For V--A interaction and neglect of renormalization of the constants, we have

$$I_D = 3G^2 p_- (2\xi + 1), \qquad B = (2\xi - 1)/(2\xi + 1).$$

We now write down the expression for the probability dW_1 of capture with the formation of two slow neutrons with energies E_1 and E_2 ($E_1, E_2, \lesssim 10$ Mev):

$$dW_1 = \frac{\nu M^2}{(2\pi)^4 \pi a^3} dE_1 dE_2 d\Omega_1 I_1 [1 + C \cos(\mathbf{j}, \mathbf{p}_1)]; \quad (13)$$

$$I_1 = |J_t|^2 a_{FF} + [|J_t|^2 + 3p_- (|J_t|^2 + |J_s|^2)] (a_{GG} - \tfrac{2}{3} a_{GP}) + (1 - 3p_-) |J_t|^2 \cdot 2\mathrm{Re}(a_{GF} - \tfrac{1}{3} a_{FP}); \quad (14)$$

$$I_1 C = \frac{\bar{\nu}^2 - p_1^2 - p_2^2}{\bar{\nu} p_1} \Big\{ |I_t|^2 \Big[(p_+\lambda_+ - \tfrac{1}{3} p_-\lambda_-) b_{FF} + \left(p_+\lambda_+ - \tfrac{4}{3} p_-\lambda_-\right)(b_{GG} - 2\mathrm{Re}\, b_{GP}) + (p_+\lambda_+ + \tfrac{2}{3} p_-\lambda_-) \times 2\mathrm{Re}(b_{GF} - b_{FP}) \Big] + p_-\lambda_- |J_s|^2 (3b_{GG} + \tfrac{4}{3} \mathrm{Re}\, b_{GP}) \Big\}. \quad (15)$$

The authors express their gratitude to V. N. Gribov for useful discussions.

*A similar effect was noted in the capture of hydrogen from the triplet state.[6]

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CYCLOTRON RESONANCE IN LEAD

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Submitted to JETP editor July 23, 1959

J. Exptl. Theoret. Phys. (U.S.S.R.) **37**, 1473-1476 (November, 1959)

THE phenomenon of cyclotron resonance predicted by Azbel' and Kaner[1] was observed in the case of lead by a number of authors.[2-4] The graphs of the dependence of the ratio R(H)/R(0) on the intensity of the magnetic field H show[2-3] a shallow minimum near 1000 oe of width ~1000 oe defined by several experimental points. The record of the quantity dR(H)/dH given in the brief communication by Kip et al[4] also contains only one broad minimum in the field range up to 2000 oe and, in addition to that, approximately ten minima for values of H = 2000 — 5000 oe.

In the present work, due to the utilization of a highly sensitive method of measurement — a resonator with rectilinear high frequency currents flowing in the sample, and very pure lead used for the preparation of the sample — several tens of cyclotron resonance minima have been observed for different orientations of the magnetic field (of intensity 150 — 3000 oe) with respect to the crystallographic directions. In our experiments the dependence of the quantity $X^{-1} \partial X/\partial H$ on $1/H$ was measured, where X is the surface reactance of the metal. The sample was a single crystal of lead characterized by the resistance ratio $\bar{\rho}_{20°C} / \bar{\rho}_{3.75°K} = 1.4 \times 10^5$ (reference 5, sample No. 6), which yields the value for the parameter $\omega\tau \approx 50$; the measurements were carried out at 2.4° K at a frequency of 9.4×10^9 cps. The single crystal grown from melt in a glass container had the shape of a rectangular plate of dimensions $13 \times 6 \times 1$ mm^3; its surface was untreated. The tetragonal crystal axis is directed along the plate, the binary axes parallel to its two smaller dimensions. The high frequency currents flow along the plate, the magnetic field vector may rotate in the plane of the plate.

The method is based on measuring the frequency modulation of the signal from an oscillator using a traveling-wave tube the resonator of which contains the sample, resulting from modulation of the magnetic field applied to the sample. The frequency F of this measuring oscillator is compared with the frequency of a similar standard oscillator stabilized by a superconducting lead resonator of high quality factor;[6] the frequency stability of the comparison oscillator is better than 10^{-9}.

