at quantum energies corresponding to the maximum in the spontaneous-emission spectrum. At currents much higher than threshold (I = 25 A), multimode generation is observed (Fig. 2c). From the distance between modes we calculated the quantity $n - \lambda(dn/d\lambda)$, which was found to be equal to 5.2, in full agreement with the value 5.2 obtained by others [2].

Thus, by using a suitable crystal geometry, it is possible to generate coherent emission in an electron-hole plasma of indium antimonide without a magnetic field.

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ANGULAR ANISOTROPY OF GAMMA QUANTA AND KINETIC ENERGY OF FISSION FRAGMENTS

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According to the existing theoretical notions developed by Strutinskii [1], the angular anisotropy of the emitted prompt fission γ quanta, $A = W(0°)/W(90°) - 1 \sim 10 - 15\%$ is caused by the fact that the fragments have an angular momentum $j \sim 10\hbar$ which is correlated with the direction of fragment emission. The appearance of a rather large angular momentum is related in [1] to the instability of the fragments to rotation, under the influence of the transverse component of the Coulomb repulsion of the stubs produced as a result of scission. On the basis of this mechanism, it can be assumed that the angular anisotropy of the γ-quantum emission is highly sensitive to the configuration of the fissioning nucleus at the critical instant of scission. In particular, an appreciable change of A is expected when the kinetic energy E_k and the fragment mass ratio m_1/m_2 change. This problem is treated in the literature in only one paper [2], where data are reported on the variation of A with m_1/m_2, i.e., for fission methods characterized by a fixed fragment mass-ratio range, but for all possible values of E_k at a given m_1/m_2.

We studied the dependence of A on both E_k and m_1/m_2 in the fission of U^{235} by thermal neutrons. A study of the dependence of A on E_k seems to be more attractive, since the variation of E_k is connected with the simplest changes in the configurations of the fissioning nucleus at the instant of scissions; these changes can be interpreted in first approximation as the results of the fluctuations of the effective distance between the produced fragments. Furthermore, it is precisely for this dependence that Hoffman [3] made a concrete prediction. According to [3], a considerable increase of A with increasing E_k is expected (j doubles when

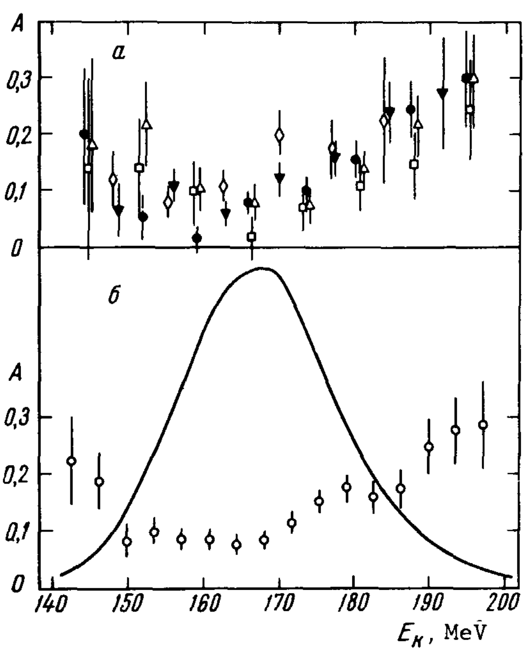
E_k increases from 140 to 200 MeV).

An investigation of the dependence of interest to us by studying the surface $A(E_k, m_1/m_2)$ has one important advantage over the simpler measurements of the function $A(E_k)$ without determining the fragment mass ratio. In the latter case, an indeterminacy arises in the interpretation of the measurement results, owing to the fact that different selected intervals of E_k correspond to different fragment-mass distributions. Judging from the $A(m_1/m_2)$ dependence [2], the distorting influence of this correlation can be quite noticeable.

