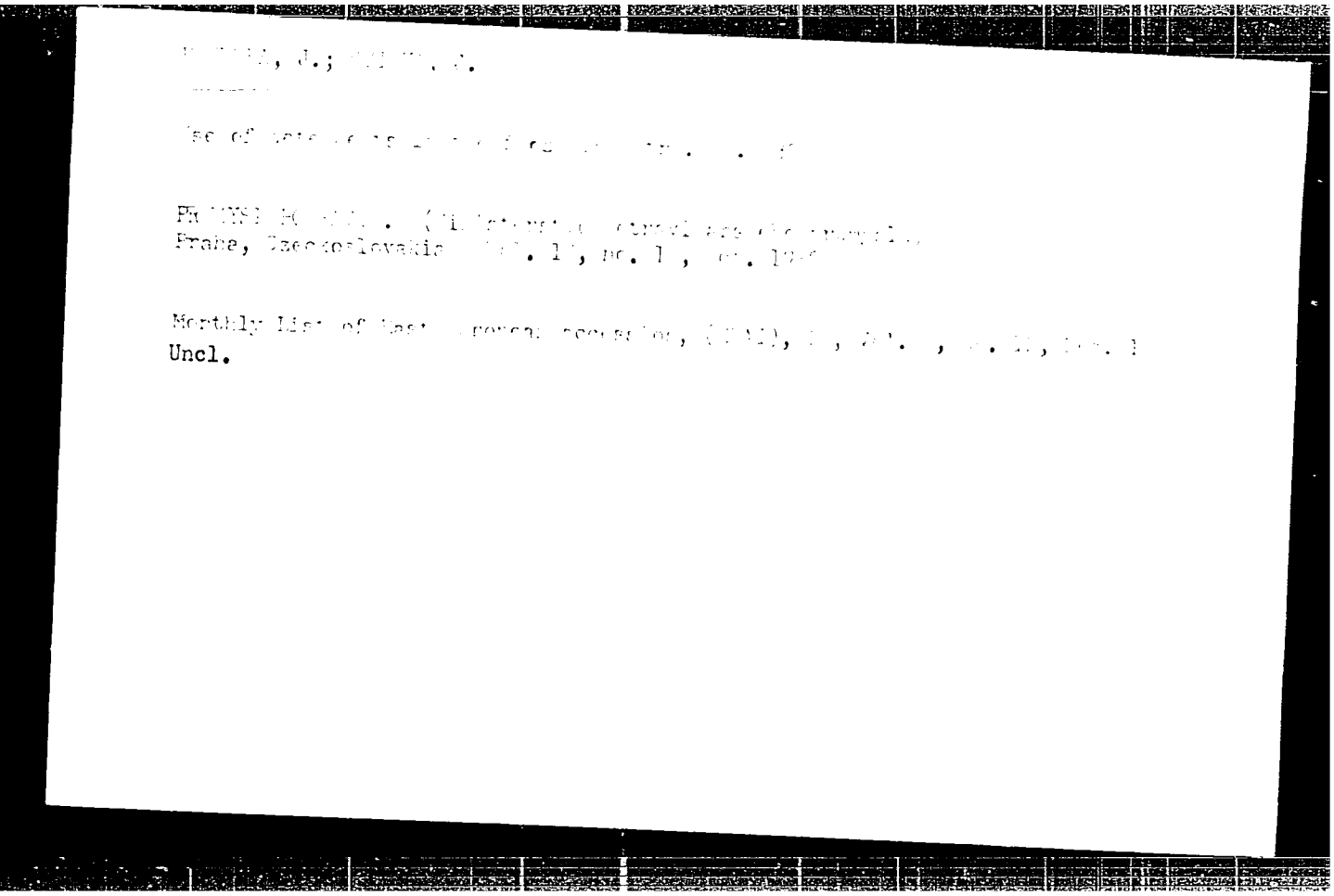
PETERKA, J., inz.

Properties of metal-bonding agents made in Czechoslovakia. Strojirenstvi 11 no.11:848-856 N '61.

1. Vyzkumny a zkusebni letecky ustav, Praha-Letnany.

(Metals) (Adhesives)



Uncl.

PETERKA, Jindrich, inz.

Surface treatment before [illegible] and its effect on the [illegible] properties. [illegible].

PETERKA, Jindrich, inz.

Increasing the use of adhesive bonding in the Czechoslovak aircraft industry. Letecky obzor 7 no.5:146-150 My '63.

ACCESSION NR: AP3000261 Z/0040/63/000/005/0146/0150

AUTHOR: Peterka, Jindrich, Engineer

TITLE: Development of the use of adhesives in joints in the Czechoslovak aircraft industry.

SOURCE: Letecky obzor, no. 5, 1963, 146-150

TOPIC TAGS: Adhesives in aircraft joints, materials used in adhesives; properties of epoxy adhesives; use of adhesives joints; adhesives in Czech aircraft industry

ABSTRACT: Gluing of aircraft parts was originally limited to non-metallic parts. Since 1941, gluing of metals was used initially in Britain. The main advantage of using adhesives instead of welding or bolts is economy. In Czechoslovakia, adhesives based on epoxy resins are chiefly used. Those marked ZV are pilot plant products, CHS are industrial adhesives. All are cured at 180C for 3 or at 145C for 8 hours. The Czech adhesives are subjected to tests for strength in shear, fragility,

Card 1/3

ACCESSION NR: AP3000261

adhesion, fatigue, resistance to liquids generally encountered aboard aircraft, and exposure to water and sea water. A table giving properties of resins ZV 1210 and CHS 1101s shown. Before the adhesives are used, the metal surface must be treated; usually first with a solvent and then with an acid. The treatment varies according to the nature of the metal. Adhesive foils are still rare in Czech production but there is an adequate supply of powders and solutions. The foils must be applies under considerable pressures. Care must be exercised to use adhesive that have a temp. exp. coeff. similar to the metals to be attached to each other. A list of 46 Western aeroplanes using adhesives in their construction is given. The Soviet AN-4 and AN-24 also use such parts. The usual application of this construction is in strengthening of critical parts for structural reasons. Weight is saved in this way. In Czechoslovakia, helicopters HC-2 and HC-3 use supports of rotor blades constructed in this way; airplane L-200 has directional levers fabricated with use of adhesives. In the planes listed above and in plane L-13 other parts of this kind are used. The quality of resin 1210 with curing agent P2 is excellent and equal to any available. It has a strength in shear of 100 kg/cm sup 2 at 83C. Orig. art. has 8 graphs

Card 2/3

ACCESSION NR: AP3000261

and 3 tables.

ASSOCIATION: none

SUBMITTED: 00	DATE ACQ: 17Jun63	ENCL: 00
SUB CODE: 00	NR REF SOV: 006	OTHER: 008

Card 3/3

PETERKA, M., inz.

Gaskets and seals from chemically resistant plastics.
Strojirenstvi 14 no.1:44-50 Ja'64.

1. Statni vyzkumny ustav materialu a technologie, Praha.

PETERKA, M., inz.

Teflex stabilization. Chem zvesti 17 no.9:656-665 '63.

1. Statni vyzkumny ustav meterialy a technologie, Praha 3, Opletalova 25.

ACCESSION NR: AP4016296 Z/0032/64/014/001/0044/0050

AUTHOR: Peterka, M. (Engineer)

TITLE: Use of chemically resistant plastics in gaskets and glands

SOURCE: Strojirenstvi, v. 14, no. 1, 1964, 44-50

TOPIC TAGS: gasketing material, expansion joint, gland, teflon, polytrifluoro-chloroethylene, PVC gasket, polyamide gasket, polyamide gland, polyethylene gasket, polyurethane gasket, silicone rubber gasket design, gland design

ABSTRACT: Evaluation of plastic materials, chiefly teflon, used for gaskets, expansion joints and glands is presented. Selection of a suitable material depends on chemical resistance, mechanical properties, temperature resistance, thermal conductivity and expansion coefficient, retention of shape, suitable hardness, and cold flow of the material. Advantages of filled teflon are mainly reduction of cold flow and decrease of friction losses. Filling with asbestos and fiber glass is suggested. Envelope gaskets with walls 1.5 and 3 mm thick are described. Thickness of teflon gasket should be calculated by a suggested equation $Wm_1 = 0.785\ G^2P + (2b)\ (3.14\ G\ m\ P)$, where Wm_1 is the

Card 1/2

ACCESSION NR: AP4016296

pressure applied to gasket expressed in kp, G is average diameter of the gasket, P allowable pressure in kp/sq. cm, b effective width of gasket, and m is minimum ratio between pressure on gasket and internal pressure in pipe; its value is given as 2.00 for a thickness of 3.2 mm and 3.50 for 0.8 mm. Various examples of practical application are given. Expansion joints should have a wall of 0.5 mm for 3 atm at 20C and 0.35 atm at 200C; 2.5 mm at 14 atm at 20C and 1.5 atm at 200C. Glands may have a direct contact with the shaft at vel. up to 0.8 m/sec without lubrication. Lubrication may be made by pumped liquid. Economic advantages due to long life of teflon are evaluated. Application of polytrifluorochloroethylene for membrances up to 250 mm diameter and 0.6 mm thick are discussed. Polyurethanes are not yet available in Czechoslovakia. Silicone rubbers are produced, and used for work with oils and as binder of asbestos fibers. Orig. art. has: 6 figures, 3 tables.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 14Feb64 ENCL: 00

SUB CODE: MA, MD NO REF SOV: 000 OTHER: 002

Card 2/2

S/081/62/000/021/057/069
B160/B186

AUTHOR: Peterka, Milan

TITLE: Method of thermal stabilization of polytrifluorochloro-ethylene

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1962, 477 abstract 21P264 (Czechosl. patent 98906, March 15, 1961)

TEXT: Polytrifluorochloro-ethylene (I) can be stabilized by adding 0.01-0.2% by weight of NH_4-, Na-, K- or Mg-salts of HBrO or $HBrO_3$. In this case the thermal stability of molten I is considerably higher than when using CrO_3, $NaNO_3$, $NaClO_3$ or $NaNO_2$. The stabilizer is added to powdered I in the solid form or in an alcohol solution with subsequent drying.

