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69689
S/126/60/009/03/012/033
E193/E483

Investigation of Certain Physical Phenomena Occurring at High Temperature on the Surface of Crystalline Substances. IV. Analytical Study of the Kinetics of "Self-Healing" of Artificial Defects on the Surface of Solid Bodies

and $1 \simeq 10^{-4}$ cm, the following values of γ were obtained for copper, silver, gold and nickel:
$\gamma Cu \simeq 10^{-4}$; $\gamma Ag \simeq 10^{-3}$; $\gamma Au \simeq 10^{-6}$, $\gamma Ni \simeq 10^{-3}$.
There are 4 figures and 8 references, 6 of which are Soviet and 2 English.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet
Khar'kovskiy filial IRYeA (Khar'kov State University
Khar'kov Branch of IRYeA)

SUBMITTED: July 3, 1959

Card 9/9

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87209

S/126/60/010/001/021/027/XX
E032/E314

9.4220 (also 1071)

AUTHORS: Zil'berman, G.Ye. and Kulik, I.O.

TITLE: On the Relaxation Time of Fast Electrons in a Metal

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol. 10, No. 1, pp. 9 - 13

TEXT: The authors consider an electron in a band lying above the conduction band in the case where the energy of the electron is insufficient to excite plasma oscillations and the finite range is due only to collisions with the conduction electrons. The following cases are considered: sr; rs; ss and rr , where rs denotes the case where the scattering electron lies in the conduction band and the scattered electron in the band above the conduction, and prior to the collision, and similarly for the other combinations. Explicit expressions are derived for the relaxation times for collisions in the above types of interactions. It is shown that the limitations imposed by the band structure on the collisions can increase the relaxation time by a large factor.

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87209

S/126/60/010/001/021/027/XX
E032/E314

On the Relaxation Time of Fast Electrons in a Metal

There are 1 figure and 9 references: 4 Soviet and 5 non-Soviet.

ASSOCIATION: Khar'kovskiy filial Vsesoyuznogo NII khimicheskikh reaktivov (Khar'kov Branch of the All-Union NII of Chemical Reagents)

SUBMITTED: January 14, 1960

Card 2/2

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

83728

S/056/60/038/004/021/048
B006/B056

24.2600

AUTHORS: Zil'berman, G. Ye., Kulik, I. O.

TITLE: Quantum Oscillations of the Photoelectric Yield of Metals in a Magnetic Field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 4, pp. 1188 - 1200

TEXT: I. M. Lifshits, A. M. Kosevich, and A. V. Pogorelov already pointed out the importance of investigations of the quantum oscillation effects for the problem of the conservation of the dispersion law of conduction electrons in certain metals. The best-known of such effects are the de Haas - van Alphen effect and the Shubnikov - de Haas effect; the former was experimentally investigated in the USSR by B. I. Verkhin, B. G. Lazarev et al. (Ref. 3). The present paper describes the theoretical investigation of the external photoelectric effect on metals in a magnetic field in the ultraviolet spectral range. Let the magnetic field be assumed to be perpendicular to the surface, so that the electrons are free to reach the anode. Under these conditions oscillating compounds

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Quantum Oscillations of the Photoelectric Yield of Metals in a Magnetic Field

occur in the photoelectric current besides the compounds changing monotonically with H. One of them is due to those oscillations of the electron state number in the magnetic field, which cause the de Haas - Van Alphen effect. A second one is due to periodic dependence of the transition matrix element on the magnetic field, and is not interrelated with the state number; it is a new oscillation effect, which is common to all optical phenomena and is connected with transitions between the bands. An investigation of this effect in principle permits determination of the position of the individual regions of the Fermi surface in the reciprocal lattice. The third component represents an interference effect. A further new quantity, which may be obtained from photoelectric experiments (of the energy distribution of the departing electrons), is the shape of the isoenergetic surfaces which are lower than the Fermi surface. The investigation of the quantum oscillations of the volume (external) photoelectric effect carried out in the ultraviolet for electrons possessing an arbitrary dispersion law, thus furnishes not only theoretically interesting results, but also gives indications for experiments. Thus, it is also pointed out that by means of photoelectric experiments, the possibility is, in principle, given with comparatively weak fields to

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Quantum Oscillations of the Photoelectric Yield of Metals in a Magnetic Field

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B006/B056

investigate large groups of electrons whose oscillations are blurred under usual experimental conditions due to the block structure. In photoeffect experiments a narrow light ray can be produced which covers just one block. The effect investigated in this case depends, as also the de Haas - van Alphen effect, actually only on the dispersion law and not on its genesis (the wave functions). The authors thank I. M. Lifshits and M. I. Kaganov for discussing this paper. M. Ya. Azbel' and E. A. Kaner (Ref. 2) are mentioned. There are 5 figures and 21 references: 7 Soviet, 6 US, 3 British, 1 Swiss, and 4 German.

ASSOCIATION: Khar'kovskoye vyssheye aviatsionno-inzhenernoye voyennoye uchilishche (Khar'kov School of Higher Learning for Airforce Engineers). Khar'kovskiy gosudarstvennyy universitet (Khar'kov State University)

SUBMITTED: October 9, 1959

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

38378
S/058/62/000/005/073/119
A061/A101

24.7000

AUTHORS: Kulik, I. O., Zil'berman, G. Ye.

TITLE: Impurity distribution in crystal growth from a melt

PERIODICAL: Referativnyy zhurnal, Fizika, no. 5, 1962, 11, abstract 5E90 (V sb. "Rost kristallov. T. 3", Moscow, AN SSSR, 1961, 85 - 89. Discuss., 214 - 218)

TEXT: The distribution of an impurity over the volume of a single crystal grown from a melt has been determined. In this problem, the decisive factors are two concurrent processes: impurity and heat flows. The former flow is determined by diffusion and thermal diffusion, and the latter by thermal conductivity and heat transfer by diffusion. In addition, the presence of a temperature field in the melt - crystal system leads to the distortion of the crystallization front and makes the impurity distribution more complex. The problem is solved by the method of successive approximations. The effect of heat transfer by diffusion is neglected altogether, and the temperature field is found from one closed equation with given boundary conditions. In the problem of diffusion in zeroth ap-

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Impurity distribution in crystal growth from a melt

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A061/A101

proximation, pure diffusion with a plane crystallization front is considered. Corrections for the impurity distribution due to the thermal diffusion effect and to the distortion of the crystallization front are obtained in first and second approximations, respectively.

K. Gurov

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

BELOZOROV, D.P.; KULIK, I.O.; ZIL'BERMAN, G.Ye.

Distribution of impurities in crystals grown from melts. Kristallografiia 6 no.2:279-282 Mr-Ap '61. (MIRA 14:9)

1. Khar'kovskiy filizl Instituta khimicheskikh reaktivov.
(Crystals--Growth)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, I.O.

Momentum distribution function of Fermi particles in gas within the high-density. Zhur. eksp. i teor. fiz. 40 no.5: 1343-1352 My '61. (MIRA 14:7)

1. Fiziko-tekhnicheskiy institut AN Ukrainskoy SSR.
(Field theory)
(Coulomb functions)
(Particles (Nuclear physics))

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

S/056/62/042/002/036/055
B108/B104

24.6714
24.2120

AUTHOR: Kulik, I. O.

TITLE: Some features of the collective energy losses of fast electrons passing through an anisotropic plasma

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 2, 1962, 543 - 551

TEXT: The plasma oscillations in a gas of quasiparticles (electron plasma in a uniaxial crystal) are discussed. The dispersion law for plasma oscillations, $\omega_p = \omega_p(\vec{k})$, is derived with the classical equation of motion. Expanding $1/(\omega - \vec{k}\vec{v})$ into series with respect to $\vec{k}\vec{v}/\omega$ ($\vec{v} = \partial\varepsilon/\partial p$ - velocity of quasiparticles) one obtains in zeroth approximation for $\vec{k} \to 0$

$$\omega_p^2(\vec{n}) = \frac{e^2}{\pi^3\hbar}\oint (v_F\vec{n})^2 \frac{ds}{v_F},$$

where $\vec{n}$ is the unit vector in the direction of $\vec{k}$, $\vec{v}_F$ is the electron velocity on the Fermi boundary. The integral has to be taken over the

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Some features of the...

Fermi surface $\epsilon(\vec{p})$. At $k \ll k_c$, where $k_c = \omega_p/v_F$, Eq. (6) assumes the form $\omega_p^2(\vec{n}) = \Omega_1^2 n_1^2 + \Omega_2^2 n_2^2 + \Omega_3^2 n_3^2$. This shows that the surface $f(\vec{n}) = 1/\omega_p(\vec{n})$ is an ellipsoid (ellipsoid of plasma frequencies) with the semiaxes $\Omega_1^{-1}, \Omega_2^{-1}, \Omega_3^{-1}$. For uniaxial crystals, the surface of plasma frequencies is a rotation ellipsoid. For small scattering angles the largest energy losses ($\epsilon = \omega_p$) in a crystal with its major axis perpendicular to the surface are

$$\omega_p^2(\theta) = \tfrac{1}{2}\{\Omega_\parallel^2 - v_0^2 p_0^2 \theta^2 + [(\Omega_\parallel^2 - v_0^2 p_0^2 \theta^2)^2 + 4\Omega_\perp^2 v_0^2 p_0^2 \theta^2]^{1/2}\}.$$

where $\Omega_\parallel$ and $\Omega_\perp$ are the components of the tensor Ω_{ik}^2 parallel and perpendicular to the major axis of the crystal. In a crystal with its major axis parallel to the surface these losses are

$$\omega_p^2(\theta, \varphi) = \tfrac{1}{2}\{\Omega_\perp^2 - v_0^2 p_0^2 \theta^2 + [(\Omega_\perp^2 - v_0^2 p_0^2 \theta^2)^2 + 4v_0^2 p_0^2 \theta^2 (\Omega_\parallel^2 \cos^2\varphi + \Omega_\perp^2 \sin^2\varphi)]^{1/2}\}.$$

The plasma surface waves, i.e., charge density oscillations on the metal surface which lead to a number of abnormal lines in the characteristic

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Some features of the... S/056/62/042/002/036/055
B108/B104

energy loss spectrum of fast electrons are studied with consideration of the anisotropic plasma frequency $\omega_p(\vec{n})$. The surface waves propagating perpendicularly to the surface and axis of the crystal have the frequency $\omega_s^2 = \Omega_\perp^2 \Omega_\parallel^2/(\Omega_\perp^2 + \Omega_\parallel^2)$. When the propagation vector is perpendicular to the major plane of the crystal,

$$\omega_s^2 = \frac{\Omega_\perp^2 (\Omega_\perp^2 \sin^2\theta + \Omega_\parallel^2 \cos^2\theta)}{\Omega_\perp^2 + (\Omega_\perp^2 \sin^2\theta + \Omega_\parallel^2 \cos^2\theta)}.$$

For the general case, the frequency of the surface plasma waves is

$$\omega_s^2(\theta, \varphi) = \frac{\Omega_\perp^2 [\Omega_\perp^2 \sin^2\theta \sin^2\varphi + \Omega_\parallel^2 (\cos^2\theta \sin^2\varphi + \cos^2\varphi)]}{\Omega_\perp^2 + [\Omega_\perp^2 \sin^2\theta \sin^2\varphi + \Omega_\parallel^2 (\cos^2\theta \sin^2\varphi + \cos^2\varphi)]},$$

where θ is the angle between the normal to the metal surface and the major axis, and φ is the angle between the propagation vector of the oscillations and the major plane of the crystal. Calculations are also made with consideration of the electrodynamic retardation. I. M. Lifshits is thanked for discussions. Mention is made of V. L. Bonch-Bruyevich (FMM,

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4, 546, 1957), L. D. Landau (ZhETF, 30, 1058, 1956), Yu. L. Klimontovich, V. P. Silin (UFN, 70, 247, 1960), A. A. Vlasov (ZhETF, 8, 291, 1938), and I. I. Gol'dman (ZhETF, 17, 681, 1947). There are 2 figures and 20 references: 15 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: D. Pines. Rev. Mod. Phys., 28, 184, 1956; R. A. Ferrell. Phys. Rev., 107, 450, 1957; R. H. Ritchie. Phys. Rev., 106, 874, 1957; E. A. Stern, R. A. Ferrell. Phys. Rev., 120, 130, 1960.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR (Physicotechnical Institute of Low Temperatures of the Academy of Sciences Ukrainskaya SSR)

SUBMITTED: August 17, 1961

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

S/056/62/043/004/046/061
B125/B186

AUTHOR: Kulik, I. O.

