Let the stationary quantities T(x), V(x) have small oscillatory contributions $T_1(x)e^{-i\omega t+ikx}$, $V_1(x)e^{-i\omega t+ikx}$, while the condition $\tau_U^{-1} \ll \omega \ll \tau_N^{-1}$ is satisfied, which means that at the frequency ω the hydrodynamic description is still applicable and the damping of second sound both from N-processes and from U-processes is small. We also assume that the characteristic length of change of the stationary quantities T(x), V(x), and consequently the amplitudes $T_1(x)$, $V_1(x)$ are much larger than the wavelength of second sound $2\pi/k$. This second condition does not contradict the first, since we assume that $l_N \ll L$.

Linearizing (20) in T_1, V_1 and omitting the term $(\partial P/\partial t)_{coll}$, which leads to small damping, we obtain

$$\left[-i\omega\frac{\partial P}{\partial T}+ik\frac{\partial \Pi}{\partial T}\right]T_1+\left[-i\omega\frac{\partial P}{\partial V}+ik\frac{\partial \Pi}{\partial V}\right]V_1=0,$$
$$\left[-i\omega\frac{\partial E}{\partial T}+ik\frac{\partial Q}{\partial T}\right]T_1+\left[-i\omega\frac{\partial E}{\partial V}+ik\frac{\partial Q}{\partial V}\right]V_1=0. \qquad (21)$$

Equating the determinant of (21) to zero, we obtain an equation for the determination of the velocities of the two branches of second sound:

$$\left(\frac{\omega}{k}\right)^2\left[\frac{\partial P}{\partial T}\frac{\partial E}{\partial V}-\frac{\partial P}{\partial V}\frac{\partial E}{\partial T}\right]+\frac{\omega}{k}\left[\frac{\partial P}{\partial V}\frac{\partial Q}{\partial T}+\frac{\partial E}{\partial T}\frac{\partial \Pi}{\partial V}-\frac{\partial Q}{\partial V}\frac{\partial P}{\partial T}-\frac{\partial \Pi}{\partial T}\frac{\partial E}{\partial V}\right]+\left[\frac{\partial \Pi}{\partial T}\frac{\partial Q}{\partial V}-\frac{\partial \Pi}{\partial V}\frac{\partial Q}{\partial T}\right]=0. \qquad (22)$$

Taking into account the definition of α(V, T) (9b), we see that for V = V_c, Eq. (22) has a root $\omega/k = 0$, i.e., the velocity of one branch of second zero is zero.

We solve Eq. (22) for the case of a spectrum consisting of one isotropic branch. The calculation of the coefficients of Eq. (22), with the help of (17a) gives

$$(\omega/k)^2(3-\gamma^2)-4\gamma(\omega/k)+3\gamma^2-1=0. \qquad (23)$$

The roots of Eq. (23) are equal to

$$(U_{II})_{1,2}=\left(V\pm\frac{c}{\sqrt{3}}\right)\Big/\left(1\pm\frac{c}{\sqrt{3}}V/c^2\right)=(V\pm U_{II}^0)\Big/\left(1\pm\frac{U_{II}^0 V}{c^2}\right). \qquad (24)$$

Thus we come to the conclusion that the law of addition of the velocity of the drift of a phonon gas and the velocity of second sound has the same form as the relativistic formula of velocity addition of Einstein, with this difference, however, that in place of the velocity of light in (24), we have the maximum attainable velocity in the phonon system—the velocity of sound. Equation (24) remains approximately valid even for an isotropic body in which, as has already been said, the contribution of the longitudinal branch to the dispersion equation for second sound can be neglected. In this case, naturally, we understand by c in (24) the value c_t.

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ERRATA

Article "Premature" Disappearance of Antiferromagnetic Resonance in Hematite, by V. I. Ozhogin and V. G. Shapiro, Sov. Phys.-JETP 28, No. 5, 915 (1969)

In lines 19 and 20 of the abstract, p. 915, read: "...effective field strengths: H_E = 8960 kOe; H_D = 22.7 kOe; $2H_{A1}$(77°K) = 01382 kOe; $2H_{A2}$(77°K) = 0.222 kOe."

Pages 917 and 918 should be interchanged.

In line 7 from the bottom, right-hand column of p. 920, read: "...the parameters $\frac{1}{2}B$ = 8960 kOe..."

In the next-to-last and last lines of the right-hand column of p. 920, read: "...pure-spin value M_0 = 175 G-cm^2/g."

The ordinates of Fig. 7 on p. 921 should be reduced by one-half, and the corresponding numbers on the ordinate scale should be 0, 0.1, 0.2, and 0.3 kOe.