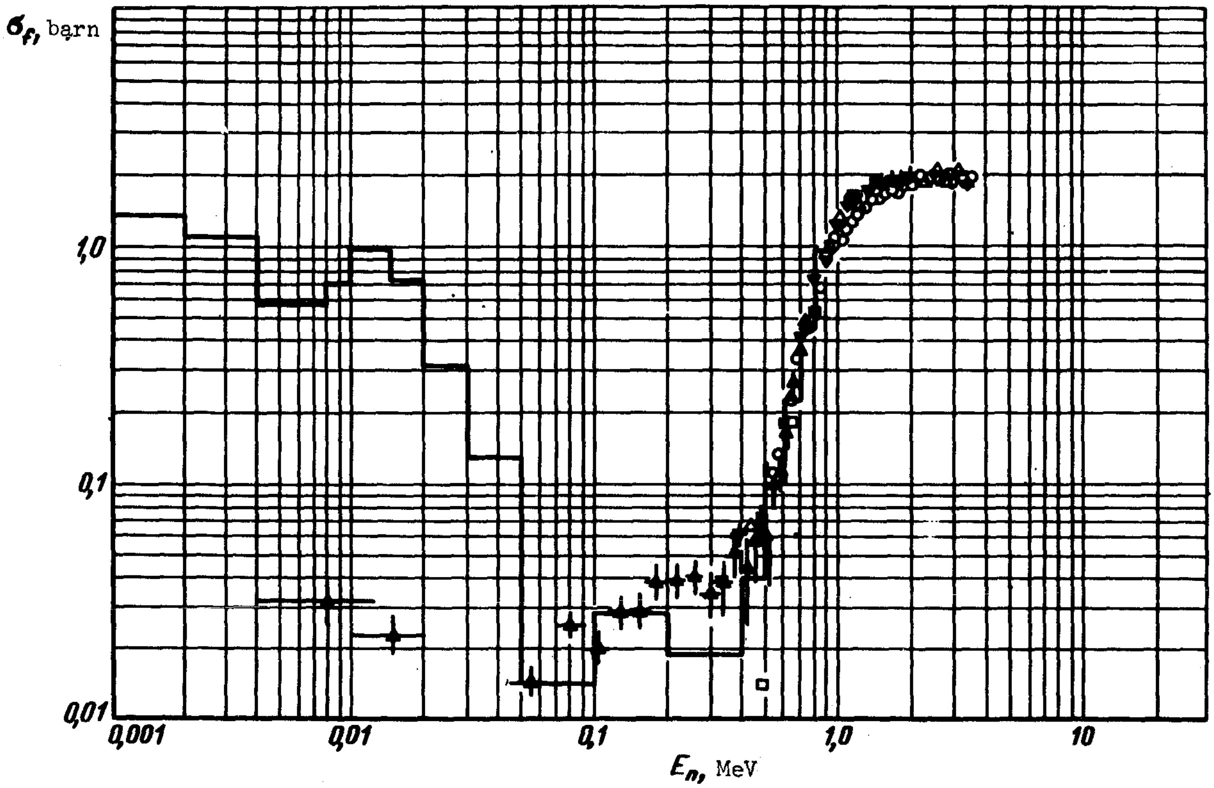
The rise of the cross section in the deep-subbarier region has the character of a "jump," which develops in a very narrow energy interval close to 30 keV. This phenomenon does not agree qualitatively with the traditional notion of monotonic dependence of the penetrability of the fission barrier, and was discussed by Lynn [5] and Vorotnikov [6] in connection with the problem of quasistationary states and the intermediate structure in the fission cross sections. To explain it, it was proposed in [6] that the radiation width for p-neutrons is anomalously small, $\Gamma_\gamma^P \leq 10^{-2} \Gamma_\gamma^S$.

The unusual nature of the discussed phenomenon, and the lack of a satisfactory explanation, has induced us to investigate in the case of monoenergetic neutrons obtained with the aid of an electrostatic generator. To this end, we used the results of measurements of the angular distributions of the fission fragments of Am^{241} (n, f), published earlier in [7]. The experimental procedure used in [7] (glass detectors) has permitted simultaneous measurements of the number of fissions for several samples of the investigated isotopes - Am^{241}, Pu^{239}, and Np^{237}. We used in these measurements two groups of samples and detectors, placed at angles 12.5 and 150° to the proton beam at equal distances from the solid tritium target, thus permitting two independent series of measurements in two non-overlapping proton-energy regions. It was possible to determine the relative course of $\sigma_f(Am^{241})/\sigma_f(Pu^{239})$ by scanning the detectors that registered the Pu^{239}(n, f) fission acts.

