GROSNKIY, V.K., FEDOROV, F.I.

Magnetic properties of a particle with spin 3/2. Dokl.AN BSSR 4 no.7:278-283 Jl '60. (MIRA 13:8)

1. Institut fiziki AN BSSR.
(Particles (Nuclear physics)--Magnetic properties)

BOKUT', B.V.; FEDOROV, F.I.

Reflection and refraction of light in optically isotropic active media. Opt. i spektr. 9 no.5:635-639 N '60. (MIRA 13:11)
(Polarization (Light)) (Reflection (Optics))
(Refraction)

MOROZ, L.G.; FEDOROV, F.I.

Taking Pauli interabtion into account in a scattering matrix.
Zhur. eksp. i teor. fiz. 39 no.2:293-303 Ag '60. (MIRA 13:9)

1. Institut fiziki Akademii nauk Belorusskoy SSR.
(Particles (Nuclear physics)) (Field theory)

FEDOROV, F.I.

Parametric description of a Lorents group. Dokl. AN BSSR 5 no.3:101-104 Mr '61. (MIRA 14:3)

1. Institut fiziki AN BSSR.
(Transformations(Mathematics))

FEDOROV, F.I.

One generalization of Lappo-Danilevskii's criterion. Dokl.AN BSSR 4 no. 11:454-455 N '60. (MIRA 13:12)

1. Institut fiziki AN BSSR.
(Differential equations, Linear)

24.4600

S/058/62/000/003/018/092
A061/A101

AUTHOR: Fedorov, F. I.

TITLE: Some properties of the Lorentz matrix

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1962, 34, abstract 3A323 (Dokl. AN BSSR, 1961, v. 5, no. 5, 194 - 198)

TEXT: It is shown that any matrix of proper Lorentz transformation can be parametrized using the complex tridimensional vector q = a + ib (the parametrization method is decribed in another paper by the author [RZhFiz, 1961, 10A108]). The change of velocity of a particle in a constant and homogeneous electromagnetic field is examined as an example.

V. Popov

[Abstracter's note: Complete translation]

Card 1/1

24.4600

S/058/62/000/003/019/092
A061/A101

AUTHORS: Bogush, A. A., Fedorov, F. I.

TITLE: An invariant expression for a Lorentz matrix transforming one vector into another

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1962, 34, abstract 3A324 (Dokl. AN BSSR, 1961, v. 5, no. 6, 241 - 244)

TEXT: A formula is obtained for the parameters of the Lorentz transformation of 4-vector ρ into ρ' (using the parametrization of the Lorentz transformation, considered by Fedorov [RZhFiz, 1961, 10A108]).

[Abstracter's note: Complete translation]

JC

Card 1/1

S/058/62/000/003/020/092
A061/A101

16.5000
24.4600

AUTHORS: Bogush, A. A., Fedorov, F. I.

TITLE: General transformation of the Lorentz group representation in the bi-spinor space

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1962, 34, abstract 3A325 (Dokl. AN BSSR, 1961, v. 5, no. 8, 327 - 330)

TEXT: Formulas are obtained for the transformation of bi-spinors in an arbitrary Lorentz transformation, if the latter is given by the complex vector q (see RZhFiz, 10A108).

[Abstracter's note: Complete translation]

VC

Card 1/1

YEL'YASHEVICH, M.A.; TOMIL'CHIK, L.M.; FEDOROV, F.I.

"Critique of the foundations of the relativity theory" by A.K. Maneev. Reviewed by M.A. El'iashevich, L.M. Tomil'chik, F.I. Fedorov. Usp. fiz. nauk 74 no.4:757-759 Ag '61. (MIRA 14:8)

(Relativity (Physics))
(Maneev, A.K.)

rb. 1500

S/250/62/006/002/001/007
I028/I228

AUTHOR: Bogush, A. A. and Fedorov, F. I.

TITLE: On the properties of the matrices of Daffin-Kemmer

PERIODICAL: Akademiya nauk Belaruskaya SSR. Doklady, v. 6, no. 2, 1962, 81-85

/B

TEXT: The most important properties of the Daffin-Kemmer matrices are obtained on the basis of general considerations. The following representation of the matrix β_μ with the aid of the projective operations $P^{(k)}$ and $\bar{P}^{(k)}$ (separating respectively the scalar and vector (tensor) part of the k-dimensional space: $k = 5, 10$) is used as starting point:

$$\beta_\mu = P\beta_\mu \bar{P} + \bar{P}\beta_\mu P \tag{3}$$

The rules of commutation are obtained from here:

$$\beta_\mu P + P\beta_\mu = \beta_\mu; \quad \beta_\mu \bar{P} + \bar{P}\beta_\mu = \beta_\mu \tag{5}$$

The general form of the projective operators P and $\bar{P}$ is then obtained:

$$\bar{P} = \frac{\beta^2 - a_1}{a_2 - a_1}, \quad P = \frac{\beta^2 - a_2}{a_1 - a_2} \tag{10}$$

Card 1/2

where $\beta^2 = \sum_\mu \beta_\mu$, $a_1^{(5)} = 4$, $a_2^{(5)} = 1$; $a_1^{(10)} = 3$, $a_2^{(10)} = 2_1^{(23)}$ Lastly, a general expression for the spur of the product of any number of 10-dimensional Daffin-Kemmer matrices is determined. The most important English-language reference read as follows: Harich-Chandra, Proc. Roy. Soc., 18, 502, 1946; M. Neuman, E. H. Furry, Phys. Rev. 76, 1677, 1949.

ASSOCIATION: Institut fiziki AN BSSR (Institute of Physics of AS BSSR)

SUBMITTED: November 3, 1961

S/070/62/007/006/011/020
E132/E435

AUTHORS: Fedorov, F.I., Bokut', B.V., Konstantinova, A.F.

TITLE: The optical activity of crystals of the classes of intermediate symmetry having planes of symmetry

PERIODICAL: Kristallografiya, v.7, no.6, 1962, 910-915

TEXT: The classes in question $L^6 6P$, $L^4 4P$ and $L^3 3P$ (6 mm, 4 mm, 3 mm) having a plane of symmetry parallel to their axes of highest order have hitherto been thought to be optically inactive. There are few crystals representative of these classes but tourmaline is one. Rotation of the plane of polarization cannot occur for any direction of propagation but optical activity can manifest itself by other phenomena, as in optically active crystals of other classes, for propagation along directions other than the optic axis. It is shown that the phenomenon of the elliptic polarization of the reflected wave is a unique symptom of optical activity. It is, however, normally extremely small - of the order of 10^{-5} in quartz. An experimental arrangement for making observations under the best conditions is suggested. The surface of the crystal is immersed in a liquid of carefully

Card 1/2

C

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9

FEDOROV, F.I.; KOTYASH, T.L.

Passage of light through a plate made from a transparent uniaxial crystal. Opt. i spektr. 12 no.2:298-303 F '62. (MIRA 15:2)

(Crystals--Optical properties)

24,3000

S/051/62/012/003/008/016
E202/E192

AUTHORS: Fedorov, F.I., and Konstantinova, A.F.

TITLE: Passage of light through plates of uniaxial active crystals belonging to axial classes

PERIODICAL: Optika i spektroskopiya, v.12, no.3, 1962, 407-411

TEXT: An exact solution to the passage of light through a plane parallel plate cut out from an optically active crystal is given. The solution takes into account the refraction at both edges of the plate. It is based on the earlier work of F.I. Fedorov and T.L. Kotyash (Ref.2: Opt. i spektr. v.12, 1962, 298) in which the same problem was solved for an uniaxial not (optically) active crystal. The accuracy in the present solution was particularly stressed since the anisotropic property is weak and could easily be masked or exceeded by the effect of the refraction at both edges of the plate polarising the emergent wave. The solution is applicable to a normal incidence of light at any orientation of optical axis. The expressions for amplitudes of the emergent wave are given in terms of the

Card 1/2

24,3300

37221
S/051/62/012/004/006/015
E039/E485

AUTHORS: Fedorov, F.I., Konstantinova, A.F.

