of electric instability, observed in germanium with partly compensated manganese, agree with the conclusions of the RW theory. Therefore, the occurrence of the described instability can be regarded as an experimental proof of the existence of RW.

The results of this paper are presented in greater detail in[6].

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Yu. M. Gal'perin, I. L. Drichko, Yu. V, Ilisavskii, and V. A. Kudinova, Possibility of Obtaining and Using the Effect of Amplification of Ultrasound by a Semiconductor in a Magnetic Field.

As is well known, the coefficient of sound absorption by carriers moving under the influence of an external electric field in piezoelectric semiconductors is given by the expression

$$\alpha_{el} = \alpha_0 \frac{\gamma\omega\tau^0_M}{(1+\omega^2\tau_i^2)^2+(\gamma\omega\tau^0_M)^2}\ (\text{dB/cm}),$$

$$\text{where } \alpha_0 = 4.34\,\frac{4\pi\beta^2}{\varepsilon\rho v^2_{ac}}\,\frac{\omega}{v_{ac}} = 8.68\,\frac{K^2}{2}\,\frac{\omega}{v_{ac}}\ (\text{dB/cm}),$$

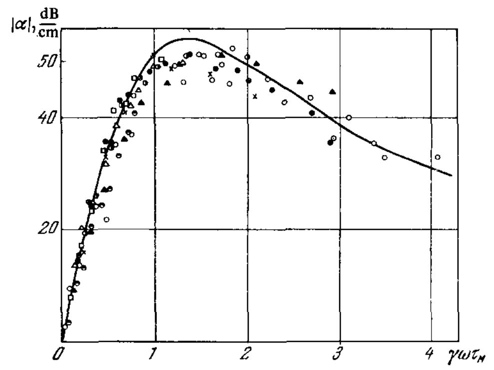
where β—effective piezoelectric coefficient in the sound propagation direction, ϵ—dielectric constant, v_{ac}—speed of sound, $\omega = 2\pi\nu$—its frequency, ρ—crystal density, $\tau_i = R_{sc}/v_{ac}$, R_{sc}—Debye screening radius, K—electromechanical coupling constant, $\tau^0_M = \epsilon/4\pi\sigma_q$—Maxwellian relaxation time, $\gamma = 1 - v_{dr}/v_{ac}$, where v_{dr} is the electron drift velocity. When $v_{dr} > v_{ac}$ we get $\gamma < 0$ and the absorption of sound gives way to amplification of the sound, as established by many experimental investigations.

When the constant magnetic field is turned on, the quantities τ^0_M and ϵ_{el} are replaced by

$$\tau_M = \tau^0_M \frac{1+\left(\frac{uH}{c}\right)^2}{1+\left(\frac{uH}{c}\right)^2\cos\theta} \qquad \left(\cos\theta = \frac{\mathbf{qH}}{qH}\right)$$

(u—mobility). In a strong (in the classical sense) transverse magnetic field, when $\cos\theta = 0$ and $(uH/c)^2 \gg 1$ we get $\tau_M = \tau^0_M\,(uH/c)^2$, i.e., the electronic sound absorption (or amplification) increases by a factor $(uH/c)^2$.

The authors investigated the influence of a transverse magnetic field on the absorption and amplification of sound with frequency 400—800 MHz in single crystals of n-InSb with $n \sim 10^{14}$ cm^{-3} and $u \sim 6 \times 10^5$ cm^2/V-sec at T = 77°K. A piezoelectric active shear wave, propagating in the [110] direction with poarization along [001] was used in the measurements. The measurements results at a magnetic field intensity $H \leq 8 \times 10^3$ Oe are in good agreement with the linear theory. This has made it possible to determine the constant of the electromechanical coupling ($K^2 = 1.4 \times 10^{-3}$). The constant was determined: 1) from measurements of sound absorption in a magnetic field under the conditions $(uH/c)^2 \gg 1$, $(uH/c)^2\cos^2\theta \ll 1$, and $\omega\tau_M \ll 1$; 2) from an analysis of the temperature dependence of the sound absorption in the magnetic field at its temperature interval 77—160°K; 3) from the value of the maximum and from the dependence of the electronic amplification coefficient α of the sound on the parameter $\gamma\omega\tau_M$, which is independent of either γ or H, or of the electron-scattering mechanism.



Dependence of the amplification of sound in n-InSb on the parameter $\gamma\omega\tau_M$. Frequency f = 800 MHz, T = 77°K.

The figure shows the form of this dependence for the frequency f = 800 MHz. The main result of the work can be formulated as follows: 1) The influence of a magnetic field on absorption and amplification of sound was observed experimentally. 2) The amplification and absorption of the sound in magnetic fields up to 8×10^3 Oe is in good agreement with the linear theory. At 800 MHz, a gain on the order of 50 dB/cm was observed. 3) The piezoelectric coefficient was found to be $e_{14} = 0.08$ C/m^2. 4) The measurement of the absorption and amplification of the sound makes it possible to investigate the transverse conductivity of the semiconductors with large mobility in a magnetic field. 5) The obtained data show that the use of a transverse magnetic field makes it possible to increase the number of semiconducting materials in which appreciable sound amplification is observed.

A. A. Vedenov, A. M. Dykhne, and M. D. Frank-Kamenetskiĭ. Melting of DNA Molecules.

The DNA molecule consists of two right-hand helices of length $\gtrsim 10^5$ Å, with a pitch of 34 Å, wound one on the other in such a way as to produce a cylinder of 20 Å diameter, and secured with the aid of hydrogen bonds, by AT and GC pairs of bases (10 pairs or links per turn of the helix).

When heated to approximately 90°C (under so-called normal conditions, when one mole of NaCl is dissolved in one liter of water), melting (in other words, (denaturalization) of the DNA molecule takes place; some of the hydrogen bonds break, and in these places the two helices diverge and, being flexible, wind themselves in the solution into disordered coils. This divergence of the helices can be seen by depositing the