[Abstracter's note: Complete translation.]

Card 1/1

CZECHOSLOVAKIA/Chemical Technology. Chemical Products and Their Applications. Synthetic Polymers. Plastics. H

Abs Jour : Ref Zhur-Khimiya, No 6, 1959, 21511

Author : Peterka M.
Inst :
Title : Physicomechanical Properties of Teflon.

Orig Pub : Strojirenstvi, 1958, 8, No 4, 293-296

Abstract : A review of the physical, mechanical and dielectrical properties of teflon is presented. Data are cited on the economics of the use of articles made of teflon. Bibliography, 24 titles. -- L. Sedov

Card : 1/1

PETRAK, V., Ing. [illegible]

Calculation of the dynamics of steam pressure in forced-circulation boilers. Strojírenství 14 no.8:575-580 Ag '64.

1. Institute of Information Theory and Automation, Czechoslovak Academy of Sciences.

L 56458-65 EWP(v)/EWP(k)/EWP(h)/EWP(l) Pf-4

ACCESSION NR: AP5018804 CZ/0032/64/014/008/0570/0580

AUTHOR: Peterka, V. (Engineer, Candidate of sciences)

TITLE: Dynamics of the steam pressure in through-flow steam generators

SOURCE: Strojirenstvi, v. 14, no. 8, 1964, 570-580

TOPIC TAGS: automatic control, automatic control system, thermoelectric generator, steam boiler

ABSTRACT:
Abstract [Author's English summary, modified]: This is a report on a seminar for engineers specialized in automatic regulation systems for steam generators. One of the papers dealt with a new theory elaborated at the Institute for the Theory of Information and Automation. It provides designers of automatic systems with a reliable basis for understanding dynamic conditions in tubes of through-flow boilers. Formulas, contained in the article, may be applied to calculating new powerful steam boilers.

Orig.art. has: 75 formulas, 15 graphs, 8 figures.

Card 1/2

L 56458-65
ACCESSION NR: AP5018804

ASSOCIATION: Ustav teorie informace a automatizace CSAV (Institute of Information Theory and Automation CSAV)

SUBMITTED: 00	ENCL: 00	SUB CODE: IE
NR REF SOV: 001	OTHER: 005	JPRS

Card 2/2

BLAGA, S. [Blaha, S.] (Praga); PETERKA, V. (Praga)

Synthesis of discrete automatic control systems ur' g a square-error integral criterion. Avtom. i telem. 26 no.1:31-41 Ja '65. (MIRA 18:4)

L 24180-65 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(l) Pf-4

ACCESSION NR: AP5003967 S/0103/65/026/001/0031/0041

AUTHOR: Blaha, S. (Prague); Peterka, V. (Prague)

TITLE: Synthesis of sampled-data automatic control systems using the mean-square error criterion

SOURCE: Avtomatika i telemekhanika, v. 26, no. 1, 1965, 31-41

TOPIC TAGS: sampled data control system, mean square error criterion, controller transfer function synthesis, linear control system

ABSTRACT: The synthesis of a sampled-data controller of a linear plant utilizing only the minimum mean square error as the performance criterion is studied. To describe the sequence of i discrete values of the control signal, the z-transformation

$$F(z)=\sum_{i=0}^{\infty} f(iT)z^{-i} \qquad (1)$$

is used. For the solution of this problem, the z-transformation of the desired discrete control signal $E_2(z)$ is sought instead of

Card 1/3

the discrete controller transfer function P(z). The algorithm for determining $E_2(z)$ is presented. It is shown that the z-transformation of the optimal control signal (in the sense of the minimal mean square error) is of the form

$$E_2(z) = \frac{1}{1-z^{-1}} \frac{K(z)A(z)}{U(z)}, \qquad (2)$$

where A(z) and U(z) are polynomials of n-th degree in z^{-1} and $K(z) = K_0 + K_1 z^{-1}$, where K_0 and K_1 are constant coefficients. The procedure for determining K_0 and K_1 is presented. The formula for the function P(z) is obtained on the basis of (2). It is evident from this that the sampled-data controller is of the $(n+1)^{-th}$ order where the order of the controlled system is n. Practical use of the derived algorithm is presented by means of an illustrative example. Orig. art. has: 3 figures and 58 formulas. [LK]

ASSOCIATION: none

L 24180-65

ACCESSION NR: AP5003967

SUBMITTED: 30Jan64	ENCL: 00	SUB CODE: IE,MA
NO REF SOV: 002	OTHER: 003	ATD PRESS: 3175

Card 3/3

PETERKA, V., inz. CSc.; CHRMAK, J., inz. CSc.

Analytic expression of some relations between the thermodynamic parameters of wet steam and overheated steam. Strojirenstvi 14 no.5:351-354 M/ '64.

1. Institute of Information Theory and Automation, Czechoslovak Academy of Sciences, Prague.

PETERKA, V.

"Automatic control systems" by B.C.Kuo. Reviewed by V.Peterka.
Automatizace 6 no.12.Suppl.:Technicka literatura:insert D '63.

L 00261-66 ENP(k)/ENP(h)/ENP(v)/ENP(l) IJP(c) BC
ACCESSION NR: AP5012866 CZ/0088/65/000/002/0127/0143

47
46
8

AUTHOR: Blaha, Svatopluk (Engineer); Peterka, Vaclav (Engineer, Candidate of sciences)

TITLE: Synthesis of sampled-data control systems using the square-error integral criterion

9

SOURCE: Kybernetika, no. 2, 1965, 127-143

14

TOPIC TAGS: data processing, information theory, automatic control system, data procession system, data sampling

ABSTRACT: A design of sampled-data control systems with a continuous linear plant characteristic is described in which a square-error integral criterion is used. The large transient of response to the step function on the reference input, usually obtained if a general square-error integral criterion is employed, can be removed by neglecting errors in the first sampling period after the start of the transient process. The proposed method is based on expressing the modified square-error integral by a z-transform. This complex integral is minimized by using the calculus of variations. A requirement concerning the regularity of a certain complex function inside the unit circle is the starting point for the calculation of the optimum form of the controller output. The method is useful for every

Card 1/2

L 00261-66

ACCESSION NR: AP5012866

type and every finite-order linear plant-transfer function. The transfer function of a discrete controller depends on the form of the reference input and can be determined for every function provided its z-transform is represented by a rational function. Calculations for a practical example are given. Orig. art. has: 2 figures and 71 formulas.

ASSOCIATION: Ustav teorie informace a automatizace CSAV (Institute of Information Theory and Automation, CSAV)

SUBMITTED: 15Jul64 ENCL: 00 SUB CODE: DP

NO REF SOV: 002 OTHER: 005

Card 2/2

BLAHA, Svatopluk, inz.; PETERKA, Vaclav, inz. CSc.

Synthesis of digital control systems according to the square error integral criterion. Kybernetika 1 no.2:127-143 '65.

1. Institute of Information Theory and Automation of the Czechoslovak Academy of Sciences, Prague 2, Vysehradska 49.
Submitted July 15, 1964.

S/194/62/000/008/017/100
D201/D308

16.6760

AUTHOR: Peterka, Václav

TITLE: Calculation of time characteristics of control systems

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 8, 1962, abstract 8-2-114 r (Automatizace, 1961, 5, no. 1, 11 - 15 [Czech.])

TEXT: The article deals with the numerical computation of the response of the control systems described by high order equations. The proposed method of calculation is based on the assumption that the Laplace transforms of any quantity in a linear controlling system (or in the system of differential equations describing this system) can always be reduced to the form

$$Y(p) = U(p)\,[1 + Z(p)] \qquad (1)$$

where U(p) and Z(p) are complex junctions, the original functions u(t) and z(t) of these are easily found. Eq. (1) may be written Y(p) = U(p) - Z(p)Y(p). Using well-known relationships for the original function of a product of image functions

Card 1/2

B/194/62/000/010/030/084
A154/A126

AUTHOR: Peterka, Václav

TITLE: The transfer function of a steam turbine with preheater

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 10, 1962, 85, abstract 10-2-169a (Souhrn prací o automat. 1959. Praha, 1961, 287 - 302; Czechoslovakian; English summary)

TEXT: The author presents the results of a detailed theoretical study of the dynamic properties of a steam preheater and its influence on the operation of an automated steam turbine. A method is proposed for the simplified calculation of the dynamics, based on the assumption that the processes taking place in the preheater space and in the connecting lines are of an isothermal nature. Comparison of the complete and simplified methods shows that the accuracy of calculations made by the simplified method is fully acceptable. The simplified method can be quite easily extended to the case of a steam turbine with several preheaters.