TITLE: The passage of light through plates of uniaxial optically active crystals. II. Plates, parallel to optical axis

PERIODICAL: Optika i spektroskopiya, v.12, no.4, 1962, 505-509

TEXT: In a previous paper a general expression was obtained for the amplitude of waves passing perpendicular to plane parallel plates with arbitrarily orientated optical axes cut from uniaxial optically active crystals. In this paper is considered the case when the optical axis is parallel to the faces of the plate. When linearly polarized light passes through non-active uniaxial crystals the polarization is unchanged, but in the case considered here the linear polarization is converted into elliptical. Calculations are made which show that the magnitude of this effect is small in the case of quartz. It is also shown that the polarization parameters for waves passing through two crossed plates have approximately the same value as for one plate. It is concluded that the plane of polarization of linearly

Card 1/2

35650

16,3000 24.4300

S/020/62/143/001/008/030
B112/B102

AUTHOR: Fedorov, F. I.

TITLE: Composition of the parameters of the Lorentz-group

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 1, 1962, 56 - 59

TEXT: The author considers quaternions $\vec{q}$. The composition rule is written in the form $(\vec{q},\vec{q}') = (\vec{q} + \vec{q}' + [\vec{q}\vec{q}'])/(1 - \vec{q}\vec{q}')$. The compositions $\vec{q} = (\vec{n},i\vec{u})$ and $\vec{q}^* = (\vec{n},-i\vec{u})$ are shown to be equivalent to the relations $1 - v^2 = |1 + q^2|^2/(1 + |q|^2)^2$, where $\vec{v} = 2\vec{u}/(1 + u^2)$, and

$$\vec{n} = (\sqrt{1 + q^2}\,\vec{q}^* + (\sqrt{1 + q^2})^*\vec{q})/(\sqrt{1 + q^2} + (\sqrt{1 + q^2})^*)$$

General considerations concerning the Lorentz group are based on these main formulas. There are 5 Soviet references.

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Institute of Physics of the Academy of Sciences BSSR)

Card 1/2

Composition of the parameters... S/020/62/143/001/008/030
B112/B102

PRESENTED: October 28, 1961, by V. A. Fok, Academician

SUBMITTED: October 7, 1961

Card 2/2

24...

S/051/63/014/001/016/031
E032/E314

AUTHORS: Fedorov, F.I. and Goncharenko, A.M.

TITLE: Propagation of light along circular optic axes of absorbing crystals

PERIODICAL: Optika i spektroskopiya, v. 14, no. 1, 1963, 100 - 105

TEXT: A general theory of propagation of electromagnetic waves along circular optic axes of absorbing crystals, based on an invariant method, is described. General solutions are derived of the Maxwell equations for an arbitrary absorbing crystal, including refraction and reflection at normal incidence, at an arbitrary absorbing crystal surface, and a plane-parallel plate, cut from such a crystal with the circular axis perpendicular to the reflecting face. Explicit expressions are obtained for the wave amplitudes in each case. The present results include the analysis of A.P. Khapalyuk (Opt. i spektr. 12, 106, 1962) as a special case.

SUBMITTED: December 19, 1961

Card 1/1

S/051/63/014/002/012/026
E039/E120

AUTHORS: Fedorov, F.I., and Petrov, N.S.

TITLE: A special case of non-uniform electromagnetic waves in transparent crystals

PERIODICAL: Optika i spektroskopiya, v.14, no.2, 1963, 256-261

TEXT: It is shown that with complete reflection of a normal plane electromagnetic wave from a transparent crystal non-uniform waves of a special form may arise, the field of which contains not only an exponential factor but also a linear polynomial. Maxwell's equations are solved for waves of the form:

$$E = (\underline{f}_1 + \underline{f}_2 \zeta') e^{i(\zeta - \omega t)} \tag{3}$$

where $\zeta' = kqr$ (q is the normal to the surface boundary directed from the first medium to the second). The equations for the scalar parameters A', B', f_1^o, f_2^o are derived and are as follows:

$$\underline{E} = \left\{ f_1^o [\underline{m}_o \underline{c}_\pm] \pm f_2^o (\underline{d} \pm \varepsilon' \zeta' [\underline{m}_o \underline{c}_\pm]) \right\} e^{i\zeta} \tag{21}$$

Card 1/2

$$\underline{H} = \left\{ f_1^o \left[\underline{m}_o \left[\underline{m}_o\ \underline{c}_\pm\right]\right] \pm f_2^o \left(\underline{d}' \pm \varepsilon' \zeta' \left[\underline{m}_o \left[\underline{m}_o\ \underline{c}_\pm\right]\right]\right)\right\} \underline{e}^{i\zeta} \qquad (23)$$

$$\left.\begin{aligned} A' &= \frac{1}{\Delta}\left\{\left[2\underline{a}^2(\eta - in_o)(\varepsilon_o\eta + in_o n^2) + \varepsilon'(\varepsilon_o\eta^2 - n_o^2 n^2)\right]A \pm 2n_o n\eta\varepsilon' \sqrt{\varepsilon_o}\ B\right\} \\ B' &= \frac{1}{\Delta}\left\{\left[2\underline{a}^2(\eta + in_o)(\varepsilon_o\eta - in_o n^2) + \varepsilon'(\varepsilon_o\eta^2 - n_o^2 n^2)\right]B \pm 2n_o n\eta\varepsilon' \sqrt{\varepsilon_o}\ A\right\} \end{aligned}\right\} \quad (30)$$

$$\left.\begin{aligned} f_1^o &= \frac{2i\underline{a}^2\eta}{\Delta n_o\sqrt{\varepsilon_o}}\left\{\left[2\underline{a}^2(\varepsilon_o\eta + in_o n^2) + \varepsilon'\varepsilon_o\eta\right]A \pm n_o n\varepsilon' \sqrt{\varepsilon_o}\ B\right\} \\ f_2^o &= \frac{2i\underline{a}^2\eta}{\Delta\sqrt{\varepsilon_o}}\left\{\left[\varepsilon_o\eta + in_o n^2\right]A \pm in\sqrt{\varepsilon_o}\,(\eta + in_o)\ B\right\} \end{aligned}\right\} \quad (31)$$

It is shown that when the solution has the form of Eq.(3) the boundary condition problem is solved more easily.

SUBMITTED: February 19, 1962

Card 2/2

L 12798-63 EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3 IJP(C)/JD/JG
ACCESSION NR: AP3000772 S/0070/63/008/003/0398/0404

AUTHOR: Fedorov, F. I. 64 63

TITLE: Approximation theory of quasilongitudinal waves in crystals

SOURCE: Kristallografiya, v. 8, no. 3, 1963, 398-404

TOPIC TAGS: elastic constants, anisotropy, cubic system, hexagonal system, alum, Al, Mo, Pb, Ni, KBr, CuZn, Li, wave velocity, wave displacement

ABSTRACT: The author has taken published data expressing an equation for propagation of elastic waves in crystals and from this has developed equations for approximating values of velocity and displacement of quasilongitudinal elastic waves in crystals. A similar derivation was made by P. Waterman (Phys. Rev. 113, 1240, 1959), but only for directions along and near the symmetry axes. This paper offers a general solution for any direction. From the developed equations, on the basis of recurrent relations, the author has computed the elastic constants of a number of materials: alum, Al, Mo, Pb, Ni, KBr, CuZn, and Li. He finds that the first approximation, even of the most elastically anisotropic of cubic crystals (lithium), has an average error of less than one half of one per cent. The second approximation gives an error on the order of 10 sup -3, which is within the limits of error of measuring the elastic constants. The author concludes that for practically all

Card 1/2

L 12798-63
ACCESSION NR: AP3000772

cubic crystals it is unnecessary to go beyond the second approximation. Similar values are found for hexagonal crystals, and he concludes further that the same rules are valid for both systems. The same technique also supplies a solution for determining velocity and displacement of quasitransverse waves. Orig. art. has: 43 formulas and 1 table.

