AUTHORS: Gel'fand, I.M., Frolov, A.S. and Chentsov, N.N. SOV/140-58-5-4/14

TITLE: Calculation of Continuous Integrals With the Monte-Carlo Method (Vychisleniye kontinual'nykh integralov metodom Monte-Karlo)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1958, Nr 5, pp 32-45 (USSR)

ABSTRACT: This is a survey consisting of 10 paragraphs and a summary. The application of the Monte-Carlo method for the calculation of integrals of high (even of denumerable) number of variables is discussed in many aspects. The Soviet contributions (Bakhvalov, Korobov, the authors, Kolmogorov, Sobol') as well as the western contributions in this new direction are appreciated. The authors present some interesting examples (diminution of dispersion, determination of the trajectory for the Brownian motion etc.). In the text 4 Soviet and 7 American papers are mentioned.

ASSOCIATION: Matematicheskiy institut imeni V.A.Steklova AN SSSR (Mathematical Institute imeni V.A.Steklov AS USSR)

SUBMITTED: December 6, 1957 (Date of Lecture, Leningrad)

Card 1/1

CHENTSOV, N.N.

16(1) PHASE I BOOK EXPLOITATION SOV/2660

Vsesoyuznyy matematicheskiy s"yezd. 3rd, Moscow, 1956

Trudy. t. 4: Kratkoye soderzhaniye sektsionnykh dokladov. Doklady inostrannykh uchenykh (Transactions of the 3rd All-Union Mathematical Conference in Moscow. vol. 4: Summary of Sectional Reports. Reports of Foreign Scientists) Moscow, Izd-vo AN SSSR, 1959. 247 p. 2,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Matematicheskiy institut.

Tech. Ed.: G.N. Shevchenko; Editorial Board: A.A. Abramov, V.G. Boltyanskiy, A.M. Vasil'yev, B.V. Medvedev, A.D. Myshkis, S.M. Nikol'skiy (Resp. Ed.), A.G. Postnikov, Yu. V. Prokhorov, K.A. Rybnikov, P. L. Ul'yanov, V.A. Uspenskiy, N.G. Chetayev, G. Ye. Shilov, and A.I. Shirshov.

PURPOSE: This book is intended for mathematicians and physicists.

COVERAGE: The book is Volume IV of the Transactions of the Third All-Union Mathematical Conference, held in June and July 1956. The book is divided into two main parts. The first part contains summaries of the papers presented by Soviet scientists at the Conference that were not included in the first two volumes. The second part contains the text of reports submitted to the editor by non-Soviet scientists. In those cases when the non-Soviet scientist did not submit a copy of his paper to the editor, the title of the paper is cited and, if the paper was printed in a previous volume, reference is made to the appropriate volume. The papers, both Soviet and non-Soviet, cover various topics in number theory, algebra, differential and integral equations, function theory, functional analysis, probability theory, topology, mathematical problems of mechanics and physics, computational mathematics, mathematical logic and the foundations of mathematics, and the history of mathematics.

Card 14/34

CHENTSOV, N.N.

21(4) PHASE I BOOK EXPLOITATION SOV/2583

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958.

Doklady sovetskikh uchenykh; yadernyye reaktory i yadernaya energetika. (Reports of Soviet Scientists; Nuclear Reactors and Nuclear Power) Moscow, Atomizdat, 1959. 707 p. (Series: Its: Trudy, vol. 2) Errata slip inserted. 8,000 copies printed.

General Eds.: N.A. Dollezhal, Corresponding Member, USSR Academy of Sciences, A.K. Krasin, Doctor of Physical and Mathematical Sciences, A.I. Leypunskiy, Member, Ukrainian SSR Academy of Sciences, I.I. Novikov, Corresponding Member, USSR Academy of Sciences, and V.S. Fursov, Doctor of Physical and Mathematical Sciences; Ed.: A.P. Alyab'yev; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This book is intended for scientists and engineers engaged in reactor designing, as well as for professors and students of higher technical schools where reactor design is taught.

COVERAGE: This is the second volume of a six-volume collection on the peaceful use of atomic energy. The six volumes contain the reports presented by Soviet scientists at the Second International Conference on Peaceful Uses of Atomic Energy, held from September 1 to 13, 1958 in Geneva. Volume 2 consists of three parts. The first is devoted to atomic power plants under construction in the Soviet Union; the second to experimental and research reactors, the experiments carried out on them, and the work to improve them; and the third, which is predominantly theoretical, to problems of nuclear reactor physics and construction engineering. Yu. I. Koryakin is the science editor of this volume. See SOV/2081 for titles of all volumes of the set. References appear at the end of the articles.

CHENTSOV, N.N.

PHASE I BOOK EXPLOITATION SOV/4981

Soveshchaniye po teorii veroyatnostey i matematicheskoy statistike, Yerevan, 1958

Trudy Vsesoyuznogo soveshchaniya po teorii veroyatnostey i matematicheskoy statistike, Yerevan, 19-25 sentyabrya 1958 g. (All-Union Conference on the Theory of Probability and Mathematical Statistics. Held in Yerevan 19-25 September, 1958. Transactions) Yerevan, Izd-vo AN ASSR, 1960. 291 p. Errata slip inserted. 2,500 copies printed.

Sponsoring Agency: Akademiya nauk Armyanskoy SSR.

Editorial Staff: G.A. Ambartsumyan, B.V. Gnedenko, Ye.B. Dynkin, Yu.V. Linnik and S. Kh. Tumanyan; Ed. of Publishing House: A.G. Sliyuni; Tech. Ed.: M.A. Kaplanyan.

PURPOSE: The book is intended for mathematicians.

COVERAGE: The book contains 41 articles submitted to the Conference and dealing with the theory of probability and mathematical statistics. Some of the articles are the papers read at the Conference and edited for publication, while others outline the theses of papers which appeared or are scheduled to appear, wholly or in part, in other publications; in some cases, such publications are quoted. A list of the papers whose contents were published elsewhere is included and the places of publication are indicated. Individual articles examine theories of mass service, spectral instruments, numbers, games, and certain functions, and discuss the theorems of Shannon, Markov's chains, and certain processes, quantities, and functions. Such items as the method of least squares, the stochastic Markov's and diffusion processes, measures and their applications, a scheme of Bernoulli experiments, Markov-type random fields, visible distribution of stars, Brownian motion, capacity of radio channels, and defective products are considered. No personalities are mentioned. References accompany some of the articles.

AVAILABLE: Library of Congress

34603
S/044/62/000/001/055/061
C111/C222

16.6500

AUTHOR: Chentsov, N. N.

TITLE: On quadrature formulas for functions of infinitely many variables.

PERIODICAL: Referativnyy zhurnal, Matematika, no. 1, 1962, 39, abstract 1V181. ("Zh. vychisl. matem. i matem. fiz.", 1961, 1, no. 3, 418-424)

TEXT: Quadrature formulas for classes of functions with a denumerable sequence of arguments are examined. It is shown that, if the functions of the class are equivalent with respect to each of the variables, there exists for each quadrature formula with a finite number of integration knots a function of the class so that the relative error of the integral of this function is greater than 50%. It follows that acceptable quadrature formulas can only be constructed for classes of functions which are not equivalent with respect to the variables. A class of functions of infinitely many variables is defined, which corresponds to certain functionals of the trajectories of a Wiener process. For this class of functions, the minimal size of the remainder of the quadrature formulas is estimated from below. A quadrature formula is constructed

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S/044/62/000/001/055/061
C111/C222

On quadrature formulas for functions ...

4

for which the estimate of the remainder approaches the possible minimum from above. It is pointed out that, if a quadrature formula with a remainder of $O(N^{-\beta})$ for $\beta > 0$ is desired, it is necessary to restrict the class of functions under consideration by requiring the functions of the class to have any derivatives of arbitrary high order. Here N is the number of integration knots.

[Abstracter's note: Complete translation.]

Card 2/2

22877
S/089/61/010/005/005/015
B102/B214

26.2246

AUTHORS: Leypunskiy, O. I., Strelkov, A. S., Frolov, A. S., Chentsov, N. N.

TITLE: The propagation of the γ-radiation of a prompt point source in air

PERIODICAL: Atomnaya energiya, v. 10, no. 5, 1961, 493-500

TEXT: The present paper gives a calculation of the propagation of an infinitely short gamma radiation pulse (δ pulse) in air space considered as infinite. The calculation is made by the Monte-Carlo method. The initial gamma radiation energy is assumed to be 1 Mev and the density of air to be $1.29 \cdot 10^{-3}$ g/cm^3. The point source considered emits isotropically. The direction of motion of one of the quanta emitted by the source and suffering collision is described by the Klein Nishina indicatrix. A special method is developed for the solution of the transcendental equation obtained. The absorption of the quanta is taken into account by a weight factor. A quantum packet thus moves along a trajectory; each trajectory is followed till the weight is only just 10^{-4} times the initial weight.

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The propagation of the γ-radiation of a...

The object of the calculations is to determine the quantity Φ_{kjim} i.e. the energy transferred at a distance R_k from the source in the time $t_j - t_{j+1}$ through a unit area perpendicular to the flux by gamma quanta of energy $E_i - E_{i+1}$ whose directions of motion make an angle $\Theta_m - \Theta_{m+1}$ with the radius vector of the point of observation. The intensities $I^o_{kjim} = \Phi_{kjim}/\Delta t_j \Delta E_i \Delta\Omega_m$ can be determined from Φ_{kjim}. The following numerical values are taken as the basis of the calculations: 1) $R_k = 250$, 500, and 1000 m corresponding to $\mu_o R_k = 2.03$, 4.08, and 8.12 free paths; 2) $t_j = 0$, 0.125, 0.250, 0.500, 1.00, 1.50, 2.00, 3.00, 4.00, ∞ μsec; 3) $E_i = 0$, 0.0625, 0.125, 0.250, 0.500, 1.00 and 2.00 Mev; 4) $\Theta_m = 0$, 10, 40, 90, 180°. The applicability of the method was checked by comparison of the build-up factors obtained by integration of I^o_{kjim}. The result is

Card 2/5

The propagation of the γ-radiation of a...

R_k, m ($\mu_o R_k$)	250 (2.03)	500 (4.06)	1000 (8.12)
Monte-Carlo method	3.69	7.57	21.8
method Ref. 6	3.6	7.5	18.6

(Ref. 6: H. Goldstein, J. Wilkins. Rept. U. S. Atomic Energy Comm., No. 40, 3075 (1955)). The investigation of the time dependence of the pulse of the gamma source (scattered quanta) for observation points at different distances showed that the pulse became broader with increasing distance. The duration of the decrease of energy amounts to 0.5, 1.0, and 1.5 μsec, respectively, for R = 250, 500, and 1000 m. The unit of intensity is taken to be the intensity during 0 - 0.125 μsec. The absolute values of the intensity in this interval over the whole spherical surface for these three R values are 1.43, 0.41, and 0.0088 Mev/μsec, respectively. The investigation of the time energy spectra for different distances showed that for a given time interval at R > 250 m the form of the spectra remain practically unchanged. The investigation of the time dependence of the energy for different R values showed that for t > 1-1.5 μsec the mean hardness of the radiation remains practically unchanged (50-60 kev). From

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a comparison of the I(t) curves in given solid angles for different R values it is found that the decrease of intensity at $\theta < 90^{\circ}$ is delayed with increasing distance. With increasing t and θ and a given R_k the spectra become softer. Table 2 gives the numerical data for the angle distribution of the scattered gamma radiation; Table 3 gives the same for the total intensity. An estimate of the accuracy of the calculation of the time dependence of the intensities gives for t = 1 μsec 15-20 %, and for t > 1 μsec 40-50 %. For the time dependence of the energies the situation is analogous. The authors thank I. M. Gel'fand for collaboration. There are 6 figures, 3 tables and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: July 7, 1961

Legend to the Tables: 1) θ in degrees, 2) R in meters; the intensities are given in %.

