"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

S/056/63/044/001/060/067
B102/B186

AUTHORS: Azimov, Ya. I., Ansel'm, A. A., Shekhter, V. M.

TITLE: Weak-coupling motion of Regge poles

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 1, 1963, 361 - 370

TEXT: The Regge pole trajectories are determined for the case of scattering from a Yukawa potential or a superposition of such potentials. This is done on the basis of perturbation theory applied to the exact radial wave function

$$\psi_l(r)=j_l(kr)+\frac{1}{k\cos\pi l}\int_0^r \{j_l(kr)\,j_{-l-1}(kr')-j_{-l-1}(kr)\,j_l(kr')\}\,U(r')\,\psi_l(r')\,dr', \tag{1}$$

$$j_l(x)=\sqrt{\pi x/2}\,J_{l+1/2}(x), \qquad U(r)=2mV(r)=2mar^{-1}e^{-\mu r},$$

Within the framework of this theory (1) can be integrated so that in lowest-order approximation the pole trajectory equation is obtained as

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$$\frac{am}{k} Q_l\left(1+\frac{\mu^2}{2k^2}\right) = le^{i\pi l}\frac{am}{k} R_l\left(1+\frac{\mu^2}{2k^2}\right) + le^{i\pi l}\cos \pi l; \qquad (4)$$

$$Q_l\left(1+\frac{\mu^2}{2k^2}\right) = 2\int_0^\infty j_l^2(kr)\frac{e^{-\mu r}}{r}dr,$$

$$R_l\left(1+\frac{\mu^2}{2k^2}\right) = 2\int_0^\infty j_l(kr)\, j_{-l-1}(kr)\frac{e^{-\mu r}}{r}dr. \qquad (5)$$

$Q_l(z)$ is a second-order Legendre function. In the complex plane l, the function Q_l has poles at integral negative points so that R_l are integral functions. Near such negative points $l = -n-1$ where the second-order Legendre function has simple poles with residua equal to the Legendre polynomials P_n, (4) assumes the form

$$\frac{am}{k}\frac{P_n(1+\mu^2/2k^2)}{l+n+1} = l, \qquad (6)$$

and the trajectories are given by

$$l_n = -n-1+\frac{am}{lk}P_n\left(1+\frac{\mu^2}{2k^2}\right), \qquad k = ix, \quad x>0, \qquad (7),$$

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(7) is valid if $l_n \sim -n-1$, and of course also if the distances between the poles are small; it loses validity if k^2 is very small. Far from the Q_l poles (4) assumes the form

$$\frac{am}{k}\left(-\frac{ie^{-i\pi l}}{\sin \pi l}\right)\frac{\sqrt{\pi}\,\Gamma(-l-1/2)}{\Gamma(-l)}\left(\frac{k^2}{\mu^2}\right)^{l+1} = 1. \qquad (8)$$

which is not applicable near halfintegral negative points. For $|k^2/\mu^2| \ll 1$ and the pole being far enough away from the real axis, $i\pi(l+1/2) - (l+1/2)\tau + \ln 2\,\xi_l = -2\pi i p$, where p is a positive integer and $\tau = \ln(\mu^2/\varkappa^2)$; $k^2 = -\varkappa^2 < 0$

$$\xi_l = -\frac{am}{\mu}\frac{\sqrt{\pi}\,\Gamma(-l-1/2)}{\Gamma(-l)} \qquad (9).$$

In this case the pole trajectory is almost circular:

$$(\mathrm{Re}\, l + p + 1/2)^2 + (\mathrm{Im}\, l - (2\pi)^{-1} \ln 2\xi_l)^2 = p^2 + (2\pi)^{-2} \ln^2 2\xi_l. \qquad (11)$$

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which holds for the case of attraction. In the case of repulsion $p \to p+1/2$ and $\xi_1 \to -\xi_1$. On the approximate assumption ξ_1=const the trajectories are straight lines if $k^2 > 0$: $2\pi p(\mathrm{Re}\, l + 1/2) = \ln 2\xi_1 \cdot \mathrm{Im}\, l$ (attraction). In the case of $k^2/\mu^2 \gg 1$

$$\ln(-am\sqrt{\pi}/\mu) + {}^1/_2 \ln(\mu/k) - {}^1/_2 \ln(-l) - (l + {}^1/_2)\,\mu/k = -2\pi i p. \quad (15),$$

so that for the pole trajectories

$$\mathrm{Im}\, l = 2\pi p \frac{k}{\mu}, \qquad \mathrm{Re}\, l = \frac{k}{\mu} \ln\left|\frac{am}{\mu}\sqrt{\frac{2\pi}{l}\frac{k}{\mu}}\right|. \quad (16)$$

is asymptotically valid. (15)(16) hold for attraction, for repulsion $p \to p+1/2$ and $\alpha \to -\alpha$. Thus the pole motion is characterized by an oscillation of the poles about integral negative points at energies corresponding to the left out of the partial amplitude (cf. Fig. 1), by collision and exit of the poles into the complex plane even at negative energies, and by condensation of the poles near $l = -1/2$ at threshold energies and open trajectories. There are 2 figures.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

S/056/63/044/002/043/065
B108/B186

AUTHORS: Azimov, Ya. ..., Ansel'm, A. A.

TITLE: Regge poles and asymptotic behavior of amplitudes in perturbation theory

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 2, 1963, 686-694

TEXT: For the scattering of particles on a Yukawa potential, a relationship is established between the asymptotic behavior of the amplitude and the position of the Regge poles. In the lower approximations of perturbation theory the asymptotic behavior is found to be associated with the motion of the poles. Higher approximations (beginning with the third) can prove the consistency of perturbation theory with the existence of only simple moving poles. The motion of the poles in relativistic field theory is studied by considering pion-pion interaction. A simple scheme of Regge poles, similar to the potential scattering, does not agree with perturbation theory. It is, however, possible that poles accumulate near negative integral points (V.N. Gribov, I. Ya. Pomeranchuk. Report presented

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Regge poles and asymptotic behavior ... S/056/63/044/002/043/065
B108/B186

at the International Conference on High-energy Physics, CERN, Geneva, July 1962; ZhETF, 43, 1556, 1962) or also near zero owing to the existence of many channels in field theory.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A.F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A.F. Ioffe of the Academy of Sciences USSR)

SUBMITTED: August 24, 1962

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 17621-63 EWT(1)/FCC(w)/BDS AFFTC/ASD/IJP(C) 56
S/056/63/044/003/041/053 55

AUTHOR: Azimov, Ya. I., Ansel'm, A. A., and Shekhter, V. M.

TITLE: Analytic properties of Regge pole trajectories

PERIODICAL: Zhurnal eksperimental'noy i tekhnicheskoy fiziki, v. 44, no. 3, 1963, 1073-1092

TEXT: In a previous paper (Ref. 1: ZhETF (in print). Preprint ITEF No. 102) the authors investigated the Regge pole behavior during scattering on a Yukawa potential $V(r) = (\alpha e^{-\mu r})/r$ for small α and studied the trajectory of poles $l = l_1(k^2)$ for changes in energies k^2 along the real axis from $-\infty$ to $+\infty$. The present paper studies the Regge pole motions for complex energies. It is found that the trajectories have complex (and real) branch points due to collisions of pole pairs. A particular choice of leaves allows one to write a dispersion relation for an arbitrary trajectory with a certain finite number of auxiliary cuts which do not appear as cuts of the amplitude. For the case of weak coupling the positions of these points have been determined explicitly while for stronger coupling the arrangement of the branch points is described qualitatively. With

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L 17621-63 S/056/63/044/003/041/053

Analytic properties of Regge pole trajectories

the increase of the coupling constant they leave the physical sheet, and, consequently, the trajectory can lead to the appearance of bound states.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physico-Technical Institute im. A. F. Ioffe of the AS USSR)

SUBMITTED: October 24, 1962

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 68255-65 SWT(m)/T/EWA(m)-2

ACCESSION NR: AP5018203

AUTHOR: Azimov, Ya. I.; Anisovich, V. V.; Anselm, A. A.; Danilov, G. S.; Dyatlov, I. T.

TITLE: Electromagnetic meson decays in the quark model

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 1, no. 2, 1965, 50-54

TOPIC TAGS: meson, strange particle, quark model

ABSTRACT: The hypothesis of SU(6) symmetry in strong interactions leads to a large number of relationships between the various matrix elements. In this paper it is pointed out that the use of SU(6) symmetry and the quark model in studying electromagnetic meson decays leads to predictions which may be experimentally verified in the near future. It is suggested that the magnetic moment of a quark may be independent of the type of interaction which binds quarks in particles, as should be the case in the non relativistic model with weakly bound quarks. "The authors are grateful to V. M. Shekhter for useful consultation." Orig. art. has: 1 table, 2 formulas.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 65255-65

ACCESSION NR: AP5014203

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe (Physicotechnical Institute)

SUBMITTED: 18Mar65 ENCL: 00 SUB CODE: NP

NO REF SOV: 002 OTHER: 005

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

AZIMOV, Ya.I.; ANISOVICH, V.V.; ANSEL'M, A.A.; DANILOV, G.S.; DYATLOV, I.T.

Possible classification of elementary particles in the quartet model. Pis'. v red. Zhur. eksper. i teoret.fiz. 2 no.3:109-113 Ag '65. (MIRA 18:12)

1. Fiziko-tekhnicheskiy institut imeni Ioffe AN SSSR. Submitted June 3, 1965.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

AZIMOV, Ya.I.; ANISOVICH, V.V.; ANSEL'M, A.A.; DANILOV, G.S.; DYATLOV, I.T.