ASSOCIATION: Institut fiziki AN BSSR (Institute of Physics, AN BSSR)

SUBMITTED: 25Apr62 DATE ACQ: 21Jun63 ENCL: 00

SUB CODE: 00 NO REF SOV: 003 OTHER: 001

Card 2/2

GONCHARENKO, A.M.; FEDOROV, F.I.

Optical properties of crystalline plates. Opt.i spektr. 14 no.1: 94-99 Ja'63. (MIRA 16:5)

(Crystal optics)

FEDOROV, F.I.; GONCHARENKO, A.M.

Light propagation along the circular optical axes of absorbing crystals. Opt. i spektr. 14 no.1:100-105 Ja '63. (MIRA 16:5)

(Crystal optics)

FEDOROV, F.I.; PETROV, N.S.

A special case of nonuniform electromagnetic waves in transparent crystals. Opt. i spektr. 14 no.2:256-261 F '63. (MIRA 16:5)
(Crystals—Optical properties) (Electromagnetic waves)

ACCESSION NR: AP4000403 S/0051/63/015/006/0792/0796

AUTHOR: Petrov, N.S.; Fedorov, F.I.

TITLE: New form of plane electromagnetic waves in absorbing crystals

SOURCE: Optika i spektroskopiya, v.15, no.6, 1963, 792-796

TOPIC TAGS: electromagnetic wave, plane wave, nonuniform wave, crystal absorption, Maxwell equation, refraction

ABSTRACT: It was shown earlier (F.I.Fedorov, Optika anizotropny*kh sred [Optics of anisotropic media], Minsk, 1958) that in the case of oblique incidence of light on an absorbing crystal of the one of the middle crystallographic systems birefringence will be absent on condition that $[m_o c]^2 = 0$, where m_o is the refraction vector of the refracted nonuniform wave, and c is the unit optical axis vector. When this condition is fulfilled the ordinary and extraordinary waves are indistinguishable; hence there is propagated through the crystal only one purely exponential wave with circular polarization. The purpose of the present work was to solve the Maxwell equations and the boundary problem for the above described particular case of absorption in middle-system crystals. Equations are written for m_o and c, and the

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ACC.NR: AP4009463

Maxwell equations are solved, using these expressions to find the electric and magnetic field vectors. The boundary problem is susceptible of solution only for a particular form of the electromagnetic wave given by the solution of the Maxwell equations. The characteristics of the waves propagating in the crystal are described; they are non-uniform plane waves with exponentially decreasing amplitude. The conditions when such waves may appear are discussed. It is noted that waves of this new distinctive type can also appear incident to oblique incidence of light on absorbing crystals of lower symmetry systems. Orig.art.has: 50 formulas.

ASSOCIATION: none

SUBMITTED: 10Jan63 ACQ.DATE: 03Jan64 ENCL: 00

SUB CODE: PH NR REF SOV: 004 OTHER: 001

Card 2/2

ACCESSION NR: AP4009464

S/0051/63/015/006/0797/0802

AUTHOR: Bokut', B.V.; Fedorov, F.I.

TITLE: Reflection and refraction of light by optically active crystals

SOURCE: Optika i spektroskopiya, v.15, no.6, 1963, 797-802

TOPIC TAGS: reflection, refraction, polarization, Maxwell equation, optically active crystal, tetragonal crystal, nonmagnetic crystal

ABSTRACT: To date the properties of optically active crystals have not been adequately investigated. Accordingly, in the present paper there is solved in general form the problem of reflection and refraction of plane electromagnetic waves at the surface of an arbitrarily oriented, transparent, isotropic medium with a given index of refraction, the magnetic properties of which are neglected. In view of the cumbersome character of the calculations in the ordinary coordinate representation, some simplifying assumptions are made and the results are obtained in covariant form. The analysis is started with the Maxwell equations for plane waves in an optically active medium, written taking into account the dielectric constant, the electric optical activity tensor, the refraction vector, the wavenumber, the

Card 1/2

ACC.NR: AP4009464

index of refraction, and the wave normal. The results of the rather lengthy and involved calculations are applied to crystals of the inversion-planar class of tetragonal symmetry. It is concluded that when the wave normals of the refracted waves coincide in direction with the optical c axis, the ellipticity will be nil; that is, in this case the inversion-planar crystal will not differ as regards its optical properties from an inactive uniaxial crystal. Orig.art.has: 81 formulas.

ASSOCIATION: none

SUBMITTED: 24Mar63

DATE ACQ: 03Jan64

ENCL: 00

SUB CODE: PH

NR REF SOV: 004

OTHER: 003

Card 2/2

FEDOROV, F.I.

Theory of quasi-transverse elastic waves in crystals. Dokl. AN SSSR 149 no.5:1060-1063 Ap '63. (MIRA 16:5)

1. Predstavleno akademikom A.V.Shubnikovym.
(Elastic waves) (Crystals)

L 12919-65 EWT(1)/T/EWC(b)-2 IJP(c)

ACCESSION NR: AP4042191

AUTHOR: ... B. V.; Fedorov, F. I.

TITLE: Reflection and refraction of light by optically active ... version-planar crystals

SOURCE: Optika i spektroskopiya, v. 17, no. 4, 1964, 607-611

TOPIC TAGS: crystal lattice symmetry, crystal syngony, light reflection, light refraction, optical activity

ABSTRACT: The results of an earlier investigation by the authors (Opt. i spektr. v. 15, 798, 1964) to determine the amplitudes of the waves reflected and refracted by ... optically active ... planar class of tetragonal ... following orientations ... parallel ... plane of incidence parallel or perpendicular to the bi-

Card 1/2

L 12910-65
ACCESSION NR: AP4047181

normal, passing through a two-fold crystal axis, and coinciding with one of the symmetry planes of the crystal. The ... [illegible] ...tally determining and mea... [illegible] ... such crystals is dis... [illegible]

... [illegible] ...rmulas.

... [illegible] ON: None

... [illegible] May6... [illegible]

... [illegible] OP, SS NR REF SOV: ... [illegible]

FEDOROV, F.I.

Generalized approximate theory of elastic waves in crystals. Dokl. AN SSSR 155 no. 4:792-794 Ap '64. (MIRA 17:5)

1. Institut fiziki AN BSSR. Predstavleno akademikom A.V. Shubnikovym.

GONCHARENKO, A.M.; GRUM-GRZHIMAYLO, S.V.; FEDOROV, F.I.

Light absorption surfaces of crystals of various systems. Kristallografiia 9 no.4:589-598 Jl-Ag '64.

(MIRA 17:11)

1. Institut fiziki AN BSSR i Institut kristallografii AN SSSR.

N NR: AP500 44

Fedorov F

Contribution to the theory of elastic ... with transverse-isotropic med...

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika, astronomiya, no. 1, 1965, 9-16

TOPIC TAGS: crystal syngony, crystal symmetry, elastic wave propagation, elastic constant

ABSTRACT: This is a continuation of an earlier paper ... author ... Kristallografiya v. 8, 213, 196 ... where ... a crystal with an ... properties makes it possible ... propagation of elastic waves ... convenient for approximate propagation ...

Card 1/3

ACCESSION NR: AP5005144

describing the propagation of elastic waves in a crystal with the aid of a tensor characterizing the isotropic medium and a deviation from this tensor. Whereas in the earlier article only two parameters were available for the determination of the comparison tensor, in the present article, to attain better approximation and to make the comparison tensor depend on a larger number of parameters, the medium is assumed to be transversely-isotropic, possessing a rotational symmetry about a fixed direction with respect to a certain property. For example, all uniaxial crystals are transversely-isotropic with respect to optical properties. With respect to elastic properties, certain hexagonal crystals are of this type. The author then determines the elastic constant tensor of a medium whose elastic properties deviate least in the mean from a specified crystal. The concept of transverse anisotropy of the elastic properties of the crystal is introduced. The results obtained are applied to crystals with tetragonal and trigonal syngonies. Of the former, tin and barium titanate have very low transverse anisotropy, and of the latter, the

L 32787-65
ACCESSION NR: AP5005144

lowest transverse anisotropy is possessed by hematite and tourmaline, which consequently differ little in their elastic properties from ... crystals. The maximum transverse anis... ...ssessed by corundum, calcite, and quartz. Orig. art. has ... and 2 tables.

