the ions, the linear addition differs in sign. The experimentally observed different slopes of the two curves (Fig. 1) are connected with the fact that the line shape is investigated experimentally as a function of the external magnetic field, and not of the klystron frequency. It is easy to show that the magnetic fields which determine the half-width ΔH can be determined from the equation

$$|\omega_{21}(\Delta H) - \omega_{21}(H_M)| = |1/\tau_{21}|, \qquad (1)$$

where $1/\tau_{21}$ is the half-width in the case when the line shape is determined as a function of the klystron frequency; ω_{21} is the frequency of the transition in question and is in general a complicated function of H; H_M is the magnetic field corresponding to the maximum of the EPR absorption signal. The experiment was performed in the magnetic-field region where ω_{21} is a nonlinear function of H. In this case, as follows for example from [3], H_M is a linear function of E and has different slopes for the two non-equivalent ion positions, in agreement with experiment (Fig. 2). This leads, as can be seen from (1) to different slopes of the ΔH vs. E plot for the two non-equivalent ion positions. Thus, the theory explains qualitatively all the features of the experimental results.

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OSCILLATIONS OF BERYLLIUM RESISTANCE IN STRONG MAGNETIC FIELDS

N. E. Alekseevskii, V. S. Egorov, and A. V. Dubrovin
Institute of Physics Problems, USSR Academy of Sciences
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We have already shown in [1] that in fields 45 - 50 kOe there appear in bismuth open trajectories along the hexagonal axis. The directions of the magnetic field and of the current in the sample are in this case mutually perpendicular and lie in the hexagonal plane. The $\rho(H)$ dependence for such a crystal orientation deviated noticeably from quadratic at $H \geq 50$ kOe, being closer to linear. Such a behavior was attributed by us to magnetic breakdown. In the case of magnetic breakdown, however, one should expect an oscillating dependence of the resistance on the magnetic field, owing to the passage of the Landau levels through the Fermi boundary. A preliminary analysis based on data obtained by observing the de Haas - van Alphen effect in Be [2] has shown that the period of such oscillations may turn out to be relatively small, requiring for their observation a noticeable increase in the homogeneous magnetic field and the use of a measurement technique different from that used in [1].

In the present study we used a superconducting solenoid with a permendur concentrator, producing a magnetic field up to 80 kOe in a 2-mm gap. The single-crystal Be sample ($I \perp [0001]$, $\rho_{300^\circ K}/\rho_{4/2^\circ K} = 120$) was mounted on a rigid shaft which was rotated through 360° by

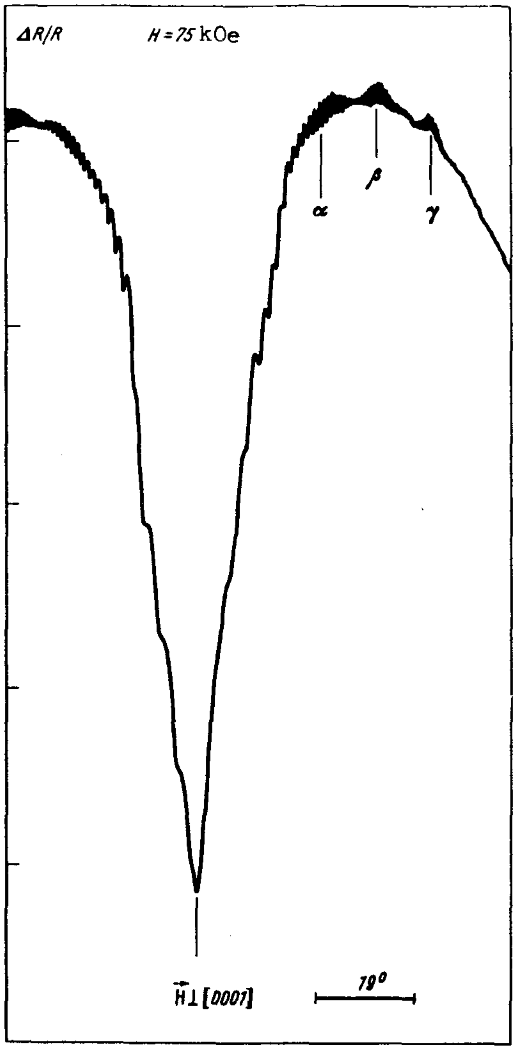

Fig. 1. Angular dependence of magnetoresistance of Be in a field H = 75 kOe at T = 4.2°K. The minimum corresponds to H perpendicular to the hexagonal axis.