Transactions of the 6th Conf. on Probability Theory and Mathematical Statistics and of the Symposium on Distributions in Infinite-Dimensional Spaces held in Vil'nyus, 5-10 Sep '60. Vil'nyus Gospolitizdat Lit SSR, 1962. 493 p. 2500 copies printed

CHENTSOV, N.N.

SOV/6371

Transactions of the Sixth Conference (Cont.)

AVAILABLE: Library of Congress

SUBJECT: Mathematics

Transactions of the 6th Conf. on Probability Theory and Mathematical Statistics and of the Symposium on Distributions in Infinite-Dimensional Spaces held in Vil'nyus, 5-10 Sep '60. Vil'nyus Gospolitizdat Lit SSR, 1962. 493 p. 2500 copies printed

0/5/63

GROLOV, A.S. (Moskva); CHENTSOV, N.N. (Moskva)

Use of a Monte Carlo method in solving definite integrals depending on the parameter. Zhur.vych.mat.i mat.fiz. 2 no.4: 714-717 Jl-Ag '62. (MIRA 15:8)
(Integrals, Definite) (Probabilities)

CHENTSOV, N.N.

Geometry of a "manifold" of probability distribution. Dokl. AN SSSR 158 no.3:543-546 S '64. (MIRA 17:10)

1. Predstavleno akademikom A.N.Kolmogorovym.

42538
S/020/62/147/001/006/022
B112/B102

16.6200

AUTHOR: Chentsov, N. N.

TITLE: Estimation of an unknown distribution density from observations

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 45-48

TEXT: The unknown density $p(x) = dP/d\mu$ of the distribution probability P for the random quantity ξ with respect to the measure μ is approximated by a random polynomial $\pi^*(x)$ defined as follows:

$$\|\pi^*(x) - p(x)\|^2 = \|\pi_n(x) - p(x)\|^2 + \sum_{k=1}^{n} (\alpha_k^* - a_{kn})^2. \qquad (4)$$

Here, the functions $\pi_n(x)$ are the projections of $p(x)$ onto certain spaces E_n, the numbers a_{kn} are the coefficients of the components of $\pi_n(x)$, and the numbers α_k^* are mean values of the independent observations $\xi^{(1)}, \ldots, \xi^{(N)}$ of the quantity ξ. Several estimates of $\sqrt{M\|\pi^* - p\|^2}$ are

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S/020/62/147/001/006/022
B112/B102

Estimation of an unknown distribution...

derived.

PRESENTED: May 21, 1962, by M. V. Keldysh, Academician

SUBMITTED: May 15, 1962

Card 2/2

ACCESSION NR: AT4019064 S/0000/63/000/000/0289/0303

AUTHOR: Avayev, V. N., Yegorov, Yu. A., Orlov, Yu. V., Frolov, A. S., Chentsov, N.N.

TITLE: Computation and analysis of the characteristics of a spectrometer with a boron-hydrogen scintillator

SOURCE: Voprosy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding; collection of articles). Moscow, Gosatomizdat, 1963, 289-303

TOPIC TAGS: nuclear reactor, reactor shielding, spectrometer efficiency, xylene borate scintillator, phenylcyclohexane borate scintillator, radiation dosimetry, scintillation spectrometer, boron hydrogen scintillator, neutron energy, yield nucleus method, twin sensor spectrometer, neutron spectrometer

ABSTRACT: Among the methods for determining the energy of fast neutrons, the authors call particular attention to the yield nucleus method, noting that a special position in this method is occupied by scintillation spectrometers. Twin-sensor fast-neutron spectrometers are described and their operational principles are briefly analyzed. It is pointed out that fast-neutron spectrometers with two sensors can operate only with collimation of the neutron stream. The limitations imposed by this circumstance, particularly with reference to the study of fast-neutron spectra behind shielding, are noted. The subject of spectrometers

Card 1/5

with one hydrogen-containing sensor is introduced. The discrimination of the gamma-background in these spectrometers is accomplished through the difference in the glow time of the scintillator when excited by protons and electrons. It is further noted that spectrometers with a single hydrogen-containing sensor are capable of operating without a collimation device. The lower boundary of the measured neutron energy levels is normally not less than 0.7 Mev. While such instruments have been used for a wide variety of test purposes, the author observes that spectrometers with a hydrogen-containing sensor cannot be used for measurements against a high gamma-background. The single-sensor scintillation spectrometer, the scintillator of which contains hydrogen and boron, and which was proposed by Marshall (Bull. Amer. Phys. Soc., 27, 11 (1952)), is described in detail and its advantages are analyzed. It is noted, however, that the data necessary to permit the actual construction of such a spectrometer are lacking inthe available technical literature. The following values in particular, are unknown: 1) the efficiency of the spectrometer as a function of the energy of the neutrons; 2) the efficiency as a function of the volume of the scintillator and the ratio of the hydrogen and boron concentrations in it; 3) the time distribution of the pulses from the alpha-particles (with the time read from the moment of the first scattering of the neutron); 4) the energy resolution of the spectrometer as a function of the energy of the neutrons. Noting that attempts have been made to supply this lacking information manually by means of the Monte Carlo method, the results of which have made it

ACCESSION NR: AT4019064

possible to draw certain useful conclusions leading to an initiation of work on the design of a spectrometer, the author calls attention to the failure of the manual method of calculation to provide a complete picture of the required characteristics and the great amount of time such computation techniques necessarily consume. The present article, therefore, reports detailed computations of the characteristics of a boron-hydrogen scintillation-type spectrometer, conducted with the aid of an electronic computer. In individual sections of the paper the author discusses the formulation of the problem, the actual computation of the spectrometer characteristics, the fundamental block-diagram of the program used to carry out the spectrometer characteristic computation described in the article and, finally, an analysis of the results of the computation, on the basis of which all the laws characteristic of a spectrometer with a boron-hydrogen scintillator are explained. The author learned, among other things, that: 1) Spectrometer efficiency as a function of the resolving time of the coincidence circuit has a maximum value, the position of which (on the various graphs and curves plotted in the article) is different for scintillators of different dimensions and composition; 2) Spectrometer efficiency is directly proportional to the concentration of boron nuclei: 3) The efficiency maximum is more distinctly expressed for scintillators with a higher concentration of boron nuclei; 4) The efficiency maximum is less clearly expressed for large volume scintillators: 5) The efficiency maximum is less clearly expressed for a cylindrical scintillator than for a spherical one with identical diameters of the sphere and

ACCESSION NR: AT4019064

cylinder base, and is shifted in the direction of greater coincidence circuit resolving time. The results of the computation and analysis of the characteristics of a scintillation spectrometer with a boron-hydrogen scintillator showed that, of all the compositions considered, the most suitable is a mixture of equal parts of xylene (dimethylbenzene) or phenylcyclohexane with trimethyl borate with boron B^{10} enriched to 80%, poured into a vessel 80 mm in both diameter and height. The resolving time of the coincidence circuit in this case should be equal to approximately 1.5 microseconds. On the basis of the study, the block-diagram of the spectrometer shown in Figure 1 of the Enclosure was adopted for development. In order to reduce the number of random coincidences, a single-channel pulse amplitude analyzer was introduced into the spectrometer control circuit. Orig. art. has: 11 figures and 13 formulas.

ASSOCIATION: None

SUBMITTED: 14Aug63 DATE ACQ: 27Feb64 ENCL: 01

SUB CODE: NP, OP NO REF SOV: 010 OTHER: 008

Card 4/5

ACCESSION NR: AT4019064 ENCLOSURE: 01

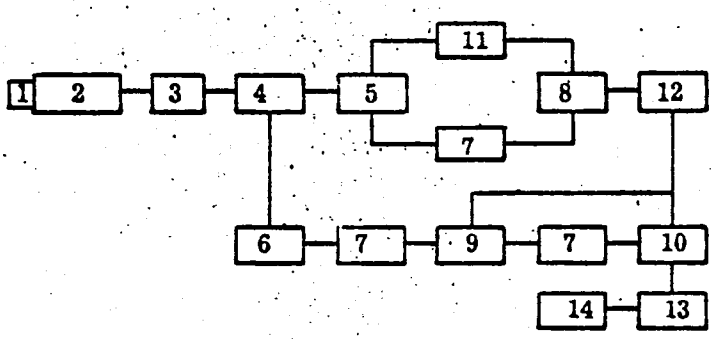

Fig. 1 - Proposed block diagram of a boron-hydrogen scintillation spectrometer: 1) C - scintillator; 2) К - cathode follower; 3) ФЭУ - photomultiplier; 4) УПС - preamplifier; 5) $У_С$ - amplifier; 6) ЛУ$_С$ - linear amplifier; 7) ЛЗ - delay line; 8) СС - coincidence circuit; 9) БЛ - blocking unit; 10) ЭК - electronic key; 11) ОА - single-channel pulse amplitude analyzer; 12) РО - regulating monovibrator; 13) О - limiter; 14) АА - multichannel pulse amplitude analyzer.

Card 5/5

L 17336-63 EPR/EWP(j)/EWT(d)/EPF(c)/EPF(n)-2/EWT(m)/FCC(w)/BDS AFFTC/ASD/IJP(C)/SSD Pr-4/Ps-4/Pc-4/Pu-4 RM/WW

ACCESSION NR: AP3004886 S/0120/63/000/004/0039/0045

AUTHOR: Avayev, V. N.; Yegorov, Yu. A.; Orlov, Yu. V.; Frolov, A. S.; Chentsov, N. N.

TITLE: Fast-neutron spectrometer with borane scintillator

SOURCE: Pribory*i tekhnika eksperimenta, no. 4, 1963, 39-45

TOPIC TAGS: spectrometer, fast-neutron spectrometer, borane scintillator, scintillator

ABSTRACT: Fundamental characteristics of the fast-neutron spectrometer with one primary detector were calculated on a computer by the Monte-Carlo method. Detailed calculating procedure is illustrated by a chart. "Pseudo-random numbers of the type suggested by N. M. Korobov were used in the calculations." The accuracy of the calculations is held to be 15% or better. Made for three scintillators, the calculations permitted determining efficiency, proper energy

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L 17336-63

ACCESSION NR: AP3004886

resolution, etc. Analysis of the results permits selecting the optimum delay time in the control channel, resolution time of the coincidence circuit, permissible loading of the spectrometer, and its block scheme. A comparison of several versions of the spectrometer showed that the best composition is a mixture of equal amounts of xylol (or phenylcyclohexane) and trimethylborate with B^{10} enriched to 80%. The resolution time of the coincidence circuit must be 1.5 microsec. Orig. art. has: 7 figures, 6 formulas, and 2 tables.

ASSOCIATION: none

SUBMITTED: 31Aug62 DATE ACQ: 28Aug63 ENCL: 00

SUB CODE: NS NO REF SOV: 005 OTHER: 007

Card 2/2

CHENTSOV, N.N.

Categories of mathematical statistics. Dokl. AN SSSR 164 no.3:511-514 S '65. (MIRA 18:9)

1. Submitted February 25, 1965.

CHENTSOV, R.