ASSOCIATION: Kafedra fiziki kristallov Moskovskogo Universiteta (Department of Crystal Physics Moscow University)

SUBMITTED: 25Feb63 ENCL: 00 SUB CODE: SS, GP

NR REF SOV: 004 OTHER: 000

Card 3/3

L 63552-65 EWT(1)/EEC(b)-2/T Pi-4 IJP(c) GG

/0083/0091

ACCESSION NR: AP5010049 537.228.3

31

B

Fedorov, F. I.; Berkovskiy, L. M.

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9"

SUBMITTED: 16May64 ENCL: 01 SUB CODE:

NO REF SOV: 004 OTHER: 006 ATD PRESS: 3227

Card

FEDOROV, F.I.

Theory of elastic waves in crystals on a comparison with a transversally isotropic medium. Vest. Mosk. un. Ser. 3: Fiz., astron. 20 no.1:9-16 Ja-F '65. (MIRA 18:3)

1. Kafedra fiziki kristallov Moskovskogo universiteta.

FEDOROV, Fedor Ivanovich; VIRKO, I.G., red.

[Theory of elastic waves in crystals] Teoriia uprugikh voln v kristallakh. Moskva, Nauka, 1965. 386 p. (MIRA 18:3)

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9"

L 3890-66 EWT(1)/EPF(c) IJP(c) WW/GG

ACCESSION NR: AP5017492

UR/0368/65/002/006/0523/0533
535.51

AUTHOR: Fedorov, F. I. 44,55

37
B

TITLE: Covariant description of the properties of light beams 21,44,55

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 6, 1965, 523-533

TOPIC TAGS: light polarization, light theory, tensor

ABSTRACT: After first pointing out some difficulties connected with the commonly used method of Stokes parameters for determining the change in polarization of a light beam interacting with a medium, the author introduces the concept of the tensor of the light beam, Φ, defined as the sum of dyads $\Phi = \Sigma_s E^{(s)} \cdot E^{(s)*}$ over all the noncoherent simple waves in the given beam ($E^{(s)}$ is the projection of the complex electric field intensity on the coordinate axis). All the quantities determining the polarization of the light are then expressed through invariants of this tensor. The tensor Φ can be represented in various mathematical forms corresponding to the representation of the beam as a sum of two polarized mutually orthogonal beams or to the resolution of the beam into a sum of natural and completely polarized light. It is shown that the tensor Φ can be determined by means of three intensity measurements, two of which are made with a linear analyzer and one with a circular analyzer. A great advantage of this method is that it can be extended to the case of

Card 1/2

L 3890-66

ACCESSION NR: AP5017492

inhomogeneous waves. The use of the tensor for a description of the changes experienced by the light beam when it interacts with matter will be described in a future article. Orig. art. has: 52 formulas and 1 table.

ASSOCIATION: none

SUBMITTED: 17Mar65 ENCL: 00 SUB CODE: OP

NR REF SOV: 012 OTHER: 004

Card 2/2

FEDOROV, F.I.; BARKOVSKIY, L.M.

Phenomenological theory of the linear electro-optical effect in uniaxial crystals. Zhur. prikl. spekt. 3 no.1:82-91 Jl '65. (MIRA 18:9)

BARKOVSKIY, L.M.; FEDOROV, F.I.

Phase relations in light modulation with the aid of the linear electro-optical effect. Zhur. prikl. spektr. 3 no.5:449-455 N '65. (MIRA 18:11)

FEDOROV, F.I.; LOBKO, S.I.

Magnetic moment of a particle with variable spin 1/2-3/2.
Dokl. AN BSSR 9 no.3:147-151 Mr '65.

(MIRA 18:6)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.

FEDOROV, F.I.

Debye temperature of crystals. Kristallografiia 10 no.2: 167-173 Mr-Ap '65. (MIRA 18:7)

1. Institut fiziki AN BSSR.

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9"

BARKOVSKIY, L.M.; FEDOROV, F.I.

Covariant form of the dielectric tensor in crystals of higher and medium syngony under vector action. Kristallografiia 10 no.2:174-180 Mr-Ap '65. (MIRA 18:7)

1. Belorusskiy gosudarstvennyy universitet imeni V.I. Lenina.

L 2822-66 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5016178 UR/0051/65/018/006/1047/1052
548.0:535.001.1

AUTHOR: Fedorov, F. I.; Barkovskiy, L. M. 44,55 44,55

TITLE: Stimulated optical anisotropy of transparent uniaxial crystals 21,44,55

SOURCE: Optika i spektroskopiya, v. 18, no. 6, 1965, 1047-1052

TOPIC TAGS: crystal anisotropy, dielectric constant, uniaxial crystal, tensor, refractive index, light transmission

ABSTRACT: The authors develop in covariant form an approximate theory for the propagation of light in transparent uniaxial crystals subjected to external orienting action of arbitrary character. The eigenvalues and the eigenvectors of the dielectric constant tensor of such crystals are determined. General expressions are derived for the refractive indices and for the orientations of the field vectors of the light waves propagating in the crystal under these conditions. The results are independent of the cause of the stimulated anisotropy, provided the change in the dielectric tensor is symmetrical. Orig. art. has: 45 formulas.

ASSOCIATION: None

Card 1/2

L 2322-66

ACCESSION NR: AP5016178

SUBMITTED: 20Jan64 ENCL: 00 SUB CODE: SS, OP

NO REF SOV: 004 OTHER: 000

Card 2/2

L 2821-66 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5016179

UR/0051/65/018/006/1053/1056
548.0:535.001.1

AUTHOR: Petrov, N. S.; Fedorov, F. I. 44,55 44,55

39 B

TITLE: On the conditions for the absence of birefringence in absorbing crystals of medium syngonies

21,44,55

SOURCE: Optika i spektroskopiya, v. 18, no. 6, 1965, 1053-1056

TOPIC TAGS: crystal structure, crystal symmetry, crystal absorption, light absorption, double refraction, light refraction

ABSTRACT: The authors consider the case of absence of birefringence (and double absorption) in absorbing crystals of medium syngonies for oblique incidence of the light. It is shown that for a specified orientation of the optical axis of the crystal the inhomogeneous waves experience no birefringence for two different directions of the normal of the incident wave, unlike the special case of total reflection in transparent crystals. If the absorption is weak, the absorbing crystal does not differ in this respect from a transparent crystal. Orig. art. has: 14 formulas.

ASSOCIATION: None

Card 1/2

L 2821-66

ACCESSION NR: AP5016179

SUBMITTED: 05Aug63 ENCL: 00 SUB CODE: SS, OP

NO REF SOV: 005 OTHER: 000

Card 2/2

FEDOROV, F.I.

General formula for the Debye temperature of crystals. Dokl. AN SSSR 164 no.4:804-806 O '65. (MIRA 18:10)

1. Institut fiziki AN BSSR.

BYSTROVA, T.G. [Bystrova, T.H.]; FEDOROV, F.I. [Fiodarau, F.I.]

Elastic properties of cubic crystals. Vestsi AN BSSR. Ser.fiz.-mat.nav. no.1:35-48 '65. (MIRA 19:1)

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9"

ROMANOVA, T.S. [Ramanava, T.S.]; FEDOROV, F.I. [Fiodarau, F.I.]

Equations with highest derivatives for an electromagnetic field. Vestsi AN BSSR. Ser.fiz.-mat.nav. no.2:47-53 '65. (MIRA 19:1)

PETROV, N.S.; FEDOROV, F.I.

Conditions for the absence of birefringence in crystals with central symmetry. Opt. i spektr. 18 no.6:1053-1056 Je '65. (MIRA 18:12)

FEDOROV, F.I.; BARKOVSKIY, L.M.

