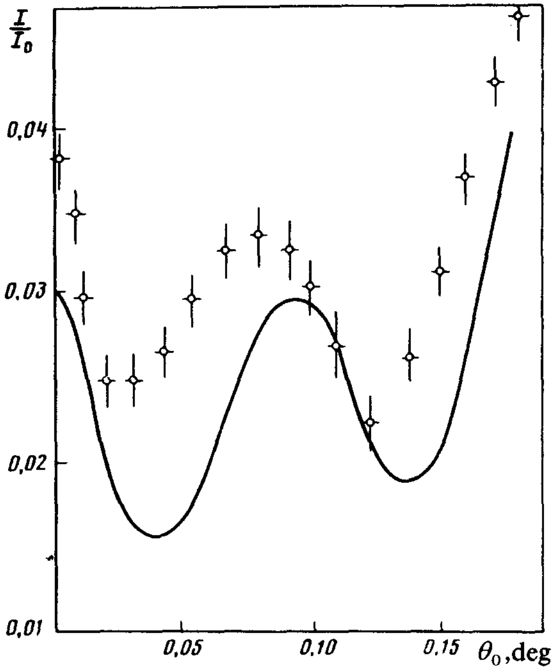

FIG. 2. The intensity of the 15-MeV electrons scattered in the 1.4-μm-thick silicon crystal as a function of the angle of entry θ_0 relative to the direction of the $\langle 111 \rangle$ axis. I_0 is the intensity of the incident particles. The experimental points were taken from Ref. 4; the solid curve denotes theoretical calculation.

$$\sigma = \sigma_0 + \frac{2}{\pi}\frac{L}{p}\frac{\frac{1}{4}\Gamma^2}{(E - E_{res})^2 + \frac{1}{4}\Gamma^2}\ ; \quad \Gamma \sim E_{res}\ \exp - |2E_{res}\ V_0 R^2 - \pi^2 n^2|^{1/2};$$

$$E_{res} = \theta_0^{-2}\{2V_0 + [4V_0^2 + 4\theta_0^2 R^{-2}(\pi^2 n^2 + m^2)]^{1/2}\}. \quad (12)$$

The indicated resonance can be observed in the crystal when the fast particle enters it at a small angle to the crystallographic axis. In this case the longitudinal momentum transfer becomes very small $q_{\parallel} \sim 1/pR^2$ and the wave function of the particle, which is insensitive to the details of the behavior of the potential at approximately the interatomic distances, is determined by a certain potential averaged over the length of the chain.[2] Schiebel and Worm[4] observed the scattering of 15-MeV electrons along the $\langle 111 \rangle$ axis of a 1.4-μm-thick Si crystal. Figure 2 shows a small-angle dependence of the intensity of the scattered particles on the angle of entry relative to the crystallographic $\langle 111 \rangle$ axis. This dependence cannot be explained in terms of the usual two-wave diffraction theory and the classical string scattering.[5] From the viewpoint of the discussion conducted above, the very narrow peak near the zero angle of entry is due to the true bound states; at the same time, its width $\sim 1/\sqrt{pL} \approx 0.02°$ is very close

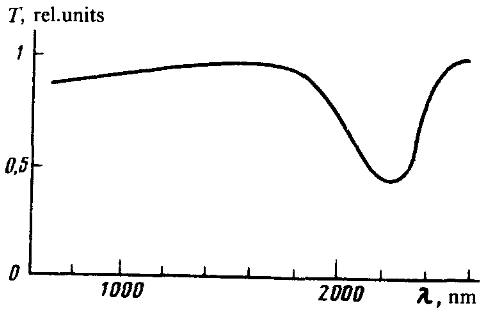

FIG. 1. Transmission spectrum of a planar texture of CLC with a pitch $P = 1.5\ \mu m$.

sputtered on one of the glass plates, placed parallel to each other and spaced 300 μm apart.

The 1.5-kHz field produced a strain and a partial untwisting of the cholesteric helix, which modulated the transmission of light at a frequency $2f$. The modulation signal (variation of transmission in the field) was measured after a narrow-band amplification by a synchronous detector. The measurement circuit was described by us elsewhere.[7]

Figure 1 shows the transmission spectrum of a planar texture of CLC at a normal

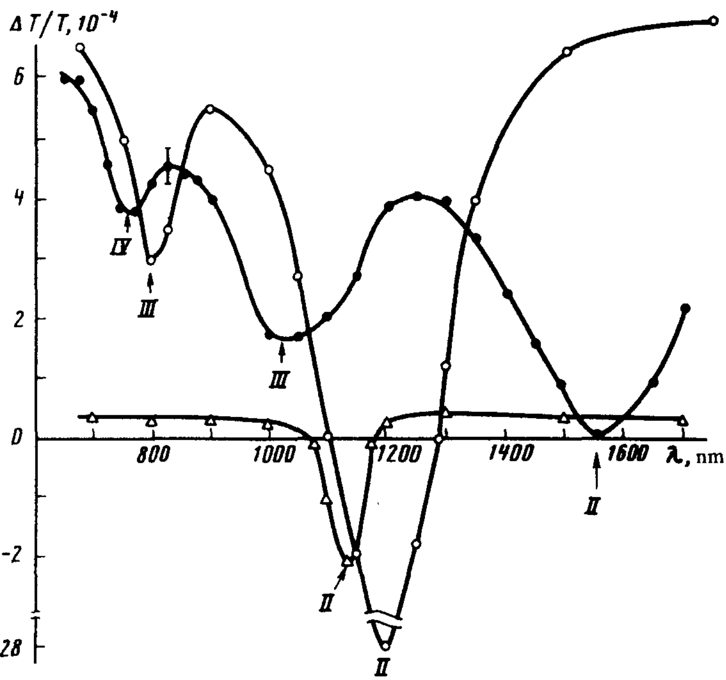

FIG. 2. Differential spectra of relative variation of the transmission $\Delta T/T$ of a sample for different voltages, U; △, $U = 200$ V; ○, 600 V, and ●, 1000 V. The Roman numerals denote the higher-order selective reflection (the first order is in the infrared region).