[Abstracter's note: Complete translation] A.S.

Card 1/1

PETERKA, V.; NECHANICKY, J.

"Automatic control in the production of woodcutting plates."

Automatisace. Praha, Czechoslovakia. Vol. 2, no. 3, Mar. 1959.

Monthly list of East European Accessions (EEAI), LC, Vol. 8, No. 6, Jun 59, Uncles

PETERKA, Vaclav, inz. CSc.

Principles of the theory of digital control circuits.
Automatizace 7 no. 4: 87-90 Ap '64.

1. Institute of Information Theory and Automation, Czechoslovak Academy of Sciences.

PETERKA, Vaclav, inz., C.Sc.

Calculation of time characteristics of control circuits.
Automatizace 5 no.1:11-15 Ja '62.

PETERKA, Vladimir

Characteristics of climatic conditions of the Upper Mura Valley. Geogr cas SAV 17 no.1[illegible]-63 '65.

B/056/63/044/001/042/067
B141/B102

AUTHORS: Damburg, R. Ya., Peterkon, R. K.

TITLE: Resonances in electron scattering from hydrogen atoms

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 1, 1963, 244 - 246

TEXT: The behavior of the elastic scattering cross section near the excitation threshold of the 2s levels is investigated taking account of the strong coupling between the 1s and 2s levels for the incident s- and p-waves. According to Ross and Shaw (Ann. of Physics, 13, 147, 1961; Phys. Rev., 126, 806, 1962) the behavior of the cross section near the threshold of a new channel is investigated with the help of the matrix M with the elements $M_{ij} = k_i^{l_i+1/2} (K^{-1})_{ij} k_j^{l_j+1/2}$, where K is the reaction matrix. In the case of two channels with $l_1=l_2=1$ elastic scattering via the "prior" channel is described by

Card 1/4

S/056/63/044/001/042/067
B141/B102

Resonances in electron scattering...

$$\sigma_l = \frac{4\pi(2l+1)}{k_1^2+\gamma_l^2}, \qquad k_1^2 \leqslant 2E_0; \tag{2}$$

$$\gamma_l = \frac{1}{k_1^{2l}}\left(M_{11} - \frac{M_{12}^2}{M_{22}+(-1)^l|k_2|^{2l+1}}\right), \qquad k_2^2 = k_1^2 - 2E_0; \tag{3}$$

$$\sigma_l = \frac{4\pi(2l+1)(M_{22}^2+k_2^{4l+2})}{|(M_{11}-ik_2)(M_{22}-ik_2)-M_{12}^2|^2}, \qquad k_1^2 > 2E_0. \tag{4}$$

The threshold energy for excitation of the 2s level is E_o=0.75 at.un. The authors have calculated $M_{ij}(E) = M_{ij}(E_o) + R_{ij}(E_o)(E-E_o)$ for $E > E_o$ in effective-radius approximation by electronic computation of the system of integro-differential equations according to Marriott (Proc. Phys. Soc. 72, 121, 1958) and Method XI from Miln's book "Numerical integration of differential equations". $M_{ij}(E_o)$ and the effective radii $R_{ij}(E_o)$ are calculated for the singlet (+), triplet (-), and the exchangeless (0) cases (cf. Fig. 1). It is shown that the Ross and Shaw's assumption that the off-diagonal radii are much smaller than the diagonal ones is not always

Card 2/4

Resonances in electron scattering...

fulfilled. The second resonance found by them is proved to be not a true one; it arises from neglecting the higher terms in the expansion of M, which are considerable (an estimate yields $10 - 10^3$). For the elastic scattering of the p-wave only one peak is found; it belongs to the triplet cross section and is positioned at $\sigma = 0.74\ k_1^2$ (given in terms of πa_0^2), calculated with the first three terms of the expansion. The peaks observed by Smith et al. (Phys. Rev. 125, 553, 1962) are sub-threshold effects. There are 2 figures and 1 table.

ASSOCIATION: Institut fiziki Akademii nauk Latviyskoy SSR (Institute of Physics of the Academy of Sciences Latviyskaya SSR)

SUBMITTED: July 17, 1962

PETERKOP, R. [Peterkops, R.]

Exciting S-levels of the hydrogen atom. Vestis Latv ak no.10:91-96 '59. (EEAI 9:10)

(Hydrogen) (Atoms)

PETERKOP, R.K.

Calculation of exchange in the theory of collisions. Zhur. eksp.i teor.fiz. 37 no.4:1172-1173 O '59.
(MIRA 13:5)
(Nuclear reactions)

PETERKOP, R. K., CAND PHYS-MATH SCI, "IONIZATION OF THE HYDROGEN ATOM BY ~~MEANS OF LOW-VOLTAGE~~ slow ELECTRONS. LENINGRAD, 1960. (LENINGRAD ORDER OF LENIN STATE UNIV IM A. A. ZHDANOV). (KL, 2-61, 199).

82827

S/048/60/024/008/003/017
B012/B067

24.6200
AUTHOR: Peterkop, R. K.

TITLE: Partial Excitation Cross Sections of the Hydrogen Atom

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 8, pp. 946-949

TEXT: In this paper, some partial excitation cross sections of the levels of continuous and discrete spectra of the hydrogen atom in the excitation from the ground state are investigated in Born approximation. Formula (1) for the amplitude of the excitation of the level nlm in Born approximation is written down as well as formula (2) for the excitation cross section of the level n. The formula for the excitation cross section of the k-level of the continuous spectrum has the same form as formula (2). $\sigma(q, c)$, the effective cross section is introduced (in units of the momentum interval of the scattered electron). q - momentum of the incident electron, and c - momentum of the scattered electron. The expressions given in formulas (1) and (2) under the integral are expanded into spherical functions, and

Card 1/2

PETERKOP, R.[Peterkops, R.] (Riga)

Asymptotic disintegration of wave function of charged particles.
Vestis Latv ak no.9:79-84 '60. (EEAI 10:9)

1. Akademiya nauk Latviyskoy SSR, Institut fiziki.

(Eigen functions) (Particles) (Asymptotes)

PETERKOP, R.[Peterkops, R.] (Riga)

Consideration of exchange in ionization. Vestis Latv ak no.12: 57-60 '60. (KEAI 10:9)

1. Akademiya nauk Latviyskoy SSR, Institut fiziki.

(Ionization)

24.6200

69833
S/051/60/008/03/003/038
E201/E191

AUTHOR: Propin, R.Kh.

TITLE: Calculation of the Probability of Self-Ionization in Helium and Lithium Atoms

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 3, pp 300-302 (USSR)

ABSTRACT: In light atoms the probability of self-ionization (when it is possible) is much greater than the probability of an optical transition (Ref 1). In the case of helium and lithium self-ionization is possible in the state of double excitation which may be produced, for example, by electron collisions. Self-ionization appears experimentally as the absence of lines representing optical transitions to or from the appropriate states. Self-ionization does not occur when it is forbidden by the selection rules, i.e. certain lines representing transitions from the states of double excitation are observed. One of such lines was reported in the spectrum of helium at 320.4 Å; it is due to a transition $1s2p^3P \rightarrow 2p^2\ ^3P$ (Ref 2). The probability of self-ionization is given by:

Card 1/4

59833
S/052/60/008/03/003/038
E201/E191

Calculation of the Probability of Self-Ionization in Helium and Lithium Atoms

$$w = \frac{2\pi}{h}\left|\int \psi_i^* \left(\sum_{k\neq j} \frac{1}{r_{kj}}\right) \psi_f \, d\tau\right|^2. \qquad (1)$$

where ψ_i and ψ_f are the wave-functions of the initial and final states of the system, r_{kj} is the distance between electrons denoted by k and j, $d\tau$ represents a product of the elementary volumes of all electrons (summation and integration refer to all electrons). The present paper deals with calculation of the probabilities of self-ionization in helium and lithium atoms. The author calculated the energies E and the probabilities of self-ionization w for helium and lithium atoms. The results are given below.