TITLE: The thermal anomaly in superconductors

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 4(10), 1962, 1489-1492

TEXT: An attempt is made to derive the anomalies in the specific heat of superconductors from the microscopic theory of superconduction. The modified phonon dispersion law holding after transition to the superconducting state is formulated. The correction to the phonon dispersion law for electron-phonon interaction follows from the polarization operators

$$\Pi = \Pi_1 + \Pi_2; \quad (1),$$

$$\Pi_1(q, \omega) = \frac{1}{(2\pi)^4 q} \int_{-\infty}^{\infty} d\xi \int_{\xi - p_0 q}^{\xi + p_0 q} d\xi_1 \left(\frac{u_\xi^2 v_{\xi_1}^2}{\varepsilon_\xi + \varepsilon_{\xi_1} - \omega - i\delta} + \frac{v_\xi^2 u_{\xi_1}^2}{\varepsilon_\xi + \varepsilon_{\xi_1} + \omega - i\delta} \right). \quad (2),$$

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The thermal anomaly in ...

$$\Pi_2(q,\omega)=\frac{\Delta^2}{4(2\pi)^2 q}\int_{-\infty}^{\infty}d\xi\int_{\xi-p_0q}^{\xi+p_0q}d\xi_1\frac{1}{\varepsilon_\xi\varepsilon_{\xi_1}}\left(\frac{1}{\varepsilon_\xi+\varepsilon_{\xi_1}-\omega-i\delta}+\frac{1}{\varepsilon_\xi+\varepsilon_{\xi_1}+\omega-i\delta}\right); \quad (3),$$

$$\varepsilon_\xi=\sqrt{\Delta^2+\xi^2},\qquad u_\xi^2=\tfrac{1}{2}(1+\xi/\varepsilon_\xi),\qquad v_\xi^2=\tfrac{1}{2}(1-\xi/\varepsilon_\xi) \quad (4)$$

with $\delta = 0$. p_0 is the Fermi momentum, ω_q^0 the phonon dispersion law ignoring phonon-electron interaction and λ_0 a dimensionless electron-photon interaction constant. The terms of the sums Π_1 and Π_2 correspond to the contributions of the graphs in Fig. 1 and Fig. 2. The solid lines in these graphs correspond to the functions $G(\vec{p},\varepsilon)$ and $F(\vec{p},\varepsilon)$ in the theory by L. P. Gor'kov (ZhETF, 34, 735, 1958). The real correction to the phonon frequency is $\Delta\omega_s = \alpha\Delta/\pi^2 Q$ (11), and when $\alpha = 0$

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The thermal anomaly in ...

$$x=\int_0^\infty dx\int_0^\infty dy\left\{\frac{1}{x+y}-\left(1+\frac{1}{\sqrt{1+x^3}\sqrt{1+y^3}}\right)\frac{1}{\sqrt{1+x^3}+\sqrt{1+y^3}}\right\}. \qquad (12),$$

where $Q = 1/\lambda = p_0/\pi^2\lambda_0 s$ and l is the phonon mean free path. The present calculations do not, therefore, describe the anomaly observed experimentally in the specific heat of superconductor lattices. R. A. Ferrell (Phys. Rev. Lett., 6, 541, 1961) did not take the graphs of the second kind into account and therefore got different results. Corrections to the phonon dispersion law of the type $\Delta\omega_s = \alpha\Delta/\pi^2 Q$ are also absent in the anisotropic case and in the case where $p_0 q \ll \Delta$. This last corresponds to the very slight change in the sonic velocity and the Debye temperature observed experimentally on transition to the superconducting state. I. M. Lifshits is thanked for discussion. There are 2 figures.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

The thermal anomaly ...

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B125/B186

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR (Physicotechnical Institute of Low Temperatures of the Academy of Sciences of the Ukrainskaya SSR)

SUBMITTED: May 4, 1962

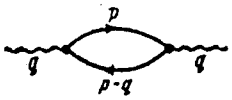

Fig. 1

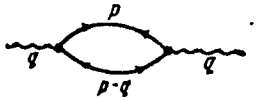

Fig. 2

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STEPIN, Lev Dmitriyevich; KULIK, I.O., kand. fiz.-mat. nauk, otv.red.; NESTERENKO, A.S., red.; TROFIMENKO, A.S., tekhn. red.

[A course of lectures on quantum radio physics] Kurs lektsii po kvantovoi radiofizike. Khar'kov, Izd-vo Khar'kovskogo univ., 1963. 167 p. (MIRA 17:3)

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and a procedure for obtaining single crystals of NaI(Tl) (I) and CsI(Tl) (II) of large dimensions (diameters 200 and 100 mm, respec-

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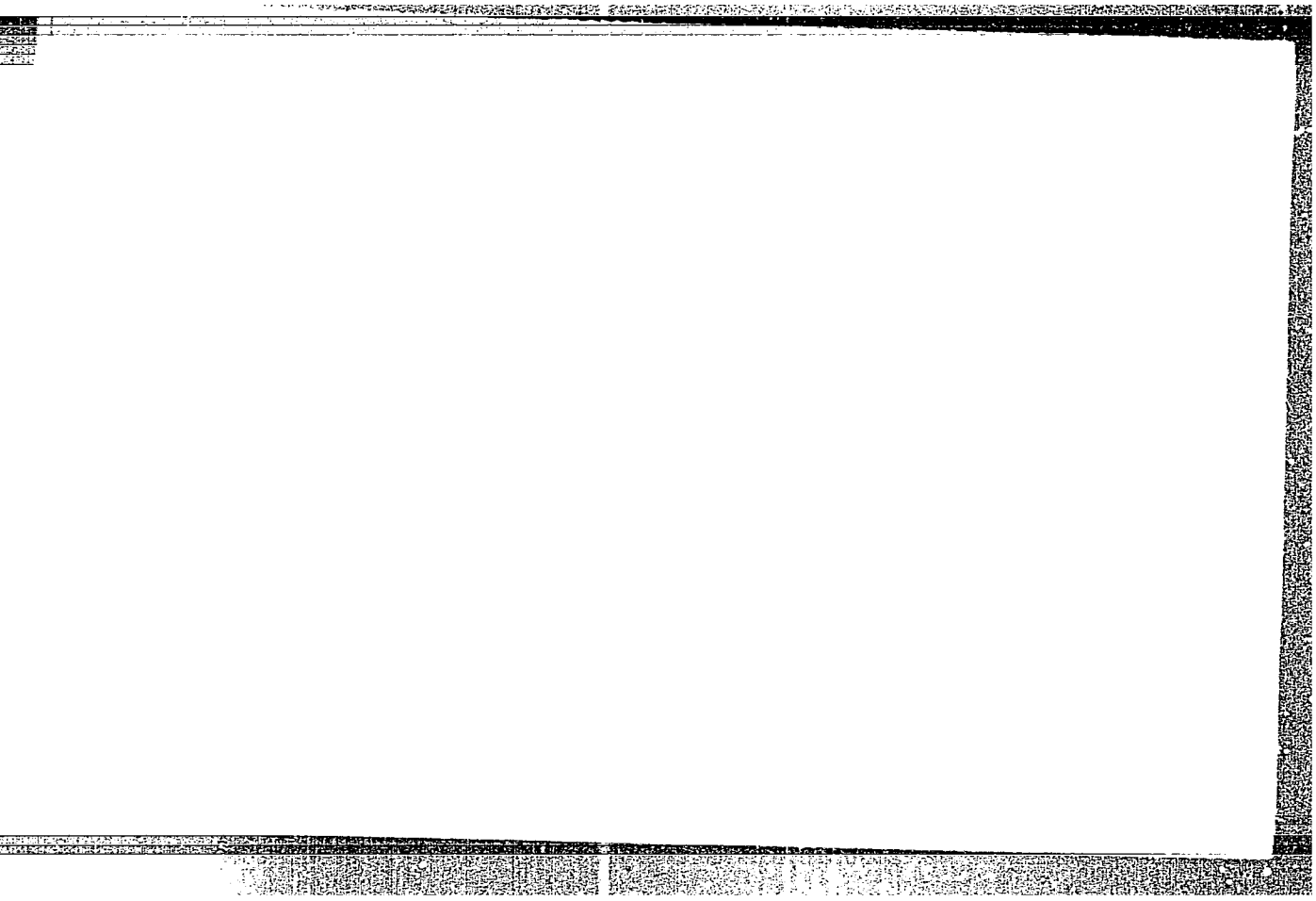

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

S/056/63/044/002/023/065
B102/B186

AUTHORS: Kulik, I. O., Gogadze, G. A.