Seventh All-Union Conference on Low Temperature Physics.
Usp. fiz. nauk 72 no.4:817-826 D'60. (MIRA 13:11)
(Low temperature research)

CHENTSOV, R.A. Cand. Tech. Sci.

Dissertation: "Variation of the Electrical Resistance of Tellurium Monocrystals in a Transverse Magnetic Field at Low Temperatures." Inst of Physical Problems, Acad Sci USSR, 27 Feb 47.

SO: Vechernyaya Moskva, Feb, 1947 (Project #17836)

M

"On the Change in the Electrical Resistance of Tellurium in a Magnetic Field at Low Temperatures. R. A. Chentsov. (*Zhur. Eksper. Teoret. Fiziki*, 1948, 18, (4), 374-385).—[In Russian]. Te single crystals, practically free from internal cracks, were prepared by a modification of Kapitza's method (*Proc. Roy. Soc.*, 1928, [A], 119, 358; *J. Inst. Metals* (Abstracts), 1928, 40, 455), in which the specimens were packed in glass powder to avoid constraints on cooling. Their elect. resistance was found to decrease in weak longitudinal or transverse magnetic fields (1000-3000 Oe. for transverse fields) at temp. below 4° K. The effect strongly depends on the crystal orientation of the specimen in the field; it is observed in very pure specimens, and also in specimens contg. 0·1% Ag or Fe, but not in an alloy of Te with 10% Se. The normal Hall effect in Te for stronger fields is about twice as great at liq.-He temp. as at liq.-H temp., but is independent of temp. in the liq.-He range. In the Te–10% Se alloy the Hall const. $\propto 1/T$. The increase in resistance of Te in longitudinal magnetic fields above 15,000 Oe. appears to approach saturation. Preliminary measurements were made on the temp. dependence of the magnetic susceptibility and elect. resistivity of Te at liq.-He temp.—G. B. H.

Apr. 1952

KUSHNIR, Yu.M.; ARISTOV, G.A.; CHENTSOV, R.A. [authors]; KUZNETSOV, V.A., inzhener-kapitan [reviewer].

Shortcomings of three booklets ("Soviet electronic microscopy" IU.M.Kushnir; "For a materialistic world outlook in astronomy," G.A.Aristov; "Physics of low temperatures," R.A.Chentsov. Reviewed by V.A.Kuznetsov). Nauka i zhizn' 20 no.7:47-48 Jl '53. (MLRA 6:7)
(Science--Bibliography) (Kushnir, IU.M.) (Chentsov, R.A.) (Aristov, G.A.)

CHENTSOV, R.A.

USSR/Physics - Low temperature heat conductivity FD-752

Card 1/1 : Pub 146-22/22

Author : Chentsov, R. A.

Title : Heat conductivity of phosphorous bronze at helium temperatures

Periodical : Zhur. eskp. i teor. fiz., 27, 126-128, Jul 1954

Abstract : Letter to the editor. Heat conductivity of bronze at low temperatures was measured by a method described. Results are presented in graphs and tables. Finds that the dependence of the heat conductivity upon temperature, between 1.7 and 2.7° K, is cubic: $k = (1.1/1000)\ T^3$ W/cm. grad^4; at lower temperatures the dependence is not so fast. 6 references including 3 foreign.

Institution : Institute of Physical Problems, Acad. Sci. USSR

Submitted : February 6, 1954

USSR/Nuclear Physics

Card 1/2 : Pub. 118 - 2/14

Authors : Chentsov, R. A.

Title : The characteristics of a light He^3 isotope at low temperatures. Part 1

Periodical : Usp. fiz. nauk 55/1, 49-80, Jan 1955 33f

Abstract : The low-temperature characteristics of ordinary helium isotopes, the diffusibility of He^3, methods of enriching He with the light isotope and the derivation of pure He^3 are reviewed. The structural diagram of He^3, the properties of liquid He^3 and liquid He^3 - He^4 solutions are discussed. It is stated that liquid helium at low temperatures represents a weakly excited quantum system the thermal energy in which is connected with the individual excitation quanta the number of which increases with the rise in temperature. At temperatures below 1° K the predominant role is played by excitations, called phonones - audio oscillations of ultra-high-frequency. Excitations of a different type - rotons with a square and not linear dependence of energy upon the impulses - assume a predominant role

Usp. fiz. nauk 55/1, 49-80, Jan 1955 (Additional Card)

Card 2/2

Abstract : at temperatures above 1.5°. Data regarding the relative content of He^3 in He of natural gas sources and the origination of He^3 on the earth are included. Fifty-seven references ; 19 USSR; 35 USA and 3 English (1934-1954). Diagrams; graphs; drawings.

Institution : .....

Submitted : .....

CHENTSOV, R. A.

USSR/Physics - Isotope He^3

Card 1/1 Pub. 118 - 3/3

Authors : Chentsov, R. A.

Title : Properties of the light isotope of helium, He^3, at low temperatures. Part II.

Periodical : Usp. fiz. nauk 55/2, 265-267, Feb 1955 2 p

Abstract : Some properties (mostly thermal: specific heat, entropy, vapor pressure, coefficients of thransfer, etc.) of the light isotope of helium, He^3, at low temperatures are discussed. The discussion is conducted in the light of the Landaw theory on "quantum liquids" and the London theory on statistical behavior of ideal gases. Properties of He^3 are discussed in the form of parallelism with the same properties of He^4. However, a definite conclusion has not yet been reached. It requires, as is stated, further experimental data. Seven references: 2 USA, 3 USSR, 1 Brit. and 1 German (1940-1954). Graphs; bibliography.

Institution : .....

Submitted : .....

Chentsov, R.A.

USSR / Physics of Low Temparatures. D-5

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9055

Author : Chentsov, R.A.
Title : Study of the Physics of Low Temperatures (Second All-Union Conference in Leningrad).

Orig Pub : Vestn. AN SSSR, 1956, No 10, 99-102

Abstract : No abstract.

Card : 1/1

Chentsov, R. A.

Magnetic apparatus for attaining very low temperatures. R. A. Chentsov. *Uspekhi Fiz. Nauk* 61, 303–7(1956).—A continuous (cyclic) magnetic cooling app. is discussed. This app. can be used to reach temp. <1°K. (down to 0.25°K.). J. Rovtar Leach

Chentsov, R.A.

26-12-20/49

AUTHOR: Chentsov, R.A., Candidate of Physico-Mathematical Sciences, Moskva.

TITLE: A Magnetic Refrigerator Producing Temperatures Below 1°K (Magnitnaya kholodil'naya mashina dlya polucheniya temperatur nizhe 1°K)

PERIODICAL: Priroda, 1957, No 12, pp 85-87 (USSR)

ABSTRACT: The author gives a detailed description of a magnetic refrigerator of cyclic action for obtaining temperatures of from 1°K to 0.25°K developed by Messrs. Arthur D. Little Inc., Cambridge, Mass. The performances of the machine (Figure 1) are based on the utilization of peculiarities in the behavior of certain paramagnetic substances in temperatures ranging close to absolute zero.

AVAILABLE: Library of Congress

Card 1/1

CHENTSOV, R.A.

CHENTSOV, R.A., kand.fiz.-mat.nauk (Moskva)

Magnetic refrigerating machine for obtaining temperatures below 1° K. Priroda 46 no.12:85-87 D '57. (MIRA 10:12)
(Refrigeration and refrigerating machinery)
(Low temperature research)

CHENTSOV, R.A. [translator].

Nuclear cooling (from "Nature," 177, 460, 1955) by N.Kurti and others. Translated from the English by R.A.Chentsov. Usp.fiz. 61 no.1:45-51 Ja '57. (MLRA 10:2)
(Low temperature research research) (Nuclear physics)
(Kurti, N.) (Robinson, F.N.G.) (Zimon, F.) (Spor, D.A.)

CHENTSOV, R.A.

AUTHOR: CHENCOV,R.A. PA - 2289

TITLE: A Magnetic Machine for the Production of Extremely Low Temperatures. (Magnitnaya mashina dlya polucheniya sverkhnizkihh temperatur, Russian).

PERIODICAL: Uspekhi Fiz.Nauk, 1957, Vol 61, Nr 2, pp 303-307 (U.S.S.R.)

Received: 4 / 1957 Reviewed: 5 / 1957

ABSTRACT: It was only recently that the construction of a permanently acting magnetic refrigeration machine was successfully accomplished. This machine serves for the production and use (for experimental purposes) of temperatures below 1° K (up to 0,25° K); it is based on the utilization of strong thermal effects on the occasion of the magnetization and demagnetization of some paramagnetic salts at low temperatures. The operation of the machine is discussed on the basis of a T-S diagram of such a salt.

First, the problem is investigated as to what happens in the case of a single magnetization and demagnetization of the salt. Magnetization is accompanied by the liberation of heat.

Application of a sufficiently strong magnetic field (~10.000 Örsted) leads to the transition of the ions responsible for the paramagnetism of the salt from various states into one single state which corresponds to the orientation of the magnetic moments of all ions along the field. This "transition" increases the "order" of the salt, i.e. it diminishes its entropy. In the case of adiabatic demagnetization the temperature decreases considerably, practically down to some

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A Magnetic Machine for the Production of Extremely Low Temperatures.

tenth or hundredth parts of a degree Kelvin. (Also the record value of 0,0012° K was obtained in this manner). For magnetic refrigeration "magnetically diluted" salts must be used, in which the ions with magnetic moment are rather wide apart from one another. The thermal effect of adiabatic demagnetization is very considerable: Thus it would be possible with 1 g of such a paramagnetic salt to cool several kg of diamagnetic substance from T 1° K to extremely low temperatures. The mode of operation of such a machine is described on the basis of a drawing. In the course of such a realization of such a scheme in practice attention must be concentrated on the problem of the variable thermal contacts, of the "keys" K_1 and K_2. These contacts must satisfy very rigorous demands. The easiest method of building such cyclical machines is based upon the considerable dependence of a supraconductor (e.g. lead) on the intensity of the magnetic field in which it is located. In conclusion the machine developed by DOUNT and Arthur D. LITTLE is discussed in short. (3 illustrations).

ASSOCIATION: Not given
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26-58-5-16/57

AUTHOR: Chentsov, R.A., Candidate of Physico-Mathematical Sciences

TITLE: Nuclear Magnetic Cooling (Yadernoye magnitnoye okhlazhdeniye)

PERIODICAL: Priroda, 1958, Nr 5, pp 75-77 (USSR)

ABSTRACT: Description of former and present magnetic nuclear cooling methods and achievements based on British and American sources.
There are 1 photo and 3 references, 1 of which is Soviet, 1 British and 1 American.

ASSOCIATION: Vsesoyuznyy institut nauchno-tekhnicheskoy informatsii gosudarstvennogo nauchno-tekhnicheskogo komiteta Soveta ministrov SSSR i akademii nauk SSSR (All-Union Institute of Scientific-Technical Information of the State Scientific-Technical Committee of the USSR Council of Ministers and the USSR Academy of Sciences)

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Card 1/1 1. Nuclear cooling - Magnetic factors

CHENTSOV, R. A.