Card 2/4

69833

S/051/60/008/03/003/038
E201/E191

Calculations of the Probability of Self-Ionization in Helium and Lithium Atoms

State	E (in Rydberg units)	w (sec^{-1})
Helium		
$2s^2\ ^1S$	-1.5443	3.51×10^{14}
$2s2p\ ^1P$	-1.3690	3.84×10^{13}
$2s2p\ ^3P$	-1.5112	5.01×10^{13}
$2p^2\ ^1S$	-1.1939	5.66×10^{12}
$2p^2\ ^3P$	-1.4088	0
$2p^2\ ^1D$	-1.3826	1.33×10^{14}
Lithium		
$1s2s^2\ ^2S$	-10.6922	8.03×10^{14}
$1s2s2p^2P$	-10.3801	9.88×10^{14}
$1s2p^2\ ^2S$	-10.1100	2.8×10^{12}
$1s2p^2\ ^2D$	-10.3765	2.18×10^{13}

Card 3/4

4

69833

S/051/60/008/03/003/038
E201/E191

Calculation of the Probability of Self-Ionization in Helium and Lithium Atoms

For the same states the author calculated the approximate wave-functions. Acknowledgement is made to B.T. Geylikman for suggesting the subject and for his advice.
There are 2 tables and 2 references, of which 1 is German and 1 is English.

Card
4/4

SUBMITTED: April 17, 1959

PROPIN, R.Kh.

Calculating the probability of autoionization in He^- and Be^+ ions. Opt.i spektr. 10 no.3:308-311 Mr '61. (MIRA 14:8)
(Ions)

31791
S/056/61/041/006/041/054
B109/B102

26.2312

AUTHOR: Peterkop, R. K.

TITLE: Ionization of hydrogen atoms by electrons with account of interference

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 6(12), 1961, 1938-1939

TEXT: The ionization cross section of hydrogen atoms by electrons has been calculated in Born's approximation, taking interference into account. The ionization cross section consists of two parts $Q = Q' - Q_{int}$, where Q' denotes the cross section without exchange, and Q_{int} the interference term expressed by:

$$Q_{int} = \int_0^{E/2} \frac{kc}{q} de \iint \mathrm{Re}\{f(k, c) f^*(c, k) \exp[i\Delta(c, k) - i\Delta(k, c)]\} dk dc. \qquad (7)$$

Card 1/4

Ionization of hydrogen atoms by ...

where q denotes the momentum of the incident electron, $\xi = k^2/2$, $f(\vec{k},\vec{c})$ denotes the ionization amplitude if the free electron flies off with the momentum $\vec{c}$, and the atomic electron with the momentum $\vec{k}$. The following expression is valid

$$f(\mathbf{k}, \mathbf{c}) = \frac{16 \exp(i\delta(k)) [(1 - ik)^2 + x^2]^{n-1} [(1 - n)\,\mathbf{kx} - x^2]}{(nk(1 - \exp(-2n/k)))^{1/2} x^2 [1 + (\mathbf{x} - \mathbf{k})^2]^{n+2}}; \qquad (4)$$

$$\delta(k) = \arg \Gamma(1 - i/k), \quad n = 1/ik.$$

In Born's approximation one has $\Delta(\vec{k},\vec{c}) = f(k)$. (7) has been calculated with the 5?11-2 (BESM-2) computer. The results shown in a figure demonstrate that taking interference into account will improve considerably the agreement of the Born cross section with experimental data. There are 1 figure and 6 references: 3 Soviet and 3 non-Soviet. The three references to English-language publications read as follows: S. Geltman. Phys. Rev., 102, 171, 1956; R. McCarroll. Proc. Phys. Soc., A70, 460, 1957; W. Fite, R. Brackmann. Phys. Rev., 112, 1141, 1958.

Card 2/

33650

S/051/62/012/001/019/020
E202/E492

24.6200

AUTHOR: Peterkop, R.K.

TITLE: The role of the exchange during the excitation of the 2s and 2p levels of hydrogen by means of electrons

PERIODICAL: Optika i spektroskopiya, v.12, no.1, 1962, 145-147

TEXT: The author evaluates theoretically the three component members of the effective cross-section excitation of the hydrogen atom with electrons, viz. the direct, the exchange and the interferential terms. Some of the results are compared with the experimental measurements of the amplitude of exchange excitation cross-section (the $^1/_2|g|^2$) for the 2s level, given by W.Lichten and S.Schultz (Ref.1: Phys. Rev., v.116, 1959, 1132). The cross-sections were evaluated by means of the distorted-waves method quoted by H. Massey (Ref.2: Rev. Mod. Phys., v.28, 1956, 199) The problem was solved by introducing full orbital moment and projection. Three incident waves were considered: L = 0, 1, 2. For L = 1 and 2, only one scattered wave with moment L - 1 was taken for the 1s - 2p transition. The amplitudes were expressed by integrals containing functions of the elastic scattering. Their

Card 1/3

The role of the exchange ...

integral-differential equations and the numerical evaluations were carried out using the same methods as used by R. Marriott (Ref.4: Proc. Phys. Soc., v.72, 1958, 121). The calculations were carried out with the help of an electronic digital computer БЭСМ-2 (BESM-2). The values of cross-sections were summarized in a table which contained values for various impulses and momenta of the incident electron. It was found that the exchange term $|g|^2$ played considerable role when the energies were small. The inclusion of the exchange term gave much closer approximation of the direct excitation. The exchange and interference term, viz. $|g|^2$ and $Re(fg)$ respectively, were also included and in many cases they led to mutual extinction. The article was concluded by comparing author's data with some of the experimental data available, stressing the fact that at low energies the sum of the three calculated partial cross-sections exceeded the experimental value of the total cross-section. There are 3 figures, 1 table and 12 references: 2 Soviet-bloc and 10 non-Soviet-bloc. The four most recent references to English language publications read as follows: Ref.1: as quoted in text; Ref.8: V.Burke, M.Seaton. Proc. Phys.

DAMBURG, R.Ya.; PETERKOP, R.K.

Role of scattered waves with the moment L - 1 in 1s- 2-p-transitions.
Opt.i spektr. 12 no.5:656-657 My '62. (MIRA 15:5)
(Quantum theory)

PETERKOP, R.K.

Wave function of the e-H collision. Opt.i spektr. 13 no.2:153-158 Ag '62. (MIRA 15:11)
(Wave mechanics) (Collisions (Nuclear physics))

42189
S/051/62/013/004/001/023
E032/E314

AUTHORS: Veldre, V.Ya. and Peterkop, R.K.

TITLE: Distortion of the incident s-wave in the ionization of the hydrogen atoms by electrons

PERIODICAL: Optika i spektroskopiya, v. 13, no. 4, 1962, 461 - 464

TEXT: In a previous paper (Peterkop - Izv. AN LatSSR, 10, 91, 1959) the partial S-ionization cross-section (both electrons in s states after ionization) was discussed on various approximations each of which led to a different result. In the present work the S cross-section for the ionization of hydrogen was computed on the basis of the distorted-wave method and without taking polarization and strong coupling into account. The elastic-scattering function was found by numerical integration and the wave function for the final state was chosen on the Born-Oppenheimer approximation. Numerical results indicate that the Born-Oppenheimer approximation is unacceptable but since the partial S cross-section is only a small fraction of the total cross-section there is very little hope that these calculations

Distortion of the ....

can be compared with experimental results. However, the results indicate that the distortion of the incident s-wave has a considerable influence on the calculations at low incident velocities but since the velocities of the electrons leaving the atom are even lower, the cross-section may be very sensitive to distortions in the final-state wave functions. Fig. 2 shows the average cross-sections with distortion allowed for and Fig. 4 shows the average cross-sections on the Born-Oppenheimer approximation. In these figures Q_1 and Q_2 are given by

$$Q_1 = \int_0^{\frac{1}{2}} \ldots \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$\ldots = \int_{\frac{1}{2}}^{\ldots} \ldots \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9) ,$$

where q is the momentum of the incident electron, $\varepsilon = k^2/2$, k is the electron momentum after ionization, $E = 1/2(k^2 + c^2)$, and c is the momentum of the second electron after ionization. The dashed curve in Fig. 4 is said to be the theoretical limit.

Card 2/3

S/051/62/013/004/001/023
E052/E314

Distortion of the ....

There are 4 figures.

SUBMITTED: August 17, 1961

Fig. 2:

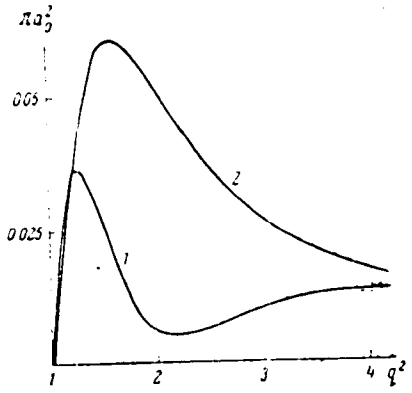
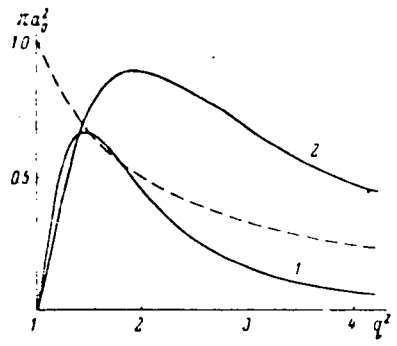


Fig. 4:



Card 3/3

1.2196
S/051/62/013/004/016/023
E039/E491

24 6710

AUTHORS: Damburg, R.Ya., Peterkop, R.K.