On certain mass formulae in a quartet model. IAd. fiz. 2 no.3:583-584 S '65. (MIRA 18:9)

1. Fiziko-tekhnicheskiy institut im. A.F. Ioffe AN SSSR.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

AUTHORS: [illegible] UR/0056/65/048/006/1776/1786

TOPIC TAGS: moving pole method, [illegible]

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 64718-65

ACCESSION NR: AP5016572

determining the unitarity condition for the three-particle amplitude in terms of the energy of the pair of the produced [illegible] is complex. It turns out that [illegible]

[illegible] tables and 10 figures.

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ACCESSION NR:

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 5349-66 EWT(m)/T/EWA(m)-2
ACCESSION NR: AP5021120

UR/0056/65/049/002/0549/0571

AUTHOR: Azimov, Ya. I.; Ansel'm, A. A.; Gribov, V. N.; Danilov, G. S.; Dyatlov, I. T.

TITLE: Three-particle partial amplitudes and the unitarity conditions for complex values of the angular momentum

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 2, 1965, 549-571

TOPIC TAGS: particle interaction, scattering amplitude, moving pole method, analyticity

ABSTRACT: This is a continuation of an earlier paper (ZhETF v. 48, 1776, 1965) dealing with the mechanism of the occurrence of Mandelstam branch points on the basis of many-particle unitarity conditions for complex angular momentum (j). The present article considers the possibility of continuing the partial amplitudes for the transformation of two particles into the domain of complex j, and investigates their properties for the simplest types of Feynman diagrams. A general method is described first for analytic continuation of the amplitudes in j when the helicity (m) assumes integer values. It is shown that the concrete character of the asymp-

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L 5349-66

ACCESSION NR: AP5021120

totic behavior of the amplitudes depends on the values of the pair energies of the produced particles. The unitarity conditions for the amplitudes are then investigated with respect to the pair energies. The exact form of the three-particle contribution to the unitarity conditions is finally obtained for complex j and for several simple Feynman diagrams, and it is shown that the construction of the unitarity conditions is equivalent to the calculation of the Mandelstam spectral functions of the corresponding diagrams. Orig. art. has: 19 figures and 48 formulas.

ASSOCIATION: none

SUBMITTED: 04Feb65

ENCL: 00

SUB CODE: GP, MP

NR REF SOV: 005

OTHER: 003

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANIZOVICH, V.V.; ANSELM, A.A.

Theory of reactions with three-particle formation near the threshold. Usp. fiz. nauk 88 no.2:287-326 F '66. (MIRA 19:2)

1. Institut fiziki vysokikh energiy i Fiziko-tekhnicheskiy institut im. A.F. Ioffe AN SSSR.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 24314-66 EWT(m)/T

ACC NR: AP6007269

SOURCE CODE: UR/0053/66/088/002/0287/0326

AUTHOR: Anisovich, V. V.; Ansel'm, A. A.

ORG: Institute of High-Energy Physics (Institut fiziki vysokikh energiy); Physico-technical Institute im. A. F. Ioffe, AN SSSR (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Theory of reactions with formation of three particles near threshold

SOURCE: Uspekhi fizicheskikh nauk, v. 88, no. 2, 1966, 287-326

TOPIC TAGS: elementary particle, quantum electrodynamics, particle interaction, scattering amplitude, pion, nucleon, gamma quantum, K meson

ABSTRACT: This is a review article dealing with the theoretical interpretation of reactions with multiple production of particles, with emphasis on the determination of the scattering amplitudes of unstable particles at zero energy. The approach used is based on an investigation of processes connected with formation of several particles near the threshold, when the total released kinetic energy is lower than the mass of any particle, and makes it possible to develop a consistent theory that describes reactions with creation of low-energy particles in terms of a certain number of independent parameters and in terms of the scattering amplitudes of the pairs of produced particles. The analysis is limited to three-particle production. Kinematic relations are derived for the transformation of two particles into three, and rules for selecting the proper Feynman diagrams are formulated. It is shown that in the case of low-energy nucleon-nucleon scattering the selection rules lead directly to

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L 24314-66

ACC NR: AP6007269

the Bethe-Peierls effective-radius theory. The section headings are: Introduction. 1. Kinematics. 2. Fundamental principles of diagram selection. 3. Scattering of particles near threshold. 4. Expansion of the amplitude in terms of states with different total angular momenta. 5. Unitarity condition and calculation of discontinuities. 6. Linear and quadratic terms in the expansion of the amplitude with $L = 0$ in terms of the threshold momenta. 7. Cubic terms in the expansion in terms of the threshold momenta and the general structure of the expansion of the amplitude with $L = 0$. 8. Production of three particles in a state with unity total angular momentum. 9. Resonant interaction of produced particles. 10. The reactions $\pi + N \to N + \pi + \pi$, $\gamma + N \to N + \pi + \pi$, and $K \to 3\pi$ decay. Appendix. Orig. art. has: 27 figures and 99 formulas.

SUB CODE: 20/ ORIG REF: 017/ OTH REF: 009

SUBM DATE: none

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSELM, A.I.

Distribution of temperatures in uniformly loaded anodes A. I. Anselm
Mathematical F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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H 53.

519. Theory of Surface Ionisation on Glowing Metals. A. Anselm. *Comptes Rendus de l'Acad. des Sciences, U.R.S.S.* 3. 5. pp. 329–334, 1934. *In German. Phys. Zeits. d. Sowjetunion,* 6. 5. pp. 505–512, 1934. *In German.*—If ν_p and ν_a are the numbers of positive ions and neutral atoms of alkali, liberated per sec. per cm.^{2} from a glowing metal surface, when bombarded by the alkali atoms, the following formula is obtained by applying Sommerfeld's theory of metals: $\nu_p/\nu_a = e^{\epsilon(\phi - V_i)/KT}$, where ϵ is the electron charge, ϕ the work of liberation, V_i the ionisation potential of the alkali metal, K Boltzmann's constant and T the absolute temperature. Modifying a formula obtained by thermodynamic theory to agree with experimental results, the above formula is again produced. A recent experiment by Copley and Phipps supports the equation.

H. M. B.

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ANSELM, A. I.

PROCESSES AND PROPERTIES INDEX

2

Electrical properties of unimolecular films. A. I. Anselm. Uchenye Zapiski Leningrad. Gosudarst. Univ., Ser. Fiz. Nauk 1939, No. 5 (No. 38), 16-25; Khim. Referat. Zhur. 1940, No. 3, 16-17; cf. C. A. 29, 18[illegible]; Gurney, C. A. 29, [illegible].—The probability of the presence of the electron in the adsorbed layer as a function of the wave no. has a no. of max. corresponding to the values of the wave nos. of the electrons in the isolated potential depression. The max. are displaced in the direction of smaller values of energy. Each valency electron moves in its own orbit of the metal and the adsorption layer. The double layer formed on the surface of the metal changes the escape energy.

W. R. Henn

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[redacted]

ANSELM, A. I.

ANSELM, A. I.
J. Exptl. Theoret. Phys. (USSR) 12, 264-73 (1942) CA: 37-33125
Molecular scattering of light and the interaction of molecules.

Phys. Inst., Leningrad State U.

[redacted]

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

CA

PROCESSES AND PROPERTIES INDEX

2

Theory of the polarization of dipolar liquids. A critique of the Debye theory of the internal field. A. I. Anselm. *Acta Physicochim. U.R.S.S.* 18, 499-513(1943)(in English); *J. Exptl. Theoret. Phys.* (U.S.S.R.) 13, 632-6 (1943); cf. *C.A.* 37, 3312[illegible].—The Debye theory of the internal (local) field contradicts qualitatively Kirkwood's theory of the polarization of polar liquids. The consequence following from the Debye theory, that the interaction of mols. in a liquid always causes a decrease in polarization, is based upon the incorrect assumption that in a polarized medium all the directions of the internal field are equally probable. By applying the simplest model corresponding to an interacting pair of mols., it is possible to evaluate quantitatively the asymmetry of the internal field and to make a reasonable correction to the Debye theory. After this the qual. contradiction between the Debye theory and Kirkwood's correct theory of polarization vanishes.

F. H. Rathmann

Leningrad Physico-Tech. Inst., AS

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

[illegible], A. I.

[illegible] 2540

The Theory of the Polarization of Dipole Liquids in Strong Electric Fields. A. Anselm (Zh. eksp. [illegible] 1943, Vol. 14, No. [illegible], pp. [illegible] yes). It was shown by the author in previous papers (Zh. eksp. [illegible] 1942, Vol. 12, p. 274, & 1943, Vol. 13, p. 432) that the theory of the inner field proposed by Debye for interpreting the polarization of dipole liquids in weak fields is incorrect. The same considerations also apply to Debye's theory of polarization in strong fields. In the present paper the author develops a new theory from the method used by Kirkwood (J. Chem. Phys., 1939, Vol. 7, p. 911) investigating the polarization in weak fields. It is pointed out, however, that Kirkwood, having derived formula (1) for determining the permittivity ϵ in a weak field has attempted to calculate M_∞, the electric moment appearing in an infinite dielectric with a fixed orientation of one of its molecules. Such attempts are bound to fail with the present state of knowledge of intramolecular forces in a liquid, so the author proposes to treat M_∞ as a parameter which characterizes the molecular interaction, and which can be determined experimentally. Accordingly, a formula (14) is derived for calculating the dielectric constant ϵ' in strong fields. It is possible to check the new theory experimentally by considering other phenomena determined quantitatively by M_∞. Thus it is shown that the value of $(\epsilon' - \epsilon)$ depends on M_∞. A comparison between the theoretical and experimental values of the ratio for water and nitrobenzene indicates that the theoretical results are of the correct order of magnitude.