Induced optical anisotropy of transparent uniaxial crystals.
Opt. i spektr. 18 no.6:1047-1052 Je '65. (MIRA 18:12)

L 15201-66 EWT(d)/EWT(1)/EEC(k)-2

ACC NR: AP6000025 SOURCE CODE: UR/0368/65/003/005/0449/0455

54

B

AUTHOR: Barkovskiy, L.M.; Fedorov, F. I.

ORG: none

TITLE: Phase relationships in light modulation by means of the linear electrooptic effect

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 5, 1965, 449-455

TOPIC TAGS: electrooptic effect, light modulation, optic crystal, uniaxial crystal, light polarization, crystal orientation, light modulator

ABSTRACT: The authors employ the covariant method in the case of the linear electrooptic effect to study the phase relationships between light waves of arbitrary direction of the electric field and light waves normal to symmetry elements in any crystal in an average system. General expressions are found for the phases of both light waves propagating in a direction in uniaxial electrooptic crystals located in a linearly polarized high frequency field of arbitrary direction. The expressions presented in this article and elsewhere (ZhPS, 3, 83, 1965) make possible the most general investigation of the phase, amplitude, and polarization modulation of light by means of electrooptic modulators. Orig. art. has: 18 formulas.

SUB CODE: 20 / SUBM DATE: 16Dec64 / ORIG REF: 003 / OTH REF: 007

Card 1/1 UDC: 535.89

L 16016-66 EWT(1) IJP(c) GG/WW

ACC NR: AP6005473 SOURCE CODE: UR/0368/66/004/001/0058/0063

AUTHOR: Fedorov, F. I.

ORG: none

TITLE: Transformation of a beam when light interacts with matter

SOURCE: Zhurnal prikladnoy spektroskopii, v. 4, no. 1, 1966, 58-63

TOPIC TAGS: light scattering, mathematic analysis, Rayleigh scattering, luminescent material, optics

ABSTRACT: The author considers the linear transformation of the electric field of a light wave which takes place during interaction with a medium due to the linearity and homogeneity of electrodynamic equations and boundary conditions. A formula is derived for transformation of the tensor of a light beam for the case of Rayleigh scattering, as well as for diffusion by a volume element of a luminescent material or by a luminescent crystal and for the case of Fresnel reflection and refraction of light. It is shown that the proposed covariant method gives the required results with considerably fewer and simpler steps than when Stokes parameters are used.

UDC: 535.51

Card 1/2

L 16016-66

ACC NR: AP6005473

Orig. art. has: 35 formulas.

SUB CODE: 20/ SUBM DATE: 27Dec64/ ORIG REF: 011/ OTH REF: 001

Card 2/2

L 25782-66 EPF(n)-2/EWT(d)/EWT(1)/T IJP(c) GG/WW

ACC NR: AP6016361 SOURCE CODE: UR/0020/65/164/004/0804/0806

30
B

AUTHOR: Fedorov, F. I.

ORG: Institute of Physics, AN BSSR (Institut fiziki AN BSSR)

TITLE: General formula for Debye temperature of crystals

SOURCE: AN SSSR. Doklady, v. 164, no. 4, 1965, 804-806

TOPIC TAGS: Debye temperature, crystal, tensor

ABSTRACT: Because of great computational difficulties the Debye temperature Θ has hitherto been calculated for only a very few crystals (excluding the cubic and hexagonal systems). In earlier articles the author suggested a method of computing the Debye temperature which was suitable, in principle, for any crystals and permitted a significant decrease in calculations as compared to all previous methods. The present article presents a further development of this method "leading to even more significant simplifications." The author formulates several correlations which are of a universal character and suitable for crystals of any symmetry. To obtain formulas for a certain type of crystal the corresponding expressions for tensor Λ must be substituted into these correlations. An illustration is given using cubic-

Card 1/2

L 25782-66
ACC NR: AP6016361

crystals, and the resultant formulas are used to compute the Debye temperature for certain cubic crystals (Al, Au, LiF, Ag, NaCl, Cu, KBr, Li). This paper was presented by Academician A. V. Shubnikov on 24 February 1965. Orig. art. has: 17 formulas and 1 table. [JPRS]

SUB CODE: 20 / SUBM DATE: 04Feb65 / ORIG REF: 005 / OTH REF: 001

Card 2/2

ACC NR: AP6030371 SOURCE CODE: UR/0428/66/000/001/0099/0106

35

B

AUTHOR: Bolsun, A. I.; Fedorov, F. I.

ORG: none

19

TITLE: Pseudoscalar matrix beta sub 5 and the electrical dipole moment of the W-meson

SOURCE: AN BSSR. Vestsi. Seryya fizika-matematychnykh navuk, no. 1, 1966, 99-106

TOPIC TAGS: meson, dipole moment

ABSTRACT: This paper, which was discussed at a seminar at the Theoretical Physics Laboratory, Institute of Physics, Academy of Sciences BSSR, shows that the β_5 matrix is necessary for the introduction of pseudovector interactions related to the internal electrical dipole moment (EDM) of a W-meson. The matrix and its properties, the EDM of the W-meson, and the effect of the latter on the processes $e^+ + e^-$ $W^+ + W^-$ are discussed in detail. The authors thank all who participated in the seminar at the Theoretical Physics Laboratory, Institute of Physics, BSSR, for the valuable discussions. Orig. art. has: 1 figure and 35 formulas. [JPRS: 35,668]

SUB CODE: 20 / SUBM DATE: 20Dec65 / ORIG REF: 007 / OTH REF: 010

Card 1/1 *mlp*

0918 1094

ACC NR: AP6033062 SOURCE CODE: UR/0428/66/000/003/0107/0116

AUTHOR: Sotskaya, Kh. N.; Fedorov, F. I.

ORG: none

TITLE: Singular points of the cross section curves of the surfaces of elastic waves in crystals

SOURCE: AN BSSR. Vestsi. Seryya fizika-matematychnykh navuk, no. 3, 1966, 107-116

TOPIC TAGS: elastic wave, elastic modulus, crystal lattice structure, crystal symmetry

ABSTRACT: The authors obtain equations for the sections of the wave surfaces by the symmetry planes for rhombic, hexagonal, tetragona, and cubic crystals in a parametric form, and for arbitrary crystals in an implicit form, and investigate the singular points of these sections. All the calculations are based on the fact that the sections of purely transverse waves by the symmetry planes are ellipses, and the equations for the different symmetries are obtained by substituting the proper moduli of elasticity and other constants. The investigation of the singular points, which has not been carried out by anyone before, is based on eliminating the angle variable from the parametric equations by means of a coordinate transformation. It is shown, in agreement with earlier results by one of the authors (Fedorov, Teoriya upurgikh voln v kristallakh [Theory of Elastic Waves in Crystals], Nauka, M. 1965) that the equation for the section of the wave surface by the symmetry plane in any crystal has

Card 1/2

ACC NR: AP6033062

a degree not higher than twelve. The positions of the turning points and other singular points are determined, with particular attention to the plane perpendicular to the fourfold axis, and the conditions under which the singular point is a turning point are established. Orig. art. has: 55 formulas.