TITLE: The collisions of electrons with hydrogen atoms taking into account strong bonds and exchange

PERIODICAL: Optika i spektroskopiya, v.13, no.4, 1962, 597-598

TEXT: Results of calculations on collision cross-sections are presented assuming full orbital moment $L = 0$ and taking account of exchange and bonds between 1s, 2s and 2p levels. A system of three integrodifferential equations was solved containing ten definite integrals. The calculations were made on a BESM-2 (BESM-2) computer. In table 1, direct, exchange, interference and neutralization cross-sections are presented. The amplitude of direct and exchange cross-sections is defined by

$$f = \frac{1}{2}(f^+ + f^-); \quad g = \frac{1}{2}(f^+ - f^-)$$

where f^+ and f^- are the amplitudes of singlet and triplet cross-sections. These and the neutralization cross-section have the form $\sigma^{\pm} = |f|^2 + |g|^2 \pm 2\,\mathrm{Re}\,(fg^*)$, $\sigma = |f|^2 + |g|^2 - \mathrm{Re}\,(fg^*)$.

Card 1/3

... strong bonds, c - with exchange and strong bonds.

Card 2/3

24.4400

391193

B125, B102

AUTHOR: Peterkop, R. K.

TITLE: Asymptotic behavior of a wave function of charged particles

PERIODICAL: [illegible]

TEXT: The phase shift of a scattered wave is studied [illegible] channels of reactions with N complex or elementary [illegible] some of which are assumed to be charged. In the [illegible] only N-1 reduced particles need be examined. In the absence [illegible] forces, the scattered wave has the asymptotic form $\varphi(r,\alpha) \sim r^{-n/2} A(\alpha)\exp(i\sqrt{2E}\, r/\hbar)$, where $A(\alpha)$ is the scattering amplitude. When Coulomb forces are taken into account, the phase of the wave function corresponds to the classical action $S(t) = S(t_0) - E(t-t_0) +$ $+\int_{t_0}^{t} 2E - 2(V(\alpha) + W(r,\alpha))\, r\, dt$. The integral is to be taken over the

Card 1/3

S/056/62/043/002/036/05?
B125/B102

Asymptotic behavior of a wave ...

trajectory $$\dot{r}\frac{d}{dr}(r^2\gamma_{i+1}^2\dot{\alpha}_i) = r^2\frac{\partial T^*}{\partial x_i} - \frac{1}{r}\frac{\partial (V(\alpha) + W(r,\alpha))}{\partial x_i}.$$ (8).

The motion of the particles approaches that of free, divergent particles as their interdistance increases. The asymptotic behavior of the motion is given by $S \sim -Et + \sqrt{2E}\, r - (V(\alpha)/\sqrt{2E})\ln r$. The asymptotic behavior in the configuration space is changed by scattering in the direction α_0 in the same way as by scattering from a constant potential $V'(\alpha) = V(\alpha_0)$. This general result implies the asymptotic behavior of a wave function of two charged particles and the result obtained by R. Hart et al. (Phys. Rev., 108, 1512, 1957) for two charged and one neutral particle. Expansion of the wave function in a power series of $(\ln r)^p r^{-m}$ furnishes the same result as a semi-classical approximation. In the presence of Coulomb forces $\rho(r,\alpha)$ can only be expanded with respect to functions of such angles on which $V(\alpha)$ does not depend. In expanding with respect to the remaining angles one first has to separate a factor containing a logarithmic phase from the wave function.

ASSOCIATION: Institut fiziki Akademii nauk Latviyskoy SSR (Institute of Physics of the Academy of Sciences of the Latviyskaya SSR)

Card 2/3

S/051/62/012/005/021/021
E032/E514

AUTHORS: Damburg, R.Ya. and Peterkop, R.K.

TITLE: On the role of the scattered wave with angular momentum L-1 in 1s-2p-transitions

PERIODICAL: Optika i spektroskopiya, v.12, no.5, 1962, 656-657

TEXT: In calculations concerned with the excitation of the 2p-level of hydrogen by electrons with total angular momentum $L > 0$, it is usual to take into account only the L-1 wave. The authors report estimates of the contribution of the scattered wave with angular momentum L + 1 to the cross-section. The results of the calculations are given in the following table.

k, at.units	L	Born approximations		Distorted wave approximation 0		+		-	
		L-1	L+1	L-1	L+1	L-1	L+1	L-1	L+1
0.9	1	0.467	0	0.0006	0	0.108	0.0001	0.299	0.0001
	2	0.096	0	0.654	-	0.803	-	0.004	0
1.0	1	0.489	0	0.0002	0.001	0.202	0.006	0.140	0.002
	2	0.356	0.0002	1.133	0.001	1.711	0.001	0.004	0.0001

Card 1/2

DAMBURG, R.Ya.; PETERKOP, R.K.

Excitation of the 2s and 2p levels of the hydrogen atom by slow electrons. Zhur. eksp. i teor. fiz. 43 no.5:1765-1768 N '62. (MIRA 15:12)

(Hydrogen) (Electrons)
(Quantum theory)

43368
S/056/62/043/005/029/058
B102/B104

24.6110

AUTHORS: Damburg, R. Ya., Peterkop, R. K.

TITLE: Excitation of the 2s and 2p levels of the hydrogen atom by slow electrons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 5(11), 1962, 1765 - 1768

TEXT: As the results obtained among others by Marriott (Proc. Phys. Soc. 72, 121, 1958) and Smith (Phys. Rev. 120, 845, 1960) showed that exchange effects and also level coupling would play a great role in collisions between slow electrons and hydrogen atoms, the authors calculated the 2s and 2p excitation cross sections taking full account of exchange and of all coupling between 1s-2s-2p. The calculations are carried out for $0 \leq L \leq 4$ when the amplitudes for direct and exchange transitions are given by $f_L = \frac{1}{2}(f_L^+ + f_L^-)$, $g_L = \frac{1}{2}(f_L^+ - f_L^-)$, f_L^+ and f_L^- denoting the singlet and triplet amplitudes. The averaged cross sections are then

Card 1/3

... the 2p
... orbital momentum of the incident electron equals zero and

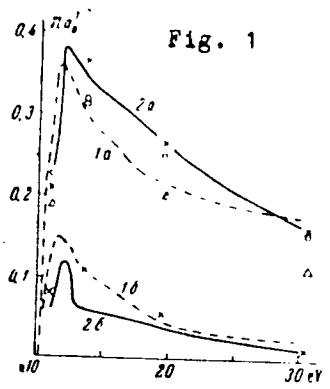
Excitation of the 2s and 2p levels...

±1, respectively. At small energies σ(1s-2p) is much greater than the experimental cross section (Phys. Rev., 116, 356, 1959) and P(2p) is much smaller. There are 2 figures and 2 tables.

SUBMITTED: May 19, 1962

Fig. 1. 2s excitation cross section in terms of πa_0^2 as dependent on energy (a_0 - Bohr's radius). a - averaged cross sections; b - $|g|^2/2$. (1) experimental curves (Lichten, Schultz, Phys. Rev. 116, 1132, 1959), (2) sum σ_2 of partial cross sections taken over L=0,1,2, calculated by the method of distorted waves and taking account of exchange (Peterkop, Optika i spektr., 12, 145, 1962); 0-σ_2 with account of 1s-2p coupling, Δ - σ_2 with account of all coupling.

Fig. 1



Table

Energy, eV	σ(1s−2p, ±1)	σ(1s−2p, 0)	P(2p), %
0,9	0,068	0,215	19,2
1,0	0,096	0,602	28,3
1,2	0,128	0,897	29,5
1,5	0,197	0,673	20,4
2,0	0,237	0,433	10,2

Card 3/3

ACCESSION NR: AT4001252 S/2668/63/000/013/0017/0035

AUTHORS: Damburg, R. Ya.; Peterkop, R. K.

TITLE: Collision of slow electrons with hydrogen atoms

SOURCE: AN LatSSR. Institut fiziki. Trudy*, no. 13, 1963, 17-35

TOPIC TAGS: hydrogen atom, slow electron, slow electron collision, electron bombardment, plasma, gas discharge plasma, upper atmosphere, astrophysics, plasma physics, collision cross section, wave function, hydrogen wave function, distorted wave method, nuclear collision

ABSTRACT: The cross sections for the excitations of hydrogen atoms by slow electrons are calculated with full account of exchange and of all the couplings between the levels 1s--2s--2p. Knowledge of these cross sections is of importance to plasma research and upper-atmosphere sounding by means of rockets and satellites. The unsatisfactory agreement between experiments and earlier theoretical

Card 1/2

ACCESSION NR: AT4001252

calculations, made under various assumptions, is noted. The problem is solved on the basis of equations derived by I. C. Percival and M. I. Seaton (Proc. Cam. Phil. Soc. 53, 654, 1957) on the BESM-2 computer of the Latviyskiy gosudarstvenny*y universitet (Latvian State University), using five total orbital angular momentum values, from 0 to 4. The results are compared with other experimental and theoretical data and regions where further research is necessary are pointed out. Orig. art. has: 10 tables and 11 formulas.