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A-1

Theory of the polarization of polar liquids in strong electric fields. A. Anselm. (*Acta Physicochim. U.R.S.S.*, 1944, 19, 400—409).—Debye's theory (cf. A., 1935, 507) is shown to be erroneous. Instead the formula $\Delta\varepsilon/\varepsilon = -(12\pi N/\varepsilon)[3\varepsilon/(2\varepsilon+1)]^2(\mu M_\infty^2 E/(4\delta k^2 T^2) \times (1-2\delta^2)/[1-(4\pi N/9kT)[3/(\varepsilon+2)](3\varepsilon/(2\varepsilon+1)\mu M_\infty)]$ is deduced, in which N = no. of mols. per c.c., E = the mean internal field, M_∞ = the moment in an unlimited dielectric when the orientation of one mol. is fixed, and $\delta^2 = (\Delta\bar{M})^2/(\bar{M})^2$ where $\bar{M}$ is the moment inside a sphere parallel to that of a fixed mol. It is shown that $1-\delta^2$ is ~ 1, so that the only unknown parameter is M_∞, which may be determined from experiments on polarization in weak fields. The formula gives results of the correct order of magnitude for H_2O and $PhNO_2$.

F. J. G.

AS USSR, Physico-Tech. Inst.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

C.A.

ANSEL'M, A.I.

2

The theory of ultrasound absorption in liquids. A. Ansel'm. (Leningrad Physico-Tech. Inst., U.S.S.R.). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 15, 751-8(1945) (English summary).—A. derives the formula $\alpha/\nu^2 = \pi\nu[(1 - (\nu/\nu_0)(\partial p/\partial T)_v]^2 - (2\psi/3)[1 - (\nu/\nu_0)(\partial p/\partial T)_v + (\phi^2/9)]/(3RT/M\nu^2)/\nu_0 V_0[1 - (3R/C_v) - 3b\phi T]/(1 + x^2)$, where α is the coeff. of absorption, ν is the frequency, ν the sp. vol. for one molecule, $\psi = d/(\nu^{1/3} - d)$, d is the distance between neighboring coordinated atoms, ξ is a parameter, M = mol. wt., R = the gas const., $\phi = 3kT/(1 - 3b\phi T)$, c_v = sp. heat at const. vol., C_v = molar heat capacity at const. vol., and x is the ratio of the given frequency to that for max. absorption. The definition of b is complicated, but b can often be set equal to zero. "Other symbols have the usual meanings." The derivation makes particular use of the relaxation-time concept. The formula has not been tested exptly. to any decisive extent.

Cyrus Feldman

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

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ANSEL'M, A.I.

PROCESSES AND PROPERTIES INDEX

2

Theory of electroöptical phenomena in nonpolar liquids. A. I. Anselm (Phys. Tech. Inst. Acad. Sci. U.S.S.R., Leningrad). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 17, 489-505(1947)(in Russian).—A common theory of the elec. (Kerr) birefringence and of the mol. scattering of light in liquids is developed statistically on the basis of an orienting interaction of anisotropic particles; this interaction is described by a function G of coördinates and eulerian angles, correlating position and orientation and representing a six-variable generalization of the correlation function of Zernike and Prins (*C.A.* 21, 1730); its integral defines a parameter J which can be evaluated approx. to $J = 2\,(\overline{\cos^2\theta} - 1/3)$, the sum extending over the s mols. of a group; the excess of the mean $\overline{\cos^2\theta}$ over $1/3$ expresses the result of the interaction, namely the av. deviation from unrestrictedly free rotation. The final formulas derived for the Kerr const. K and for the depolarization Δ of scattered light both involve J, in addn. to phys. consts. such as mol. wt., d., dielec. const., n, the principal optical polarizabilities, and the compressibility. The theory can thus be subjected to a test; owing mainly to the uncertainty in the detn. of Δ and to certain limitations of the theory (use of Onsager's schematic field, failure to take into account the anisotropy of the effective field), one can at best expect agreement only of the order of magnitude of J from the Kerr effect and from depolarization. Actually, for CS_2, with $K = 11.7 \times 10^{-10}$ and $\Delta = 0.686$, $J = -0.31$ and -0.14; however, with $\Delta = 0.640$ (which differs from the previous value only by 6.6%), $J = -0.31$ and -0.28, a surprisingly good agreement. For C_6H_6, $J = -0.45$ and -0.32. At the very least, what is certain is that J is neg. and of the order 0.2-0.4. This conflicts altogether with the basic tenet of the H. A. Stuart school according to which the symmetry axes of the mols. should tend to parallel orientation, and which would lead to $J = 1/2$ or $J = 1/3$ in the case of a mon. in pairs ($s = 2$). Rather, interaction results in orientation at an angle. The electro-optical consts. characteristic of a mol. in the gaseous state do not change materially on liquefaction; the increase of K and of Δ from the gaseous to the liquid state is due mainly to the orienting interaction correctly expressed by J; its neg. sign in the case of CS_2 and of C_6H_6 means that the symmetry axes of near-order mols. form large angles with the axis of the correlating mol.

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B

2C

Theory of Polarization of Dipolar Liquids. (In Russian.) A. I. Anselm, *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 18, Sept. 1948, p. 1095-1112.

The theories of Debye, Onsager, Kirkwood, and the author were investigated. Shows fallacy of the basic premises of Debye's theory of the inner molecular field. Particular emphasis is devoted to the physical bases of the different theories. 19 ref.

METALLURGICAL LITERATURE CLASSIFICATION

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USSR/Physics
Crystals Lattices

May 49

"Orientation-Translation Waves in Molecular Crystals: I, Dynamics of a Linear Lattice," A. I. Ansel'm, N. N. Porfir'yeva, Leningrad Physico-tech Inst Acad Sci USSR, 9 pp

"Zhur Eksper i Teoret Fiz" Vol XIX, No 5

PA 46/49T97

Studied oscillations of a linear crystallic lattice, each particle of which possessed progressing and rotating degrees of freedom. Spectrum of orientation-translation oscillations has as many branches as the elementary lattice of the molecular crystal has degrees of freedom (translation and rotation). In a linear lattice only one branch begins (at lambda equal to infinity) with a frequency omega equal to zero (acoustic branch). Submitted 13 Dec 48.

46/49T97

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ANSEL'M, A. I.

'From 14 to 21 October 1950 in the town of Kiev, the seventh conference on semiconductor properties took place. This conference was called by the Dept. Physico-Mathematical and Chemical Sciences. of the Acad. Sci. UkSSR, together with the Dept. Physico-Mathematical Sciences of the Acad. Sci. USSR. The Conference was opened by E. O. Paton, Vice President of the Acad. Sci. UkSSR. The following was among reports presented:

"Band Theory of Solid Body and Limits of Its Application." F. F. Vol'kenshtein. Discussed by I. E. Angel'm, T. A. Kontorova, E. I. Adirovich, K. B. Tolpygo and F. F. Vol'kenshtein.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

USSR/Nuclear Physics - Semiconductors Mar 52

"Kinetic Processes in Atomic Semiconductors Taking Into Account the Scattering of Electrons on Admixture Ions," A. I. Ansel'm, V. I. Klachkin, Leningrad Phys Tech Inst, Acad Sci USSR

"Zhur Exper i Teoret Fiz" Vol XXII, No 3, pp 297-302

Investigates kinetic processes of elec cond, thermoelectromotive force, and Hall's effect in atomic semiconductors while taking into account the scattering of current carriers on ions of admixt. Shows

215T56

erroneous research in a number of works, based on assumptions of additivity of lattice and admixt resistances. Received 4 May 51.

ANSEL'M, A.I.

215T56

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSELM, A. I.*

Distribution of Concentration of the Current Carrier in a Semi-Conductor Test With the Hall Effect**

Journal of Technical Physics, 22, 1146-1153 Jul 1952

*An important worker in the field
**An important contribution to the field

Published by the
PHYSICAL TECHNICAL INSTITUTE

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, A. I.

Jul 52

USSR/Physics - Obituary

"Yakov Il'ich Frenkel' (Deceased 23 January 1952)," A. I. Ansel'm

"Uspekh Fiz Nauk" Vol XLVII, No 3, pp 470-476

Outstanding Soviet physicist-theoretician, Laureate of Stalin Prize, Corr Mem, Acad Sci USSR. Born 10 Feb 1894 in Rostov-on-Don, almost his whole life had been spent in Peterburg-Leningrad. Mol theory of crystals and liquids, electron theory of metals, theory of electron properties of dielectrics and semiconductors, nuclear physics, geophysics were his subjects of interest. Proposed in 1925 the fruitful idea of analogy between fluid and solid states (crystallic states).

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

USSR.

Influence of resonance scattering of charge carriers by impurity centers on the electric properties of atomic semiconductors. A. I. Anselm (Phys.-Tech. Inst., Acad. Sci. U.S.S.R., Leningrad). Zhur. Eksper. i Teor. Fiz. 24, 13-9(1953).—Math. It is shown that in Ge at low temp. the influence of a resonance scattering of carriers on impurity atoms is larger than the scattering on thermal vibrations of the lattice. Cond. electrons are scattered at electrons trapped in neutral atoms and forming neg. ions. The mobility at low temp. in case of resonance scattering is proportional to $T^{-1/2}$ whereas at high temp. it is proportional to $T^{-3/2}$. The Hall const. is calcd. and it is shown that the transition from resonance scattering to thermal scattering takes place at $\sim 100°K$.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

USSR / Electricity G

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9718

Author : Ansel'm, A.I.
Inst : Not given
Title : Theory of Photomagnetic Effect in Semiconductors in Large Magnetic Fields.

