estimate in [1], thus offering evidence of the high level of the electronic oscillations. Intense maxima were observed in the intrinsic radiation of the plasma in the region $\lambda > 3.5$ cm at frequencies close to ω_{pe}, and a much weaker maximum in the interval $\lambda = 1.5 - 2$ cm where the frequency $2\omega_{pe}$ is situated.

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1) The theory of Raman scattering for an unbounded plasma [2,3] was confirmed experimentally on a laminar plasma of a "Q machine," where the Raman scattering was from slow space-charge oscillations excited by an external generator [4]. Combination frequencies were observed in [5] upon interaction of an external high-frequency field with low-frequency ionic plasma oscillations in a magnetic field.

QUANTUM OSCILLATIONS OF THE THERMOELECTRIC POWER IN n-InAs

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It is shown in this paper that quantization of the electron energy spectrum of degenerate ($\mu/k_1T \gg 1$) indium arsenide placed in a strong magnetic field ($uH/c \gg 1$) is manifest at low temperatures ($k_0T \ll \hbar\Omega$) in an oscillatory dependence of the thermoelectric power on the magnetic field intensity H (u is the mobility, μ the chemical potential, and $\Omega = eH/m^*c$ the cyclotron frequency). We also explain in this paper some additional details of the quantum oscillations of the Hall effect, which take place at the same time. So far n-InSb is the only semiconductor exhibiting quantum oscillation of the thermoelectric power [1].

An oscillatory field dependence was observed earlier in several investigations of the magnetoresistance and of the Hall coefficient of n-InAs. A detailed discussion of these results is given in [2]. According to theory, the physical conditions which determine the oscillation of the magnetoresistance differ noticeably from the conditions determining the oscillation of the thermoelectric power in a strong transverse field. The former phenomenon is caused essentially by certain peculiarities in the scattering of the electrons, whereas the latter is simple the consequence of the periodic variation of equilibrium thermodynamic quantities [3]. However, in view of the fact that the quantum oscillations are brought about by a single factor - the periodic variation of the state density function - the period of the quantum oscillations of different equilibrium and non-equilibrium coefficients should, according to theory, be determined in the simplest case (spherical zone, elastic isotropic scattering without account of spin splitting) by the electron density n [1]:

$$\Delta\left(\frac{1}{H}\right) = \frac{2e}{\hbar c}\,(3\pi^2 n)^{-2/3} = \frac{3.2 \times 10^6}{n^{2/3}}\ \mathrm{Oe}^{-1} \quad (1)$$

In discussing the experimental results of investigations of thermoelectric-power oscillations it is of interest not only to determine the period of the oscillation, but also to compare the magnetoresistance and the thermoelectric-power curves for the purpose of disclosing their phase relations, since the dragging effect is noticeably manifest in the thermoelectric power of n-InAs.

These curves are compared in Fig. 1. We see that the maxima of both curves occur at the same field values, with a periodicity $\Delta(1/H) = 3.8 \times 10^{-5}$ Oe^{-1}, which agrees well with the theoretical estimate $\Delta(1/H) = 3.7 \times 10^{-5}$ Oe^{-1}. The entrainment effect is manifest in the value of the thermoelectric power without the field: in the case of isotropic scattering by ionized impurities, the thermoelectric-power coefficient of the investigated sample should have been $\alpha_0 = 21$ μV/deg, as against the experimentally obtained $\alpha_0 = 56$ μV/deg. According to theory and experimental data, the action of the dragging effect should become stronger with increasing field.

In investigating the Hall coefficient of n-InSb, a large oscillation of this coefficient was observed near the zero maximum of the

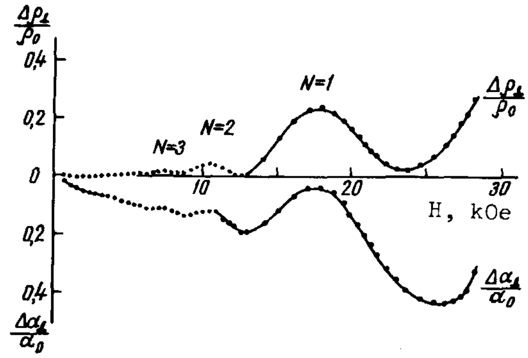

Fig. 1. Magnetoresistance ($\Delta\rho_\perp/\rho_0$) and magnetothermoelectric power ($\Delta\alpha_\perp/\alpha_0$) vs. intensity of the transverse magnetic field for polycrystalline n-InAs ($2.0 \times 2.8 \times 50$ mm) with concentration 3.4×10^{16} cm^{-3} and mobility 2×10^4 cm^2/V-sec at $T \approx 4$°K.

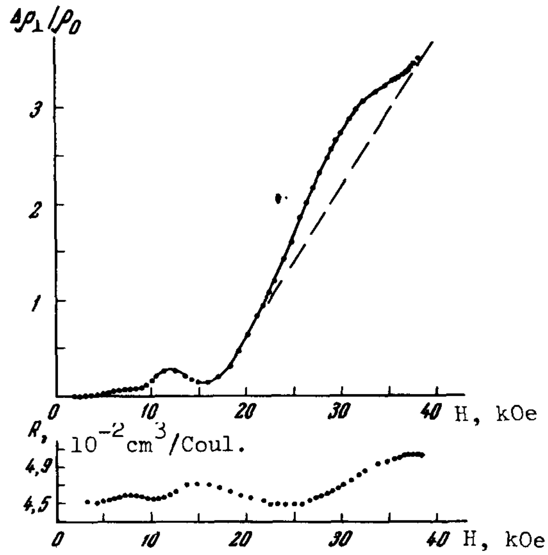

Fig. 2. Transverse magnetoresistance and Hall coefficient vs. field intensity for polycrystalline n-InAs ($2 \times 2 \times 15$ mm) with concentration 1.4×10^{16} cm^{-3} at $T = 1.4$°K. The dashed line shows the proposed smooth magnetoresistance background.

transverse magnetoresistance [4]. Since clarification of the nature of this oscillation is of theoretical interest, we investigated this coefficient for n-InAs in the region of the zero maximum of the transverse magnetoresistance. We see from Fig. 2 that the Hall coefficient of n-InAs exhibits near the zero maximum of $\Delta\rho_{\perp}/\rho_0$ ($H > 30$ kOe) a similar oscillation (12%) as n-InSb. Two other maxima on the R(H) curve (at H = 15 and 8 kOe), with smaller amplitudes, appear quite distinctly, with the R(H) curve showing an appreciable phase shift relative to the magnetoresistance curve [5].

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CRITICAL SCATTERING OF POLARIZED NEUTRONS IN NICKEL

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A study of the critical small-angle scattering of neutrons is a very effective means of investigating phase transitions.

In the case of ferromagnets, the space-time spin correlation motions, which are responsible for the dynamics of the phase transitions, are directly related to the neutron scattering cross section [1]. Some parameters of the space-time correlations were determined in [2,3], where it was shown that scattering near the Curie point is connected with magnetization fluctuations. These investigations were made with unpolarized neutrons, and yielded naturally only an averaged picture of the phenomena.

To obtain more complete information we deemed it advisable to investigate the critical scattering of polarized neutrons. We present in this article the results of the first stage of this research.

The measurements were made with the aid of a previously described installation [4]. A single-crystal nickel sample was placed in a ~10 Oe magnetic field. The sample temperature was kept accurate to ±0.07°. The beam of the incident neutrons is characterized by the following parameters: wavelength ~5.1 Å, polarization after reflection from the analyzer 80%, horizontal divergence ±1.5 min, vertical ±10 min.