AUTHOR: Chentsov, R. 53-1-7/8

TITLE: The Kryotron, the Superconducting Element of the Future Calculating Machine (Kriotron, sverkhprovodyashchiy element budushchikh vychislitel'nykh mashin)

PERIODICAL: Uspekhi Fizicheskikh Nauk, 1958, Vol. 64, Nr 1, pp. 193-195 (USSR)

ABSTRACT: The word "kryotron" is derived from the Greek word kryos = coldness, the suffix "tron" indicates the application of this device in electronic circuits (which here means in calculating machines). The kryotron utilizes the interruption of superconductivity by a magnetic field. The practically used form of this apparatus consists of a piece of tantalum wire, 3 cm long and somewhat over 0,2 mm in diameter, on which a layer of insulated niobium wire of about 80 microns in thickness is rolled up. Tantalum and niobium are superconducting elements. The principle of the kryotron is based upon the various critical temperatures with regard to the superconductivity of tantalum and niobium. Compared with a thermionic valve, a kryotron, i. g. has the following

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characteristic features: It permits the passage of the main current in both directions and the interrupting action of the control current does not depend on the direction of the control current. For the operation of the kryotron it is essential that the main current is greater than the control current. Now something is said about the operation of the kryotron in the circuit of calculating machines. By means of kryotrons all logical schemes, which are used in the calculating devices, can be constructed ("and", "or" etc.). The main element, which guarantees the memory in the scheme, is a certain combination of two kryotrons, which here is more closely described. Then the author discusses a circuit, which is not very complicated, for registering and accumulating the zero and the one. The kryotrons can also be used in a multivibrator circuit. The application of kryotrons in calculating machines has among other, the following advantages: Easy and cheap production, little need in space, low current consumption . The operation at helium-temperature of course is somewhat unusual, but no problem at the present state of technology. Maybe the kryotron will be the first serious technical application of

The Kryotron, The Superconducting Element of the Future Calculating Machine 53-1-7/8

superconductivity. There are 1 figure and 1 reference which is Slavic.

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CHENTSOV, R.A.

AUTHOR: Chentsov, R. 53-1-8/8

TITLE: The Separation in Strata of the Liquid Isotopes of Helium at Very Low Temperatures (Rassloyeniye rastvorov zhidkikh izotopov geliya pri ochen' nizkikh temperaturakh)

PERIODICAL: Uspekhi Fizicheskikh Nauk, 1958, Vol. 64, Nr 1, pp. 195-196 (USSR)

ABSTRACT: A temperatures above 1° K, liquid He^3 and He^4 are completely soluble in one another. It was interesting to examine, if this is valid still in case of further approach to the absolute zero. Because of the very intensive zero motion in liquid helium one would expect that the mutual solubility in the liquid mixtures He^3 -He^4 will be retained unto the absolute zero. The authors performed experiments with a small-variable magnetic field, which made it possible to observe the resonance signal directily at the oscillograph. These measurements were performed in the temperature interval of from 1,2 to 0,25°K. These extremly low temperatures were produced by the method of the adiabatic demagnetisation of a paramagnetic salt. These investigations furnished the following results: At

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temperatures below 0,7 to 0,8°K the tested solutions of He^3 - He^4 (which contained 4o and 6o% He^3) separated in strata into 2 phases, in which the concentration of He^3 is different. The lighter phase (which contained a higher percentage of the lighter isotope) was on top in the container, the other one below. The authors could ascertain the approximate shape of the complete phase-diagram of the solubility in the He^3 - He^4 -system. The diagram has, in the coordinates T - x (temperature - concentration), the shape of a deformed parabola with the apex at T = 0,83°K and x = 61% He^3. At T = 0,25°K the heavy phase contains ~7% He^3 and the light one ~1o% He^4. The extrapolation of the diagram towards T = 0 does not disagree with the hypothesis of the separation in strata of the solutions He^3 - He^4 into pure isotopic phases at the absolute zero. Thus obviously every liquid mixture He^3 - He^4, in case of sufficient cooling down, separates into 2 phases, the composition of which in case of further approach to the absolute zero approximates the pure He^3 and He^4. Subsequently a short report is given on works by other authors, dealing with the same subject. This phenomenon has, without doubt, also great theoretical

The Separation in Strata of the Liquid Isotopes of Helium at Very Low Temperatures 53-1-8/8

importance. There are 1 figure and 4 references, 2 of which are Slavic.

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CHENTSOV, B.

Fourth All-Union Conference on Low Temperature Physics. Usp. fiz. nauk 64 no.4:781-789 Ap '58. (MIRA 11:7)
(Low temperature research)

AUTHOR: Chentsov, R. 53-64-4-1o/11

TITLE: From Current Publications (Iz tekushchey literatury)
New Kind of Memory Apparatus Based on Superconductivity
(Novyy vid zapominayushchego ustroystva, osnovannogo na sverkhprovodimosti)

PERIODICAL: Uspekhi Fizicheskikh Nauk, 1958, Vol. 64, Nr 4, pp. 796 - 796 (USSR)

ABSTRACT: The author shortly reports on two English works by James W. Growe (Dzh. V. Krou) and D. A. Buck, published in J.Appl. Phys. 28, Nr 9, 1069 and Proc. I. R. E. 44, Nr 4, pp. 482-493. There are 2 references, both English.

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SOV/53-65-3-10/11

AUTHOR: Chentsov, R.

TITLE: On the Direct Determination of the Spectrum of Elementary Excitation in Liquid Helium II (Pryamoye opredeleniye spektra elementarnykh vozbuzhdeniy v zhidkom gelii II)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol. 65, Nr 3, pp. 545-546 (USSR)

ABSTRACT: The author gives a short survey of some Russian and American publications concerning investigations of the properties of liquid He II. The following Russian works are discussed: The works by P. L. Kapitsa (Ref 1) and L. D. Landau (Ref 2) on superfluidity and elementary excitation (EE), by V. P. Peshkov (Ref 3) and Landau (Ref 4) on the energetic EE spectrum (domain of phonons of the spectrum) $\varepsilon = cp$, c = velocity of sound; the following holds within the domain of the minimum of the EE: $\varepsilon = \Delta + (p-p_0)^2/2\mu$; the values of these parameters are obtained from the specific heat of He II and the 2. velocity of sound according to I. M. Khalatnikov (Ref 5); $\Delta = 8{,}9^{\circ}K$, $p_0 = 2{,}1.10^{-19}$ g.cm.sec^{-1}, $\mu = 1{,}72.10^{-24}$ g ($\approx 1/4$ of the He mass). These spectra were found by N. N. Bogolyubov (Ref 6), Feynman (Ref 7) and others.

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On the Direct Determination of the Spectrum of Elementary Excitation in Liquid Helium II

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Further, some American works are discussed (Refs 7-12). There are 1 figure and 12 references, 6 of which are Soviet.

1. Helium (Liquid)--Properties 2. Spectroscopy 3. Mathematics

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SOV/53-66-2-8/9

AUTHOR: Chentsov, R.

TITLE: From Current Literature (Iz tekushchey literatury)
Direct Detection of Optical Oscillations of the Crystal Lattice of a Solid Body by the Method of Neutron Scattering (Pryamoye obnaruzheniye opticheskikh kolebaniy kristallicheskoy reshetki tverdogo tela metodom rasseyaniya neytronov)

PERIODICAL: Uspekhi fizicheskikh nauk,1958, Vol 66, Nr 2, pp 347-348 (USSR)

ABSTRACT: This is an abstract from 8 publications. The contents, with the exception of a reference made to Pomeranchuk's theory of the scattering of neutrons on crystals (1938, Ref 2), was obtained from Western publications. (The 2. Soviet reference concerns a translation of Born's book on the "Dynamic Theory of Crystal Lattices", which was published in Moscow. There are 1 figure and 8 references, 2 of which are Soviet.

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SOV/53-67-4-7/7

24(0)
AUTHOR: Chentsov, R.

TITLE: The Fifth All-Union Conference on the Physics of Low Temperatures (5-ye Vsesoyuznoye soveshchaniye po fizike nizkikh temperatur)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 4, pp 743-750 (USSR)

ABSTRACT: This Conference took place from October 27 to November 1 at Tbilisi; it was organized by the Otdeleniye fiziko-matematicheskikh nauk Akademii nauk SSSR (Department of Physico-mathematical Sciences of the Academy of Sciences, USSR), the Akademiya nauk Gruzinskoy SSR (Academy of Sciences, Gruzinskaya SSR), and the Tbilisskiy gosudarstvennyy universitet im. Stalina (Tbilisi State University imeni Stalin). The Conference was attended by about 300 specialists from Tbilisi, Moscow, Khar'kov, Kiyev, Leningrad, Sverdlovsk, and other cities as well as by a number of young Chinese scientists at present working in the USSR. About 50 lectures were delivered which were divided according to research fields. - I. Liquid Helium. Reports were delivered by the researchers of the Laboratoriya nizkikh temperatur TGU (Laboratory for Low Tem-

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peratures of Tbilisi State University) under the supervision of E. L. Andronikashvili: D. S. Tsakadze, Yu. G. Mamaladze and S. G. Matinyan spoke about the investigation of the damping of rotational oscillations of a single disk in He II in dependence on the rotation rate. G. A. Gamtsemlidze spoke about the influence exercised by the state of the disk surface on critical rate and on the damping of its oscillations in the transcritical range. V. P. Peshkov (IFP AN SSSR - Institute for Physical Problems AS USSR) spoke about further investigations of the boundary between superfluid and non-superfluid helium (discovered by himself) in a heat flow. This boundary characterizes the density- and temperature jump. Kuang, Wei-yen, K. N. Zinov'yeva and V. P. Peshkov spoke about investigations at extremely low temperatures (down to 0.5°K) which were attained by the method of the evacuation of He^3-vapors. Kuang, Wei-yen investigated in the interval 0.57 - 2.07°K the phenomenon of the temperature jump (discovered by P. L. Kapitsa in 1941) on the boundary of a solid (in this case Cu) by means of He II; for the thermal resistance not the T^3-law but a T^n-law holds, where $n=2.6\pm0.1$. Zinov'yeva and Peshkov investigated, among other things, also the phase

diagram of He^3 dissolved in He^4 (20 - 89%). V. L. Ginzburg (FIAN) gave a report on the phenomenological theory of He II in the region of the λ-point in consideration of quantum effects (the theory was developed by himself and by L. P. Pitayevskiy). B. T. Geylikman (IAE AN SSSR - Institute for Atomic Energy, AS USSR) delivered a short report on the theory of phase transition in liquid He^4. I. M. Lifshits and D. G. Sanikidze (KhFTI AN USSR - Khar'kov Physico-technical Institute AS UkrSSR) investigated the melting of solid He^3 on the basis of Landau's theory of the Fermi-fluid and found that melting pressure as a function of temperature has a minimum at 0.5°K (Pomeranchuk-effect). The comprehensive discussion was held under the supervision of P. L. Kapitsa.- II. Supraconductivity. 13 lectures were delivered on this field of which two were experimental and the others theoretical. Reports on experimental investigations of supraconductivity were delivered by Yu. V. Sharvin and V. F. Gantmakher (IFP) and N. V. Zavaritskiy (IFP). The former investigated the structure of the intermediate state in monocrystals of pure tin, the latter measured the thermal conductivity of different-

ly shaped orientated cylindrical gallium samples at 0.1 - 4.2°K. A. A. Abrikosov, L. P. Gor'kov and I. M. Khalatnikov (IFP) theoretically investigated the behavior of a superconductor in the high-frequency field. V. L. Ginzburg and G. F. Zharkov (FIAN) dealt with the microscopical theory, and Ginzburg discussed among other things the part played by fluctuations in phase transitions of the second kind. I. M. Lifshits (KhFTI) showed that it follows from the modern theory of supraconductivity in consideration of the anisotropy of metals that, in principle, the existence of supra-conductors is possible which are supra-conductive only within a limited range of temperature (and not at all temperatures below the critical ones). B. T. Geylikman and V. E. Kresin (IAE) investigated the electron- and phonon thermal conductivity of supraconductors by means of the microscopical theory at temperatures that are not very near absolute zero. M. V. Buykov and L. E. Gurevich (FTI AN SSSR) spoke about the surface energy on the boundary between the supraconductive and normal phases. D. N. Zubarev and Yu. A Tserkovnikov (Matematicheskiy institut AN SSSR - Mathematics Institute AS USSR) dealt with the thermodynamics of the supraconductive state (Froehlich-model),