SUB CODE: 20/ SUBM DATE: 10May66/ ORIG REF: 007/ OTH REF: 001

Card 2/2

ACC NR: A.7000753 SOURCE CODE: UR/0250/66/010/005/0301/0304

FEDOROV, F. I. Institute of Physics, AN BSSR (Institut fiziki AN BSSR)

30
8

"Beam Surfaces for Elastic Waves in Crystals"

Minsk, Doklady Akademii Nauk BSSR (Reports of the Academy of Sciences BSSR), No 5, 66, pp 301-304

ABSTRACT: The beam surface (wave surface) is an important indicator of the propagation of elastic waves in crystals, since it describes the real movement of the wave-energy flux when the wave normal is oriented in various directions. On the basis of methods suggested in a previous study (FEDOROV, F. I., Teoriya Uprugikh Voln v Kristallakh, Izd-vo Nauka, 1965), the author derives in an explicit form an equation for the curve of the section of wave surfaces by any plane of symmetry in crystals with hexagonal, tetragonal, cubic, and rhombic syngony. It is shown that in the case of hexagonal crystals this equation actually determines the total beam surface, which thus turns out to be a 12-th order rather than 150-th order surface. The corresponding formulas are derived with the assumption that the equation for the section of wave surfaces is obtained by excluding components of the unitary displacement vector u (u_1, u_2) $(u^2 = 1)$ from the system $\beta_{abcd}u_bu_cu_d = 0$ (a, b, c, d = 1, 2), where β_{abcd} is a two-dimensional fourth-rank tensor. Orig. art. has: 14 formulas. [JPRS: 37,330]

TOPIC TAGS: elastic wave, crystallography

SUB CODE: 20 / SUBM DATE: 17Jan66 / ORIG REF: 002

Card 1/1

0723 1726

L 38513-66 EWT(d)/EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) JD/WW

ACC NR: AP6018764 SOURCE CODE: UR/0070/66/011/003/0368/0374

AUTHOR: Fedorov, F. I.; Bystrova, T. G.

ORG: Institute of Physics, AN BSSR (Institut fiziki AN BSSR)

TITLE: Debye temperatures for cubic crystals

SOURCE: Kristallografiya, v. 11, no. 3, 1966, 368-374

TOPIC TAGS: Debye temperature, cubic crystal

ABSTRACT: Using generalized formulas, the article presents calculations of the Debye temperature Θ for 82 cubic crystals whose elastic constants are known. These results are compared with experimental data and with the results of calculations by other authors, with good agreement. In general, the characteristic Debye temperatures close to absolute zero depend only on the elastic constants of the crystals and can be written in the form:

$$\Theta = C(IV_a)^{-1/3}, \qquad (1)$$

where C is expressed in terms of the Boltzmann and Planck elastic constants

$$C = \frac{h}{k}(18\pi^2)^{1/3} = 135{,}78, \qquad (2)$$

Card 1/2 UDC: 548.0

ACC NR: AP6018764

The method of calculation used starts with the approximate expression

$$I_1 = a^{-1/2}\left\{2 + r_a r_b\left[0,1r_1(1-0,06r_a) + \frac{57,2-8,4r_a+0,48r_b}{1001}\right]\right\} + $$
$$+ c^{-1/2}\left\{1 - \frac{r_b r_c}{1001}[57,2(1-r_2)+0,5r_b - r_c(7,2-6,7r_2)]\right\}. \qquad (3)$$

If we limit ourselves to terms not higher than the 4th order with respect to the elastic anisotropy, we get

$$I_2 = I_1 + \frac{r_b^4}{1001}[a^{-1/2}(0,17r_1+0,26r_1^2+4,18r_1^3+5,72r_1^4) - $$
$$- c^{-1/2}(0,17r_2+0,7r_2^2+5,86r_2^3-5,28r_2^4)]. \qquad (4)$$

Here $r_a = c_3/a$; $r_b = c_3/b$; $r_c = c_3/c$; $r_1 = b/a$; $r_2 = b/c$; $a = c_1 + 0.2c_3$; $b = c_2 + 0.4c_3$; $c = a + b$; c_1, c_2, and c_3 are expressed in terms of the usual elastic constants of the cubic crystals, and the density in the following manner:

$$c_1 = \frac{c_{44}}{\rho}, \quad c_2 = \frac{c_{12}+c_{44}}{\rho}, \quad c_3 = \frac{c_{11}-c_{12}-2c_{44}}{\rho}. \qquad (5)$$

Results of calculation with Equation (3) and (4) are shown in extensive tables. Orig. art. has: 5 formulas and 2 tables.

SUB CODE: 20/ SUBM DATE: 11Apr65/ ORIG REF: 012/ OTH REF: 037

Card 2/2

ACC NR: AP6032961 SOURCE CODE: UR/0070/66/011/005/0766/0770

AUTHOR: Fedorov, F. I.; Barkovskiy, L. M.

ORG: Belorussian State University (Belorusskiy gosudarstvennyy universitet)

TITLE: Effects of stimulated optical anisotropy in biaxial crystals

SOURCE: Kristallografiya, v. 11, no. 5, 1966, 766-770

TOPIC TAGS: optic crystal, crystal property, dielectric constant, tensor, electrooptic effect, piezoelectricity

ABSTRACT: This is a continuation of earlier work (Optika i spektroskopiya v. 18, 1047, 1965), where a simple method was proposed for approximately determining the parameters of the reciprocal dielectric tensor of a transparent uniaxial crystal under the influence of an external action. The present paper is devoted to a similar problem for the case of a biaxial crystal. A covariant method is used, in which the changes to the tensor are determined in the form of small increments to the initial values of its components. It is assumed that the natural anisotropy of the crystal is much larger than the artificial anisotropy produced by the external action. The method yields the directions of the optical axes and the principal values of the dielectric tensor for the disturbed crystal. The method is also used to determine the linear electrooptic effect in a Rochelle salt crystal. Covariant expressions are pre-

Card 1/2 UDC: 548.0:535.34

ACC NR: AP6032961

sented for the tensor of the electrooptic constants in biaxial crystals. An interesting result in the case of Rochelle salt is that the scattering indicatrix is rotated as a whole under the influence of an electric field of arbitrary direction, without changing forms and dimensions. Orig. art. has: 18 formulas a 1 table.

SUB CODE: 20/ SUBM DATE: 23Mar65/ ORIG REF: 008/ OTH REF: 003

Card 2/2

ACC NR: AM5015198 BOOK EXPLOITATION UR/

Fedorov, Fedor Ivanovich

Theory of elastic waves in crystals (Teoriya uprugikh voln v kristallakh) Moscow, Izd-vo "Nauka", 1965. 386 p. illus., biblio., index. 4500 copies printed. Editor: I. G. Virko; Technical editor: L. A. Pyzhova; Proofreader: L. O. Secheyko

TOPIC TAGS: Crystal physics, crystal theory, elastic wave, elasticity theory, linear operator, tensor analysis

PURPOSE AND COVERAGE: This book will be of use to scientists and engineers specializing in the practical utilization of elastic waves in crystals and also may be used as a textbook for students and aspirants specializing in the physics of crystals. The basic laws of the propagation of two-dimensional elastic waves in crystals of different symmetry are presented. In distinction from usual methods of presentation, linear (noncoordinate) methods of vector and tensor calculus are utilized here. Special attention is paid to investigation of general methods of solving pertinent problems; however, at the same time, the methodology of real computations is presented in detail. The book is based on a course of lectures presented in the fall of 1962 to students and aspirants specializing in the physics of crystals at MGU. The author thanks V. A. Koptsik and T. G. Bystrova for their assistance in preparing the manuscript for publication.

TABLE OF CONTENTS:

Card 1/2 UDC: 534.21

ACC NR: AM5015198

SUB CODE: 20 /SUBM DATE: 25Jan65 /ORIG REF: 028 /OTH REF: 023

Card 2/2

ACC NR: AP6024334 SOURCE CODE: UR/0428/66/000/001/0091/0098

34

AUTHOR: Fedorov, F. I.