TITLE: Quantum oscillations in the tunnel contact current of two metals in a magnetic field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 2, 1963, 530-535

TEXT: The authors consider two different metals which are separated by a thin semiconductor layer to which a constant or alternating magnetic field is applied perpendicularly. The tunnel contact current oscillations arising in both cases are calculated (cf. also: Phys. Rev. Lett. 5, 55, 1960; J. Phys. Chem. Sol. 19, 8, 1961; Phys. Rev. 123, 85, 1961). It is shown that these oscillations allow the determination of the extreme cross-sections of the Fermi surface and of the effective masses of the quasi-particles. For the small electron groups the amplitude of the oscillations is sufficiently great; for the large groups it is very small since the probability of tunnelling through the potential barrier is extremely small for the electrons at the extremum sections responsible for the

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oscillation phenomena. Another type of oscillation caused by oscillations of the chemical potentials of the metals can be observed in alternating magnetic fields in which the pulse duration T is smaller than the relaxation time τ of the tunnel diode. The amplitude of the oscillation of the chemical potential ζ can be estimated from the relation $\zeta^{osc} \sim \frac{\pi}{\sqrt{2}} \theta \left(\frac{\mu H}{\hbar}\right)^{1/2} \exp(-2\pi^2\theta/\mu H)$. With $\theta = 10^0$K and $H = 10^4$ oe for the small electron groups, $\zeta^{osc} \sim 10^{-3} - 10^{-4}$ ev; for the large groups it is $\sim 10^{-6}$ ev. τ is estimated from $\tau = RC$ (R and C of the contact); for $v_F \sim 10^8$ cm/sec, $n \sim 10^{22}$ cm^{-3}, and $S \sim 1$ cm^2 one obtains $\tau \sim 10^{-3}$ sec. $T \lesssim RC$ is easily achieved by raising the gap width. The experimental possibilities are such that the ζ-oscillations can be observed even at relatively high temperatures. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR (Physicotechnical Institute of Low Temperatures of the Academy of Sciences Ukrainskaya SSR)

SUBMITTED: June 17, 1962
Card 2/2

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, I.O. [Kulyk, I.O.]

Momentum distribution of electrons and phonons in a normal metal
Ukr. fiz. zhur. 8 no.11:1213-1222 N '64. (MIRA 17:9)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR, Khar'kov.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

ACCESSION NR: AP4025924 S/0056/64/046/003/0913/0919

AUTHOR: Gogadze, G. A.; Itskovich, F. I.; Kulik, I. O.

TITLE: Quantum oscillations of cold-emission current of metals in a magnetic field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 913-919

TOPIC TAGS: cold emission, field emission, tunnel current, tunnel current oscillation, chemical potential, number of electronic states, complex cathode emission

ABSTRACT: Following an earlier study of the oscillations of the tunnel current between two metals separated by a thin layer of dielectric, which yielded a more accurate determination of the effective mass and which showed that the tunnel-current oscillations depend significantly on the oscillations of the chemical potential of the metals, the authors investigate theoretically the oscillations of the field-emission current from a metal in a magnetic field prependicular to the sample surface. The oscillations are shown to be due either to oscillations

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ACCESSION NR: AP4025924

in the number of the electronic states in the magnetic field or to oscillations of the chemical potential of the metal, the latter having usually an appreciable amplitude and the former being significant only for metals having small electron groups. As an example, the features are considered of field emission from a complex cathode consisting of two metals separated by a thin layer of dielectric, through which tunnel current can flow. It is shown that a considerable current can exist even in a relatively weak field incapable of inducing appreciable emission from one of the metals (in the absence of a potential difference between metals). The field-emission current exhibits oscillations associated with both metals. It is pointed out that an experimental investigation of these oscillations is extremely difficult. Orig. art. has: 4 figures and 16 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR (Physicotechnical Institute of Low Temperatures, AN UkrSSR); Khar'kovskoye vy*sheye komandno-inzhenernoye uchilishche (Khar'kov Engineer Officers' College).

SUBMITTED: 27Jul63 DATE ACQ: 16Apr64 ENCL: 00

SUB CODE: PH, GE NR REF SOV: 009 OTHER: 001

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

ACCESSION NR: AP4042377 S/0056/64/047/001/0107/0112

AUTHOR: Kulik, I. O.

TITLE: Sound dispersion in metals in a magnetic field

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 1, 1964, 107-112

TOPIC TAGS: sound transmission, wave dispersion, sound absorption, sound velocity, elastic modulus

ABSTRACT: The investigation is aimed at studying the dependence of elastic properties of metals (i.e., the velocity of elastic waves) on the magnetic field by measuring the interaction between the sound-wave field and the conduction electrons. The dispersion of the sound in metals is analyzed at T = 0 and it is shown that a considerable (10%) change in the velocity of longitudinal sound occurs as a result of the anomaly of absorption of longitudinal sound at $k \perp H$ (standard symbols), compared with the value in the absence of the

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field. This effect takes place in a strong magnetic field ($r_H \ll \lambda$) and sufficiently high frequencies ($\omega\tau \gtrsim 1$), and for arbitrary electron dispersion (for closed Fermi surfaces), as follows from a qualitative explanation presented in the article, but the rigorous analysis is confined to the three-electron model with isotropic quadratic electron dispersion. Observation of such an effect makes it possible to separate the spin and electron contributions to the modulus of elasticity of the metal, and to determine certain characteristics of the Fermi surface. Certain difficulties in the experimental observation of the effect are discussed. "I am deeply grateful to I. M. Lifshits for useful advice and a discussion of the work, and to E. A. Kaner, V. M. Kontorovich, and V. G. Peschanskiy for useful discussions." Orig. art. has: 3 figures and 28 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperature Akademii nauk UkrSSR (Physicotechnical Institute of Low Temperatures,

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ACCESSION NR: AP4042377

Academy of Sciences, UkrSSR)

SUBMITTED: 01Jul63

SUB CODE: GP, MM

NR REF SOV: 004

ENCL: 00

OTHER: 002

3/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, I.O.

"Step" theory of the volt-ampere characteristics of the Josephson tunnel current. Pis'. v red. Zhur. eksper. i teoret.fiz. 2 no.3:134-139 Ag '65. (MIRA 18:12)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR. Submitted June 12, 1965.

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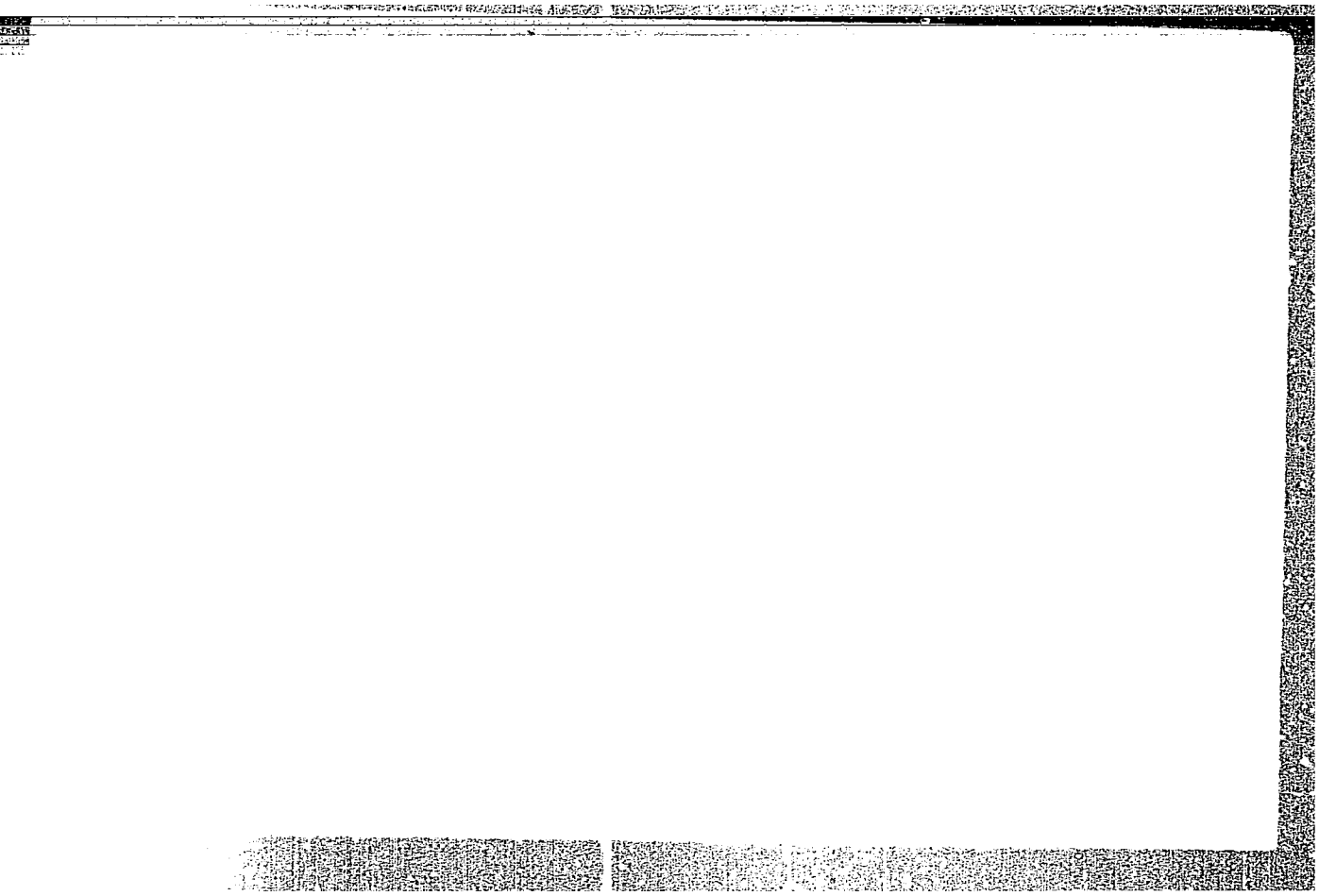

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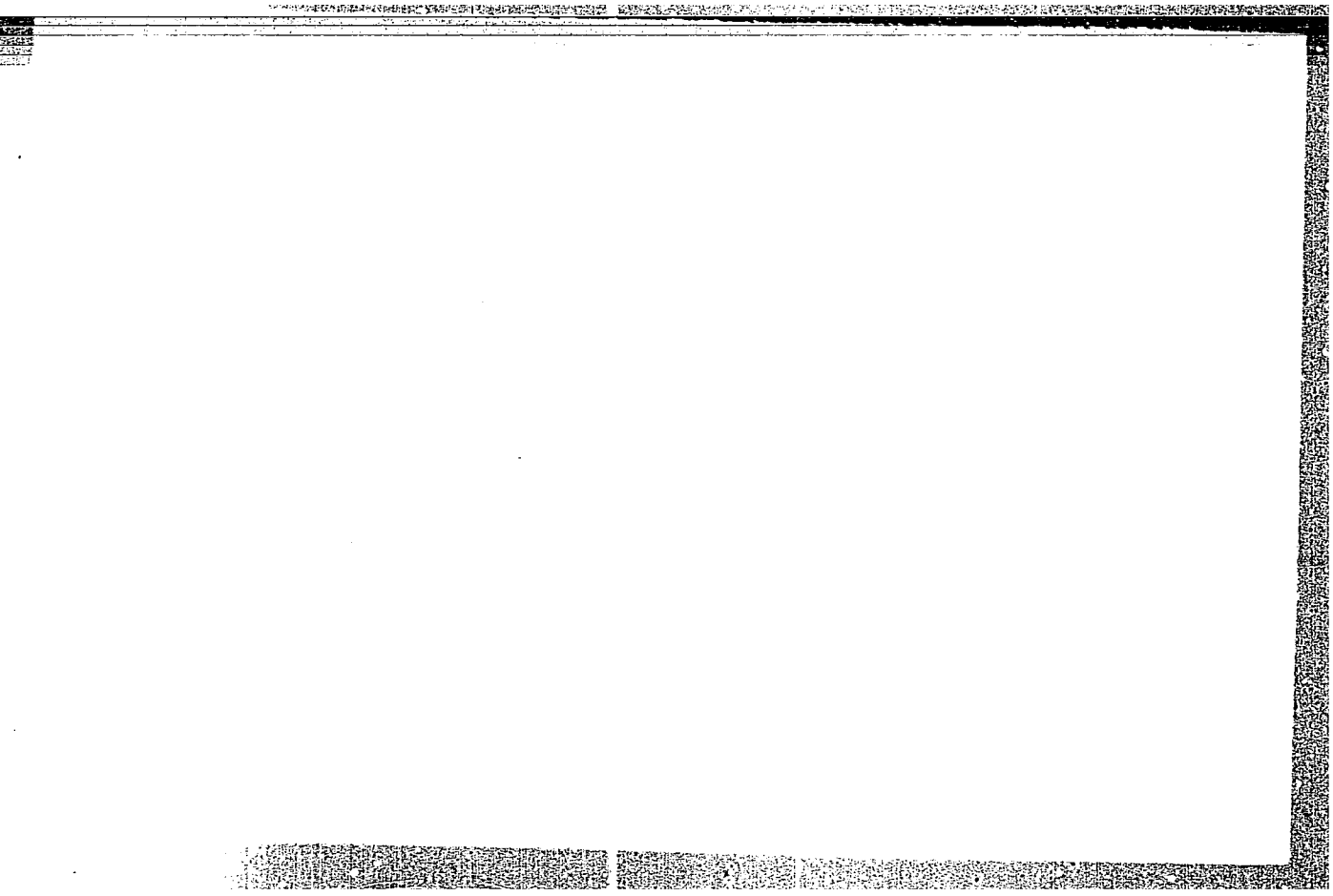