Orig Pub : Zh. tech. fiziki, 1954, 24, vyp 11, 2064-2069

Abstract : The author calculates the electric field occurring in the photomagnetic effect in the case of large magnetic fields ($uH/c > 1$, where u is the mobility of the carriers and c the velocity of light. He considers ionic semiconductors at low temperatures as well as atomic semiconductors. The expressions obtained for the ionic semiconductors confirm the dependence of the effect on the field intensity $aH/(1 - bH^2)$, established in the experiments by Komar, Reynov, and Shalit. Nearly equal results are obtained also for atomic semiconductors.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, A.I.

Conclusions of a discussion on certain problems of the electron theory of crystals. Zhur.tekh.fiz.no.13:2399-2402 N '55. (Crystallography) (Electrons) (MLRA 9:2)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSELM, A. I.

USSR/Physical Chemistry - Crystals, B-5

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60941

Author: Ansel'm, A. I., Korovin, L. I.

Institution: None

Title: Conditions of the Electron of Admixture Center in an Anisotropic Crystal

Original Periodical: Zh. tekhn. fiziki, 1955, 25, No 12, 2044-2049

Abstract: Considered are the stationary conditions of the electron in the field of admixture center of atomic crystal taking into account the anisotropy of the effective mass of electron as well as of the permittivity of the crystal. The wave equation thus obtained is solved by direct variational method. Energy levels and wave functions are calculated for the basic and excitation conditions.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

USSR/Physics - Crystals

Card 1/1 Pub. 153 - 24/26

Author : Ansel'm, A. I.

Title : Discussion. Summary of a discussion on certain problems of the electron theory of crystals

Periodical : Zhur. tekh. fiz., 25, No 13 (November), 1955, 2399-2402

Abstract : At the 7th conference on semiconductors in Kiev in October 1950 certain problems of the electron theory of crystals were discussed. On the proposal of the editors of this journal the author wrote an article (ibid, 21, 489, 1951) which started a discussion on a number of general and particular problems of the electron theory of crystals. In the present article, also written on the proposal of the editors, the author attempts to present certain results of this discussion. He notes that the entire discussion was concentrated practically on one problem, namely the theory of polarons. He discusses the works of F. F. Vol'kenshteyn (ibid., 21, 1544; 1951; 23, 703, 720, 1953), S. I. Pekar (ibid., 22, 1076, 1952; 22, 1062, 1952; UFN, 50, No 2, 249, 1953; ZhETF, 27, 651, 1954; Soveshchaniye po teorii poluprovodnikov v Leningrad 4-8 fevralya 1955 g. [Conference on theory of semiconductors in Leningrad of 4-8 Feb 1955]), S. V. Tyablikov (ZhETF, 21, 16, 1951; 22, 513, 1952; 23, 381, 1952), and Western authors. The author considers particularly interesting the unique work of S. I. Pekar (ibid., 22, 1062, 1952) on applicability of the zone theory of electrons in crystals.

Submitted : June 14, 1955

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, A. A.

USSR/Physics - Exciton FD-1818

Card 1/1 Pub 146-3/25

Author : Ansel'm, A. I., and Firsov, Yu. A.

Title : Length of free flight of a nonlocalized exciton in an atomic crystal

Periodical : Zhur. eksp. i teor. fiz. 28, 151-159, February 1955

Abstract : The authors calculate the length of the free flight of a nonlocalized exciton in an atomic crystal in the case where the length is due to the exciton's interaction with the thermal oscillations of the lattice. They first discuss the wave function of an exciton and its interaction with phonons, and find the probability of the transition of an exciton $W_{kk'}$ during excitation and radiation of a phonon. Fourteen references.

Institution: Leningrad Physicotechnical Institute, Academy of Sciences USSR

Submitted : March 1, 1954

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

FRENKEL', Ya.I.; SEMENOV, N.N., akademik, redaktor; SOKOVOV, A.A., doktor fiziko-matematicheskikh nauk, redaktor; BOGOLYUBOV, N.N., akademik, redaktor; TAMM, I.Ye., akademik, otvetstvennyy redaktor; ANSEL'M, A.I., doktor fiziko-matematicheskikh nauk, redaktor; BLOKHINTSEV, D.I., doktor fiziko-matematicheskikh nauk, redaktor; KONTOROVA, T.A., kandidat fiziko-matematicheskikh nauk, redaktor; GOLANT, V.Ye., redaktor izdatel'stva; SMIRNOVA, A.V., tekhnicheskiy redaktor

[Selected works] Sobranie izbrannykh trudov. Moskva, Izd-vo Akademii nauk SSSR. Vol.1. [Electrodynamics; general theory of electricity] Electrodinamika; obshchaia teoriia elektrichestva. 1956. 370 p. (MLRA 9:11)

1. Chlen korrespondent AN SSSR (for Frenkel')
(Electrodynamics)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

USSR / Electricity G

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9677

Author : Ansel'm, A.I., Firsov, Yu.A.
Inst : Physico-Technical Institute, Academy of Sciences USSR, Leningrad

Title : Mean Free Path of Non-localized Excitaton in Polar Crystal

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 4, 719-723

Abstract : The author calculates the length of the mean free path of the non-localized exciton in a polar crystal, due to interaction with thermal oscillations of the lattice. The non-localized exciton is considered as a hydrogen-like formation of an electron and a hole.
Scattering of such an exciton is due to interaction between the electron and the hole with the longitudinal optical vibrations. An estimate shows that under ordinary conditions the probability of excitation or dissociation of the exciton

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1695
AUTHOR ANSEL'M, A.I.
TITLE On the Problem of the Present Stage of the Semiconductor Theory.
PERIODICAL Usp.fis.nauk, 60, fasc.2, 179-189 (1956)
Issued: 12 / 1956

Why does the study of semiconductors play so important a part when studying solids ?1.It is only in semiconductors that a distinct difference is made between two kinds of charge carriers, namely electrons and holes. Only in semiconductors do we find an anisotropy of effective mass, localized energy levels, and a superposition of the degenerated energy zones. 2. The oscillations of the crystal lattice play a particularly active part in the case of semiconductors. 3. A modification of the temperature of the semiconductor entails a considerable modification of the concentration of current carriers and of the ratio (number of electrons / number of holes). 4. The possibility of varying concentration and the existence of two kinds of current carriers led to the creation of a new branch of physics and of the technology of semiconductors: rectification and amplification on the basis of electron-hole-transitions. 5. A number of physical phenomena was found only in semiconductors and dielectrics. Finally, the close connection between electron processes and crystal defects in semiconductors deserves mention.
Which of the assumptions and conclusions of the theory of semiconductors may be described as being sufficiently well founded ? At first the very important problem of the applicability of the one-electron approximation is investigated.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, A. I.

AUTHOR: ANSEL'M,A.I., KOROVIN,L.I.

TITLE: The State of an Electron in a Center of Admixtures in an Anisotropic Crystal. (Sostoyanie elektrona primesnogo tsentra v anisotropnom kristalle, Russian). PA - 2345

PERIODICAL: Izvestiia Akad.Nauk SSSR, Ser.Fiz. 1957, Vol 21, Nr 1, pp 69-69 (U.S.S.R.)

Received: 4 / 1957 Reviewed: 4 / 1957

ABSTRACT: In the following the literal translation of the short table of contents of this lecture is given. The detailed article was published in Zhurnal Tekhn.Fiz, 1955, Vol 25, 2044.

The steady states of an electron in an admixture center of an atomic semiconductor are investigated in consideration of the tensor character of the effective mass of the electron and the dielectricity of the crystal.

By means of the direct variation method the energy levels and the wave functions of the ground state and the excited states are computed. (No illustrations)

ASSOCIATION: Not given

PRESENTED BY:

SUBMITTED:

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

AUTHORS: Ansel'm, A. I., Korovin, L. I.,

57-27-7-22/40

TITLE: Calculation of the Oscillator Strengths for the Transitions of an Additional Electron in Uniaxial Crystals (Vychisleniye sil ostsillyatorov dlya perekhodov primesnogo elektrona v odnoosnom kristalle)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1957, Vol. 27, Nr 7, pp. 1564-1586 (USSR)

ABSTRACT: Reference is made to the authors' paper in Zhurnal Tekhnicheskoy Fiziki, 1955, Vol. 25, p. 2044. Only dipole-transitions and uniaxial crystals are investigated here. I. e. when the effective electron-masses are $m_2 = m_3$ and the dielectric constants of the crystal are $_2 = _3$. On this condition the non-excited part of the Hamiltonian function is axially symmetric and the wave functions of the zeroth approximation differ according to their distinctness. It is shown that the light with the vector E which is parallel with the axis of symmetry of the crystal causes transitions to the odd non-degenerate terms with $m_x = 0$ (m_x is the quantum number) and that the light with a correspondingly different polarization causes transitions to the double-degenerate odd levels with $m_x = \pm 1$. It is shown that the strengths of the oscillators and therefore also the probability of a transition chiefly depend on the anisotropy-parameter. When B 1 a transition to the next excited level is most probable, the probability of the

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Calculation of the Oscillator Strengths for the Transitions of an Additional Electron in Uniaxial Crystals. 57-27-7-22/40

transition increasing with increasing anisotropy. $B = {}_1m_1 / {}_2m_2$ is the anisotropy-parameter. When $B = 1$ the process is analogous, but in this case the next level will be the double-degenerate one. There are 1 table and 5 references, 4 of which are Soviet.