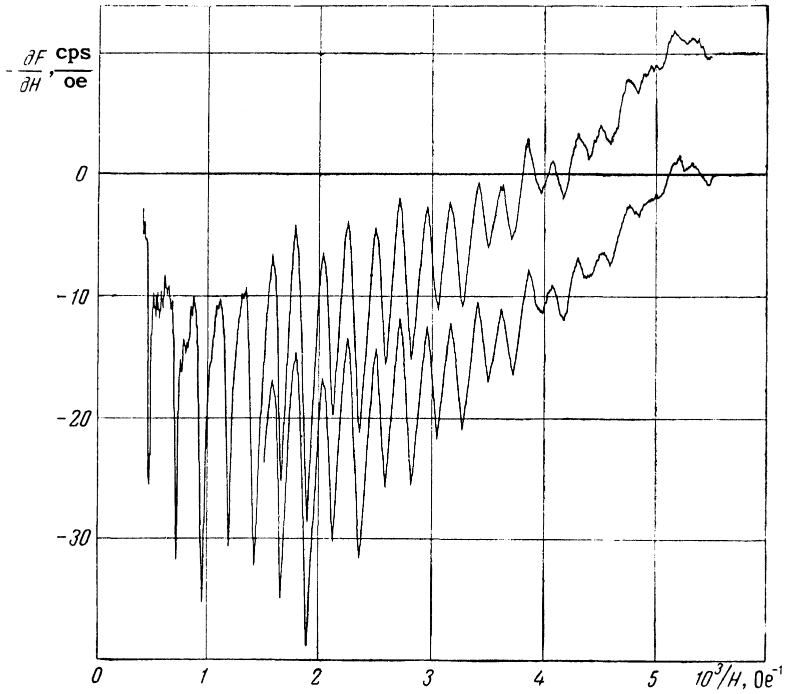

FIG. 1. Spectrum of cyclotron resonances in a magnetic field directed along the bisector of the angle between the tetragonal and the binary axes of a lead crystal (in the table $\psi = 45°$). The displaced lower curve is another record illustrating the reproducibility of observations. The temperature is 2.4°K, the frequency is 9.4×10^9 cps.

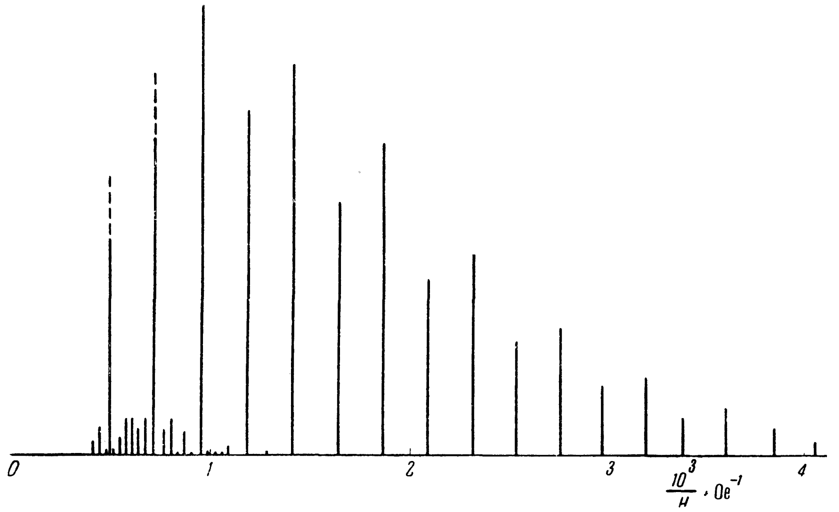

FIG. 2. Schematic representation of a part of the spectrum of Fig. 1; the height of a line representing a resonance is proportional to its depth.

Figure 1 shows a sample record of the quantity $-\partial F/\partial H$ (which is proportion to $X^{-1}\,\partial X/\partial H$) as a function of $1/H$. The observed resonances are so sharp that the position of their peaks may be determined with an accuracy of ~ 1000 oe. The sensitivity of the method, determined from the smallest resonances which can be reliably reproduced on repeated recordings, amounts to $\sim 10^{-5}$ expressed in terms of the quantity dX/X, which is approximately 10^3 times less than the scatter of the points in the graphs of $R(H)/R(0)$ given by Fawcett[2] and by Bezuglyĭ and Galkin[3] (a comparison with reference 4 is not possible since there is no scale given in their figure). Apparently in the work of the authors cited above only some average variation in the resistance of the metal in the magnetic field was observed; probably this also applies to the work of Kip et al.[4]

The spectra obtained for other orientations of the field have a different appearance, however a main sequence of deep equidistant resonances is always apparent, while smaller peaks may be separated into 1 to 3 additional series having other periods of $\Delta(H^{-1})$. A schematic representation of a part of the spectrum of Fig. 1, which enables us to decipher it, is shown in Fig. 2; a series of small peaks is partially noticeable in Fig. 1, but it is indicated in Fig. 2 on the basis of a different record made on a larger scale.