ASSOCIATION: Institut fiziki AN LatSSR (Physics Institute, AN LatSSR)

SUBMITTED: 00 DATE ACQ: 10Dec63 ENCL: 00

SUB CODE: PH, NS NO REF SOV: 008 OTHER: 028

Card 2/2

ACCESSION NR: AT4001254 S/2668/63/000/013/0047/0053

AUTHORS: Damburg, R. Ya.; Peterkop, R. K.

TITLE: Resonance phenomena in electron scattering on hydrogen atoms

SOURCE: AN LatSSR. Institut fiziki. Trudy*, no. 13, 1963, 47-53

TOPIC TAGS: resonance, nuclear collision, hydrogen, hydrogen atom, electron scattering, elastic scattering, electron elastic scattering, Wigner threshold peak, Wigner threshold

ABSTRACT: Two channels are taken into account in an investigation of resonances in elastic scattering of electrons by hydrogen atoms near the excitation threshold of the 2s level, namely elastic scattering and virtual excitation of the 2s level. The M-matrix elements were calculated with a BESM-2 digital computer. This made it possible to match the solutions obtained above and below threshold for both the singlet and the triplet states. The calculations were

Card 1/2

ACCESSION NR: AT4001254

made for incident s waves and p waves, but not for the exchangeless case. The results are compared with calculations by others, especially by K. Smith et al. (Phys. Rev. v. 125, 553, 1962) and it is shown that the maxima observed by the latter correspond to isolated subthreshold resonances of the Breit-Wigner type. The results are also discussed from the point of view of allowance for several approximations (distorted waves, effective radius, weak coupling, strong coupling). Orig. art. has: 4 figures, 18 formulas, and 1 table.

ASSOCIATION: Institut fiziki AN LatSSR (Physics Institute AN LatSSR)

SUBMITTED: 00 DATE ACQ: 10Dec63 ENCL: 00

SUB CODE: PH, NS NO REF SOV: 000 OTHER: 011

Card 2/2

ACCESSION NR: AT4001257 S/2668/63/000/013/0115/0120

AUTHOR: Peterkop, R. K.

TITLE: Preservation of particle flux in collisions

SOURCE: AN LatSSR. Institut fiziki. Trudy*, no. 13, 1963, 115-120

TOPIC TAGS: ionization, ionization process, electron atom collision, continuous spectrum, electron scattering, nuclear collision, nuclear scattering, electron collision

ABSTRACT: By using the collision of an electron with a hydrogen atom as an example, it is shown that in the case of collisions with excitation of the continuous-spectrum levels the derivation of the optical theorem has certain singularities brought about by the fact that in ionization or recombination the probability flux is conserved in configuration space but the particle flux is not conserved in three-dimensional space. As a result, failure to take into account

Card 1/2

ACCESSION NR: AT4001257

the non-conservation of the total particle flux in the presence of ionization has led to erroneous conclusions in several articles, which are pointed out. Orig. art. has: 32 formulas and 1 figure.

ASSOCIATION: Institut fiziki AN LatSSR (Physics Institute, AN LatSSR)

SUBMITTED: 00	DATE ACQ: 10Dec63	ENCL: 00
SUB CODE: PH, NS	NO REF SOV: 002	OTHER: 009

Card 2/2

KARULE, E.M.; PETERKOP, R.K.

Collisions of electrons with lithium atoms in the approximation of strong coupling. Opt. i spektr. 16 no.6:958-962 Je '64.
(MIRA 17:9)

L 18157-63 EWT(l)/BDS AFFTC/ASD
ACCESSION NR: AP3004489

S/0048/63/027/008/1012/1017

AUTHOR: Peterkop, R.K.

TITLE: Asymptotic behavior of the wave function of a system of neutral and charged particles /Report presented at the Second All-Union Conference on the Physics of Electronic and Atomic Collisions held in Uzhgorod 2-9 Oct 1962/

SOURCE: AN SSSR, Izvestiya, ser.fiz.,v.27, no.8, 1963, 1012-1017

TOPIC TAGS: wave function , ion-atom collision , many particle system

ABSTRACT: In problems involving impact ionization of atoms it is usually necessary to consider, after the collision, a system consisting of three or more independent, charged, diverging particles. In order to formulate the problem properly one must know the asymptotic behavior at infinity of the wave function characterizing the encounter. In general one can consider a nonrelativistic reaction channel containing N compounds or elementary particles, some or all of which may be charged. The Schrodinger equation is written for this system in spherical coordinates. Certain simplifying assumptions are introduced and the asymptotic solution is sought in general form. Knowledge of the asymptotics of the total wave function also al-

Card 1/2

L 18157-63
ACCESSION NR: AP3004489

lows of investigating the convergence of the integral expressions for the excitation and ionization amplitudes. It is noted that the arrived at asymptotic gives rise to certain difficulties in solving some specific collision problems. Orig. art. has: 43 formulas.

ASSOCIATION: Institut fiziki Akademii nauk LatvSSR (Institute of Physics, Academy of Sciences, Latvian SSR)

SUBMITTED: 00 DATE ACQ: 26Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 008 OTHER: 006

Card 2/2

DAMBURG, R.Ya. [Damburgs, R.]; PETERKOP, R.K. [Peterkops, R.]

Resonances in the scattering of electrons on hydrogen atoms. Zhur eksp. i teor. fiz. 44 no.1:244-246 Ja '63. (MIRA 16:5)

1. Institut fiziki AN Latviyskoy SSR.
(Electrons--Scattering)
(Hydrogen)

PETERKOP, R.K. [Peterkops, R.]

Asymptotic behavior of the wave function of a system of neutral and charged particles. Izv. AN SSSR. Ser. fiz. 27 no.8:1012-1017 Ag '63. (MIRA 16:10)

1. Institut fiziki AN Latviyskoy SSR.

L 26485-65 EWT(1)/EWT(m)/EPF(n)-2/EWP(t)/EEC(t)/EPA(w)-2/EWP(b) Pab-10/Pu-4 IJP(c)
ACCESSION NR: AR5004851 JD/JG S/0058/64/000/011/D005/D005

SOURCE: Ref. zh. Fizika, Abs. 11D35

44
31
B

AUTHORS: Karule, Ya. M.; Peterkop, R. K.

TITLE: Scattering of electrons by lithium atoms

CITED SOURCE: Izv. AN LatvSSR. Ser. fiz.-tekhn. n., no. 1, 1964, 53-58

TOPIC TAGS: electron scattering, wave function, elastic scattering, scattering cross section, excitation cross section, lithium atom

TRANSLATION: The effective cross sections for elastic scattering and excitations of the state $1s^2 2p$ of the lithium atom by electrons are calculated in the Born approximation. The effective diffusion and viscosity cross sections are also determined. The dependence of the results on the choice of the atomic wave functions is investigated.

SUB CODE: NP ENCL: 00

Card 1/1

ACCESSION NR: AP4039703 S/0051/64/016/006/0958/0962

AUTHORS: Karule, E. M.; Peterkop, R. K.

TITLE: Collisions of electrons with lithium atoms in the strong-coupling approximation

SOURCE: Optika i spektroskopiya, v. 16, no. 6, 1964, 958-962

TOPIC TAGS: electron collision, atomic spectroscopy, level transition, Schroedinger equation, electron scattering

ABSTRACT: The effective cross sections are calculated for the scattering of electrons by lithium atoms at 2--3 eV, with allowance for the strong coupling of the ground and first-excited states and for the exchange of the incident and optical electrons. The calculation was carried out in a representation involving the total orbital momentum and its projection. The integro-differential equations obtained by substituting the expressions for the wave function in the

Card 1/2

L 14300-65 EWT(1) SSD/ASD(a)-5/AFWL/AS(mp)-2/AFETR/ESD(gs)/ESD(t)/IJP(c)
ACCESSION NR: AP4047936 S/0056/64/047/004/1602/1603

AUTHORS: Damburg, R. Ya.; Peterkop, R. K. B

TITLE: Concerning the single electron approximation in collision theory

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 4, 1964, 1602-1603

TOPIC TAGS: electron scattering, polarization, collision theory, single electron approximation

ABSTRACT: To explain the surprising agreement between the calculations of B. A. Veklenko and I. V. Novobrantsev (ZhETF v. 43, 919, 1962) and the more thorough but also more laborious calculations of A. Temkin (Phys. Rev. 126, 130, 1962) and C. Schwartz (Phys. Rev. v. 124, 1468, 1961), the authors repeated the calculations of Veklenko and Novobrantsev using the BESM-2 computer. It is concluded that

Card 1/2

L 14300-65
ACCESSION NR: AP4047936

2

the agreement is due to errors in the numerical calculations. Consequently, further results by Veklenko and others, based on the original data, are likewise in error, as is their conclusion that within the framework of the single-electron approximation it is possible to take correct account of the polarization of the atom by the scattered electron. The main difficulty in applying the single-electron approximation to continuous-spectrum problems lies in the fact that it is not clear what type of stationary potential can be produced by the unbound particle. "We are grateful to A. F. Gorshanova for help with the calculations." Orig. art. has: 2 formulas.