ASSOCIATION: Institute for Semiconductors AS USSR, Leningrad (Institut poluprovodnikov AN SSSR, Leningrad).

SUBMITTED: December 1., 1956

AVAILABLE: Library of Congress.

1. Crystals-Electron transitions-Mathematical analysis 2. Electron transitions-Oscillator strength-Mathematical analysis

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

AUTHORS Ansel'm A.I., Rabotnikov Yu.L.

TITLE On the Influence of Unharmonicity on Vibrations and Waves in a Crystal (A Linear Atomic Chain). 57-8-12/36
(K voprosu o vliyanii angarmonizma na kolebaniya i volny v kristalle (Lineynaya atomnaya tsepochka) - Russian)

PERIODICAL Zhurnal Tekhn. Fiz., 1957, Vol 27, Nr 8, pp 1723 - 1730 (U.S.S.R.)

ABSTRACT

With an example of a linear atomic chain the unharmonicity is taken into account by means of consecutive approaches in such a way for the solution of the equations of motion as is the case with nonlinear systems with a degree of freedom. This leads to the development of "overstone"-travelling- and standing waves. First travelling waves in an infinite atomic wave are investigated and the authors show that in this case the solution has the form of a wave with an amplitude fading exponentially in the depth of the crystal. Then the energy- and the impulse flow of travelling waves are investigated. The authors show that the impulse flow in the travelling wave is equal to zero; the mechanic stress developing on this occasion is calculated. A limited linear chain of (N+L)-atoms, where every atoms is in interaction only with its closest neighbour, is investigated and the equations for the mean relative extension of the atomic chain are deduced. By means of a scanning in series of the potential energy of the interaction of two atoms in the state of equilibrium the change of frequency in the case of atomic oscillations in a linear chain on the occasion of chang-

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

FRENKEL', Yakov Il'ich, [deceased 1945]; SEMENOV, N.N., akad., red.; SOBOLEV, S.L., doktor fiz.-mat. nauk, red.; BOGOLYUBOV, N.N., akad., red.; TAMM, I.Ye., akad., red.; ANSEL'M, A.I., doktor fiz.-mat. nauk, red.; BLOKHINTSEV, D.I., doktor fiz.-mat. nauk, red.; KONTOROVA, T.A., kand. fiz.-mat. nauk, red. izd-va.; SMIRNOVA, A.V., tekhn. red.

[Selected works] Sobranie izbrannykh trudov. Moskva, Izd-vo Akad. nauk SSSR. Vol. 2. [Scientific articles] Nauchnye stat'i. 1958. 600 p. (MIRA 11:11)

1. Chlen-korrespondent AN SSSR (for Frenkel').
(Physics)

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S/181/60/002/009/034/036
B004/B056

9.4300 (1035,1138,1143)

AUTHORS: Ansel'm, A. I., Askerov, B. M.

TITLE: Thermomagnetic Phenomena in Semimetals in a Strong Magnetic Field

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 9, pp. 2310-2321

TEXT: The authors proceed from the theory of the magnetic reluctance of metals such as was developed in consideration of the quantization of electrons in a magnetic field by S. Titeica (Ref. 4) and improved by Davydov and Pomeranchuk (Ref. 5), and M. I. Klinger and P. I. Voronyuk (Ref. 6). The authors' aim was to investigate the action of the quantization of conduction electrons in a magnetic field upon the thermomagnetic properties in the presence of a temperature gradient. First, the steady states of the electron in crossed magnetic and electric fields are investigated. The magnetic field is assumed to be directed along the z-axis, and the electric field along the x-axis. The wave equation (1.3) for the steady state of the electron is written down, and equation (1.7) is obtained for the current density in the direction of the y-axis. There

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follows the calculation of the thermomagnetic coefficient from the kinetic equation (Ref. 2) assuming a magnetic field in the direction of the z-axis, a temperature gradient in the direction of the x-axis, and an electric field with the components E_x and E_y. Assuming the electrons to be scattered by acoustic lattice vibrations, equation (3.11) is derived for the current in the direction of the temperature gradient running along the x-axis. This equation is applied to a metal whose temperature is higher than the Debye temperature. In part 4, the current which is perpendicular to the temperature gradient and not connected with electron scattering is dealt with. Finally, there follows an investigation of the thermomagnetic effect in the quantum limit. The authors state that their illustrative representation may probably be made more precise by applying the equation of motion of the density matrix. In the quantum-theoretical treatment of the galvanomagnetic and thermomagnetic effects, the difference between metal and semimetal vanishes in a certain sense. The equation (5.14) obtained by the authors for the Nernst coefficient is therefore applicable both for semimetals and metals. However, magnetic fields of the order of 10^9 oersted are necessary for the realization of quantum

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Thermomagnetic Phenomena in Semimetals in a Strong Magnetic Field

S/181/60/002/009/034/036
B004/B056

limit in metals. The authors mention papers by L. Landau (Ref. 1) and G. Ye. Zil'berman. They thank G. Ye. Pikus, R. Ya. Moyzhes, and Yu. N. Obraztsov for discussions. There are 12 references: 3 Soviet, 3 US, 2 Dutch, 1 French, 1 German, and 1 Japanese.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors of the AS USSR, Leningrad). Institut fiziki AN AzSSR, Baku (Institute of Physics of the AS Azerbaydzhanskaya SSR, Baku)

SUBMITTED: March 5, 1960

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

S/181/60/002/011/023/042
B006/B056

AUTHORS: Ansel'm, A. I. and Askerov, B. M.

TITLE: The Chemical Potential and the Criterion for the Degeneracy of Conduction Electrons in a Strong Magnetic Field

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 11, pp. 2821-2826

TEXT: The authors calculated the chemical potential of conduction electrons in a magnetic field in quantum limit, taking account of the electron spin. On this occasion, the case was considered in which the electrons are in a degenerate, a non-degenerate, and in an intermediate state. This makes it possible to find the range of application of electron quantization in the so-called quantum limit (all magnetic oscillators are in the non-excited ground state, $n = 0$; low temperatures and high magnetic field strength for $kT \ll \mu H$; μ = Bohr magneton) and furnishes the criterion for electron degeneracy in quantum limit. In all cases under consideration, implicit equations are given for determining the chemical potential ζ. In the general case, an impurity of monovalent donor ions is taken as an example, whose electrons are in the s-state. In the magnetic field, the ground level

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($-\varepsilon_d$) of the electrons in the local center is split into two sublevels ($-\varepsilon_d \pm \mu_0 H$). For the electron concentration, the relation $N = N_d / \left[1 + 2\exp\left(\frac{\zeta + \varepsilon_d}{kT}\right) ch(\mu_0 H/kT)\right]$ is obtained, where N_d is the concentration of impurity atoms, from which ζ may be calculated. This equation was numerically solved together with another one for N, and the results are shown in Figs. 2 and 3 (for T = 30°, 40°, and 50°K). From Fig. 2, which shows $\zeta^* = \zeta/kT$ as a function of H, it may be seen that ζ^* grows linearly with an increase of H, and that all the more quickly, the lower the temperature. Fig. 3 shows N(H); the electron concentration decreases with an increase of H, the curves for the various temperatures taking almost a parallel course; they are the lower, the lower the temperature. Yu. N. Obraztsov, M. I. Klinger, and G. Ye. Pikus are thanked for discussions. There are 3 figures and 11 references: 6 Soviet, 1 US, 3 German, and 1 Swiss.

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The Chemical Potential and the Criterion for the Degeneracy of Conduction Electrons in a Strong Magnetic Field

S/181/60/002/011/023/042
B006/B056

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors of the AS USSR, Leningrad). Institut fiziki AN Azerb.SSR Baku (Institute of Physics of the Azerbaydzhanskaya SSR, Baku)

SUBMITTED: July 7, 1960

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

S/181/61/003/001/042/042
B102/B204

AUTHORS: Ansel'm, A. I. and Lang, I. G.

TITLE: Estimation of the part played by many-phonon processes in the scattering of conduction electrons in atomic crystals

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 308-311

TEXT: Following a previous paper (Fiz.tverd.tela, Vol. 1, p. 683), the authors studied the contribution made by two-phonon processes to the scattering of conduction electrons in atomic crystals by means of the density matrix, as well as the part played by inter-band transitions of electrons in the intermediary state. The electron operators are all represented by Bloch functions ($u_{n\vec{k}}e^{i\vec{k}\vec{r}}/\sqrt{V}$), and the temperature is assumed to be considerably higher than the Debye temperature. The correction $f_p^{(2)}$ to the diagonal element of the field-dependent addition to the density matrix is determined from an equation containing the known diagonal element $f_p^{(0)}$ in lowest order with respect to the perturbation

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V_1. First, the probability ($P_{pp'}$) is determined in the usual perturbation-theoretical way for the transition $p \to p'$, at which two phonons are absorbed (their wave vectors are $\vec{q}$ and $\vec{q}'$). The amount obtained for $f_p^{(2)}$ equals $\sum \{ f_p^{(o)} P_{pp'} - f_{p'}^{(o)} P_{p'p} \}$ (2). By means of the density matrix, it is possible to formulate the expression obtained for $P_{pp'}$ in such a manner that the expression for $f_p^{(2)}$ does not diverge.