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TOPIC TAGS: thin film, tunnel effect, quantum effect, potential barrier, superconductivity, particle collision

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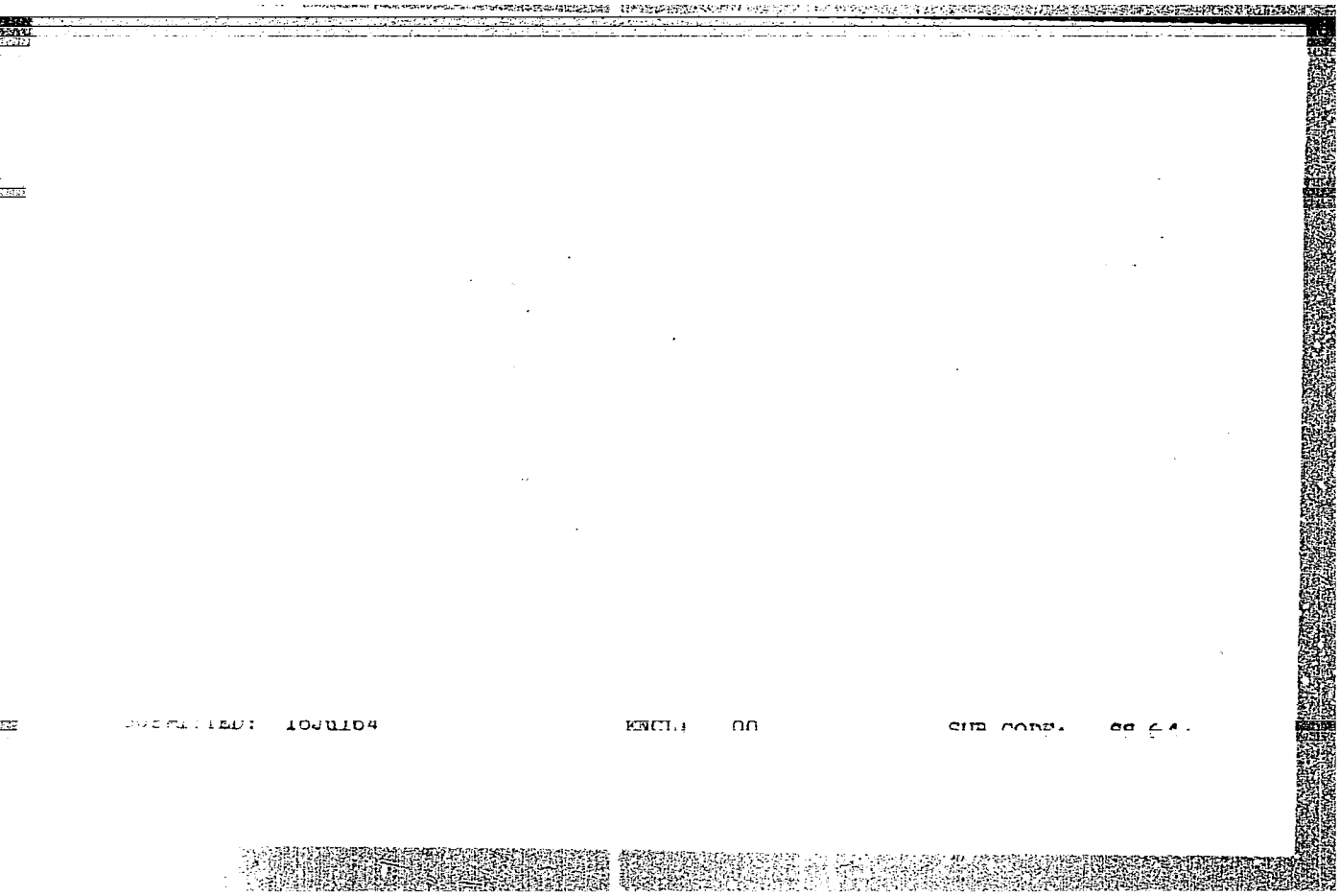

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L 11786-66 EWT(1)

ACC NR: AP5026614 SOURCE CODE: UR/0056/65/049/004/1211/1214

44,55

AUTHOR: Kulik, I. O.

57
B

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences, Ukrainian SSR (Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR)

21,44,55

TITLE: Magnitude of the critical Josephson tunnel current

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 4, 1965, 1211-1214

TOPIC TAGS: spin orbit interaction, paramagnetic impurity, tunnel current, superconductivity, critical point

ABSTRACT: The article is devoted to an analysis of some of the reasons why experiments on superconducting tunneling give for the maximum Josephson current a value lower than the critical Josephson current. It is shown by analysis of the tunneling Hamiltonian that the maximum value of the superconducting tunnel current at zero potential difference is always smaller than the current in the normal state when the bias is equal to $\pi\Delta/2$. This result follows from a more exact theory in which it is assumed that the transverse dimensions of the tunnel junction are

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ACC NR: AP5026614

small enough so that the effect of finite depth of penetration of the superconducting tunnel current can be neglected, if no account is taken of the limitation of the Josephson current by its own magnetic field. Orig. art. has: 18 formulas.

SUB CODE: 20/ SUBM DATE: 26Apr65/ NR REF SOV: 001/ OTH REF: 008

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

L 22985-66 EWT(1) IJP(c) GG
ACC NR: AP6009719 SOURCE CODE: UR/0386/66/003/004/0133/0136

AUTHOR: Kulik, I. O.

ORG: Physicotechnical Institute of Low Temperatures, AN UkrSSR, Khar'kov (Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR)

TITLE: Nonstationary phenomena in the mixed state of superconductors of the second type

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 4, 1966, 183-186

TOPIC TAGS: superconductivity, superconductivity alloy, magnetic effect, tunnel effect, tunnel current, volt ampere characteristic

ABSTRACT: The author shows that, without specifying concretely the energy dissipation mechanism in a superconducting alloy, it is possible to draw certain conclusions concerning the character of phenomena accompanying the motion of quantized magnetic flux filaments (Abrikosov filaments) under the influence of a Lorentz force in a direction perpendicular to the current and to the magnetic field.

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This motion is customarily used to explain the appearance of a potential difference in the direction of current flow when a sufficiently strong current flows perpendicular to the magnetic field in a superconducting alloy. It is shown that if the structure is periodic in the direction of motion, then the density of the superconducting electrons will be at each point of space an oscillating function of time, with oscillations that are similar to those of the superconducting Josephson current. Like the latter, these oscillations should give rise to a radiation effect accompanying the 'resistive' effect in superconductors. The bulk of the high frequency energy will be dissipated inside the superconductor, and only a small fraction can emerge to the outside (this too is analogous to the Josephson effect, where the radiated power is $\sim 10^{-4}$ -- 10^{-5} of the power released inside the superconducting tunnel structure). In addition, an inverse effect should exist, whereby irradiation of the superconducting sample with external high frequency power changes the volt-ampere characteristics and gives rise to singularities that are related to the irradiation frequency. The irradiation frequency is estimated at 10^6 -- 10^7 cps. It is pointed out in conclusion that the effect

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is highly sensitive to the regularity of the Abrikosov structure, so that it can become observable only in sufficiently homogeneous conductors of the second kind, which have no macroscopic defects. The author thanks A. A. Abrikosov, I. Ye. Dzyaloshinskiy, and L. P. Pitayevskiy for a discussion of the work and valuable remarks. Orig. art. has: 5 formulas

SUB CODE: 20/ SUBM DATE: 07Jan66/ ORIG REF: 003/ OTH REF: 008

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

L 26126-66 EWT(1) IJP(c)

ACC NR: AP6015802 SOURCE CODE: UR/0386/66/003/010/0398/0401

AUTHOR: Kulik, I. O.

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences, Ukrainian SSR (Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR)

TITLE: Magnetic moment of a superconducting ellipsoid in a mixed state

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 10, 1966, 398-401

TOPIC TAGS: superconductivity, critical point, critical magnetic field, magnetic moment, surface property

ABSTRACT: The author investigates the manner in which the superconductivity is destroyed by a magnetic field in bulky specimens of superconductors of type II with nonzero demagnetizing factor. By confining the analysis to an ellipsoidal body, within which the distribution of the magnetization is macroscopically homogeneous, it is shown that the variation of the magnetic moment per unit volume as a function of the field during the course of the phase transition can be uniquely expressed as a function of the sample geometry, in the same manner as for superconductors of type I. The difference lies in the fact that in the case of type I the transition is via an intermediate state, whereas in the case of type II it does not differ in principle from a transition of a long cylinder in a parallel field, i.e., it is realized with the mixed state introduced by A. A. Abrikosov (ZhETF v. 32, 1442, 1957) in which the

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ACC NR: AP6015802

transition from the superconducting to the normal state takes place continuously in a field interval between the upper and lower critical fields. The author thanks M. I. Kaganov for a discussion of the work. Orig. art. has: 1 figure and 7 formulas.

SUB CODE: 20/ SUBM DATE: 18Mar66/ ORIG REF: 001/ OTH REF: 002

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

L 24552-66 EWT(1)/T/EWA(h) IJP(c) AT
ACC NR: AP6011003 SOURCE CODE: UR/0056/66/050/003/0799/0806

AUTHOR: Kulik, I. O.