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V. V. Tolmachev (MIAN) investigated the problem of collective excitations in a supraconductor. D. V. Shirkov (Ob"yedinennyy institut yadernykh issledovaniy - Joint Institute of Nuclear Research) spoke about consideration of Coulomb-interaction of electrons in semiconductors. The problem of consideration of the Coulomb interaction was discussed by Chen' Ch'un-hsien and Chou, Hsi-hsin ' (MGU). - III. Galvanomagnetic Phenomena. (10 lectures). I. M. Lifshits and V. D. Peschanskiy (KhFTI, Khar'kov Physico-technical Institute, Khar'kov University) showed that the most important part in connection with the galvanomagnetic properties of metals is played by the concrete form of the Fermi surface of conductivity electrons. N. Ye. Alekseyevskiy (IFP) spoke about experiments he carried out together with Yu. P. Gaydukov. He investigated the variation of the resistance in the transversal magnetic field at helium temperatures of Au, Cu, Pb, Ta, Ga, Na and (together with T. I. Kostina) of Bi. Ye. S. Borovik and V. G. Volotskaya (KhFTI) investigated the galvanomagnetic properties at low temperatures of chromium and zirconium and found that the resistance of chromium grows with field strength without attaining a saturation value. L. S. Kan and B. G. Lazarev (KhFTI)

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investigated the resistance minimum in gold at low temperatures and found that if the sample is heated, the minimum disappears. Yu. P. Gaydukov (IFP) said in this connection in the course of the discussion that the minimum effect does not occur in gold in the case of very pure samples; the disappearance of the minimum is explained by the plastic deformation of the sample at helium temperatures. M. Ya. Azbel' (KhFTI) gave a report of his work in connection with the quantum theory of the high-frequency resistance of metal in a constant magnetic field at low temperatures. M. I. Kaganov and V. M. Tsukernik (KhFTI) spoke about a theoretical investigation of the influence exercised by thermoelectric forces upon the skin effect in various conductors. B. I. Verkin and B. N. Aleksandrov (KhFTI) spoke about measurements of the electric resistance of thin wires made from highly-pure tin, indium and cadmium, and computed the free length of path at 4.2°K in these metals as amounting to 1/3 to 2/3 mm. N. B. Brandt (MGU) and B. I. Verkin and I. M. Dmitrenko (KhFTI) investigated the influence exercised by the hydrostatic pressure (of 1000 atmospheres absolute pressure) upon the behavior of metals at low temperatures and investigated

the quantum oscillations of the magnetic susceptibility of bismuth at 1.6 - 4.2°K. G. Ye. Zil'berman and A. M. Kosevich (KhFTI) gave a theoretical explanation of the fact that already relatively small deformations exercise considerable influence upon oscillation effects in metals. IV. Magnetism. A. S. Borovik-Romanov (IFP) delivered a report on investigations he carried out of the anisotropy of the weak ferromagnetism in monocrystal samples of the antiferromagnetic $MnCO_3$ (the effect of anisotropy was predicted by the thermodynamical theory developed by Dzyaloshinskiy). In the course of the discussion R. A. Alikhanov (IFP) spoke about neutronographical investigations he carried out of the magnetic structure of $MnCO_3$ and $FeCO_3$ at low temperatures. P. L. Kapitsa stressed the importance of the method based upon Dzyaloshinskiy's theory. N. M. Kreynes (VNIIFTRI), whose lecture was read by A. S. Borovik-Romanov, reported on measurements carried out by him (in the IFP) of the magnetic anisotropy of the antiferromagnetic $CuSO_4$- and $CoSO_4$-monocrystals.

 Ye. A. Turov (IFM AN SSSR, Sverdlovsk) spoke about his theore-

tical investigations of the magnetizability, the susceptibility, the specific heat, and the resonance frequencies of antiferromagnetics and weak ferromagnetics. A. I. Sudovtsov and Ye. Ye. Semenenko (KhFTI) spoke about measurements of the electric resistance of iron in magnetic fields in a wide temperature range with simultaneous plotting of the magnetization curve. N. V. Vol'kenshteyn, G. V. Fedorov, E. V. Galoshina and M. I. Turchinskaya (IFM AN SSSR) spoke about measurements of magnetization and the Hall effect of polycrystalline samples, nickel and Ni_3Mn at low temperatures. Ye. I. Kondorskiy, V. Rode, U. Gofman and Chang, Shou-ch'un (MGU) gave a report on susceptibility measurements on nickel and its alloys with copper at low temperatures; T. I. Sanadze (TGU) spoke about the spectrum of the paramagnetic resonance of Tb^{3+} in terbium nitrate at temperatures of liquid hydrogen. M. I. Kaganov and V. M. Tsukernik (KhFTI) dealt with the kinetic phenomena in ferromagnetics at low temperatures and with calculation of relaxation time; A. I. Akhiyezer, V. Bar'yakhtar and S. Peletminskiy (KhFTI) carried out a theoretical investigation of the relaxation of the magnetic moment in ferrodielectrics; Vlasov (IFM AN SSSR) showed that a linearly polarized elastic

(ultrasonic) wave of a frequency of 10^9 cycles when passing through a ferromagnetic substance in the direction of the magnetic field, is subjected to a turn of the polarization plane of the order of 10^{-3} - 10^{-4} radian/cm oersted. M. I. Kaganov pointed out that in this connection yet another phenomenon may be observed, namely the resonance absorption of ultrasonics if the wavelength is equal to the radius of the Larmor orbit of the electron. . V. Various Questions. One of the most interesting lectures delivered at this Conference was that by I. A. Gindin, B. G. Lazarev, Ya. D. Starodubov and V. I. Khotkevich (KhFTI) on the polymorphism of metals at low temperatures; P. L. Kapitsa commented on this topic during the discussion. R. F. Bulatova, V. S. Kogan and B. G. Lazarev (KhFTI) investigated the system hydrogen-deuterium by the methods of low-temperature-radiography, thermal analysis, and the visual observation of crystallization. Kh. I. Amirkhanov, Sh. Kh. Amirkhanova and R. I. Bashirov investigated the thermomagnetic properties of compounds of the type $A^{III}B^{V}$ and $A^{II}B^{VI}$, and dealt with the phenomenon of the "photon

wind" predicted by Gurevich; the investigation was carried out at the Dagestanskiy filial AN SSSR (Dagestan Branch, AS USSR). N. M. Reynov and A. P. Smirnov (LFTI - Leningrad Physico-technical Institute) gave a report on the measurement of the electricity limit of tin- and indium polycrystals at very low temperatures ($1^{\circ}K$), and N. M. Reynov and N. I. Krivko (LFTI) spoke about attempts made to find the expected diamagnetic resonance on polarons in cuprous oxide. G. R. Khutsishvili (TGU i Institut fiziki AN Gruzinskoy SSR - Tbilisi State University and Institute of Physics AS Gruzinskaya SSR) carried out a theoretical investigation of the Overhauser effect in non-metals. Lomkadze investigated the electron- and nuclear (proton) resonance in diphenylpicryl hydracyl at helium temperature. B. N. Samoylov spoke about experiments he carried out concerning the orientation of Co^{60}- and Au^{198}-nuclei (in iron) at extremely low temperatures. B. P. Zakharchenya and Ye. F. Gross (LFTI) investigated the absorption spectrum of a cuprous oxide crystal in the magnetic field at helium temperature and observed the effect of magneto-optical oscillations. V. P. Peshkov and M. P. Malkov gave information concerning scientific work of Soviet scientists in foreign coun-

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tries (zagranichnaya nauchnaya komandirovka), and E. V. Shpol'skiy spoke about the abstracting journal "Fizika". The head of the department for problems of the physics of low temperatures, Academician P. L. Kapitsa and the President of the Academy of Sciences Gruzinskaya SSR, Academician N. I. Muskhelishvili closed the Conference. The 6. All-Union Conference on the Physics of Low Temperatures will be held in June and July 1959 in the city of Sverdlovsk.

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AUTHOR: Chentsov, R.

TITLE: VI. All-Union Conference on Low-temperature Physics

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol. 71, No. 2, pp. 339-347

TEXT: The above-mentioned conference took place from June 27 to July 2, 1959 in Sverdlovsk. About 50 lectures were delivered, which are dealt with in the present article. About 300 scientists attended the conference, among them 200 from Russian towns (Moscow, Leningrad, Khar'kov, Kiyev, Tbilisi, Sukhumi, Krasnoyarsk, Dubna, etc.), scientists from the Chinese People's Republic, Poland, and Hungary. The Conference was opened by Academician P. L. Kapitsa before an audience of 900 persons. He gave a survey on the present stage of low-temperature physics and spoke about the historical development of physics in Sverdlovsk. The general topic, ferromagnetic and antiferromagnetic properties of matter at low temperatures, was dealt with by S. V. Vonsovskiy, Yu. P. Irkhin, and V. G. Shavrov of the Institut fiziki metallov AN SSSR (Institute of Metal Physics of the AS USSR) (Hall effect in ferromagnetics), N. V. Vol'kenshteyn

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and G. V. Fedorov of the Institut fiziki metallov (Institute of Metal Physics) (experimental investigation of the temperature dependence of the Hall effect in pure ferromagnetics), Ye. A. Turov and A. I. Mitsek of the Institute of Metal Physics (theoretical investigation of the temperature dependence of the constants of anisotropy on ferromagnetic crystals of varying symmetry), A. S. Borovik-Romanov and I. Ye. Dzyaloshinskiy of the Institut fizicheskikh problem AN SSSR (Institute for Physical Problems of the AS USSR) (experimental and theoretical investigations of piezomagnetism in antiferromagnetic cobalt- and manganese fluoride; samples prepared by M. M. Mikhaylov of the Institute for Physical Problems), Ye. A. Turov and V. Ye. Vzdornov of the Institute of Metal Physics (theory of weak ferromagnetism in rare earth orthoferrites of the $MeFeO_3$ type (Me - rare earth element between Sm and Lu)); A. S. Borovik-Romanov (investigations of the magnetic properties of cobalt sulfate, which have been carried out by N. M. Kreynes at the Institute for Physical Problems); Ye. A. Turov and N. G. Guseynov of the Institute of Metal Physics (magnetic resonance frequency in weakly ferromagnetic rhombohedral crystals by taking into account anistropy); V. V. Tolmachev of the Matematicheskiy institut AN SSSR (Mathematical