The expression

$$U_{2pp'} + \sum_{p''\neq p,p'} \frac{U_{1pp''} U_{1p''p'}}{\varepsilon_p - \varepsilon_{p''} - i\delta}, \tag{5}$$

which is proportional to

$$K_{pp'} = \sum_{\alpha,\beta} e_\alpha^*(\mathbf{q},\sigma) e_\beta^*(\mathbf{q}',\sigma') \Big\{ \Big(n\mathbf{k} \Big| \frac{\partial^2 V}{\partial x_\alpha \partial x_\beta} \Big| n\mathbf{k} + \mathbf{q} + \mathbf{q}' \Big) + \sum_{n'} \frac{\Big(n\mathbf{k} \Big| \frac{\partial V}{\partial x_\alpha} \Big| n'\mathbf{k} + \mathbf{q} \Big) \Big(n'\mathbf{k} + \mathbf{q} \Big| \frac{\partial V}{\partial x_\beta} \Big| n\mathbf{k} + \mathbf{q} + \mathbf{q}' \Big)}{\varepsilon_{nk} - \varepsilon_{n'k+q} - i\delta} + \sum_{n'} \frac{\Big(n\mathbf{k} \Big| \frac{\partial V}{\partial x_\beta} \Big| n'\mathbf{k} + \mathbf{q}' \Big) \Big(n'\mathbf{k} + \mathbf{q}' \Big| \frac{\partial V}{\partial x_\alpha} \Big| n\mathbf{k} + \mathbf{q} + \mathbf{q}' \Big)}{\varepsilon_{nk} - \varepsilon_{n'k+q'} - i\delta}, \tag{6}$$

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is discussed. Here,

$(n\vec{k}|\frac{\partial V}{\partial x_\alpha}|n'\vec{k}') = \frac{1}{\Omega}\int u^*_{n\vec{k}}\frac{\partial V}{\partial x_\alpha}u_{n'\vec{k}'}d\tau_0$ is the matrix element in which integration is carried out over the volume Ω of the unit cell. By means of

$$\left(nk\left|\frac{\partial V}{\partial x_\alpha}\right|n'k'\right) = (\varepsilon_{n'k'} - \varepsilon_{nk})\left(nk\left|\frac{\partial}{\partial x_\alpha}\right|n'k'\right) + \overline{\left(nk\left|\frac{\partial V}{\partial x_\alpha}\right|n'k'\right)}, \quad (7)$$

TAC

$$\overline{\left(nk\left|\frac{\partial V}{\partial x_\alpha}\right|n'k'\right)} = \frac{\hbar(k-k')}{m}\left(nk\left|p\frac{\partial}{\partial x_\alpha}\right|n'k'\right) + \frac{\hbar^2(k^2-k'^2)}{2m}\left(nk\left|\frac{\partial}{\partial x_\alpha}\right|n'k'\right)$$

and the condition $\varepsilon_{n\vec{k}} = \varepsilon_{n\vec{k}+\vec{q}+\vec{q}'}$, one obtains

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$$\overline{K_{pp'}} = \sum_{\alpha\beta} e_\alpha^*(\mathbf{q},0)\, e_\beta^*(\mathbf{q},0')\left\{\frac{\hbar q q'}{m}\overline{\left(nk\left|\frac{\partial^2}{\partial x_\alpha \partial x_\beta}\right|nk+q+q'\right)} + \right.$$

$$+ \sum_{n'} \frac{\overline{\left(nk\left|\frac{\partial V}{\partial x_\alpha}\right|n'k+q\right)\left(n'k+q\left|\frac{\partial V}{\partial x_\beta}\right|nk+q+q'\right)}}{\varepsilon_{nk} - \varepsilon_{n'k+q} - i\delta} +$$

$$+ \sum_{n'} \frac{\overline{\left(nk\left|\frac{\partial V}{\partial x_\beta}\right|n'k+q'\right)\left(n'k+q'\left|\frac{\partial V}{\partial x_\beta}\right|nk+q+q'\right)}}{\varepsilon_{nk} - \varepsilon_{n'k+q'} - i\delta}. \qquad (8)$$

If, in (8), one separates the terms from the sum over n', for which n'=n, and if one denotes them by $K'_{pp'}$, then $K_{pp'} = K'_{pp'} + K''_{pp'}$. By expanding (2) in a series of ka, where a is the lattice constant, the contribution of lowest order with respect to ka supplies a term containing $|K'_{pp'}|^2$. The corresponding correction to the mean value of the electron velocity

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in the direction of the electric field is of the order of

$\frac{\bar{v}^{(2)'}}{\bar{v}^{(0)}} \simeq \frac{\hbar}{\varepsilon_k \tau_1}$ (10), where $\varepsilon_k = \hbar^2 k^2/2m^*$, $\bar{v}^{(0)}$ is the mean velocity, and τ_1 is the relaxation time, which are related only to single-phonon scattering. The remaining terms supply the contribution

$\frac{\bar{v}^{(2)4}}{\bar{v}^{(0)}} \simeq \frac{\hbar}{\varepsilon_k \tau_1} \cdot \frac{\hbar^4}{a^4 m^{*2} C^2} ka = \frac{8 k_0 T}{9\pi a^3 \varrho v_0^2}$, where $C = \frac{\hbar^2}{2m} (n0|\mathrm{grad}^2|n0)$ is the single-phonon scattering constant, and v_0 is the velocity of sound. In the following, a paper by Kohn et al. is briefly dealt with (Phys. Rev. Vol. 108, p. 590), in which only the potential U_2 was considered. It may be shown that the relation for $\bar{v}^{(2)}/\bar{v}^{(0)}$ obtained there is wrong, because the contribution made by U_2 is entirely compensated by that of U_1. This means that one must not study the scattering of the potential U_2 alone.

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If $\hbar^4 ka/m^{*2}a^4c^2 \ll 1$, the contribution of two-phonon processes is of the order of (10). If (10) is not small, all many-phonon processes must be taken into account. The authors thank G. Ye. Pikus for discussions. G. L. Bir is mentioned. There are 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors, AS USSR, Leningrad)

SUBMITTED: August 29, 1960

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32082

S/181/61/003/012/017/028
B104/B102

24.2200 (1158, 1160, 1164)

AUTHORS: Anselm, A. I., and Askerov, B. M.

TITLE: Thermomagnetic effects in semiconductors in a strong magnetic field in electron scattering from a short-range potential

PERIODICAL: Fizika tverdogo tela, v. 3, no. 12, 1961, 3668 - 3677

TEXT: The authors determine the thermomagnetic coefficients by calculating the heat flux due to electron migration in an electric field with the aid of the Onsager relations. A general expression is given for the energy flux which holds when the electrons are scattered elastically. Furthermore, the thermomagnetic coefficients for short-range scattering potentials are calculated, which are used for determining the galvanomagnetic effects It is assumed that the electrons are not degenerate and that their concentration is independent of temperature and magnetic field. The problem is studied in a scalar effective-mass approximation. For short-range scattering potentials in the X-ray quantum limit the thermo-emf and the Nernst constant are obtained as functions of the magnetic field and of

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Thermomagnetic effects in ...

temperature. It was found that the method of calculating the flux in a strong magnetic field with the existence of a temperature gradient in the X-ray quantum limit, which has been suggested by both authors in a previous paper (FTT, 2, 2821, 1960) gives results that are contradictory to the Onsager principle. This is explained by the fact that the non-commutativity of the velocity operator $\hat{v}$ and the energy operator $\mathcal{H}$ has to be considered when calculating the heat flux in an external electric field. In the heat flux a peculiar hybridization of the electron states with the mixed magnetic quantum numbers takes place which, in the quasiclassical case, do not exist and do not influence the X-ray quantum limit. The method suggested by the authors is a generalization of the method of S. Titeica (Ann. d. Phys., 22, 128, 1935). Since the above circumstances are not considered correct results can be obtained only for the quasiclassical case. L. E. Gurevich and M. I. Kliner are mentioned. There are 12 references: 8 Soviet and 4 non-Soviet. The three references to English-language publications read as follows: Arnold H. Kanh. Phys. Rev., 119, 1180, 1960; W. Kohn, J. M. Luttinger. Phys. Rev., 108, 590, 1957; E. N. Adams, T. D. Holstein. Phys. Chem. Sol., 10, [illegible]

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S/181/62/004/006/029/051
B104/B112

AUTHORS: Ansel'm, A. I., and Askerov, B. M.