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences, Ukrainian SSR, Khar'kov (Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR)

TITLE: The Josephson tunnel effect in superconductors with magnetic impurities

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 3, 1966, 799-806

TOPIC TAGS: superconductivity, tunnel effect, paramagnetic ion, Green function, impurity center, electron spin, magnetic moment

ABSTRACT: The author develops a theory of the Josephson effect in superconductors with paramagnetic impurities at zero temperature, as well as a theory for the absence of a potential difference between the superconductors. It is shown that in ordinary superconductors, the superconducting tunnel current differs from zero both in the

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ACC NR: AP6011003

region of the ordinary superconductivity and in the region of a gapless superconductivity. The Josephson current at T = 0 is determined by evaluating the thermodynamic Green's functions of the isolated superconductors. The dependence of the maximum value of the Josephson current on the concentration of the paramagnetic impurities is calculated. The calculation shows that nonmagnetic impurities, as well as diamagnetic impurities, which lead to no change in the direction of the electron spin upon scattering (no spin flip), do not change the value of the Josephson direct current. A close relation between spin flip and the change in the Josephson direction current is established, inasmuch as no impurities (that is, all kinds of impurities that have no localized magnetic moment), produce no effect on the critical Josephson current, just as they have no effect on the thermodynamics of superconductors. Orig. art. has: 2 figures and 35 formulas.

SUB CODE: 20/ SUBM DATE: 160ct65/ ORIG REF: 005/ OTH REF: 007

Card 2/2 UDC

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

LEBEDEVA, G.N.; BURMISTRENKO, L.A.; KOLODYAZHNYY, I.V.; KAPLINA, Ye.G.; POLANUYER, O.G.; KULIK, I.P.

Recovery of pure ammonium sulfate in case of processes using Glover acid. Koks i khim. no.9:42-45 '63. (MIRA 16:9)

1. Vostochnyy uglekhimicheskiy institut (for Lebedeva, Burmistrenko).
2. Moskovskiy koksogazovyy zavod (for Kolodyazhnyy, Kaplina, Polanuyer, Kulik).

(Ammonium sulfate)
(Coke industry--Equipment and supplies)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, JIRI.

Renovace soucasti. [Vyd. 1.] Praha, Statni zemedelske nakl., 1955. 195 p. [Renovation of machine parts. 1st ed.]
DA Not in DLC

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6,no. 10, October 1957. Uncl.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, J.

Reconstruction of the magnet and the carburetor of the auxiliary PD-10 engines. p. 156.
MECHANISACE ZEMEDELSTVI. Vol. 5, No. 6, Apr. 1955

SO: Monthly East European Accession, (EEAL), LC, Vol. 4, No. 9, Sept. 1955 Uncl.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, J.

"Preparation of machinery for the spring work."

MECHANISACE ZEMEDELSTVI, Praha, Czechoslovakia, Vol. 5, No. 20, October 1955.

Monthly list of East European Accessions (EAI), LC, Vol. 8, No. 9, September 1959.

Unclassified.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, L. M., RUD'KE, A. K., and BORODACHEV, V. Ya.

"Approximate Solution of Heat Conduction Equation For Uniformly Laminated Media."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

S/024/61/000/002/003/014
E113/E135

26.5100

AUTHORS: Kulik, L.M., and Shatalov, G.Ye. (Moscow)

TITLE: Unsteady heat transfer in composite slabs

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1961, No.2, pp. 72-77

TEXT: This work gives the analytical solution of the unsteady heat condition equation for a composite plain slab consisting of n layers with general boundary conditions in case of internal heat sources being present. The system of differential equations describing the heat distribution in the composite slab consisting of n layers of differing properties is:

$$\frac{\partial t_i}{\partial \tau} = a_i \frac{\partial^2 t_i}{\partial x^2} + P_i(x)W_i(\tau) \qquad (1)$$

where the term $P_i(x)W_i(\tau)$ represents the internal heat sources varying in time and space. The boundary conditions at the free surfaces are given in general form from which, by suitable choice of coefficients, it is possible to obtain an expression for each

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particular problem. By introducing new variables and solving a system of equations derived from the general boundary conditions, the problem of solution of the system of differential equations (1) is reduced to the problem of solving an inhomogeneous differential equation with homogeneous boundary conditions. This equation is solved by means of the Green function over the corresponding area. To illustrate the application of the solution obtained, the following example is included. On one side of a wall consisting of two layers there is a fast moving liquid of sufficiently large heat transfer coefficient and high temperature which varies in time according to the law $t_{b1}(\tau) = 1700 - 1680\, e^{-5\tau}$. The other side of the wall is cooled by air having heat transfer coefficient $\alpha = 100$ kkal/m^2 °C.hour and temperature $t_{b2} = 20$ °C. The material of the first layer is magnezit of thickness and thermal conductivity $\delta_1 = 5 \times 10^{-2}$ m, $\lambda_1 = 5$ kkal/m °C.hour. The material of the other layer is dipas of the thickness and thermal conductivity $\delta_2 = 0.1$ m, $\lambda_2 = 1$ kkal/m °C.hour. Throughout this system there are uniformly distributed heat sources of power $P/c\gamma = 100$ °C/hour where P is the heat generated per unit volume, c is the specific heat, γ is density. From these data

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Unsteady heat transfer in composite.... E113/E135

the temperature profile across the wall can be calculated at any time. The problem of presence of heat sources proportional to temperature is not dealt with but the equation which includes the term representing this type of heat source is given and by applying the transformation suggested the equation can be transformed into Eq.(1).
There are 1 figure and 2 references: 1 Soviet and 1 English.
The English language reference reads as follows:
Ref.2: E. Mayer. Heat flow in composite slabs.
J. Amer. Rocket Soc., V.22, May-June 1952, No.3.

SUBMITTED: March 30, 1960

Card 3/3

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

S/058/63/000/003/063/104
A059/A101

AUTHORS: Lyskovych, O. B., Vaydanych, V. I., Spitkovs"kyy, I. M., Belikovych, B. O., Kulyk, L. M., Chepelyev, V. V., Maksymovych, Kh. K.

TITLE: Growing large single crystals of NaI(Tl)

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1963, 49, abstract 3E324 ("Visnyk L'vivs"k. un-tu. Ser. fiz.", no. 1(8), 117 - 119, Ukrainian)

TEXT: Temperature conditions were chosen for growing optically transparent NaI(Tl) single crystals, about 140 mm in diameter and about 100 mm long. Growing was performed by the method of Kyropoulos in a furnace with lateral and bottom heaters. Corundum slag crucibles the walls of which are not wetted by the melt are used. The rate of growth is 3 to 4 mm/hour.

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

ACC NR: AR6035045 SOURCE CODE: UR/0058/66/000/008/D091/D091

AUTHOR: Vyshnevs'kyy, V. N.; Kulik, L. M.; Romanyuk, M. O.

TITLE: Optical properties of some alkali halide crystals in the spectral range 2000 to 800 Å

SOURCE: Ref. zh. Fizika, Abs. 8D707

REF SOURCE: Visnyk L'vivs'k. un-tu. Ser. fiz., no. 2, 1965, 32-34

TOPIC TAGS: optic property, crystallization, sodium iodide crystal, lithium fluoride crystal, single crystal, alkali halide crystal

ABSTRACT: The reflecting power of sodium iodide thallium and lithium fluoride single crystals have been measured in the energy field 6—15 ev. The effect of changes of the crystallization temperature and chemical activity of salts on their reflecting power is observed. [Translation of abstract] [NT]

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Card 1/1

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, L.M. [Kulyk, L.M.], dotsent

Clinical significance of determining bilirubin in the urine by the methylene blue reaction in Botkin's disease in children. Ped., akush. i gin. 24 no.1:31-34'62. (MIRA 16:8)

1. Kafedra fakul'tetsko-gospital'noy pediatrii (zav. - prof. V.O.Bilousov) Khar'kovskogo meditsinskogo instituta (rektor - dotsent B.Ya. Zadorozhnyy [Zadorozhnyi, B.IA]).
(HEPATITIS, INFECTIOUS) (BILIRUBIN)
(METHYLENE BLUE)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, L. N.

"Infectious Hepatitis and Its Sequelae in Children." Cand Med Sci, Khar'kov Medical Inst, Khar'kov 1955. (KL, No 12, Mar 55)

SO: Sum. No. 670, 29 Sep 55—Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (15)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

MZHEL'SKIY, V.S.; KULIK, L.N.; TKHORZHEVSKIY, V.I.

Causes of failures in the surgical treatment of varicose veins of the lower extremities. Vest.khir. no.4:54-59 '61. (MIRA 14:4)

1. Iz 2-y gospital'noy khirurgicheskoy kliniki (nach. - prof. Ye.V. Smirnov) Voyenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova.

(VARIX)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, L.N., dotsent

Liver cirrhosis in children. Sov.med. 25 no.2:62-68 F '61.
(MIRA 14:3)

1. Iz kafedry fakul'tetskoy i gospital'noy pediatrii (zav. - prof. V.A.Belousov) Khar'kovskogo meditsinskogo instituta (direktor - dotsent B.A.Zadorozhnyy).
(LIVER—CIRRHOSIS) (CHILDREN—DISEASES)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

GRINEV, M. V. (Leningrad, Zagorodnyy pr., d. 45, kv. 29); KULIK, L. N.

Role of the muscle flap in the plastic repair of the bone cavities in chronic osteomyelitis. Vest. khir. no.4:50-55 '62. (MIRA 15:4)

1. Iz 2-y gospital'noy khirurgicheskoy kliniki (nach. - prof. Ye. V. Smirnov) Voyenno-meditsinskoy ordena Lenina akademii im. S. M. Kirova.

(OSTEOMYELITIS) (MUSCLES--TRANSPLANTATION)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

ACC NR: AP7003615 SOURCE CODE: UR/0185/66/011/012/1345/1349

AUTHOR: Vyshnevs'kyy, V. N.--Vishnevskiy, V. N.; Kulyk, L. M. --Kulik, L. N.; Romanyuk, M. O.--Romanyk, N. A.

ORG: Lvov State University im. I. Franko (L'vivs'kyy derzhuniversytet)

TITLE: Structure of the fundamental absorption bands of mixed potassium chloride and potassium bromide single crystals

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 11, no. 12, 1966, 1345-1349

TOPIC TAGS: absorption band, potassium chloride crystal, potassium bromide crystal, mixed crystal, ionic crystal, ion interaction

ABSTRACT: An investigation was made of the reflection spectra of a system of mixed potassium chloride and potassium bromide single crystals in the region 2000—900 Å. The intensity of the long-wave fundamental absorption bands of "pure" and mixed crystals was also estimated. The results of the investigation are compared with the conclusions of the existing models of interaction of ionic crystals with radiation. Orig. art. has: 2 figures and 1 table. [Authors' abstract] [NT]

SUB CODE: 20/SUBM DATE: 16Mar66/ORIG REF: 004/OTH REF: 025/

Card 1/1

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

VISHNEVSKIY, V.N. [Vyshnevs'kyi, V.N.]; VUS, Ya.M.; KULIK, L.N. [Kulyk, L.M.]; MARCHUK, Ye.P. [Marchuk, IE.P.]; ROMANYUK, M.A.[Romaniuk, M.O.]

