The ratio of $^{235}\text{U}$ photofission cross section to that of $^{238}\text{U}$ was measured using the bremsstrahlung $\gamma$ rays beam from the Frascati electronsynchrotron. The head energy was varied between 300 and 1000 MeV and a photon difference method was applied.

I. EXPERIMENTAL PROCEDURE.

We used a mica detection technique, which is particularly suitable for fission fragment detection. It has been already successfully used by several authors in this and in similar fields\(^1\).

Our layout was a very simple one. Extended uranium targets in form of U-acetate layers were placed in front of mica sheets used as detectors. It was used always the same target for a given nuclide. The two layers were obtained by electrospraying on an 1 mm thick aluminum disc $^{235}\text{U}$ and $^{238}\text{U}$ acetate for an overall target thickness of about 900 $\mu g/cm^2$. Their diameter was $\phi = 2.0\,\text{cm}$, the content was known at 2.0\% and their uniformity was better than 10\%. The $\gamma$ rays beam was collimated to a diameter of $\phi = 1.4\,\text{cm}$ and its head energy was measured to less than 10 MeV by means of a pair spectrometer. Each plate was exposed singly and the normalisation was made by the help of a Wilson type quantameter.

The mica surface used for detection was freshly cleaved and pre-etched for about 4$^\text{h}$ in 50\% hydrofluoric acid solution at room temperature. In this way "fossil tracks" from background fissile materials were enlarged to an hole diameter of about 10 $\mu m$. The
II. - RESULTS.

In Fig. 1 the cross sections per equivalent quantum $\sigma_Q$ are shown in arbitrary units at various energies. The errors are purely statistical. $\sigma_Q$ is calculated as if the number of incident photons causing the process were $Q = \frac{1}{E} \int_{0}^{E} k n(k, E) dk$, where $k$ is the photon energy and $E$ the head energy. Obviously $\sigma_Q = \frac{1}{Q} \int_{E}^{Q} \sigma_k n(k, E) dk$ where $\sigma_k$ is the cross section per photon. In the hypothesis of a square spectrum, that is $n(k, E) = \frac{Q}{k}$, then $\sigma_k = \frac{d \sigma_Q}{d \ln E}$. Least square straight lines are fitted through our experimental points, assuming a constant value of $\sigma_k$ in this energy range. The ratio of the relative slopes is $\frac{\sigma_k(U^{235})}{\sigma_k(U^{238})} = 1.11 \pm 0.15$. From known $U^{238}$ cross section(4) a value $\sigma_k(U^{235}) = 74 \pm 13$ mb is drawn.

(x) - In this laboratory, by means of loaded emulsion irradiations, the forward-backward anisotropy was found to be $< 10\%$. 

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FIG. 1 - The experimental yields of fission cross section per equivalent quantum ($\sigma_Q$) at different spectrum head energies fitted by least-squares straight lines.
III. - CONCLUSIONS.

These measurements allow us to calculate the fraction $f$ (fissility) of disexcitation via fission of the $^{235}_{\text{U}}$ nucleus.

In the hypothesis that the excitation energy is absorbed through a process of pion photoproduction off single nucleons followed by subsequent re-absorption or scattering of the pion and/or of the reaction nucleon, one can calculate the total excitation cross section as an additive quantity of the number of nucleons. From data on photostar production from Ag and Br nuclei in emulsions (Peterson, Roos(6)) one obtains a total excitation cross section per nucleon $\sigma_{\text{TOT}}^{\text{TOT}}(N) = \sigma_{\text{k}}^{\text{TOT}}(N) = 335 \pm 40 \, \mu\text{b}$, which gives $\sigma_{\text{k}}^{\text{TOT}}(^{235}_{\text{U}}) = 79 + 9 \, \text{mb}$ and $f(^{235}_{\text{U}}) = 0.94 \pm 0.20$. This value of $f$ is in full agreement with what is known about the dependance of $f$ on $Z^2/A$.(7)

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