not cause reversible switching, the duration of which is of the order of 10^{-10} sec [2].

A comparison of the amorphous-crystalline PT temperatures stimulated in GeTe by thermal and optical radiation indicates that the excess density of the free carriers generated by the light does not change the conditions of this PT significantly.

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TEMPERATURE OSCILLATIONS OF THE THERMAL EXPANSION COEFFICIENT OF A SUPERCONDUCTING CuS FILM

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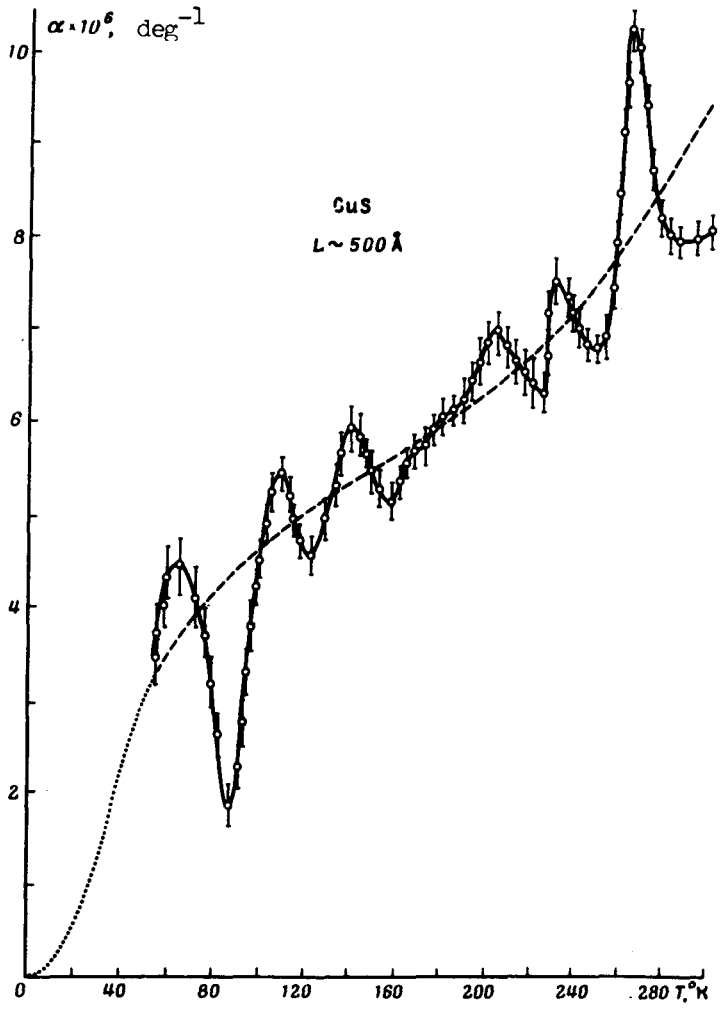
According to Nedorezov's theory [1], the non-equidistance of the quantum energy levels of the carriers in films should lead to oscillations of the thermodynamic and kinetic quantities as functions of the temperature. This was first confirmed experimentally by observation of a temperature oscillation of the resistivity of semiconducting CuS films 200 and 500 Å thick [2]. For further study of the high-temperature quantum size effect, it was deemed of interest to investigate the thermodynamic properties of this semiconducting film as functions of the temperature.

We present here experimental data on the thermal expansion of a semiconducting CuS film 500 Å thick in the temperature interval from 60 to 300°K, obtained by the double-helix procedure of Lazarev and Sudovtsov [3, 4].

The sample was prepared by evaporating in vacuum ($\sim 10^{-5}$ mm Hg) the compound CuS, with accompanying sulfur enrichment, on the internal surface of a glass helix. To obtain uniform thickness, the glass helix was moved around the evaporator by a special device. The finished sample was annealed in sulfur vapor at 150°C for 5 hours.

The double helix had the following dimensions: height 65, inside diameter 35, turn width 5, thickness 0.8 mm, number of turns 6.

In the experiment we measured the difference between the thermal expansion of the investigated sample and pyrex glass at constant pressure. The rotation of the double helix was registered with a bridge-type measuring circuit, one arm of which was an FSK-6 photoresistor. The dilatometer was calibrated against a standard copper-glass sample [5, 6], and the obtained sensitivity was $(4.0 \pm 0.4) \times 10^{-9}$.



Temperature dependence of the coefficient of linear thermal expansion of semiconducting CuS film 500 Å thick.

The temperature of the sample was maintained constant within 0.4°C during the measurement, which was performed with a copper-constantan thermocouple. The film thickness was determined accurate to 100 Å.

The figure shows the linear thermal expansion coefficient (TEC) determined after allowance for the expansion of the glass and differentiation of the thermal expansion of the CuS film in steps of 2°K. The dashed curve represents the averaging of the TEC of the 500-Å CuS film, due to the anharmonicity of the oscillations. Below 60°K, the points represent the extrapolated TEC plot.

As seen from the figure the TEC of the semiconducting CuS film actually oscillates as a function of the temperature at the given thickness. These measurements have also shown that the temperature 178°C is the transition point between two opposite harmonics. The periods of the oscillations vary like T^{-1} below this temperature and like $T^{1/2}$ above it.

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GENERATION OF POWERFUL RADIATION WITH VARIABLE SPECTRUM IN THE 280 - 385 nm RANGE

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The use of lasers based on organic compounds has made it possible to obtain powerful laser radiation with the spectrum variable over the entire visible and near-infrared regions of the spectrum. Of particular importance is the extension of the range of such lasers into the ultraviolet region. Lasing of organic compounds down to 340 nm was attained in [1], and tunable lasing in the 330 - 352 nm range was obtained in [2]. To obtain shorter wavelengths, a more promising procedure is apparently to use dyes that generate in the visible region, with subsequent conversion into the second harmonic. This eliminates one of the main difficulties, in the need for finding organic media that are active at short wavelengths. Such a variant, furthermore, requires no resonator for the UV radiation and makes it possible to decrease the generation threshold, which for organic compounds is much lower in the visible region than in the ultraviolet. Conversion of the generation frequency of dyes with the aid of linear crystals was used to obtain tunable UV radiation in [3, 4]. In [3] the procedure used was to shift the emission frequency of a ruby or cryptocyanine-dye laser, and also double the cryptocyanine emission frequency. This made it possible to vary the spectrum in the 373 - 378 nm range. In [4] they obtained the second harmonic of a laser with rhodamine-6G, with tuning in the 290 - 300 nm range. The maximum radiation power attained in the latter case was only 40 W. We present here results of experiments wherein the laser spectrum was variable in the 280 - 385 range at a maximum radiation power 0.4 MW.

Table I

No.	Dyes	Dye lasing eff. %	Spectral region of dye lasing, nm	Phase matching angle	Spectral region of sec. harm. emission, nm
1	Rhodamine 6G	67.0	560,9 – 574,6	66° – 63°	280.0 – 287.3
2	№4546	35.0	603.4 – 617.8	60° – 58°	301.7 – 308.9
3	№3	23.4	635.2 – 668.4	56° – 53°	317.6 – 334.2
4	№26369	25.0	686.2 – 699.6	51°50′ – 51°	341.1 – 349.8
5	№4568	51.9	721.0 – 770.0	50° – 45°	360.5 – 385.0