Institute of the AS USSR) (mathematical theory of ferromagnetism); M. O. Kostryukova of the MGU (Moscow State University) (measurements of the specific heat of nickel-, zinc-, and mixed nickel-zinc ferrites (20% Ni)); R. A. Alikhanov of the Institute for Physical Problems (neutronographic studies of antiferromagnetic nickel fluoride); N. V. Vol'kenshteyn and M. I. Turchinskaya of the Institute of Metal Physics (experimental investigation of the anisotropy of magnetization of a disordered NiMn alloy at the temperature of liquid helium); O. S. Galkina and L. A. Chernikova (MGU) (measurements of the temperature dependence of the resistivity of ferromagnetic alloys (Cu-Ni)); Ye. I. Kondorskiy, O. S. Galkina, and L. A. Chernikova (MGU) (anomaly of the electric resistivity of Cu-Ni alloys near the Curie point (a small maximum above the Curie point)); Ye. I. Kondorskiy and V. L. Sedov (MGU) (influence exercised by a uniform compression on saturation magnetization and the resistivity of iron, nickel, and some ferromagnetic alloys at low temperatures); V. Ye. Rode (MGU) (measurement of the susceptibility of Ni-Cu and Ni-Al alloys in fields up to 7000 oersteds in the paraprocess region). In a discussion M. I. Kaganov made remarks on this subject. - The following lectures were delivered on superconductivity: S. V. Vonsovskiy and M. S. Svirskiy ✓

of the Institute of Metal Physics (criteria of superconductivity)[31]; I. B. Borovskiy of the Institut metallurgii (Institute of Metallurgy) (investigations of the fine structure of X-ray spectra of a number of superconductive compounds). In the discussion, N. Ye. Alekseyevskiy spoke about the correlation between critical temperatures and atomic radius of the second metal in bismuth alloys. V. L. Ginzburg of the Fizicheskiy institut AN SSSR (Physics Institute of the AS USSR) (comparison of experimental data with the Ginzburg-Landau theory of macroscopic superconductivity). In the discussion, N. Ye. Alekseyevskiy pointed to the fact that the data on the critical fields of films obtained by B. K. Sevast'yanov of the Institut kristallografii AN SSSR (Institute of Crystallography of the AS USSR) are in good agreement with data published by Zavaritskiy. L. P. Gor'kov of the Institute for Physical Problems also spoke about the Ginzburg-Landau theory. S. V. Vonsovskiy and M. S. Svirskiy of the Institute of Metal Physics (superconductivity of ferromagnetic metals); G. F. Zharkov of the Physics Institute of the AS USSR (superconducting and intermediate states of ferromagnetic superconductors); A. I. Shal'nikov and N. I. Ginzburg (MGU) (critical magnetic fields and critical temperatures of thin films); M. N. Mikheyeva of the Institute

for Physical Problems and N. Ye. Alekseyevskiy took part in the discussion. Yu. V. Sharvin and V. F. Gantmakher of the Institute for Physical Problems (dependence of the penetration depth of the magnetic field in superconductors on the field strength); N. V. Zavaritskiy of the Institute for Physical Problems (results of new measurements of thermal conductivity of gallium at 0.1-4.2°K); P. A. Bezuglyy, A. A. Galkin, and A. P. Korolyuk of the Fiziko-tekhnicheskiy institut AN USSR (Institute of Physics and Technology of the AS UkrSSR) (investigations of ultrasonic absorption in superconductive tin as dependent on the crystallographic direction); N. N. Zhuravlev, G. S. Zhdanov, and N. Ye. Alekseyevskiy (MGU) (superconductivity of bismuth compounds). The following scientists spoke about the electronic properties of metals at low temperatures: N. Ye. Alekseyevskiy and Yu. P. Gaydukov of the Institute for Physical Problems (investigations of galvanomagnetic properties as a method of investigating the Fermi surface of metals); I. M. Lifshits and V. G. Peschanskiy, Institute of Physics and Technology of the AS UkrSSR and Khar'kovskiy universitet (Khar'kov University) (theory of galvanomagnetic phenomena); Ye. S. Borovik and V. G. Volotskaya of the Institute of Physics and Technology of the AS UkrSSR (galvanomagnetic

phenomena in indium and aluminum at high field strengths); I. M. Lifshits of the Institute of Physics and Technology of the AS UkrSSR (possible anomalies in galvanomagnetic effects in the high-pressure range); L. S. Kan and B. G. Lazarev of the Institute of Physics and Technology of the AS UkrSSR (results of experimental investigations of zinc- and tin crystals concerning the influence exercis i by pressure upon resistivity at low temperatures); G. Ye. Zil'berman and I. O. Kulik (Khar'kov) (theoretical investigation of quantum oscillations of the electron yield in the photoeffect as a function of the magnetic field); A. A. Galkin and A. P. Korolyuk of the Institute of Physics and Technology of the AS UkrSSR and of the Institut radiotekhniki i elektroniki AN SSSR (Institute of Radioengineering and Electronics of the AS USSR) (fluctuations of the ultrasonic absorption coefficient in zinc-, tin-, and bismuth crystals in the magnetic field at low temperatures); N. B. Brandt (MGU) (investigations of the magnetic susceptibility of bismuth at 0.05-0.1°K in the fields of up to 13000 oersteds); B. N. Aleksandrov, B. I. Verkin, and I. V. Svechkarev of the Institute of Physics and Technology of the AS UkrSSR (magnetic susceptibility of monocrystalline indium-, lead-, and tin samples in a wide temperature range); B. I. Verkin

and I. M. Dmitriyenko of the Institute of Physics and Technology of the AS UkrSSR (dependence of the period of susceptibility fluctuations in tin single crystals on pressure). - In the field "polymorphism, semiconductors, and other problems", the following scientists took the floor: I. A. Gindin, B. G. Lazarev, Ya. D. Starodubov, and V. I. Khotkevich of the Institute of Physics and Technology of the AS UkrSSR (phenomena of low-temperature polymorphism); B. G. Lazarev, Ye. Ye. Semenenko, and A. I. Sudovtsev of the Institute of Physics and Technology of the AS UkrSSR (beryllium superconductivity and its low-temperature polymorphism); B. N. Samoylov, B. V. Sklyarevskiy, and Ye. P. Stepanov of the Institut atomnoy energii AN SSSR (Institute of Atomic Energy of the AS USSR) (investigations of nuclear polarization of weakly magnetic elements). In the discussion, A. V. Kogan reported on similar experiments conducted at the Leningradskiy fiziko-tekhnicheskiy institut (Leningrad Institute of Physics and Technology). K. B. Vlasov of the Institute of Metal Physics of the AS USSR (theoretical investigations of the rotation of the polarization plane of elastic waves in metals); N. I. Krivko, A. I. Gubanov, and N. M. Reynov of the Leningrad Institute of Physics and Technology of the AS USSR (investigations of diamagnetic

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resonance of Cu_2O crystals at temperatures of liquid helium). Three lectures were delivered by S. S. Shalyt and I. N. Timchenko, I. V. Mochan and T. V. Smirnova, as well as by Yu. N. Obraztsov, all of them (with one exception) of the Institut poluprovodnikov AN SSSR (Institute for Semiconductors, AS USSR). They reported on problems connected with the increased number of current carriers in semiconductors according to an effect predicted by L. E. Gurevich. G. Ye. Pikus and G. L. Bir (theoretical investigations of the influence of mechanical deformation on semiconductor properties); I. M. Lifshits and M. I. Kaganov of the Institute of Physics and Technology of the AS UkrSSR (theoretical investigations of electron resonance in semiconductors); I. M. Lifshits, M. P. Malkov, S. S. Shalyt, and A. N. Orlov reported on the work of the symposia of the Conference. I. A. Kvasnikov and V. V. Tolmachev of the Mathematics Institute of the AS USSR (application of methods of the theory of superconductivity to problems of the fundamental state of an antiferromagnetic body); Z. Golyasevich (Poland) of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) (problems of interacting fermions); L. P. Pitayevskiy, Ye. M. Lifshits, and I. Ye. Dzyaloshinskiy of the Institute for Physical Problems (prop-

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erties of helium II films); Yu. G. Mamaladze and S. G. Matinyan of Tbilisskiy universitet (Tbilisi University) (theoretical investigations of the influence exercised by rotation on the attenuation coefficient of oscillations of a disk in He II); B. N. Yesel'son of the Institute of Physics and Technology of the AS UkrSSR (application of adsorption coal pumps for producing low temperatures); N. B. Brandt (MGU) (simple spring balances with a sensitivity of 0.05 milligrams and a method of producing high pressures at low temperatures); A. G. Zel'dovich of the Joint Institute of Nuclear Research (ionization chamber of 50 liters); I. D. Kurova (MGU) (properties of high-purity germanium between 300 and 2.5°K); E. I. Zavaritskaya (temperature dependence of the p-n junction in germanium, investigated by B. M. Vul); I. A. Gindin of the Institute of Physics and Technology of the AS UkrSSR (influence exercised by a preceding plastic deformation of commercial iron on its mechanical properties at low temperatures); N. M. Reynov and A. P. Smirnov of the Leningrad Institute of Physics and Technology of the AS USSR (limits of elasticity of tin and indium single crystals at ~ 0.1°K). P. L. Kapitsa delivered the final speech. The VII All-Union Conference on Low-temperature Physics will take place in Khar'kov in June and July 1960.

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AUTHOR: Chentsov, R.

TITLE: Seventh All-Union Congress on Low-temperature Physics

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol. 72, No. 4, pp. 817-826

TEXT: Congresses on low-temperature physics are held annually in the Soviet Union. From June 23 to June 28, the Seventh Congress was held at Khar'kov. The cryogen laboratory of FTI AN USSR (Institute of Physics and Technology of the Academy of Sciences UkrSSR) offered useful material to the 400 delegates. More than 100 lectures were delivered. Among the participants in the congress were prominent Soviet scientists, specialists in the field of low-temperature and solid-state physics: Academicians P. L. Kapitsa, L. D. Landau, I. V. Obreimov, Member of the AS UkrSSR B. G. Lazarev, Corresponding Members of the AS USSR N. Ye. Alekseyevskiy, S. V. Vonsovskiy, I. M. Lifshits, and others. The Congress was opened by the head of the Institutes of Low-temperature and Solid-state Physics of the Academy of Sciences USSR, Academician P. L. Kapitsa, who, among other things, stressed the growing demand for liquid helium and the