Reflection spectra in the vacuum region of the spectrum.
Ukr. fiz. zhur. 10 no.2:222-223 F '65. (MIRA 18:4)

1. L'vovskiy gosudarstvennyy universitet im. I. Franko.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M., inzhener.

Advantages of continuous production organization. Mast.ugl.3 no.10:12-13 O '54. (MLRA 7:12)
(Coal mines and mining)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.

For the next year's crop. Zemledelie 25 no.10:68 O '63.
(MIRA 16:11)

1. Predsedatel' kolkhoza "Krasnyy novoselets", Borisovskogo rayona, Minskoy oblasti.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M. A. (Kiev)

"Utilization of the Method of Conditioned Probalities in Establishemnt of Medical Diagnosis"

report presented at the 3rd Conference on the use of Mathematics in Biology, Leningrad University, 23-28 Jan 1961.
(Primeneniye matematicheskikh Metodov v Biologii. II, Leningrad, 1963, pp. 5-11

(Moscow Agricultural Academy imeni Timiryazev)

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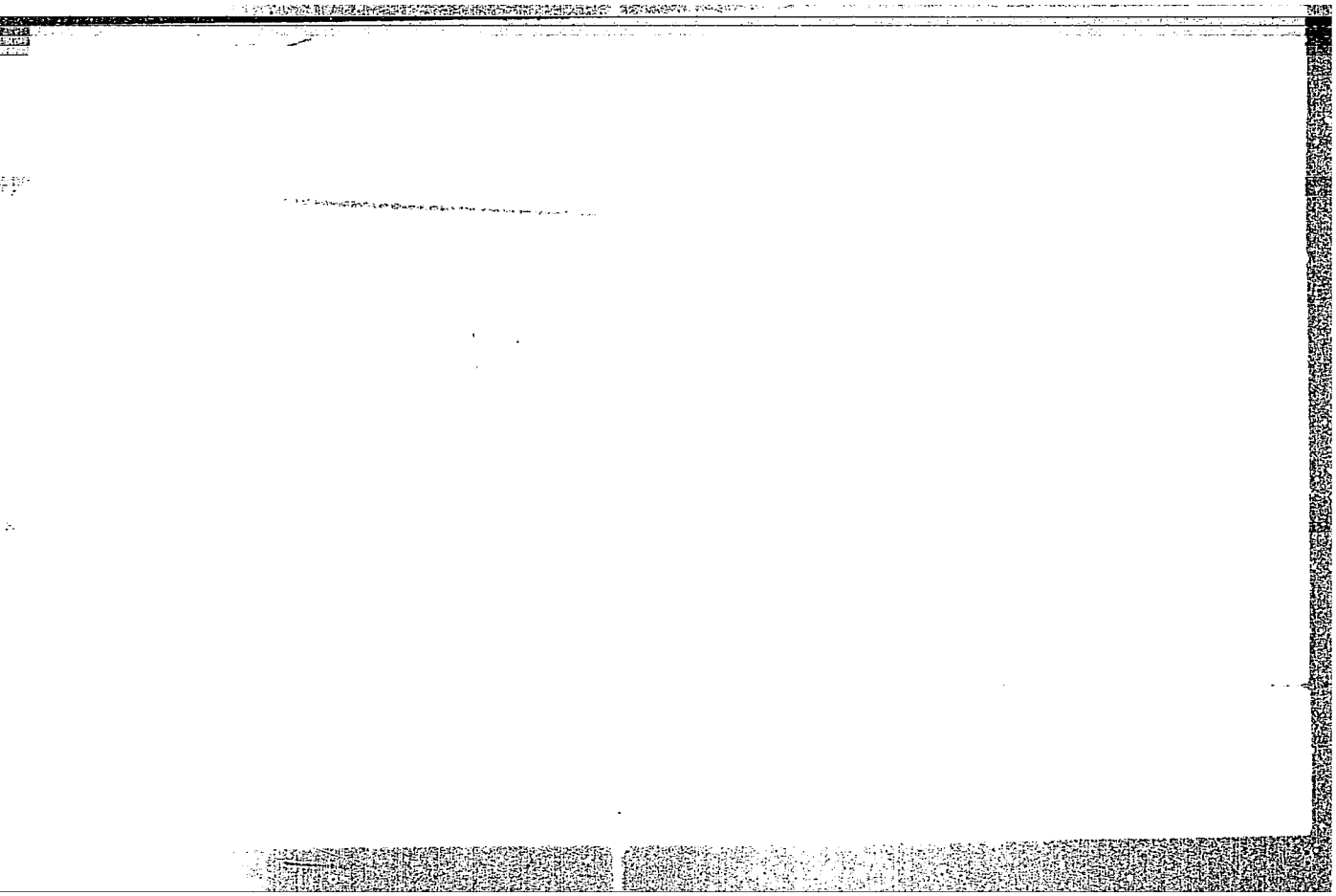

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I.

Problem of complete automatic control of industrial processes.
Sakh.prom.30 no.3:40-43 Mr '56. (MLRA 9:7)

1.Ukrgiprosakhar.
(Automatic control) (Sugar industry)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I.

Calculating the automation of heaters. Sakh.prom. 31 no.7:31-33 Jl '57. (MLRA 10:8)

1.Ukrgiprosakhar.
(Heating) (Automatic control)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

MITROFANOV, Vladimir Pavlovich; RUDZITSKIY, Aleksandr Abramovich; LOSSIYEVSKIY, V.L., prof., retsenzent; RAKOVSKIY, M.Ye., dots., retsenzent; KULIK, M.I., inzh., retsenzent; IVANOV, A.S., inzh., spetsred.; KRUGLOVA, G.I., red.; DOBUZHINSKAYA, L.V., tekhn. red.

[Automatic control in the manufacture of beet sugar] Avtomatizatsiia sveklosakharnogo proizvodstva. Moskva, Pishchepromizdat, 1958. 299 p. (MIRA 11:9)

(Sugar manufacture)
(Automatic control)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

S/205/61/001/004/029/032
D298/D303

AUTHOR: Kulik, M. I.

TITLE: Experimental mutations in tomatoes

PERIODICAL: Radiobiologiya, v. 1, no. 4, 1961, 624-626

TEXT: Experiments were conducted with tomatoes into the mutagenic action of gamma-radiation and hot neutrons. Air-dried seeds of Pushkin and Bizon tomato varieties were exposed to radiation. The irradiated seeds were cultivated in a glasshouse and the 4 - 5-week seedlings transplanted into the open. Some 3 - 4 fruits of this generation were taken for cultivating individual second-generation offspring which were then studied for mutations. As a result of the seeds' irradiation, 125 different mutations were obtained. About 30% of these mutations showed various useful properties. Some of the mutant forms in this category preserved their positive qualities in the third generation and considerably exceeded the original varieties and the district standards as regards both yield (an increase of 11 - 17 tons/hectare) and the

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yield of ripe fruits (an increase of 8 - 17 tons/hectare). The manifestly adverse mutant forms did not exceed 23% of the total mutations. Among the positive mutants were several high-yield and quick-ripening strains. The author recommends the method of experimental mutation in plant selection. There are 3 tables and 1 Soviet-bloc reference.

ASSOCIATION: Institut tsitologii i genetiki Sibirskogo otdeleniya AN SSSR (Institute of Cytology of the Siberian Department, AS USSR), Novosibirsk

SUBMITTED: March 7, 1961

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

23817
S/020/61/138/001/022/023
B103/B208

27.1220

AUTHOR: M. Kulik

TITLE: Experimental production of mutations in tomatoes

PERIODICAL: Doklady Akademii nauk SSSR, v. 138, no. 1, 1961, 211-214

TEXT: The author tried to produce experimentally mutant, valuable tomato sorts by A) γ-radiation, B) X-radiation, and C) thermal neutrons as mutagenic factors. The following test sorts were used: 1) Pushkinskiy. 2) Gruntovyy desertnyy, 3) Shtambovyy karlikovyy, and 4) Bizon. Air-dried seeds which were stored for 2 years were irradiated. They were then allowed to germinate in Petri dishes, cultivated for 1 month in the greenhouse, and, finally, transplanted in the open air. The following results were obtained: γ-doses of 1000 and 5000 r accelerated the germination of the seeds only during the first two days after sowing (Fig. 1). From the third day onwards the germination of this experimental series lagged behind the control. Higher doses (from 10000 r upwards) reduced the germination energy of the seeds from the beginning, so that the total number of germinated seed of all series reached the control only at the

Card 1/6

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Experimental production of mutations in...

end of germination. Equal doses of X-rays reduced in all cases both the germination energy and the percentage rate of the germinating power, the more, the higher the dose was (Fig. 2). The plants coming from seeds treated with A) and B) exhibited a high survival rate which only markedly decreased at doses from 150000 r upwards. B) reduced the survival rate more than A). Doses of A) of 20000 r and of B) of 15000 r caused the plants to lag behind the controls by nearly one month, in spite of a rather high survival rate, without the growth of ripe fruits. The author regards these doses as critical for air-dried seed. C) The treatment with thermal neutrons was made in an atomic reactor, where also a certain amount of γ-rays was acting upon the seed. Neutron doses of $1 \cdot 10^9$ - $4 \cdot 10^{10}$ per cm^2 reduced the survival rate by only 6-10 %, doses of $4 \cdot 10^{11}$ and $4 \cdot 10^{12}$ per cm^2 by 27-42 %, and the germinating power by 13-21 %. The dose of $4 \cdot 10^{12}$ might be the critical one. The sensitivity of the individual tomato sorts to ionizing radiation is different. Plants of the sort 3) from seed irradiated with $4 \cdot 10^{10}/cm^2$ of C) were more suppressed during the entire period of growth than those of the sort 4). The plants of the first

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Experimental production of mutations in...

generation of all sorts exhibited numerous changes of characteristics, such as color of the growing plant, growth, forms of bush, leaves and fruit, and others. The percentage rate of these plants was: control 1.9, 1000 r 2.2, 5000 r 18.7, 10000 r 39.5, 15000 r 37.2, 20000 r 1.9, 25000 r 1.3. Table 1 gives data on the frequency of mutants in the second generation. The author summarizes his results as follows: The frequency of mutants caused by γ-radiation and thermal neutrons is 10-15 times higher than the spontaneous ones. More than 70 % of the resultant mutants were biologically valuable. 30 % of them had characteristics that may be utilized by plant breeders: increased productivity, earlier ripeness, larger and better colored fruits which stick better to the bush, closer form of the bush, and others. Distinctly negative forms such as nanism, deformation or sizereduction of some organs, sterility, and others formed about 22 % of all mutants. The number of mutants was most increased by the action of A), dose 15000, and 20000 r. The highest qualitative manifoldness of the mutants, and their comparatively highest number with practically valuable characteristics were obtained by comparatively weak γ-doses (1000-5000 r), whereas higher doses were less effective in this respect. The quantitative and qualitative differences between the

Card 3/6

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Experimental production of mutations in...

mutagenic effect of A) and C) are due to the fact that C) doses up to $4 \cdot 10^{10}/cm^2$ caused the same frequency of mutants as A) doses up to 10000 r. But A) gave rise to a much broader scale of mutations than C). There are 2 figures, 1 table, and 18 references: 11 Soviet-bloc and 7 non-Soviet-bloc. The three most recent references to English-language publications read as follows: J. Mac-Key (Ref. 4: Brookhaven Symposia in Biology, no. 9, 1956), C. F. Konzak (Ref. 10, ibid.), E. R. Sears (Ref. 11: ibid).