The preliminary results of the analysis of several spectra are given in the table. The periods $\Delta(H^{-1})$ have been determined from the minima

ψ^0	n	k	$10^3 \cdot \Delta (H^{-1})$, Oe^{-1}	m^*/m	ψ^0	n	k	$10^3 \cdot \Delta (H^{-1})$, Oe^{-1}	m^*/m
0	12	12	0.47	0.60	67.5	6	6	0.95	0.30
	6	5	0.36	0.78		15	7	0.19	2.4
	5	4	0.52	0.54		8	5	0.31	0.91
	5	4	0.60	0.47		4	4	1.06	0.27
22.5	13	13	0.40	0.70	90	12	10	1.04	0.27
	2	2	0.34	0.83		12	7	0.32	0.88
45	24	23	0.23	1.2		8	5	1,10	0.26
	34	19	0,033	8.5					

ψ is the angle between the field vector and the tetragonal crystal axis, n is the highest order of resonance observed in a given series, k is the number of identified resonances of the given series.

of $X^{-1} \partial X/\partial H$, however they must coincide with the periods in the variation of X(H). The effective masses of the electrons have been computed by means of the following formula

$$m^*/m = (e/mc\omega)/\Delta(H^{-1}).$$

For each orientation ψ we have first tabulated the main series of deep resonances. The quantity m*/m is determined with an error of $\lesssim$ 2%, primarily as a result of the inaccuracy in the measurement of H. The error in the values of ψ amounts to ~ 2°.

An analysis of the shapes and amplitudes of the resonance peaks is for the time being still premature due to a number of experimental reasons (inexact adjustment of the field, uneven surface of the single crystal etc.). However, certain regularities are apparent: for example in Fig. 1 the even resonances are deeper than the odd ones, which, possibly, may be explained by the effective mass being equal to exactly one-half. An investigation of these regularities will undoubtedly be useful in constructing the Fermi surfaces.

The author is grateful to P. L. Kapitza and A. I. Shal'nikov for unfailing interest in and attention to his work, and to G. S. Chernyshev for technical aid.

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Translated by G. Volkoff
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MEASUREMENT OF ANGULAR DISTRIBUTIONS OF NEUTRONS ELASTICALLY SCATTERED FROM He^3

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Submitted to JETP editor August 1, 1959

J. Exptl. Theoret. Phys. (U.S.S.R.) **37**, 1476-1478 (November, 1959)

To measure the angular distributions of neutrons elastically scattered from He^3 nuclei, we used a miniature spherical ionization chamber, filled with a mixture of 25% He^3 and 75% argon to a total pressure of 11 atmos.[1] As is well known, in elastic scattering the energy of the recoil nucleus ($E_{r.n}$) is linearly dependent on the cosine of the scattering angle of the neutron in the center-of-mass system

$$E_{r.n} = \tfrac{1}{2} E_{max} (1 - \cos\theta),$$

where E_{max} is the maximum energy that can be transferred to the recoil nucleus. Therefore the energy distribution of the recoil nuclei is proportional to the differential scattering cross section in the c.m.s. and consequently the spectrum of the pulses due to the recoil nuclei yields directly the angular distribution curve for the argument $\cos\theta$. The angular distribution of elastic scattering of neutrons from He^4 was measured in an analogous manner. In the case of He^3 the measurements are made more difficult by the exothermal reaction $He^3(n, p)T^3$ (Q = 770 kev) which proceeds in paral-