ASSOCIATION: Institut fiziki Akademii nauk Latviyskoy SSR (Institute of Physics, Academy of Sciences Latvian SSR)

SUBMITTED: 20Mar64 ENCL: 00

SUB CODE: NP NR REF SOV: 002 OTHER: 006

Card 2/2

L 59415-65 EPF(n)-2/EWA(h)/EWT(m) Pu-4

ACCESSION NR: AR5015978 UR/0058/65/000/005/D011/D011

SOURCE: Ref. zh. Fizika, Abs. 5D70

AUTHOR: Propin, R. Kh.

TITLE: On the ionization of the Li atom whose nucleus collides with a neutron

CITED SOURCE: Izv. AN LatvSSR. Ser. fiz. i tekhn. n., no. 6, 1964, 9-14

TOPIC TAGS: lithium atom, ionization, neutron bombardment, ionization probability, excitation energy

TRANSLATION: The author calculates the probability of ionization of a Li atom under the influence of neutron bombardment. The calculation is based on the formulas of the theory of sudden perturbations, using a variational wave function. It is shown that along with the direct process, an appreciable role is played by ionization via the intermediate self-ionizing states $1s2s2p\,^2P$. Because of these states, one should observe a sharp increase in the emission of electrons with definite energies. It is indicated that this fact can be used for an experimental determination of the energy levels of excited states and their widths.

SUB CODE: NP ENCL: 00

Card 1/1

L-12898-65 EWT(l)/EWT(m)/EPF(c)/EPF(n)-2/EPA(w)-2/EWG(t)/T/EWP(b)/EWA(m)-2
Pab-10/Pr-4/Pu-4 IJP(c)/ASD(p)-3/ASD(a)-5/AS(mp)-2/AFWL/SSD/ASD(d)/ASD(f)-2/
ACCESSION NR: AP4047183 ESD(t) JD/WW/JGS/0051/64/017/004/0618/0620

AUTHOR: Propin, R. Kh.

TITLE: Autoionization of the He and Li atoms and of the Be^+ ion

SOURCE: Optika i spektroskopiya, v. 17, no. 4, 1964, 618-620

TOPIC TAGS: helium, lithium, beryllium, autoionization, wave function

ABSTRACT: This is a refinement of earlier papers by the author (Opt. i spektr. v. 8, 300, 1960 and v. 10, 308, 1961), in which the probabilities of autoionization were estimated, but the wave functions employed were rather crude. A new and more exact formulation is obtained for the wave functions, in the form of expansions of single-electron Coulomb functions with an additional function to ensure orthogonality. Calculations for four different states result in new probabilities which are quite close to the old ones in the case of He, but are quite different in the case of Li and Be^+. "The

Card 1/2

L 12898-65
ACCESSION NR: AP4047183

author thanks B. T. Geylikman for valuable advice." Orig. art. has: 5 formulas and 1 table.

ASSOCIATION: None

SUBMITTED: 13Jun63 ENCL: 00

SUB CODE: OP, NP NR REF SOV: 005 OTHER: 002

Card 2/2

VELDRE, V.Ya., otv. red.; DAMBURG, R.Ya., red.; PETERKOP, R.K., red.; SAVEL'YEVA, Ye., red.

[Electron and atom collisions; atom collisions] Elektronno-atomnye stolknoveniia; atomnye stolknoveniia. Riga, Zinatne. No.2. 1965. 144 p. (MIRA 18:11)

1. Latvijas Padomju Socialistiskas Republikas Zinatnu Akademija. Fizikas instituts.

L 26514-66 EWT(1) IJP(c) AT/GS

ACC NR: AT6011779 SOURCE CODE: UR/0000/65/000/000/0105/0138

50

AUTHOR: Peterkop, R. K.

ORG: none

TITLE: Exchange of electrons in collisions between electrons and atoms

SOURCE: AN LatSSR. Institut fiziki. Elektronno-atomnyye stolknoveniya; atomnyye stolknoveniya (Electron and atom collisions; atom collisions), no. 2, Riga, Iz vo Zinatne, 1965, 105-138

TOPIC TAGS: charge exchange, electron collision, electron spin, Hamiltonian, wave function

ABSTRACT: This is a review article dealing with the treatment of exchange and the role of exchange effects in collisions between electrons and atoms. The case is considered when the Hamiltonian of a multi-electron system does not depend on the spins (magnetic interactions are disregarded). This means that the calculations reduce in practice to finding the coordinate wave functions. The importance of representing the unknown wave function in a form which is symmetrized in a definite manner is emphasized and some misconceptions in the literature concerning the symmetry requirements are briefly pointed out. Problems connected with allowance for exchange in the theory of collisions are first discussed in detail for systems containing two or three electrons, using as examples the collisions between the electrons and monovalent and divalent atoms. This is followed by a review of exchange effects in the collision

2

Card 1/2

L 26514-66
ACC NR: AT6011779 O

of electrons with atoms of hydrogen, helium, and alkali metals. Many of the experimental cross sections are compared with the results of the present calculations. It is shown in particular that the role of the Pauli principle is overestimated, and that solutions without maximum asymmetry properties could not be obtained even if there were no Pauli principle in nature. In the case of continuous spectrum, no resort to the Pauli principle would lead to symmetrized solutions, and the solutions with maximum symmetry are preferred because they are the simplest and entail the minimum amount of labor. Orig. art. has: 3 figures, 143 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 23Jul65/ ORIG REF: 019/ OTH REF: 022

Card 2/2 CC

L 3529-66 EWT(m)/EPF(c)/EPA(w)-2/EWP(t)/EWP(b)/EWA(m)-2/EWT(l) IJP(c)
ACCESSION NR: AP5015114 JD/AT UR/0371/65/000/003/0047/0052

AUTHOR: Peterkop, R. K. 44,55

TITLE: The role of exchange in the scattering of electrons by helium atoms 3,44,55

SOURCE: AN LatSSR. Izvestiya. Seriya fizicheskikh i tekhnicheskikh nauk, no. 3, 1965, 47-52

TOPIC TAGS: elastic scattering, scattering amplitude, scattering cross section, electron scattering, particle interaction

ABSTRACT: The amplitudes for direct and exchange elastic scattering of electrons by helium atoms are determined in the distorted-wave approximation by solving the integro-differential equation for the amplitudes with the aid of a computer by a non-iterative technique. The exchange cross section is found to be approximately 10 per cent, and the interference term up to 60 per cent of the direct cross section. Even when the exchange processes have by themselves a low probability, their role as a whole can be appreciable. At zero energy

Card 1/2

L 3529-66

ACCESSION NR: AP5015114

allowance for the mutual interaction between the direct and exchange scattering reduces the direct cross section by a factor of approximately 6. In the case of strong interaction the exchange and interference terms must be added to the direct cross sections. The results show that methods such as the Born-Oppenheimer approximation, in which the mutual influence of the direct and exchange processes are not taken into account, cannot be employed in the case of strong interaction with exchange scattering. Orig. art. has: 2 figures, 35 formulas, and 2 tables

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

SUBMITTED: 30Dec64 ENCL: 00 SUB CODE: NP

NR REF SOV: 003 OTHER: 005

Card 2/2

ACC NR: AT7008876 SOURCE CODE: UR/0000/65/000/000/0139/0145

AUTHOR: Peterkop, R. K.

ORG: none

TITLE: Optical theorem for an n-space

SOURCE: AN LatSSR. Institut fiziki. Elektronno-atomnyye stolknoveniya, 1965, 139-145

TOPIC TAGS: particle scatter, asymptotic property, scattering amplitude, wave function

SUB CODE: 20

ABSTRACT: The author in an earlier article obtained the following correlation for scattering of one-dimensional particles:

$$\sigma = -2\,\mathrm{Re}\,f(0).$$

The purpose of the present article is to find the form taken by an optical theorem in an n-space. The problem of the scattering of an n-dimensional particle in a certain force field is considered. The scattering amplitude is determined by the following asymptotic condition for the wave function:

$$\psi(r) \underset{r\to\infty}{\sim} e^{ikr} + r^{-\frac{n-1}{2}} f(\Omega) e^{ikr}.$$

The article considers only stationary states for which $|\psi|$ is time-independent. The following optical theorem is derived for an n-dimensional case:

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$$\sigma = -2\,\mathrm{Re}\left[\left(\frac{2\pi i}{k}\right)^{\frac{n-1}{2}} f(0)\right],$$

where

$$\sigma = \int |f(\Omega)|^2 d\Omega \qquad (1)$$

It is shown that this theorem also holds true for n = 1. The author considers the connection of the optical theorem with the condition of unitariness. Just as in the one-dimensional or three-dimensional case, optical theorem (1) in the n-dimensional case holds true as well during the collision of constituent particles, when inelastic processes are possible. In such a case σ denotes the sum of elastic and inelastic cross sections. Orig. art. has: 46 formulas. [JPRS: 34 310]

Card 2/2

BENESOVA, Olga; KRISTANOVA, Anna; PETRKOVA, Blazena; SEMECKA, Irena

Biological titration of pituitrin. Cesk. farm. 3 no.6:213-219 Je '54.