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imminent investigation of polymers at low temperatures. Liquid helium: V. P. Peshkov (IFP AN SSSR - Institute of Physical Problems of the Academy of Sciences USSR) suggested a mechanism for disturbing the superfluidity of helium II in capillaries with circular cross section, and he also gave a formula for the contribution of the critical velocity v_s. L.D. Landau and I. M. Khalatnikov made comments on this paper. According to R. A. Chentsov, a change in the character of the disturbance of superfluidity may be expected at frequencies of more than $\sim 10^3 - 10^4$ cps. Yu.G. Mamaladze gave a report on several papers concerning the experimental and theoretical investigation of vortices in superfluid helium. All these works were carried out at the Institut fiziki AN Gruzinskoy SSR (g.Tbilisi) (Institute of Physics of the AS Gruzinskaya SSR). E. L. Andronikashvili and D. S. Tsakadze investigated the axial torsional vibrations of a light disk suspended in rotating helium II. D. S. Tsakadze and K. B. Mesoyed made similar investigations for a heavy disk. Yu. G. Mamaladze theoretically investigated the mechanism of the damping of a disk, where two elastic waves with oppositely directed circular polarizations are produced in vortex filaments. Yu. G. Mamaladze and S. G. Matinyan solved

the set of hydrodynamic equations for rotating helium II. Guan Vey-yan' reported on measurements of the temperature jump on the interface between helium II and lead, tin, and other solids. This work was carried out at the IFP AN SSSR (Institute of Physical Problems of the Academy of Sciences USSR). This phenomenon was discovered by P. L. Kapitsa, and a theory was developed by Khalatnikov. I. L. Bekarevich and I. M. Khalatnikov (IFP AN SSSR) theoretically predicted a temperature jump on the interface between solid and He^3, like in He II. V. P. Peshkov in this connection considers measurements at 0.01°K to be necessary. T. P. Ptukha (IFP AN SSSR) reported on the determination of diffusion coefficient and thermal conductivity. Superconductivity: P. A. Bezuglyy and A. A. Galkin (FTI AN USSR) reported on new measurements of the anisotropy of absorption of ultrasonic waves by tin. According to L.D. Landau, the formula derived from the isotropic theory for the energy gap of superconductors gives only a rough mean value. According to I. M. Lifshits and M. I. Kaganov, the formula derived in consideration of damping has the same exponential form as the formula hitherto used. A. A. Abrikosov and L. P. Gor'kov (IFP AN SSSR) developed a theory of superconductors with paramagnetic impurities in low concentrations. P. L. Kapitsa, L. D. Landau, I. M. Lifshits, N. V.Zavanit-

skiy, and M. Ya. Azbel' took part in a discussion on this lecture. S. V. Vonsovskiy, B. V. Karpenko (Institut fiziki metallov AN SSSR, g. Sverdlovsk)(Institute of Physics of Metals of the AS USSR, Sverdlovsk) and M. S. Svirskiy (Chelyabinskiy pedagogicheskiy institut - Chelyabinsk Pedagogical Institute) delivered a theoretical lecture on the interrelation between superconductivity and ferro- and antiferromagnetism. A. A. Abrikosov and L. A. Fal'kovskiy (IFP AN SSSR) theoretically investigated the Raman scattering of light in superconductors. N. V. Zavaritskiy (IFP AN SSSR) reported on an investigation of the thermal conductivity of the hexagonal metals zinc and cadmium, and some other superconductors. B. K. Sevast'yanov and V. A. Sokolina (Institut kristallografii AN SSSR i MGU - Institute of Crystallography of the AS USSR and Moscow State University) spoke about investigating the magnetic properties of thin films of tin and indium. The corresponding experimental data were evaluated on the basis of a theoretical paper by G.F. Zharkov (FIAN - Institute of Physics of the Academy of Sciences). According to N. Ye. Alekseyevskiy, the outlines of a solution to the problem of measuring the magnetic moment of thin films were first observed in the above paper. L. D. Landau, B. G. Lazarev, and others took part in the

discussion. A. M. Kolchin, Yu. G. Mikhaylov, N. M. Reynov, A. V. Rumyantseva, A. P. Smirnov, and V. N. Totubalin (FTI AN SSSR, g. Leningrad - Institute of Physics and Technology of the Academy of Sciences USSR, Leningrad) reported on an investigation of the destruction of the superconductivity of thin tin layers by current. B. G. Lazarev, Ye. Ye. Semenenko, and A. I. Sudovtsov (FTI AN USSR) gave a report on investigations of the electrical conductivity of beryllium films, which were condensed onto a cold backing. According to N. V. Zavaritskiy, also the measurements carried out at IFP (Institute of Physical Problems) showed that 10^{-7} to 10^{-5} cm thick iron films, which were condensed at the temperature of liquid helium, have a finitely great resistance and show no superconductivity. According to Ye. A. Nikulina, N. M. Reynova, and A. P. Smirnova (FTI AN SSSR), iron films precipitated at $T \sim 5^{\circ}K$ with a thickness of 10^{-5} cm are superconductive. N. Ye. Alekseyevskiy, B. G. Lazarev, P. L. Kapitsa and other scientists took part in the discussion. There is agreement on the fact that this problem requires further experiments. III. Thermal Properties of Metals Due to Electrons. N. Ye. Alekseyevskiy, Yu. P. Gaydukov (IFP AN SSSR), I. M. Lifshits (FTI AN USSR), and V. G. Peschanskiy (Khar'kov University) delivered a

lecture on "The Shape of the Fermi Surface of Tin According to Data of Galvanomagnetic Measurements". L. D. Landau, Ye. S. Borovik, M. I. Kaganov, and others took part in the discussion. E. A. Kaner (Institut radiotekhniki i elektroniki AN USSR, g. Khar'kov - Institute of Radio Engineering and Electronics of the AS UkrSSR, Khar'kov) spoke about his studies in which the theory of absorption of ultrasonic waves in pure metal was developed in detail. A. A. Galkin and A. P. Korolyuk (FTI AN UkrSSR and IRE AN USSR) reported on experiments on the absorption of ultrasonic waves by tin, indium, and zinc in a magnetic field. I. M. Lifshits, N. Ye. Alekseyevskiy, P. L. Kapitsa, M. I. Kaganov, and others took part in the discussion. M. S. Khaykin (IFP AN SSSR) spoke about the discovery of an oscillatory dependence of the surface resistance of a metal on a weak magnetic field (~6 oersteds). Yu. S. Sharvin (IFP AN SSSR) mentioned in the discussion that he, together with V. F. Gantmakher, made the same discovery at a frequency of 1.9 Mc/sec on a cylindrical tin specimen in a longitudinal magnetic field. I. M. Lifshits, M. I. Kaganov, B. G. Lazarev, M. Ya. Azbel', P. L. Kapitsa, and L. D. Landau took part in the discussion. M. Ya. Azbel' (FTI AN USSR) submitted a paper, in which a new resonance effect in pure metals at high frequencies

was described. M. S. Khaykin (IFP AN SSSR) reported on an investigation of cyclotron resonance on tin by means of a highly accurate method of frequency modulation. According to I. M. Lifshits, this is the first paper in which cyclotron resonance does not appear as a purpose in itself. A. A. Galkin, M. Ya. Azbel', and others took part in the discussion. M. Ya. Azbel' (FTI AN USSR) reported on a paper concerning the possibility of determining the Fermi correlation function $\Phi(p,p')$ of a Fermi fluid. S. V. Vonsovskiy, N. V. Vol'kenshteyn, Yu. P. Irkhin, G. V. Fedorov, and V. P. Shirokovskiy (Institut fiziki metallov AN SSSR, g. Sverdlovsk - Institute of Physics of Metals of the AS USSR, Sverdlovsk) gave the results of a comprehensive experimental investigation of the anisotropy of the Hall effect of the ferromagnetics Ni, Co, Gd and Ni_3Mn. N. B. Brandt (MGU) reported on the influence exerted by the addition of lead to bismuth upon the energy spectrum of electrons. This effect was studied with the aid of quantum oscillations of magnetic susceptibility. Yu. A. Bychkov (IFP AN SSSR) spoke about the theoretical investigation of the influence exerted by impurities upon the quantum oscillations of magnetic susceptibility of metals with a quadratic dispersion law. According to I. M.

Lifshits, this paper demonstrates the applicability of the quantum-field theory to investigations of the electron structure of metals. IV. Low-temperature Magnetism: Ye. G. Guseynov (Institut fiziki AN Azerbaydzhanskoy SSR, g. Baku - Institute of Physics of the Azerbaydzhanskaya SSR, Baku), V. Ye. Naysh, and Ye. A. Turov (Institute of Physics of Metals of the AS USSR, Sverdlovsk) delivered a lecture on the magnetic properties of ferromagnetics with a noncollinear distribution of the magnetic moments of their sublattices. According to S. V. Vonsovskiy, this work permits the measurement of some constants. N. Ye. Alekseyevskiy and G. A. Smolenskiy took part in the discussion. A. S. Borovik-Romanov and V. I. Ozhogin (IFP AN SSSR) investigated the magnetism of a $CoCO_3$ single crystal at 1.3-300°K. L. L. Landau, M. I. Kaganov, G. A. Smolenskiy took part in the discussion. N. M. Kreynes (IFP AN SSSR) reported on the investigation of weak ferromagnetism in the anhydrous sulfates $CoSO_4$, $CuSO_4$ of the transition group. A. S. Borovik-Romanov, Ye. A. Turov, and N. Ye. Alekseyevskiy took part in the discussion. D. I. Astrov (VNIIFTRI, g. Moskva) spoke about the newly discovered magnetic moment in the action of an electric field upon matter. This phenomenon has already been predicted by

L. D. Landau and Ye. M. Lifshits, and, according to I. Ye. Dzyaloshinskiy, this effect must occur in Cr_2O_3. L. D. Landau, N. Ye. Alekseyevskiy, G. A. Smolenskiy, and A. S. Borovik-Romanov took part in the discussion. A. I. Akhiyezer, V. G. Bar'yakhtar, and S. V. Maleyev (FTI AN USSR) developed a theory of the elastic and inelastic scattering of slow neutrons in ferrites and antiferromagnetics. The discussion (A. S. Borovik-Romanov, L. D. Landau, and others) dealt with the possibility of distinguishing between the effect caused by spin waves and scattering involving phonons. A. I. Akhiyezer, V. G. Bar'yakhtar, G. I. Urushadze, and S. V. Peletminskiy (FTI AN USSR) spoke about their papers on the theory of relaxation phenomena in ferromagnetics and antiferromagnetics. Ye. A. Turov and M. I. Kaganov took part in the discussion. The latter emphasized the necessity of experimentally investigating the non-resonance absorption of high-frequency energy by solids, in order to determine various mechanisms of interaction. P. T. Mina (IFP AN SSSR) spoke about measuring the relaxative absorption of electromagnetic energy in the antiferromagnetic $CoCl_2$. N. Ye. Alekseyevskiy, A. S. Borovik-Romanov, Ye. A. Turov, M. I. Kaganov, and G. A. Smolenskiy discussed a possible

absorption mechanism. Yu. A. Izyumov and Ye. A. Turov (Institute of Physics of Metals of the AS USSR, Sverdlovsk) spoke about the theoretical investigation of the ferromagnetic resonance line in metals. L. I. Buyshvili, G. R. Khutsishvili, and O. D. Cheyshvili (Institute of Physics AS Gruzinskoy SSR, Tbilisi) explained the theory of magnetic relaxation in a ferromagnetic metal, which is considered to be composed of magnetic ions and conduction electrons. V. Various Problems (Nuclear Resonance, Spectroscopy, Experimental Technique, etc.): I. M. Lifshits (FTI AN USSR) spoke about theoretical investigations of the kinetics of the formation of an ordered phase from the original disordered phase in a transition of the second kind. According to V. S. Kogan, the kinetics of the ordering of the alloy Fe_3Al, which was annealed at 300°C, agrees with the opinion expressed by I. M. Lifshits. According to A. S. Borovik-Romanov, domains are observed in antiferromagnetic carbonates. I. V. Obreimov stressed the great importance of I. M. Lifshits' work and mentioned the successful application of topology to some important problems of modern physics. V. S. Kogan (FTI AN USSR) spoke about the results obtained by X-ray structural analysis (carried out together with R. F. Bulatova and B. G. Lazarev of FTI AN SSSR) and neutron-diffraction studies (carried out

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together with B. G. Lazarev (UFTI), G. S. Zhdanov and R. P. Ozerov (Fiziko-khimicheskiy in-t, g.Moskva - Institute of Physical Chemistry, Moscow). V. P. Peshkov, S. V. Vonsovskiy, P. L. Kapitsa, and I. M. Lifshits took part in the discussion. A lecture by I. A. Gindin, B. G. Lazarev, and Ya. D. Starodubov (FTI AN USSR) dealt with the mechanical properties of lithium in connection with its polymorphous transformation at low temperatures. P. L. Kapitsa, N. Ye. Alekseyevskiy, N. V. Zavaritskiy, and M. S. Svirskiy participated in the discussion, which dealt mainly with the formation of low-temperature phases. A lecture by O. N. Trapeznikova and I. A. Sagava (LGU - Leningrad State University), which was read by O. N. Trapeznikova, dealt with the specific heat of chain-like structures at low temperatures. Yu. S. Karimov and I. F. Shegolev (IFP AN SSSR) spoke about the investigation of proton resonance on a free diphenylpicrylhydrazyl radical at temperatures of 1.5-300°K and 500-3000 oersteds. I. V. Obreimov, B. N. Samoylov et al. took part in the discussion. D. A. Kichigin (IRE AN USSR) gave a report on the electron resonance in oxygen-adsorbing coals (anthracite etc.). A. A. Galkin and I. V. Matyash (FTI AN USSR, IRE AN USSR, Khar'kov) spoke about the investigation of magnetic nuclear resonance on adsorbed hydrogen.