The experiments were performed with the neutron beam in a horizontal channel of the SM-2 target. The fissionable-material target, containing 40 μg of U^{235}, was placed in a narrowly-collimated (1.5 x 30 mm) neutron beam. The fission fragments were registered by two surface-barrier silicon counters of 20 mm diameter. The geometry of the counter arrangement ensured fragment collimation within 1% of 4π. The target and the silicon counters were placed in a vacuum chamber, which could be rotated together with the neutron collimator about the beam axis in such a way that the angle between the registered fragment and γ-quantum emission directions ranged from 0 to 90°.

The γ quanta were detected with a 100 mm (dia) x 100 mm scintillation detector with plastic scintillator. The fission-neutron discrimination was by time-of-flight at a distance of 700 mm from the target to the plastic scintillator.

In the experiment, we measured directly the energies E_1 and E_2 of two fragments coinciding with the γ quanta. The electronic circuitry transformed pulses proportional to E_1 and E_2 into pulses proportional to $E_k = E_1 + E_2$ and $m_1/m_2 = E_2/E_1$. The two-parameter distributions with respect to E_k and m_1/m_2 were analyzed by a multidimensional analyzer with a memory capacity 128 x 32 channels. The measurements were made alternately for 0 and 90°, the distributions with respect to E_k and m_1/m_2 corresponding to different angles being stored in dif-



Anisotropy of the γ-quantum yield vs. fragment kinetic energy in the fission of U^{235}. a) for different fragment-mass ratios: □ - m_1/m_2 = 1.1 - 1.25, △ - m_1/m_2 = 1.25 - 1.35, ● - m_1/m_2 = 1.35 - 1.45, ▼ - m_1/m_2 = 1.45 - 1.65, ◇ - m_1/m_2 = 1.65 - 1.9; b) for all realized mass ratios. The solid curve shows the fragment kinetic-energy distribution.

ferent sections of the analyzer memory.

The figure shows certain results of the performed measurements, in the form of plots of A vs. E_k for different m_1/m_2 intervals (a), and in the form of the entire aggregate of the realized fission methods (b). Both groups of data, differential and integral, exhibit approximately a similar tendency for the variation of the anisotropy with E_k. It is in satisfactory agreement, in the main, with Hoffman's prediction [3] in the greater part of the variation region $E_k > 155$ MeV. The results of measurements of A with constant E_k and different values of m_1/m_2 show a certain growth of A with increasing m_1/m_2. We note that the integral data on $A(m_1/m_2)$ (for the entire aggregate of realized E_k) agree on the whole with the results of [2].

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CONCERNING THE SUPERCONDUCTIVITY OF THE ALLOYS OF THE SYSTEM Nb_3Al - Nb_3Ge *

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We have already reported [1] that an investigation of alloys of the niobium-aluminum-germanium-tin system revealed the presence of a β phase with the β-W structure and constituting an Nb_3-Al-Nb_3Sn-Nb_3Ge solid solution.

An investigation of the dependence of the critical superconducting transition temperature T_c on the composition in the pseudobinary sections Nb_3Al-Nb_3Sn and Nb_3Al-Nb_3Ge has shown a smooth decrease of T_c from one compound to the other. However, for the Nb_3Al-Nb_3Ge alloys the dependence of T_c on the composition had a maximum close to 20% Nb_3Ge. The alloys were prepared by crucible-less melting in the suspended state. The alloys were poured in a copper mold and annealed at 600° for 250 hours, after which they were quenched in water. Since we were interested in checking on the possibility of further increasing the observed maximum of the critical temperature, we undertook investigations of the alloys of the system Nb_3Al-Nb_3Ge at compositions close to the maximum of T_c. To this end we prepared the alloys by sintering the powdered metals in a quartz ampoule placed in a high-frequency furnace at 2000°C in an atmosphere of pure helium drawn through the ampoule. The pressed sample was suspended by a niobium wire in such a way that it hung freely in the ampoule during the sintering time, without touching its walls. The magnetic moment of the sample was measured immediately after the sintering and after the heat treatment. To anneal the sintered sample, it was suspended in another quartz ampoule, which was filled with pure argon and sealed, and then placed in an oven, kept 100 hours at 900°, and quenched in water at 0°C. AC bridge measurements of the magnetic moments and of the transition curve, based on the change of the inductance of a mea-