ORG: none

TITLE: Formula for the Debye temperature for transverse-isotropic media

SOURCE: AN BSSR. Vestsi. Seriyya fizika-matematychnykh navuk, no. 1, 1966, 91-98

TOPIC TAGS: Debye temperature, crystal, crystal lattice, crystal vibration

ABSTRACT: A formula for the Debye temperature for transverse-isotropic media has been derived. This derivation is an extension of an expression for the Debye temperature derived by the present author in an earlier paper (F. I. Fedorov. DAN SSSR, 164, 804, 1965). In the first approximation, the formula assumes the form

$$I = I_0 + (r_1 a_0^{-3/2} - r_2 c_0^{-3/2})(A_0 + 2A_1 - 2A_2) + r_1^2 a_0^{-3/2}(A_3 + 5A_1 + r_1 A_4) + r_2^2 c_0^{-3/2}(A_3 + 5A_2 - r_2 A_4),$$

where

$$A_0 = \frac{3}{2}\langle k^2 \rangle = \frac{1}{105}(21 f_2^2 + 18 f_2 f_4 + 5 f_4^2);$$

$$A_1 = \frac{3}{4}\langle (a_0 - c) k^2 \rangle = \frac{f_4}{175}\left(f_2^2 + \frac{34}{33} f_2 f_4 + \frac{335}{1287} f_4^2 \right);$$

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ACC NR: AP6024334

$$A_2 = \frac{3}{4}\langle \sigma k^2 \rangle = \frac{2}{105}\left(f_2^3 + \frac{11}{5} f_2^2 f_4 + \frac{239}{165} f_2 f_4^2 + \frac{43}{143} f_4^3 \right);$$

$$A_3 = \frac{15}{8}\langle (\alpha_2 - \sigma)^2 \rangle = \frac{f_4^2}{70}; \quad A_4 = -\frac{35}{16}\langle (\alpha_c - \sigma)^2 \rangle = \frac{19 f_4^3}{96525};$$

$$A_5 = \frac{15}{8}\langle \sigma^2 \rangle = 2\left(\frac{1}{3} f_2^2 + \frac{2}{7} f_2 f_4 + \frac{1}{15} f_4^2 \right);$$

$$A_6 = \frac{35}{16}\langle \sigma^3 \rangle = \left(\frac{2}{3} f_2 \right)^3 + \frac{8 f_4}{15}\left(f_2^2 + \frac{19}{33} f_2 f_4 + \frac{7}{65} f_4^2 \right),$$

where θ Debye is given by $135.78\,(IV_a)^{-1/3}$. Here V_a is the atomic volume in units of $10^{-21}\,cm^3$. A second approximation for I was also derived. It was found that in all cases the second approximation was identical with the first expression to within less than 1%. The Debye temperatures for the following 12 substances were calculated: barium titanate, beryl, beryllium, yttrium, cadmium, cadmium sulfate, cancrinite, β-quartz, cobalt, ice, magnesium, and zinc. The results are tabulated. The author thanks T. G. Bystrova for her help in the computational work. Orig. art. has: 1 table and 52 equations.

SUB CODE: 20/ SUBM DATE: 20Dec65/ ORIG REF: 003

Card 2/2 egk

ACC NR: AP7004541 SOURCE CODE: UR/0368/66/005/003/0371/0380

AUTHOR: Fedorov, F. I.; Barkovskiy, L. M.
ORG: none

TITLE: Theory of the linear electrooptical effect in cubic crystals

SOURCE: Zhurnal prikladnoy spektroskopii, v. 5, no. 3, 1966, 371-380

TOPIC TAGS: cubic crystal, electrooptic effect, eigenvalue

ABSTRACT: An approximation covariant method is applied to the study of the linear electrooptical effect in cubic crystals of acentric classes. For any direction of the electric field in these crystals, simple analytical expressions are obtained for the induced optical axes and for eigenvalues and eigenvectors of the inverse dielectric tensor. The method enables one to find these quantities with a high degree of precision. The cases when the electrical field rotates in the planes orthogonal to the crystallographic directions and in the symmetry planes of the crystals are considered in detail. [Based on author's English Abstract] Orig. art. has: 2 figures and 48 formulas. [JPRS: 38,695]

SUB CODE: 20 / SUBM DATE: 28Aug65 / ORIG REF: 005 / OTH REF: 004

Card 1/1 UDC: 537.228.3

0926 1367

ACC NR: AP7008902 SOURCE CODE: UR/0250/66/010/009/0636/0640

AUTHOR: Fedorov, F. I. (Corresponding Member of the Academy of Sciences Belorussian SSR)

ORG: Institute of Physics, Academy of Sciences Belorussian SSR (Institut fiziki AN BSSR)

TITLE: Averaging of Green-Christoffel tensor invariants

SOURCE: AN BSSR. Doklady, v. 10, no. 9, 1966, 636-640

TOPIC TAGS: Debye temperature, elastic wave

SUB CODE: 20

ABSTRACT: The properties of plane elastic waves in crystals are defined by the tensor

$$\Lambda = (\Lambda_{kl}) = \lambda_{ikl} n_i n_l = (\Lambda_{lk}).$$

The tensor Λ is said to be a Green-Christoffel tensor. In a number of cases particularly when computing the Debye temperature, the need arises to compute values, averaged for all components of the vector n, for certain functions of the phase velocities of elastic waves in crystals, which in turn depend on Λ_{kl}. The author's book Teoriya Uprugikh Voln v Kristallakh (Theory of Elastic Waves in Crystals) gives a general formula for the mean value of the product of any number of components of the vector n, according to which

$$\langle n_i n_j n_k n_l \ldots n_r n_p \rangle = \frac{\Sigma \delta_{ij} \delta_{kl} \ldots \delta_{rp}}{(s+1)!!}. \quad (1)$$

Card 1/2

UDC: none

0929 1710

ACC NR: AP7008902

The present article describes a method which permits a significant reduction in the number of "tiresome" calculations involved in the use of formula (1) for computing the mean values of various joint invariants of the tensor Λ and vector n. The author limits himself to sixteen invariants of the first, second, and third orders. By way of example, the article considers the averaging of the third-order invariant $n\Lambda n \cdot n\Lambda^2 n$. Orig. art. has: 33 formulas. [JPRS: 39,688]

Card 2/2

GONCHARENKO, A.M.; SOTSKIY, B.A.; FEDOROV, F.I.

Self-excitation of a plane-parallel anisotropic layer. Kristallografiia 8 no.1:47-50 Ja-F'63 (MIRA 17:7)

1. Institut fiziki AN Belorusskoy SSR.

SOV/124-58-8-8852

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 8, p 75 (USSR)

AUTHOR: Fedorov, F.M.

TITLE: Determining the Immersion Depth of Z_{B_1} Echo-sounder Vibrators in the Presence of Sea Waviness and the Angular Motion of a Ship (Opredeleniye velichiny pogruzheniya vibratorov Z_{B_1} pri nalichii volneniya i kachki sudna)

PERIODICAL: Uch. zap. Leningr. vyssh. inzh. morsk. uch-shche, 1957, Nr 6, pp 112-122

ABSTRACT: The author discusses a method for calculating more precisely the immersion depth of Z_{B_1} echo-sounder vibrators in the presence of sea waviness and of the angular motion of a ship. Since this device takes into account the true position of the ship on the wavy sea surface, it avoids the inaccuracies inherent in the usual method of using echo sounders to attempt to measure sea depths from a ship rolling and pitching on a wavy surface. The author examines cases involving different locations of the center of gravity of the ship with respect to its load line. Recommendations are made concerning the most

Card 1/2

SOV/124-58-8-8852

Determining the Immersion Depth of Z_{B_1} Echo-sounder Vibrators (cont.)

suitable location of the echo-sounder vibrators in relation to the ship hull. A method is described for calculating the immersion depth of the Z_{B_1} vibrators from bathometer recordings of the sea-bottom topography.

A. A. Kostyukov

Card 2/2

FEDOROV, F.M., kand.tekhn.nauk, dotsent

Evaluating the accuracy of depths measured by sounding devices by the results of double measurements. Uch. zap. LVIMU no.13:103-113 '59. (MIRA 13:9)

1. Kafedra morskogo dela Leningradskogo vysshego inzhenernogo morkogo uchilishcha im. admirala Makarova.
(Deep sea sounding)

FEDOROV, F.M., dotsent, kand.tekhn.nauk

Using passive radar reflectors on small ships. Sudovozhdenie no.2:127-130 '62. (MIRA 17:4)

1. Kafedra morskogo dela Leningradskogo vysshego inzhenernogo morskogo uchilishcha im. admirala Makarova.

FEDOROV, G., (Moscow)

Compensated voltmeters. Radio no.7:43-46 Jl '53. (MLRA 6:7)
(Voltmeter)

FEDOROV, G.

MILZARAYS, Ya.: SHADRIN, V. (Kislovodsk); FEDOROV, G. (Rostov-na-Donu).