ASSOCIATION: Institut tsitologii i genetiki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Cytology and Genetics of the Siberian Department of the Academy of Sciences USSR)

PRESENTED: July 15, 1960, by V. N. Sukachev, Academician

SUBMITTED: July 14, 1960

Card 4/6

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I.

Preparing programs for the computers in the control system of the evaporation plants. Sakh.prom. 36 no.4:35-42 Ap '62.
(MIRA 15:5)

1. Ukrgiprosakhar.
(Sugar manufacture) (Electronic computers)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I.; ROKITSKIY, A.A.

Efficient methods for the control of the hydraulic conveying of sugar beets to sugar factories. Sakh.prom. 37 no.11:31-35 N '63. (MIRA 16:11)

1. Ukrainskiy gosudarstvennyy institut po proyektirovaniyu predpriyatiy sakharnoy promyshlennosti.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I.

Experimental mutations in tomatoes. Radiobiologiia 1 no.4: 624-626 '61. (MIRA 17:2)

1. Institut tsitologii i genetiki Sibirskogo otdeleniya AN SSSR, Novosibirsk.

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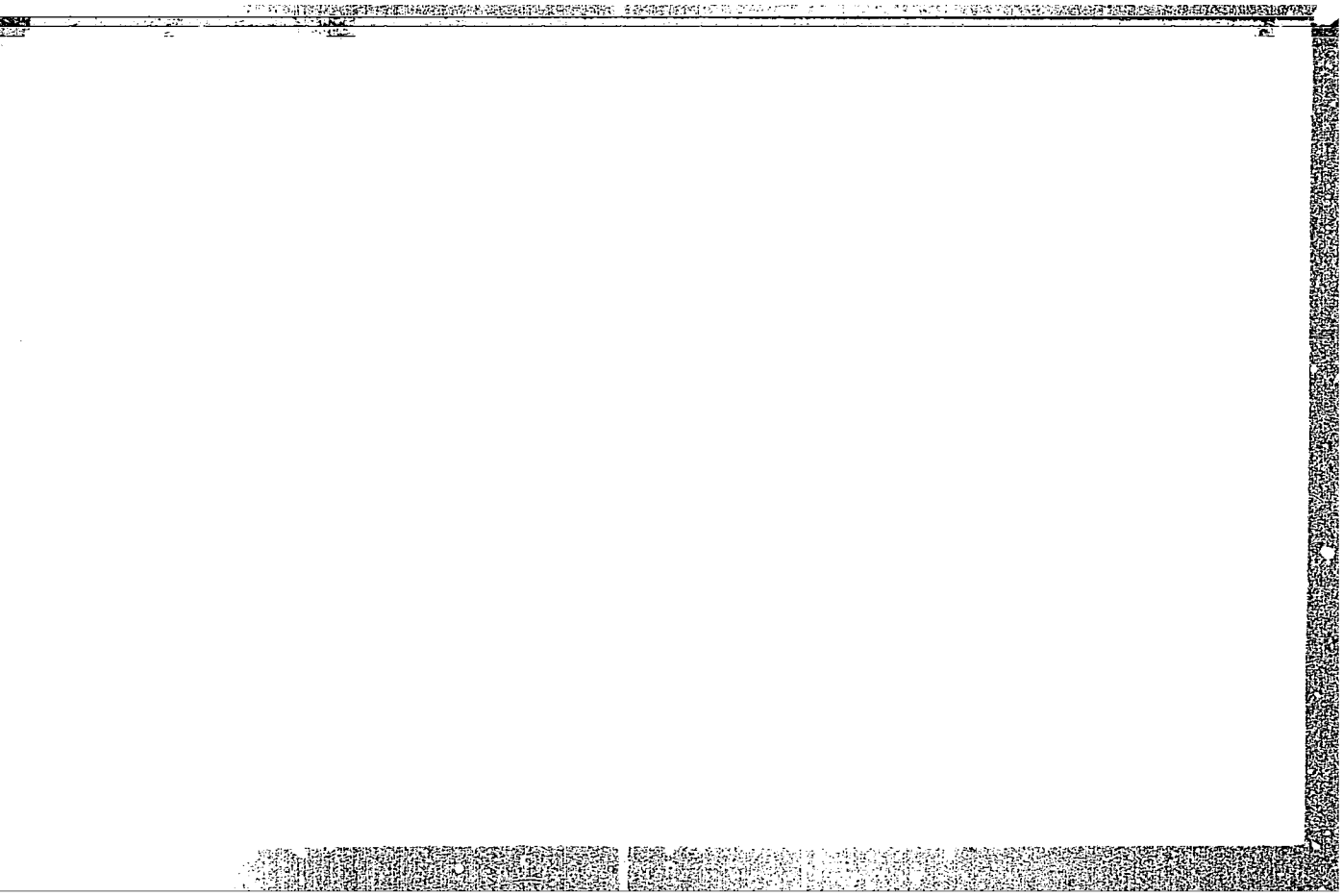

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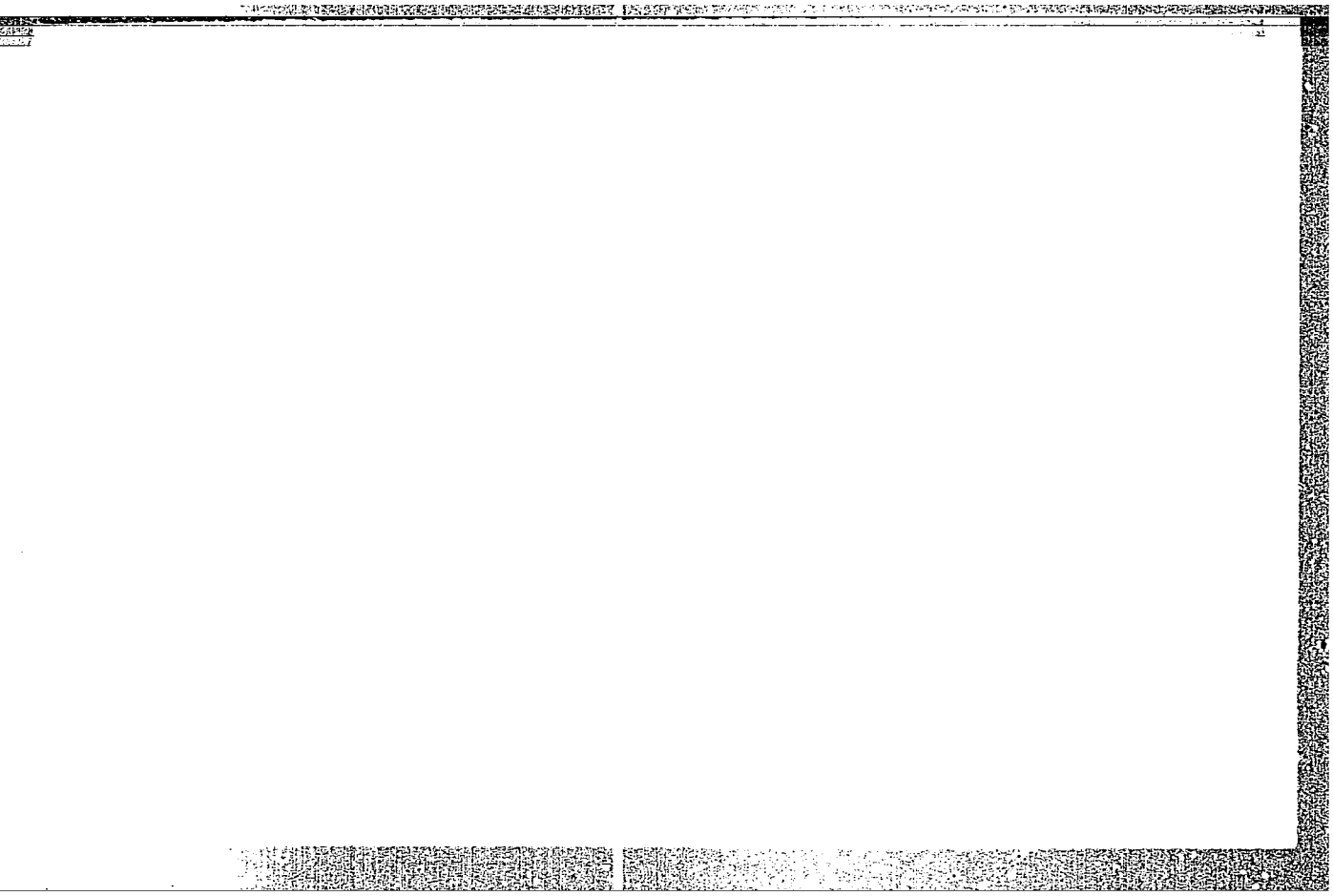

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

SHKVARNIKOV, P.K.; KULIK, M.I.; SAFONOVA, V.T.

Relative mutagenic effectiveness of some chemical compounds on plants. Dokl. AN SSSR 164 no.5:1161-1164 O '65.

(MIRA 18:10)

1. Institut tsitologii i genetiki Sibirskogo otdeleniya AN SSSR.
Submitted December 14, 1964.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I.

Early and productive tomato mutants obtained by gamma irradiation. Genetika no.2:148-151 Ag '65. (MIRA 18:10)

1. Institute of Cytology and Genetics, Academy of Sciences of the U.S.S.R., Siberian Department, Novosibirsk.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.

AID - P-247

Subject : USSR/Aeronautics

Card : 1/1

Author : Kulik, M., Engineer

Title : Flights in Regions of Storm Activity

Periodical : Vest. vozd. flota, 37-6, 39-47, Je 1954

Abstract : Weather conditions in which storms occur and the formation of storms are reviewed. Detailed descriptions of various flights in these conditions follow. Some figures related to these flights concerning altitude, speed, and electrical charges may be found in the text. Photos, diagrams, graphs.

Institution : None

Submitted : No date

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.I., Inzhener

Flights in thunderstorm areas. Grazhd. av. 12 no.5:12-15 My '55
(Storms) (Airplanes--Piloting) (MLRA 8:9)

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DMYANITOV, I.M.; KULIK, M.M.; CHUVAYEV, A.P.

Investigation of thunderstorm zones in the southern regions of European Russia and Transcaucasia. Trudy GGO no.67:3-32 '57.
(Thunderstorms) (MIRA 11:4)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

IMYANITOV, I.M.; KULIK, M.M.; CHUVAYEV, A.P.

Preliminary data on experiments designed for the control of development and change of the electric state of massive convection clouds in the southern regions of European Russia and Transcaucasia. Trudy GGO no.67:33-58 '57. (MIRA 11:4)

(Clouds) (Weather control)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

VOSKANOV, A.I.; IMYANITOV, I.M.; KULIK, M.M.; CHUVAYEV, A.P.