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N. G. Koloskova and U. Kh. Kopvillem (Kazanskiy un-t - Kazan' University) gave a report on the theoretical investigation of ultrasonic nuclear induction at low temperatures. This phenomenon was predicted by Al'tshuler. I. V. Obreimov and N. Ye. Alekseyevskiy took part in the discussion. D. Kh. Amirkhanova spoke about two studies of galvanomagnetic and thermomagnetic effects in semiconductors at low temperatures. These studies were performed at the Institut fiziki Dagestanskogo filiala AN SSSR g. Makhachkala (Institute of Physics of the Dagestan Branch of the AS USSR, Makhachkala). D. Kh. Amirkhanova and R. I. Bashirov, when investigating n-type InSb at 20-120°K, discovered an effect of the quantization of the electron energy spectrum in a magnetic field. Kh. I. Amirkhanov, R. I. Bashirov, and Yu. D. Zakiyev investigated the Hall effect and the change of resistivity in n-type InSb at 77°K. A. V. Kogan, V. D. Kul'kov, L. P. Nikitin, N. M. Reynov, I. A. Sokolov, and M. F. Stel'makh (FTI AN SSSR, Leningrad) reported on their investigations of such nuclei as had been orientated at low temperatures. N. Ye. Alekseyevskiy and B. N. Samoylov took part in the discussion. L.P.Zverev, M. M. Noskov, and M. Ya. Shur (Ural'skiy gos.un-t,g.Sverdlovsk - Ural State University, Sverdlovsk) delivered a lecture on the exciton

absorption edge in cuprous oxide. V. V. Yeremenko and L. I. Chuyko (Institut fiziki AN USSR, g. Kiyev - Institute of Physics of the AS UkrSSR, Kiyev) investigated the change in the absorption spectrum of Cu_2O in the case of uniaxial compression (T = 20°K). I. V. Obreimov, A. F. Prikhod'ko, I. M. Lifshits, and others took part in the discussion. Ye. S. Borovik and A. G. Limar' (FTI AN USSR) spoke about the production of pulsed magnetic fields up to 200000 - 300000 oersteds in coils cooled by liquid hydrogen. N. Ye. Alekseyevskiy and I. V. Obreimov took part in the discussion. Ye. S. Borovik then spoke about three studies performed at the FTI AN USSR on the technology of low temperatures; together with B. G. Lazarev and I. F. Mikhaylov he developed a high-vacuum hydrogen condensation pump. B. G. Lazarev and M. F. Fedorova built new types of low-temperature, high-vacuum adsorption pumps. B. N. Yesel'son and A. D. Shvets used the carbon-adsorption pump to obtain temperatures below 1°K by evacuating the vapor of a helium bath. N. Ye. Alekseyevskiy and I. V. Obreimov, in the discussion, stressed the great practical importance of this research device. N. N. Mikhaylov (IFP AN SSSR) reported on the carbon-resistance thermometer for low temperatures developed by him and

A. Ya. Kaganovskiy. According to B. G. Lazarev, many of such thermometers are used at UFTI. I. G. Fakidov, B. N. Samoylov, and A. I. Sudovtsov took part in the discussion. Academician I. V. Obreimov stressed the great success of the Congress and, in the name of all participants, thanked the collaborators of the FTI AN USSR and all other persons having contributed to the work of the Congress. The next, i.e., the Eighth Congress will take place in the summer of 1961.

CHENTSOV, R.A.

[Action of thermal effects on the response speed of the superconducting elements of a computer]Vliianie teplovykh effektov na bystrodeistvie sverkhprovodiashchikh elementov vychislitel'noi mashiny. Moskva, ITM i VT AN SSSR, 1961. 45 p. (MIRA 15:9)
(Electronic calculating machines) (Superconductivity)

PHASE I BOOK EXPLOITATION SOV/6310

Chentsov, R. A.

Vliyaniye teplovykh effektov na bystrodeystviye sverkhprovodyashchikh elementov vychislitel'noy mashiny (Action of Thermal Effects on the Response Speed of the Superconducting Elements of a Computer) Moscow, 1961. 45 p. (Series: Elektronnyye vychislitel'nyye mashiny) 500 copies printed.

Sponsoring Agency: Institut tochnoy mekhaniki i vychislitel'noy tekhniki Akademii nauk SSSR.

Contributors not mentioned.

PURPOSE: This booklet is intended for scientists and engineers concerned with the development of computers. It may also be used as a textbook by students taking courses in computing engineering at schools of higher education.

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Action of Thermal Effects (Cont.) SOV/6310

COVERAGE: The role of thermal elements is investigated, especially a specific example of the trapped flux superconduction memory element, the active (switching) part of which is formed by a film of tin deposited on glass, crystal quartz, or sapphire base. Data are given on the thermal properties of all these materials at low temperature. Numerical appraisals of basic thermal effects are derived in Ch. 2. Some means of preventing damaging action of these effects are described in Chs. 3 and 4. Although numerical data concern a limited number of materials. the results obtained seem to be significant. The methods of appraisal and ways to eliminate damaging effects may be applied to other materials, as well as to cryogenic (or even noncryogenic) elements. No personalities are mentioned. There are 11 refere..ces: 3 Soviet and 8 English.

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APGC/IJP(C)/SSD Pe-4/Pr-4/Pu-4/Pq-4 WW/JD/WH
ACCESSION NR: AP3000447 S/0170/63/006/005/0099/0105 86 82

AUTHOR: Berkovich, S. Ya.; Golovistikov, P. P.; Chentsov, R. A.

TITLE: Calculation of non-steady-state heat transfer from film to substrate

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 6, no. 5, 1963, 99-105

TOPIC TAGS: heat transfer, superconducting thin film, computer memory device, storage, crystal substrate, amorphous substrate, thermal conductivity, memory

ABSTRACT: Many thin-film elements liberate heat during operation and the resulting rise in temperature may affect the performance of the element. This is particularly true of elements working at low temperatures, for example superconducting memory elements in computers. It is therefore of interest to determine the time dependence of the temperature of the film on the heat released. The problem is stated mathematically in equations (1) through (3) of Enclosure 1. An explanation of symbols used in equations is given in Enclosure 2. A method of solving this problem is described (Berezin, I. S.; Zhidkov, N. P., Metody vychisleniy, 2. Fizmatgiz, 1960). Results obtained on an electronic computer for thin films used in superconducting memory devices are discussed. It is shown that when the film is deposited on a crystalline substrate (sapphire) with high thermal diffusivity, the thermal resistivity of

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the film-substrate interface has an important effect on heat transfer (Fig. 1 of Enclosure 3). In the case of amorphous substrates, on the other hand, with low thermal diffusivity of the film-substrate interface, heat transfer is mainly determined by the product of the thermal conductivity and specific heat of the substrate (Fig. 2 of Enclosure 4). Orig. art. has: 20 formulas and 4 figures.

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Deceased

LAPTEV, I.D.; TERYAYEVA, A.P.; SAPIL'NIKOV, N.G.; CHENTSOV, R.Ye. [deceased]; SEPP, Ya.P.; SUVOROVA, L.I.; ZASLAVSKAYA, T.I.; GREKOVA, A.I.; TONKOVICH, V.S.; IBRAGIMOV, A.I.; KOTSYUBA, T.Ya.; KURYLEV, V.M.; KOVALEVSKIY, G.T.; KALNYNSH, A.A. [Kalnins, A.]; SIDOROVA, M.I.; MALISHAUSKAS, V.I. [Malisauskas, V.]; PASECHNIK, P.P.; BUGAREVICH, V.S.; KARNAUKHOVA, Ye.I.; AREF'YEV, T.I.; KAZAKOV, I.G.; GUMOVSKIY, I.A.; SEMIN, S.I., red.; LINKUNA, N.I., red.; TSITKO, I.A., red.; VOLKOVA, V.V., tekhn. red.

[Material incentives for developing the collective farm production] Material'noe stimulirovanie razvitiia kolkhoznogo proizvodstva. Moskva, Izd-vo AN SSSR, 1963. 326 p.
(MIRA 16:12)

1. Akademiya nauk SSSR. Institut ekonomiki. 2. Institut ekonomiki AN SSSR (for Laptev, Teryayeva, Suvorova, Zaslavskaya, Sidorova, Karnaukhova). 3. Sredneaziatskiy gosudarstvennyy universitet (for Sapil'nikov). 4. Komi filial AN SSSR (for Chentsov). 5. Institut ekonomiki AN Estonskoy SSR (for Sepp). 6. Bashkirskiy filial AN SSSR (for Grekova). 7. Institut ekonomiki AN Belorusskoy SSR (for Tonkovich, Kovalevskiy). 8. Institut ekonomiki AN Uzbekskoy SSR (for Ibragimov).

(Continued on next card)

CHENTSOV, S. D. PA 19T78

USSR/Teletypewriters Jul 1946
Telegraphy, High speed

"Significance of Shortened Contacts," S. D. Chentsov, Candidate of Tech Sci, L. V. Belostotskiy, 2 pp

"Vestnik Svyazi - Elektro Svyaz'" No 7 (76)

Author attempts to make clear the fact that the rectifying ability of the dual apparatus Bodo-duplex is not controlled by further shortening the contacts of the first ring PD, but basically by the sensitivity and operating time of the printing relay. Reference is made to an article by Kordobovskiy and Klimkov in "Vestnik Svyazi" No 6, 1945 titled "Rectifying Ability of the Bodo Appartus."

19T78

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Vechernyaya Moskva, Moscow, 7 May 54.

SO: SUM 284, 26 Nov 1954

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Detector for SSB reception. Radio no.5:26-28 My '63. (MIRA 16:5)
(Radio--Equipment and supplies) (Radio detectors)

CHENTSOV, V.N., kand. geograficheskikh nauk

Modernizing the characteristics of the 1 : 1,000,000 international map of the world in accordance with the new specifications approved at the U.N. Technical Conference at Bonn in 1962. Izv. vys. ucheb. zav.; geod. i aerof. no.5:117-123 '63.
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SO: U-3042, 11 March 53, (Letopis 'Zhurnal 'nykh Statey, No. 7 1949).

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CHENTSOV, L.L., kandidat geograficheskikh nauk.

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(Relief maps)

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(Cartography)