TITLE: Longitudinal thermomagnetic effect in semiconductors situated in a strong longitudinal magnetic field

PERIODICAL: Fizika tverdogo tela, v. 4, no. 6, 1962, 1573 - 1577

TEXT: An investigation is made of the longitudinal thermomagnetic effect in semiconductors situated in a quantizing magnetic field and possessing only a single band. The change of the thermo-emf in the x-ray quantum limit is obtained:

$$\alpha(H)=\frac{E_z}{\nabla_z T}=-\frac{k}{e}\left\{\frac{\int_0^{\hbar\omega_0}\frac{\varepsilon_z^{3/2}}{kT}\tau_H(\varepsilon_z)\frac{\partial f_0(\varepsilon_z)}{\partial\varepsilon_z}d\varepsilon_z}{\int_0^{\hbar\omega_0}\varepsilon_z^{1/2}\tau_H(\varepsilon_z)\frac{\partial f_0(\varepsilon_z)}{\partial\varepsilon_z}d\varepsilon_z}-\zeta_z^0\right\}, \quad (1.9),$$

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where $\zeta^*_z = \zeta_z / kT$ is the reduced chemical potential, and ε_z is the Fermi surface energy at absolute zero in the absence of a magnetic field. It is shown that the change $\Delta\alpha = \alpha(H) - \alpha(0)$ in the x-ray quantum limit is determined by the changes of the relaxation time τ and of ζ. The relaxation time in the cases of scattering by acoustic phonons and ionized impurities is discussed. The following formulas are obtained for the electronic part of thermal conductivity:

$$\varkappa(H) = -\frac{W_e}{V_e T} = \sigma(H)\frac{k}{e}\left(\frac{kT}{e}\right)\frac{I_{1/2}I_{5/2} - I_{3/2}^2}{I_{1/2}^2}, \qquad (2.3),$$

$$\sigma(H) = \frac{e^2}{\sqrt{2}\,\pi^2}\frac{\hbar\omega_0}{m}\left(\frac{m}{\hbar^2}\right)^{3/2}(kT)^{3/2} I_{1/2}. \qquad (2.4),$$

$$I_n = \int_0^\infty x^n \varepsilon_z(x)\frac{\partial f_0(x)}{\partial x}dx \qquad (1.11),$$

$$f_0(x) = [1 + \exp(x - \zeta^*_z)]^{-1}, \qquad (1.12),$$

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Longitudinal thermomagnetic...

where σ (H) is the electrical conductivity in the x-ray quantum limit.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad). Institut fiziki AN Az. SSR Baku (Institute of Physics AS AzSSR, Baku)

SUBMITTED: February 2, 1962

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, Andrey Ivanovich; PIKUS, G.Ye., red.; LUK'YANOV, A.A., tekhn. red.

[Introduction to the theory of semiconductors]Vvedenie v teoriiu poluprovodnikov. Moskva, Fizmatgiz, 1962. 418 p. (MIRA 16:2)
(Semiconductors)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, A.I.; ASKEROV, B.M.

Longitudinal thermomagnetic effects in semiconductors in a high longitudinal magnetic field. Fiz. tver. tela 4 no.6:1573-1575 Je '62. (MIRA 16:5)

1. Institut poluprovodnikov AN SSSR, Leningrad i Institut fiziki AN AzSSR, Baku.
(Thermomagnetism) (Semiconductors) (Quantum theory)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEL'M, A.I.; OBRAZTSOV, Yu.N.; TARKHANYAN, R.C.

Quantum theory of thermomagnetic currents in semiconductors and metals. Fiz. tver. tela 7 no.9:2837-2842 S '65. (MIRA 18:10)

1. Institut poluprovodnikov AN SSSR, Leningrad.

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L 14844-65 EWT(1)/EWG(k)/EWT(m)/EWP(t)/EPR/EEC(b)-2/EWP(b) Ps-4/Pz-6
[illegible]

AUTHORS: Ansel'm, A. I.; Tarkhanyan, R. [illegible]

TITLE: The moelectric force in semiconductors of the n-InSb type in a quantizing magnetic field

SOURCE: Fizika tverdogo tela, v. 6, no. 11, 1964, 3357-3360

TOPIC TAGS: indium antimonide, thermal emf, conduction band, electron spin, thermomagnetic electronic effect

ABSTRACT: The authors calculate the effect of the non-parabolicity of the conduction band and of the electron spin on the thermal emf, starting from the conclusion of Y. N. [illegible] (FTT v. 6, 414, 1964) that the differential thermal emf is equal to the entropy per [illegible]

[illegible]

[illegible] with spin can be appre[illegible]

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L 14444-65
ACCESSION NR: AP4048413

[illegible] why the spin dependence is not disclosed by experiments re- [illegible] The results are [illegible] by others under different assumptions. [illegible] and G. Ye. Pikus for valuable discussions [illegible] art. has 2[illegible] formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AN SSSR)

SUBMITTED: 01Jun64 ENCL: 00

SUB CODE: SS, EM NR REF SOV: 006 OTHER: 002

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

[illegible]

ACCESSION NR: [illegible]

AUTHOR: [illegible]

TITLE: [illegible]

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3620-3625

TOPIC TAGS: quantum theory, thermomagnetic phenomenon, semiconductor band structure, indium antimonide, conduction electron, diamagnetism

ABSTRACT: It is shown that the expression $\alpha = -s/e$ (α -- differential thermal emf, s -- entropy per electron, e -- electron charge), derived for a standard (parabolic) band by a quantum method developed by one of the authors (Anselm with B. M. Askerov, FTT v. 2, 2316 1960), can be obtained from kinetic considerations also for the case of a non-parabolic band of the n-InSb type. This is done by adding

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to the expression derived by the earlier method an increment due to the diamagnetism of the conduction electrons. This result is important not only from the point of view of confirming the expression for a non-parabolic band but also as a check on the method proposed in the earlier paper for introducing the temperature gradient. Although this pertains strictly speaking only to the calculation of the non-dissipative current it is planned in the future to justify the derived method also in the presence of [illegible] art. has: 34 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AN SSSR)

SUBMITTED: 08Jul64 ENCL: 00

SUB CODE: SS NR REF SOV: 007 OTHER: 001

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSELM, A.I.; TARKHANYAN, R.G.

Thermo-e.m.f. in n-InSb-type semiconductors in a quantizing magnetic field. Fiz. tver. tela 6 no.11:3357-3360 N '64. (MIRA 18:1)

1. Institut poluprovodnikov AN SSSR, Leningrad.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 8845-66 EWT(1) IJP(c) GG

ACC NR: AP5022703 SOURCE CODE: UR/0181/65/007/009/2837/2842

AUTHOR: Ansel'm, A. I.; Obraztsov, Yu. N.; Tarkhanyan, R. G.

ORG: Institute of Semiconductors AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: Quantum theory for thermomagnetic currents in semiconductors and metals

SOURCE: Fizika tverdogo tela, v. 7, no. 9, 1965, 2837-2842

TOPIC TAGS: theoretic physics, quantum physics, thermomagnetic effect

ABSTRACT: The authors consider the problem of determining kinetic coefficients in equations for thermomagnetic phenomena in the quantum case when there is a temperature gradient. It is shown that solutions of the motion equations for the density matrix assuming local thermodynamic equilibrium lead to expressions for the current density which were proposed by Ansel'm and Askerov in 1960 (A. I. Ansel'm, B. M. Askerov, *FTT*, 2, 2310, 1960). The results coincide with data in recent papers on the quantum theory of thermomagnetic phenomena in semiconductors and metals. Orig. art. has: 28 formulas.

SUB CODE: 20/ SUBM DATE: 03May65/ ORIG REF: 005/ OTH REF: 003

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

L 27409-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6012455 SOURCE CODE: UR/0181/66/008/004/1013/1020

AUTHORS: Ansel'm, L. N.; Bir, G. L.; Myl'nikova, I. Ye.; Petrov, M. P.

ORG: Institute of Semiconductors AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

67
65
B

TITLE: Electron paramagnetic resonance of Cr^{3+} ions in lithium-aluminum spinel

27

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1013-1020

TOPIC TAGS: electron paramagnetic resonance, chromium, lithium compound, aluminum compound, epr spectrometry, fine structure

ABSTRACT: The purpose of the investigation was to determine the structure of the crystalline electric fields in the octahedral lattice sites of inverted and intermediate ordered spinel. The single crystals of $LiAl_5O_8$ were grown by spontaneous crystallization from the solution. The solvent was a mixture of PbF_2 and PbO. The EPR spectra were measured at room temperature in the 3-cm band using a standard radiospectroscope (RE-1301). In the main measurements the constant magnetic field was in the (110) plane. When the magnetic field was rotated in this plane, seven lines were observed, and the angular dependence of their positions

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ACC NR: AP6012455

as well as the number point to the existence of a strong crystalline field with rhombic symmetry. The spin Hamiltonian corresponding to the spectrum and the corresponding values of the g factor and the crystal-field constants are determined. The Cr^{3+} ion has twelve magnetically non-equivalent positions, so that in an external magnetic field of arbitrary direction it is possible to observe 12 EPR lines. To determine the correct number of lines it is necessary to take into account the rhombic distortion of the potential, and this is found to be due to the presence of differently-charged ions, Al^{3+} and Li^{+}, in the octahedra. The rhombic distortion decreases linearly with increasing temperature (from 250 Oe at 100K to 120 Oe at 800K). The rhombic distortion also causes the axis of the crystal electric field in the octahedra to deviate somewhat from the crystallographic axes $[111]/\sqrt{3}$, $[112]/\sqrt{6}$, and $[110]/\sqrt{2}$. The larger the difference in the charge between the ions and the octahedra, the greater the deviations of the field axes. The authors thank G. A. Smolenskiy for interest in the work and a discussion of the results and M. F. Bryzhina for x ray investigations of the samples. Orig. art. has: 18 formulas and 2 figures.

SUB CODE: 20/ SUBM DATE: 23Jul65/ ORIG REF: 003/ OTH REF: 007

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

KSENDZOV, Ya.M.; ANSEL'M, L.N.; VASIL'YEVA, L.L.; LATYSHEVA, V.M.

Current carrier mobility in NiO containing Li. Fiz. tver. tela 5 no.6:1537-1547 Je '63. (MIRA 16:7)

1. Institut poluprovodnikov AN SSSR, Leningrad.

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L 13358-63 EWT(1)/EWG(k)/BDS/EEC(b)-2 AFFTC/ASD Pz-4 AT/IJP(C)
ACCESSION NR: AP3001269 S/0181/63/005/006/1537/1547 65 62

AUTHOR: Ksendzov, YA. M.; Ansel'm, L. N.; Vasil'yeva, L. L.; Latyshova, V. M.