Feasibility of safe passage of airplanes through thunderstorm zones.
Trudy GGO no.67:114-120 '57. (MIRA 11:4)
(Thunderstorms) (Radar in aeronautics)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.N., Engineer

"Basic Elements in the Technological Process of Capital Repair of the Carriage and Mounting of the Apron on the DiP-200 Lathe." Stanki I Instrument Vol. 15, No. 9, 1944

BR 52059019

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.P., dotsnet; TEL'NOVA, R.P.

Clinical evaluation of the Kafka and "KR" diaphragms. Akush.i gin. 35 no.6:30-31 N-D '59. (MIRA 13:4)

1. Iz zhenskoy konsul'tatsii (glavnyy vrach N.A. Shevchuk) Stalinskogo rayona Kiyeva.
(CONTRACEPTIVES)

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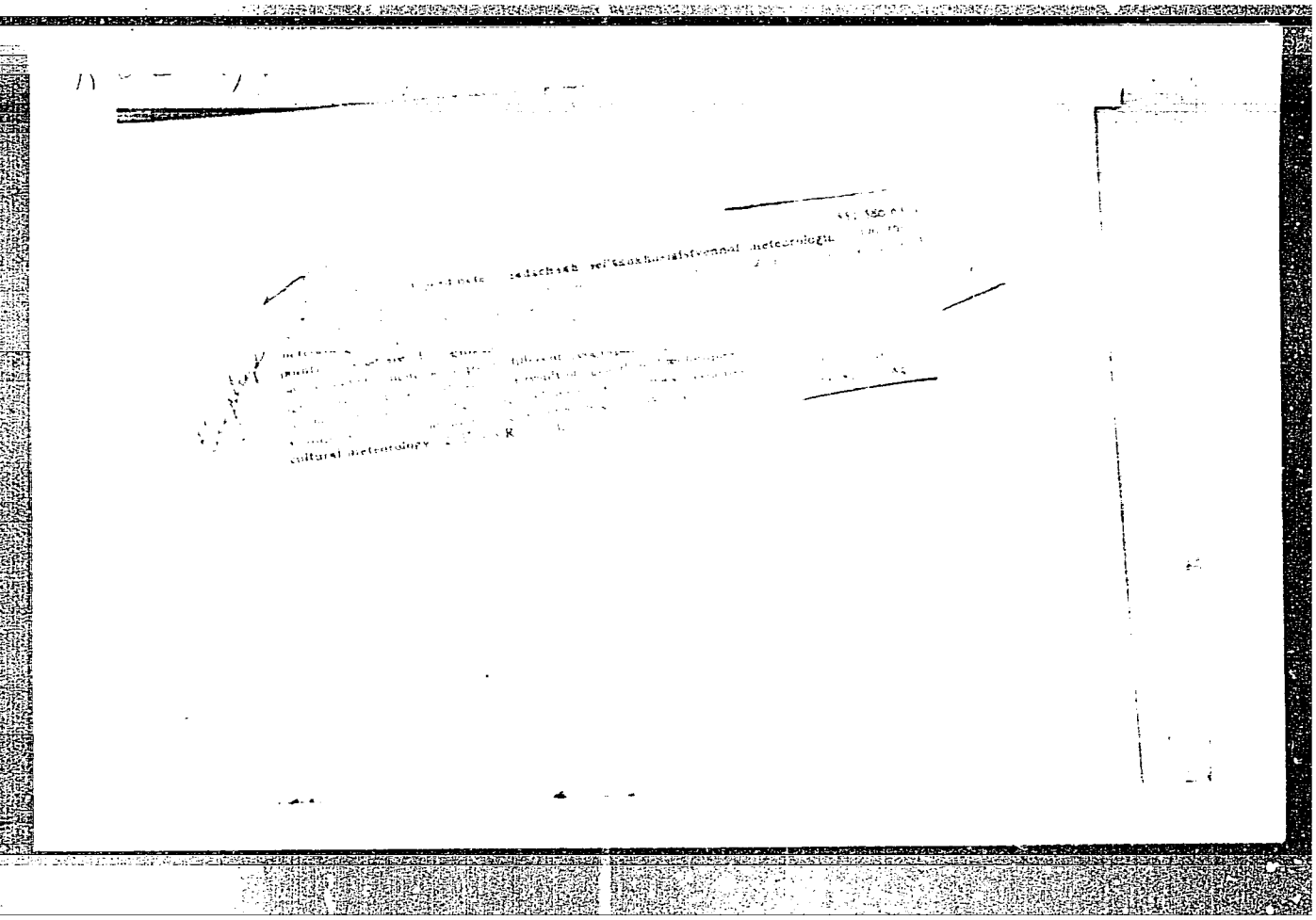

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK,M.S., kandidat geograficheskikh nauk

Evaluation of droughts. Meteor.i gidrol. no.1:35-40 Ja '52.
(MLRA 8:9)

1. TSentral'nyy institut prognozov, Moskva.
(Droughts)

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231T71

KULIK, M. S.

USSR/Meteorology - Aridity Indices Sep 52

"Some Indices in Evaluation of Phenomena of Aridity," M. S. Kulik, Cand Geog Sci, Moscow, Cen Inst of Forecasting

"Meteorol i Gidrol" No 9, pp 10-14

Kulik states that analysis of moisture in the soil is necessary for evaluation of deg of aridity. Notes that work by S. A. Sapozhnikova and M. I. Budyko (cf. "Change of Climate in Connection With Control of Nature in Arid Regions of USSR," 1952) on thermal balance is

231T71

supplying data on variation of evapn under application of modern agricultural techniques. It also furnishes basic agricultural sciences with quant indices of ratio of moisture supply in soil to evapn. Exptl data on crops is given.

231T71

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M. S.

"Taking Account of Dry-Wind Phenomena in Agrometeorological Servicing," Meteorol. i gidrologiya, No 8, 1953, pp 30-33

The author analyzes many years' data on the status of grain cultivations in connection with the sukhovey (dry winds) at four stations in the Ukraine and for a shorter period at other stations. In most of the casses the author notices indications of a remarkable depression in the status of grain cultivations for wind velocities greater than 5 m/sec, accompanying air temperatures greater than 25°, and relative humidity greater than 30%. Moisture deficit at 1300 (hours) equal to 17 mm and greater for wind velocity 5 m/sec and greater at the height of the wind vane is an indication of the dry wind. (RZhGeol, No 5, 1954)

SO: Sum No. 568, 6 Jul 55

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M.S., red.; MOISEYCHIK, V.A., red.; PROTOPOPOV, V.S., red.; FLAUM, M.Ya., tekhn.red.

[Collection of methodological directions on the analysis and estimation of established and expected agrometeorological conditions] Sbornik metodicheskikh ukazanii po analizu i otsenke slozhivshikhsia i ozhidaemykh agrometeorologicheskikh uslovii. Pod red. M.S.Kulika i V.A.Moiseichik. Leningrad, Gidrometeor.izd-vo, 1957. 260 p. (MIRA 12:11)

1. Moscow. TSentral'nyy institut prognozov.
(Meteorology, Agricultural)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, M. S.

"Conditions of water supply for summer wheat with basic methods of its cultivation in the Steppe regions of Kazakhstan and Kulanda"

report presented at the first plenum of the Section for Agricultural Meteorology of VASKhNIL (on tasks and research to be undertaken) 21-23 May 1957 (Meteorologiya i Gidrologiya, Leningrad, No. 8, 1957, pp 72-73)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

KULIK, N.S.

Taking into account the moistening of agricultural soils. Meteor.i gidrol no.6:21-25 Je '57. (MLRA 10:8)
(Soil moisture)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927420002-5

50-11-5/9

AUTHOR: Kulik, M. S.

TITLE: 40 Years of (Soviet) Agricultural Weather Servic (Agrometeorologiches-kaya sluzhba za 40 let).

PERIODICAL: Meteorologiya i Gidrologiya, 1957, Nr 11, pp. 32-39 (USSR).

ABSTRACT: In every agricultural enterprise measures are necessary which need the taking into account of agro-climatic and agro-meteorologic conditions. An important position of the activity of agrometeorologists takes the continuous classification of agrometeorological conditions which makes necessary the central organization for the determination of the position of agricultural growing as well as of harvest prospects and the reasoning of the use of agrotechnical measures for the fighting of unfavorable phenomena (dryness, dry winds, dust winds, ice crusts, great frosts, early frosts, etc.). The reasoning of agroclimatic coefficients of the classification of thermal sources with respect to the single cultures, the working out of the methods for the registration of climatic phenomena which shorten the vegetation period and reduce damage during winter time are some of the general results of great practical importance.
In 1932 the Agrometeorologic Institute was founded which united all scientific research- and methodologic work in agricultural meteorolo-

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gy with the exception of problems the solution of which belongs to the tasks of the Institute for the Investigation of Dryness and Dry Winds. Also investigations were carried out which make it possible to determine a dependence of the velocity of the development of plants on the humidity supply of the soil; e. g. for the "sowing-germinating" period of winter cultures at an optimal temperature (14°) and different humidity it was possible to determine this dependence by means of the formula $n = \frac{14.2}{w.0.79}$, where n = the duration of time, w = the stocks of productive humidity in mm in the layer of the soil of from 0-20 cm. After the determination of the effective temperatures at the "formation of ears-maturation of growth-period" this can be classified by means of the weight of 1000 grains. A close connection was found between the weight of 1000 grains and the duration of time of the "formation of ears and maturation of growth". The duration of maturation period depends on the velocity of the collection of the sum of necessary effective temperatures. With some kinds of summer wheat the weight of 1000 grains corresponds to the number of days of the period mentioned above.

In the field of the investigation of the different types of soil as well as of the humidity supply of plants the methods of the quantitative determination of the stocks of productive humidity were worked

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out. This made it possible to make great use of the earlier observations for the determination of the regularities of the formation of humidity in the soil and the distribution according to districts of the area according to the stocks of humidity of the soil as well as for the characteristics of the type of soil and the humidity of the ground fields of the consequence of growing in the relations of field-protection to forest-protection as well as of an explanation of agrometric conditions of growth of young forest growings.
The optimal need of humidity for summer wheat was also stated to be determined by the sum of the average daily deficit of air-humidity for the given period (decade, inter-phase period, etc.).
For the process of agrometeorological service several valuable processes for the classification of agrometeorological conditions were worked out among which there are the method of complex classification using the hydrothermal coefficients, which are of great importance.
The agroclimatic characteristics of areas of original- and ungrown land as well as the work on climatic sources for central areas and its use in agriculture offers in a useful way the agroclimatic possibilities of these areas, explains the climatic impedances and offers reason for the methods of their overcoming.
There are 53 Slavic references.

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40 Years of Soviet Agricultural Weather Service. 50-11-5/9

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1. Agriculture-USSR 2. Meteorology-USSR 3. Weather forecasting-USSR

Card 4/4

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ULANOVA, Yevgeniya Stanislavovna; KULIK, M.S., otv.red.; SAGATOVSKIY, N.V., red.; BRAYNINA, M.I., tekhn.red.

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