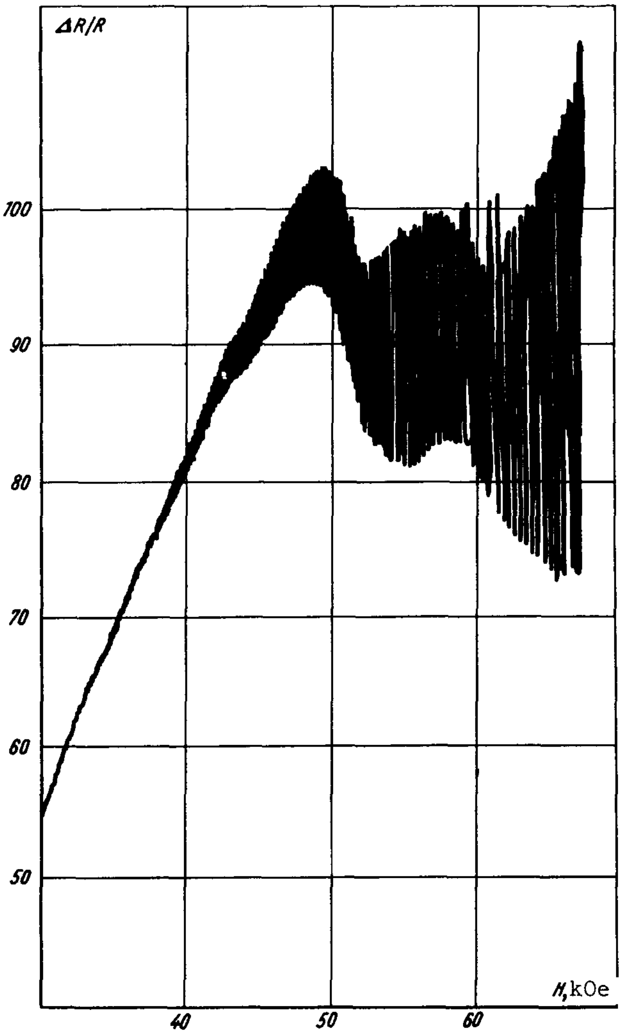

Fig. 2. Dependence of the resistance of beryllium on the magnetic field at the minimum of the angular diagram of Fig. 1, T = 4.2°K.

means of a drive wire and a friction device [3]. The resistance was measured by a standard potentiometer method using a photoelectrooptical amplifier and plotting the signal with an EPP-09 automatic recorder (for the angular dependence at constant H) or with an x-y recorder (PDS-021) (for the dependnece of ρ on the magnetic field; the signal fed to the x-coordinate came from a special Hall pickup installed in the gap between the concentrators).*

The angle diagram for the binary sample is similar in form to the plots obtained in [1] for beryllium. However, hitherto unobserved oscillations are superimposed on the usual anisotropic dependence of the resistance on the angle. Figure 1 shows part of the angle diagram at angles close to the direction H $\perp$ [0001]. It is seen distinctly that the oscillating dependence of ρ on the angle has both a variable amplitude (which increases noticeably in the region of the angles α, β, and γ) and a variable period, which decreases with increasing distance from the minimum. Figure 2 shows the dependence of the resistance on the field at the minimum of the angle diagram. It is seen from the figure that in strong field there are produced oscillations with an amplitude that increases with the field and amounts to approximately 30% of the total magnetoresistance of the sample in a field close to 65 kOe. The general behavior of the function $\rho(H)$ agrees sufficiently well with the results of [1]; thus, for example, the magnetic field at which the slope of $\rho(H)$ changes is equal approximately to 48 kOe.

The period of the observed oscillations does not depend on the reciprocal of the magnetic field. The period of the oscillations at the minimum is 1.1×10^{-7} Oe^{-1}. The amplitude of the oscillations increases more than 10 times when the sample is rotated 4° relative to the direction of the magnetic field corresponding to the minimum of $\rho(\phi)$. In the angle regions close to α, β, and γ (see Fig. 1) the amplitude of the oscillation again increases and amounts to approximately one-third the amplitude of the oscillations at the minimum. The period of the oscillations decreases in this case and takes on values 0.9×10^{-7}, 0.77×10^{-7}, and 0.64×10^{-7} for the angles α, β, and γ respectively. Such a value of the period can correspond, according to the data of [2], to the sections of the "monster."

This communication should be regarded as preliminary. The results will be described in greater detail in a special article.

In conclusion, the authors consider it their pleasant duty to thank Academician P. L. Kapitza for interest in the work.

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*The Hall pickup was an InSb crystal with increased electron density, graciously furnished by I. Hlasnik [4]. While such a pickup has a slightly lower sensitivity, it has very good linearity (not worse than 1%) up to fields of 100 kOe.

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The azimuthal orientation of the sample is incorrectly indicted in the text and in Fig. 1. $\vec{H} \perp [0001]$ must be replaced throughout by $\vec{H} \parallel [0001]$.