The measurements at 150° made it necessary to introduce noticeable corrections for the background of the scattered neutrons, reaching 50% for E_n in the keV region. To plot the relative variation of $\sigma_f(Am^{241})$ we used the values of $\sigma_f(Pu^{239})$ recommended by Hart [8]. The relative measurement data were converted into absolute ones by normalization to the results of [3]. Our final results are shown in the figure. The errors of the low-energy series of measurements at 150° are appreciable, but the discrepancy from the results of [4] in the region $E_n < 50$ greatly exceeds any uncertainty of our experiment. All sets of data are in good agreement at higher energies.

It is of interest to compare the results of our data on σ_f in the dramatic energy region $E_n \sim 10$ keV with feasibility by slow neutrons. At these energies, the contribution of the S-wave to the cross section for the production of the compound nucleus is already larger by one order of magnitude than the contribution of the P-wave. The fission width Γ_f^S averaged over the first 11 resonances amounts to 0.18 ± 0.06 meV [9]. We assume further that in the 10 keV interval the average width Γ_f^S changes insignificantly, and substitute its value in the expression for the fission cross section

$$\sigma_f = 2\pi^2 \lambda^2 g(\Gamma_n / \bar{D})[\Gamma_f^S / (\Gamma_n + \Gamma_\gamma)] , \tag{1}$$



Fission cross section σ_f of Am^{241} vs. neutron energy E_n: □ - [1], o - [2], Δ - [3], ▲, ▼ - present data, obtained at measurement angles 12.5° and 150°, respectively; histogram - [4].

using $2g\Gamma_n^0 = 0.18$ meV, $\bar{D} = 1$ eV, and $\Gamma_\gamma = 40$ meV [4]. Here λ is the neutron wavelength, Γ_n the neutron width, and $\bar{D}$ the mean distance between levels. The calculated σ_f is 10 mb, which is in good agreement with the experimental values.

This result shows, first, that the low-energy part of σ_f is due mainly to fission by S neutrons and not by P neutrons as in [6]; second, it becomes unnecessary to make use of the too strong assumption that the radiation width is greatly suppressed for the P-wave [6]. In other words, a review of the experimental data eliminates the difficulties of the interpretation of the low-energy section of the dependence of $\sigma_f(Am^{241})$ on E_n, which behaves, according to our results, in approximately the same manner as for other threshold nuclei.

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SELF-SYNCHRONIZATION OF TRANSVERSE MODES OF A CO_2 LASER

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We report here the results of experiments on the synchronization of the transverse modes of a CO_2 laser with the aid of a nonlinear BCl_3 absorber. The self-synchronization was accompanied by spatial rocking of the laser emission at the frequency of the intermode beats.

Wood and Schwarz [1] synchronized several longitudinal modes of a CO_2 laser with a nonlinear SF_6 absorber. In our experiments we used BCl_3, which is a more suitable saturating filter for CO_2 lasers from the spectral point of view [2, 3].

The experiments were performed with a laser with a semi-confocal resonator 17.6 m long. The output mirror was a plane-parallel germanium plate. The cell with the BCl_3 was located near the output mirror. A rectangular graphite diaghragm placed near the spherical mirror separated the TEM_{moq} modes. The frequency intervals were 8.5 and 4.25 MHz between the longitudinal and transverse modes, respectively.

The laser emission was recorded with a Ge:Zn receiver, using an S-1-11 oscilloscope and an S-4-8 spectrum analyzer.

Stable synchronization of the transverse modes was observed for a cell 1 mm thick at BCl_3 pressures from 2 to 12 torr. The synchronization of the transverse modes was accompanied by transverse rocking of the laser beam [4]. In this case, when the receiver was moved relative to the aperture of the rocking beam, a sequence of pulses, following each other with the frequency of the intermode beats, was observed at the points of maximum deflection. At the center, the pulse repetition frequency was doubled. Figure 1 shows oscillograms of the pulse sequences of the laser emission at the edge of the laser output aperture (a) and at the center (b).

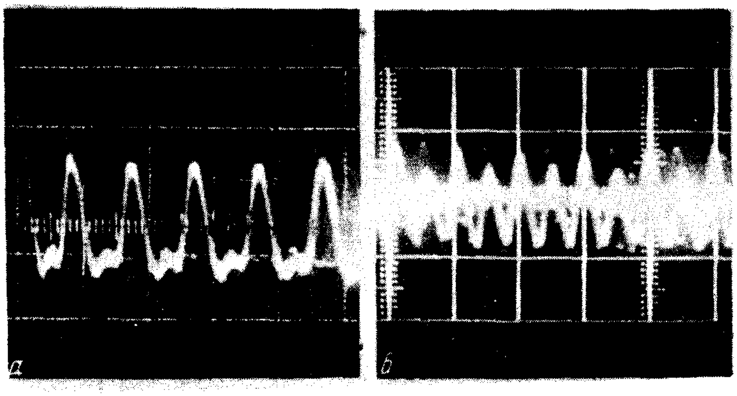

Fig. 1. Oscillograms of rocking laser beam at the point of maximum deflection (a) and at the center (b). Time scale: 1 division = 250 nsec.