ERRATA TO VOLUME 10

page	reads	should read
Article by A. S. Khaĭkin		
1044, title	. . . resonance in lead	. . . resonance in tin
6th line of article	~ 1000 oe	~ 1 oe
Article by V. L. Lyuboshitz		
1223, Eq. (13), second line	$\ldots - \mathrm{Sp}_{1,2}\,\mathscr{E}(\mathbf{e}_1)$	$\ldots - \mathrm{Sp}_{1,2}\,\mathscr{E}(\mathbf{e}_2)\ldots$
1226, Eq. (26), 12th line	$\cdots\{(\mathbf{p}+\mathbf{q},\ \mathbf{p}$	$\cdots\{(\mathbf{p}+\mathbf{q},\mathbf{p}) - (\mathbf{p}+\mathbf{q},\ \mathbf{n})\cdot\cdot(\mathbf{pn})\}$
1227, Eqs. (38), (41), (41a) numerators and denominators	$(\mathbf{p}^2 - \mathbf{q})$	$(\mathbf{p}^2 - \mathbf{q}^2)^2$
1228, top line	$\mathbf{m}_2 = \frac{\mathbf{q}_1 - \mathbf{p}_1}{\mathbf{q}_1 - \mathbf{p}_1}$	$\mathbf{m}_2 = [\mathbf{m}_3\ \mathbf{m}_1]$

ERRATA TO VOLUME 12

page	reads	should read
Article by Dzhelepov et al.		
205, figure caption	54	5.4
Article by M. Gavrila		
225, Eq. (2), last line	$-2\gamma\Theta^{-4}\,{}^1\!/_8$	$-2\gamma\Theta^{-4} - {}^1\!/_8$
Article by Dolgov-Savel'ev et al.		
291, caption of Fig. 5, 4th line	$p_0 = 50 \times 10^{-4}$ mm Hg	$p_0 = 5 \times 10^{-4}$ mm Hg.
Article by Belov et al.		
396, Eq. (24) second line	$\ldots - (4 - 2\eta)\,\sigma_1 + \ldots$	$\ldots + (4 - 2\eta)\,\sigma_1 + \ldots$
396, 17th line (r) from top	. . less than 0.7	. . less than 0.07
Article by Kovrizhnykh and Rukhadze		
615, 1st line after Eq. (1)	$\omega_{0e}^2 = 2\pi e^2 n_e/m_e,$	$\omega_{0e}^2 = 4\pi e^2 n_e/m_e,$
Article by Belyaev et al.		
686, Eq. (1), 4th line	$\ldots b_{\rho_2' m_2'}(s_2') + \cdots$	$\ldots b_{\rho_1' m_1'}(s_1') + \cdots$
Article by Zinov and Korenchenko		
798, Table X, heading of last column	$\sigma_{\pi^- \to \pi^+} =$	$\sigma_{\pi^- \to \pi^-} =$
Article by V. M. Shekhter		
967, 3d line after Eq. (3)	$\varepsilon \equiv 2m_pE + m_p^2$	$\varepsilon \equiv (2m_pE + m_p^2)^{1/2}$
967, Eq. (5), line 2	$+ (B_V^2 + B_A^2)\ldots$	$+ (B_V^2 + B_A^2)\,Q\ldots$
968, Eq. (7)	$\ldots (C_V^2 + C_A^2).$	$\ldots C_V^2 + C_A^2 - Q^2(B_V^2 + B_A^2).$
968, line after Eq. (7)	for $C_V^2 + C_A^2 \equiv \ldots$	for $C_V^2 + C_A^2 - Q^2(B_V^2 + B_A^2) \equiv \ldots$
Article by Dovzhenko et al.		
983, 11th line (r)	$\gamma = 1{,}8 \pm$	$\gamma = 1{,}8 \pm 0{,}2$
Article by Zinov et al.		
1021, Table XI, col. 4	—1,22	1,22
Article by V. I. Ritus		
1079, line 27 (1)	$-\Lambda_{\pm}(t),$	$\Lambda_{\pm}(t),$
1079, first line after Eq. (33)	$\frac{1}{2}(1 + \beta).$	$\frac{1}{2}(1 \pm \beta).$
1079, 3d line (1) from bottom	$\ldots\mathfrak{N}(q'p;\ pq')\ldots$	$\ldots\mathfrak{N}(p'q;\ pq')\ldots$
Article by R. V. Polovin		
1119, Eq. (8.2), fourth line	$U_{0x}u_xg(\gamma) - [\gamma\cdots$	$-U_{0x}u_xg(\gamma)\,[\gamma\cdots$
1119, Eq. (8.3)	$\cdots$sign $u.$	$\cdots$sign $u_g.$
Article by V. P. Silin		
1138, Eq. (18)	$\cdots + \frac{4}{5}\,c^2k^2$	$\cdots + \frac{6}{5}\,c^2k^2.$