Compensating background noise. Radio no.6:44 Je '57. (MIRA 10:7)
(Amplifiers, Electron-tube)

FEDOROV, G.

To make the city cleaner. Zhil.-kom. khoz. 12 no.4:32 Ap '62.
(MIRA 15:7)
(Nizhniy Tagil—Refuse and refuse disposal)

GEL'BERG, L., kand.tekhn.nauk; FEDOROV, G., kand.tekhn.nauk

Technical and economic characteristics of the principal types of apartment houses. Zhil.stroi. no.3:14-15 '62. (MIRA 15:9)
(Apartment houses)

FEDOROV, G., inzh.

Movements and passage through locks of "Volgo-Don"-type motorships on the V.I.Lenin canal. Rech. transp. 21 no.9: 39-41 S '62. (MIRA 15:9)

(Canals--Navigation)

FEDOROV, G., doktor istoricheskikh nauk

Finding of Tivertsy settlement (Conclusion). Nauka i zhizn' 30 no.9:90-94 S '63. (MIRA 16:10)

FEDOROV, G., kand. tekhn. nauk; ZERNOV, D., inzh.

Effect of the propuslion rate of heavy tonnage vessels on canal banks. Rech. transp. 23 no.10:38-39 O '64.
(MIRA 17:12)

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9"

FEDOROV, G.

"Thermodynamic Properties of Zirconium and Its Alloys with Tin. Report presented at the International Atomic Energy Agency Symposium on Thermodynamics of Nuclear Materials, 21-25 May 62, Vienna, Austria.

45455

S/892/62/000/001/018/022
B102/B186

AUTHORS: Fedorov, G. A., Konstantinov, I. Ye.

TITLE: Determination of the efficiency of a scintillation gamma spectrometer by the modeling method

SOURCE: Moscow. Inzhenerno-fizicheskiy institut. Voprosy dozimetrii i zashchity ot izlucheniy, no. 1, 1962, 121-124

TEXT: The modeling of radioactive sources of arbitrary shape by gamma point sources of known activity is discussed. Measurements were carried out with Hg^{203}, Cs^{137}, Zn^{65}, Co^{60} and Na^{24} sources of less than 1 mm diameter arranged in 2-3 mm wide and 5 mm high cylindrical Dewar vessels, and a 70 · 50 mm large NaI(Tl) counter crystal. The source activities were between 0.3 and 2.5 μcuries, and were determined from the counting rate of a scintillation γ-counter with a NaI(Tl) crystal 39.2 by 37.6 mm. The line shape was determined for the point sources placed at six different positions, not more than 10 mm away from the crystal surface. Line shape and resolution were found to be almost independent of the position; e.g. for Cs^{137} the resolution was

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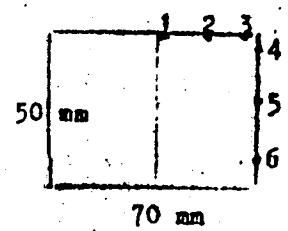
11.3±0.4%. The E_γ-dependence of the photoefficiencies (ε) and of the contributions was measured and compared for the source positions. The ε-values of the 6 curves coincided at E_γ = 1120 kev. Knowing $\varepsilon(E_\gamma)$, the γ-line intensity was easily calculated from the relation $I(E_\gamma) = S(E_\gamma)/\varepsilon(E_\gamma)$, where $S(E_\gamma)$ is the photopeak area. The accuracy of the method of source modeling by properly arranging point sources depends on the accuracy of the activity measurements and on the number of points. In the experiments described the arrangement was as follows:



There are 2 figures.

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620007-9"

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S/120/61/000/003/005/041
E032/E314

26.2263

AUTHORS: Stolyarova, Ye.L., Kramer-Ageyev, Ye.A. and Fedorov, G.A.

TITLE: A Scintillation Spectrometer for Fast Neutrons with a Boron-containing Organic Scintillator

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No. 3, pp. 49 - 51

TEXT: The principle of the instrument is as follows. A fast neutron entering a scintillator may produce a number of recoil protons as a result of multiple scattering (in a time of the order of 10^{-8} sec). Having been slowed down to less than 10 keV, it is captured by B^{10} nuclei. The capture is accompanied by the emission of an α-particle which gives rise to a second pulse (on the average 2.2 μs after the first pulse). Using the delayed coincidence technique and the amplitude analysis of the pulses, one can determine the energy of the incident neutrons. In the arrangement employed by the present authors, pulses from the anode of a photo-

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multiplier are amplified and then fed into the "alpha" and "proton" channels. The pulses in the proton channel are, on the average, delayed by 2.2 μs. Pulses from the output of the coincidence circuit, which are due to coincidences between the "alpha" and "proton" channel pulses trigger a univibrator which produces a 100 V output pulse. This pulse is used as the gating pulse for a kicksorter (АИ-100-1 (AI-100-1)). At the same time, the pulses taken from the eighth dynode of the photomultiplier are amplified and amplitude-analysed. The scintillators employed were:

1) p-terphenyl plus o-xylol plus trimethylborate (d = 4 cm; h = 4 cm);
2) p-terphenyl plus toluol plus trimethylborate (d = h = 8 cm).

The authors carried out a theoretical calculation of the efficiency of the spectrometer, assuming that in each i-th scattering the energy of the neutron is reduced to $E_{i+1} = E_i \exp(-\zeta)$, where ζ is the average logarithmic energy loss. The neutron slowing-down time was taken into

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account (elastic scattering with C^{12} and H^{1} nuclei). In the calculation, the cylindrical scintillator was replaced by an equal sphere, beginning with the second scattering. The computed efficiency curves were found to be in good agreement with experimental data (N.A. Vlasov - Neutrons, 1955, Gostekhizdat). The major advantage of the spectrometer is the relatively high efficiency. Fig. 1 shows the efficiency as a function of neutron energy (MeV). The two curves refer to the two phosphors mentioned above. The efficiency for Curve 1 is multiplied in the figure by a factor of 3. The efficiency at 15, 8.65 and 4.65 MeV on this curve is 0.12, 0.60 and 2.23%. A disadvantage of the spectrometer is the relatively low resolution and a considerable spurious coincidence background. A preliminary description of this apparatus was given by the first of the present authors et al in Ref. 3 (Peredovoy nauchno-tekhnicheskiy i proizvodstvennyy opyt, No. P-58-161/7). It was developed during the period 1957-1958 at the Moscow Engineering Physics Institute.

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E032/E314

A Scintillation Spectrometer ....

There are 4 figures and 6 references: 3 Soviet and 3 non-Soviet. The three English-language references quoted are:
Ref. 1 - R.C. Marshall - Phys. Rev., 1953, 79, 896;
Ref. 2 - W.H. Campbell, I.I. Kopkins - Phys. Rev., 1953, 91, 224;
Ref. 6 - F.D. Brooks - Nucl. Instr. and Meth., 1959, 4, 3.

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy institut (Moscow Engineering-physics Institute)

SUBMITTED: June 7, 1960

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FEDOROVA, G.A.; DEVYATNIN, V.A.

Method for the determmnation of flavonols in vegetable products and industrial preparations. Trudy VNIVI 6:251-256 '59. (MIRA 13:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy vitaminnyy institut. Khimiko-analiticheskaya laboratoriya. (FLAVONES)

FEDOROVA, G.A.

Paper chromatography of some substances related to vitamin P.
Trudy VNIVI 6:256-260 '59. (MIRA 13:7)

1. Khimiko-analiticheskaya laboratoriya Vsesoyuznogo nauchno-issledovatel'skogo vitaminnogo instituta.
(FLAVONES)

DEVYATNIN, V.A.; FEDOROVA, G.A.

Materials on a spectrophotometric method for the determination of the quality of 4-methyl-5-oxyethylthiazole. Trudy VNIVI 6: 285-287 '59. (MIRA 13:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy vitaminnyy institut. Khimiko-analiticheskaya laboratoriya.
(SPECTROPHOTOMETRY) (THIAZOLE)