TITLE: Mobility of current carriers in NiO containing impurities of Li

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1537-1547

TOPIC TAGS: current carrier, Ni, Li, O, polaron, thermoelectromotive force, Hall effect, electrical conductivity, acceptor, donor

ABSTRACT: The authors have examined the electrical conductivity, thermoelectromotive force, and Hall effect in solid solutions of Li sub x Ni sub 1-x O for values of x between 0.01 and 0.2 in the temperature interval from liquid nitrogen to 300C. The experimental data are satisfactorily explained by the ordinary energy scheme with a narrow polaron band formed by holes at levels of Ni sup II and by acceptor levels lying above the Ni sup II level at 0.2 ev and more, depending on the Li concentration. In the computations the authors kept in mind the partial compensation of acceptors by donors formed by vacant sites in the oxygen part of the lattice: they also considered the electronic conductivity along acceptor levels. Data on the Hall effect and computation of drift velocity

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have shown that the mobility of holes in the polaron band diminishes but the mobility of electrons in acceptor levels increases exponentially with rising temperature. The activation energy of hole mobility is near the energy corresponding to the Debye temperature, but the energy of electron mobility is double the energy of the exchange interaction for antiferromagnetic ordering. "The authors express their thanks to N. N. Parfenova for chemical analysis and to A. G. Tutov for x-ray analysis of the samples." Orig. art. has: 9 figures and 7 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, Academy of Sciences, SSSR)

SUBMITTED: 28Dec62 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 007 OTHER: 013

Card 2/2

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GASTOL, B.; ANSELM, O.; DLUZNIEWSKA, K.; WANIEWSKA, D.; Gorczynska, K.

Nutrition of rural population in the Miechow and Myslenice regions. Przegl. lek., Krakow 10 no.6:173-178 1954.

1. Z Zakladu Higieny Akademii Medycznej w Krakowie. Kierownik: Doc. dr B.Gastol.

(NUTRITION,
in Poland, rural population)
(RURAL CONDITIONS,
nutrition of rural population in Poland)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

GASTOL, Blazej; ANSELM, O.

Nutritional state of the rural populations of the Miechow and Myslenice counties. Przegl. lek., Krakow 10 no.9:255-258 1954.

1. Z Zakladu Higieny Akademii Medycznej w Krakowie. Kierownik: Doc. dr B Gastol.
(NUTRITION,
in Poland, of rural population)
(RURAL CONDITIONS,
nutrition of rural population in Poland)

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ANSELM, Yu.I. KHODOROV, Ye.I., kandidat tekhnicheskikh nauk, redaktor; KOSAREVA, V.M., nauchnyy redaktor; TYUTYUNIK, M.S., redaktor; LYUDKOVSKAYA, N.I., tekhnicheskiy redaktor

[Shaft kilns] Shakhtnaia pech'. [Perevod.] Pod red. E.I.Khodorova. Moskva, Gos. izd-vo lit-ry po stroit. materialam. Pts.1 and 2. 1956. 137 p. (MLRA 10:3)
(Cement kilns)

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Samorazgruzhayushchiyesya suda. (Self-unloading ships, by) A. F. Arsendv (and) A. P. Irkin. Moskva, Rechizdat, 1940.
30 p. diagrs., tables.

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ANSEROV, M. A. & GUSHCHIN, V. F.

Prisposobleniya dlya sverlil'nykh stankov: konstruktsii i naladki.
Pod obshchey redaktsiey ... M. A. Anserova.
Moscow, Gosudarstvennoe Nauchno-Tekhnicheskoe Izdatel'stvo Mashinostroitel'noy Literatury, 1950. pp. 299, illus, diags., tabs., bibliog.;
23 x 15; green cloth boards.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSKROV, M.A., kandidat tekhnicheskikh nauk, dotsent.

Tasks in the field of devices and automation arrangements for machine tools. [Izd] LENITOMASH 24:5-10 '51. (MLRA 8:2)

1. Leningradskiy politekhnicheskiy institut imeni M.I.Kalinina.

(Machine tools)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEROV, M.A., kandidat tekhnicheskikh nauk.

Fast-acting manual clamps. [Izd] LONITOMASH 24:233-278 '51.
(Machine tools) (MIRA 8:2)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

[illegible]

ANSEROVA, M.A.

BLYUMBERG, V.A.

Rezsy (Materialy i konstruktsii) [Cutters; materials and designs] Pod red. M.A. Anserova. Leningrad, 1952. 34 p.

SO: Monthly List of Russian Accessions, Vol. 6, No. 2, May 1953

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent.

New mandrel and chuck design. [Izd] LONITOMASH 25:59-86 '52. (MLRA 8:2)

(Machine tools—Accessories and attachments)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent; NIKITIN, P.S., redaktor, inzhener.

[Ways of increasing labor productivity in lathe work] Puti povysheniia proizvoditel'nosti truda na tokarnykh stankakh. Moskva, Gos. nauchno-tekh. izd-vo mashinostroitel'noi i sudostroitel'noi lit-ry. 1953. 28 p. (Bibliotechka tokaria-novatora, no.1) (MLRA 7:2)
(Turning)

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OZERKOVICH, M.I.; ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent.

[Individual lathe worker's business accounting] Individual'nyi khozraschet tokaria. Pod red. M.A.Anserova. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1953. 30 p. (Biblioteka tokaria-novatora, no.11) (MLRA 7:4)
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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

SERGEYEV, M.A.; NIKITIN, P.S.; ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent, redaktor.

[Working place layout and accident prevention] Organizatsiia rabochego mesta i tekhnika bezopasnosti. Pod obshchei redaktsiei M.A.Anserova. Moskva, 1953. 37 p. (Bibliotechka tokaria-novatora, no.10) (MLRA 7:3)
(Machine-shop practice--Safety measures) (Factories--Design and construction)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

KUCHER, I.M., kandidat tekhnicheskikh nauk; KUCHER, A.M., kandidat tekhnicheskikh nauk; ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent, redaktor.

[High-speed lathes] Tokarnye stanki dlia skorostnoi obrabotki. Moskva, Gos. nauchno-tekhnicheskoe izdatel'stvo mashinostroitel'noi i sudostroitel'noi lit-ry, 1953. 51 p. (Bibliotechka tokaria-novatora, no.3) (MLRA 7:3)

(Lathes)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

BLYUMBERG, V.A., kandidat tekhnicheskikh nauk; KOSMACHEV, I.G., inzhener; ANSEROV, M.A., redaktor, kandidat tekhnicheskikh nauk, dotsent.

[Cutters for high-speed lathe work] Rezetsy dlia skorostnogo tocheniia. Pod red. M.A.Anserova. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1953. 61 p. (Biblioteka tokaria-novatora, no.5) (MLRA 7:4)

(Cutting tools)

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KUCHER, I.M., kandidat tekhnicheskikh nauk; KUCHER, A.M., kandidat tekhnicheskikh nauk; ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent, redaktor.

[Modernization and automatization of lathes] Modernizatsiia i avtomatizatsiia tokarnykh stankov. Pod obshchei radaktsiei M.A.Anserova. Gos.nauchno-tekhnicheskoe izd-vo mashinostroitel'noi i sudostroitel'noi lit-ry, Moskva, 1953. 73 p. (Bibliotechka tokaria-novatora, no.4) (MLRA 7:3)
(Lathes)

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ANSEROV M.A.

SEROKYEV, M.A., inzhener; BLYUMBERG, V.A., kandidat tekhnicheskikh nauk; BORTKEVICH, G.S., tokar'-novator, laureat Stalinskoy premii; TRUTNEV, V.N., tokar'-novator laureat Stalinskoy premii; ANSEROV, M.A., kandidat tekhnicheskikh nauk, dotsent; OGLOBLIN, A.N., redaktor, dotsent

[Experience of innovator lathe operators in machining standard parts] Opyt tokarei-novatorov po obrabotke tipovykh detalei. Pod obshchei redaktsiei M.A.Anserova. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1953. 124 p. (Bibliotechka tokarya-novatora, no.8) (MLRA 7:7)
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ANSELOV, M. A.

Prisposobleniia dlia tokarnykh i kruglosh li foval'nykh stankov [Attachments for lathes and circular grinding machines]. Leningrad, Lenizdat, 1953. 24[illegible] p.

SO: Monthly List of Russian Accessions, Vol. 7 No. 2 May 1954.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEROV, M.A.; BUTKOVSKIY, B.D.; VAKSER, D.B., dotsent, redaktor.

[Milling machine attachments; parts, drives, designs] Prispo-
sobleniia dlia frezernykh stankov (elementy, privody, konstruktsii).
Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit.
lit-ry, 1953. 296 p. (MLRA 7:7)
(Milling machines)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000101710013-7

ANSEROV, Mikhail Aleksandrovich; GERST, Vadim Mikhaylovich; KUCHER, A.M., kandidat tekhnicheskikh nauk, redaktor; SIMONOVSKIY, N.Z., redaktor izdatel'stva; SOKOLOVA, L.V., tekhnicheskiy redaktor

[Attachments for metal-cutting apparatus; a survey of foreign techniques] Prisposobleniia dlia metallorezhushchikh stankov; obzor zarubeshnoi tekhniki. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1956. 185 p. (MLRA 10:1)
(Machine tools)

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