1. Z Kontrolniho ustavu farmaceutickeho v Praze.
(PITUITARY GLAND, POSTERIOR, hormones,
*pituitrin, biol. standard, technic)

ENDRYS, J.; STEINHART, L.; KOSNAR, I.; PETERLE, M.; PROCHAZKA, J.; BELOBRADEK,Z.; RESAC, V.; SLEZAK, P.

Catheterization of the left heart. Evaluation of experiences with 650 examinations. Vnitrni lek. 11 no.4:331-338 Ap'65.

1. Kardiochirurgicke stredisko, fakultni nemocnice a lekarska fakulta Karlovy University v Hradci Kralove.

CA

2

The form of macromolecules in solution. Interaction of segments of the molecule and solvent. Anton Peterlin (Univ. Ljubljana, Yugoslavia). *Les grosses molécules en solution, Hommage méd. à Paul Langevin et Jean Perrin* (Collège de France) 1948, 70–8.—For very large degrees of polymerization there is interaction between the mol. and the solvent, changing the length of the mol. Modifications are then required in the equations for sedimentation, viscosity, and birefringence. Rip O. Rice

1952

C-7

2

Viscosity and sedimentation of linear macromolecules exhibiting partial solvent immobilization. Anton Peterlin (Univ., Ljubljana, Yugoslavia). *J. Polymer Sci.* 5, 473-82(1950).—The formulas of Debye and Bueche (*C.A.* 42, 8199c) and of Kirkwood and Riseman (*C.A.* 42, 6205e) and of Peterlin (unpublished) relating intrinsic viscosity $[\eta]$ and sedimentation const. $[s]$ with the mol. wt. M of the subject mols. all show $M/[\eta]$ and $[s]$ proportional to $M^{2/3}$. From the slopes of the curves, the effective lengths of the coiled mols. can be calcd. Application to available data is not entirely satisfactory, possibly because the data may represent the transition from straight to coiled mols.

Arnold M. Collins

1701

CA

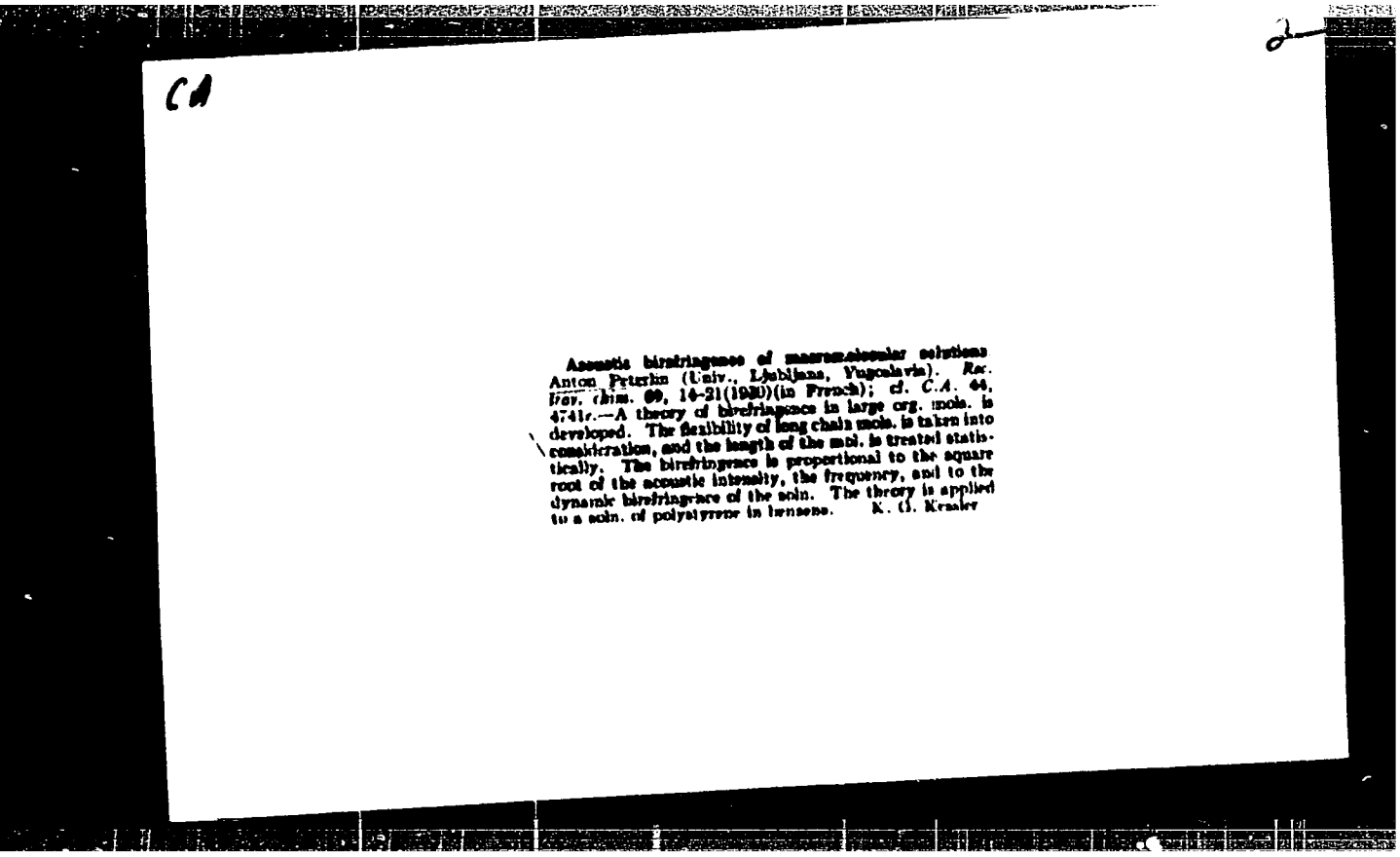
2

Acoustic birefringence in liquids. Anton Peterlin (Univ., Ljubljana, Yugoslavia). *J. phys. radium* **11**, 45-8 (1950).—The mols. of the liquid are replaced by rigid ellipsoids which, under the influence of an ultrasonic field, orient themselves with their major axes in the direction of the max. dilation. The birefringence is proportional to the sq. root of the sonic field intensity and to the frequency at frequencies sufficiently low for relaxation effects to be negligible. K. G. Kessler

CA

2

Statistical model of short chain polymers. Antom Ilavsky (Univ. Ljubljana, Yugoslavia). *J. Chem. Phys.* 17, 568(1950).—The intrinsic viscosity of a soln. of models with a finite no. of chains was calcd. In varying the flexibility of the model and the hydrodynamic interaction of the chains, there was set up an S-shaped curve to represent the chain structure. The results correspond closely to semi-flexible polymers, like the celluloses. E. Balgley



CA

Acoustic birefringence of macromolecular solutions
Anton Peterlin (Univ., Ljubljana, Yugoslavia). *Rec. trav. chim.* **69**, 14-21(1950)(in French); cf. *C.A.* **44**, 4741c.—A theory of birefringence in large org. mols. is developed. The flexibility of long chain mols. is taken into consideration, and the length of the mol. is treated statistically. The birefringence is proportional to the square root of the acoustic intensity, the frequency, and to the dynamic birefringence of the soln. The theory is applied to a soln. of polystyrene in benzene. K. (J. Kessler

CA

1

Form of amylose acetates in chloroform. A. Peterlin (Slovene Acad. Sci. Arts, Ljubljana, Yugoslavia); Slovenska Akad. Znanosti Umetnosti, Razred Mat., Fiz., Tehn. Vede, Class III, Ser. A, Razprave II, 31-4(in English, 35-40)(1951).—If macromols. exist as random coils, the equation $[\eta] = BM/(1 + \sqrt{B/A})$ should apply, where $[\eta]$ = intrinsic viscosity, M = mol. wt., and A and B are consts. depending on the nature of the solvent and solute. This equation agreed well with the data of Sarner and Knop (cf. *Acad. Sci. Ar. Slov. Class III, Ser. A* No. 3, 5(1951)) for amylose triacetate in $CHCl_3$. The calcd. end-to-end distance of the mols. was much smaller than that of the stretched mols. (a 115° angle was assumed at the O atom), but larger than that of a chain of statistically independent glucose residues. This shows the presence of hindered rotation at the O atom; this is due either to steric hindrance (allowed angle of rotation 131°), or to a potential barrier of height 5.4 kT.

H. Newcombe

Effect of the velocity gradient on intrinsic viscosity of polymers in solution. A. Peterlin (Inst. Phys., Ljubljana, Yugoslavia). *J. Polymer Sci.* **8**, 621-32(1952). Math. For very soft free-draining macromols. the intrinsic η is independent of velocity gradient. With completely stiff mols. orientation in flow occurs without change in shape, and the intrinsic η decreases with increasing orientation. For real macromols. the effect of velocity gradient should lie between these two limiting cases. The effect of hydrodynamic interaction of chain elements cannot be computed precisely, but qual. considerations indicate an increase in η with stretching of the mol. coils. The data available do not furnish a reliable test of the theory. J. R. Hill

Peterlin, A.

YUGO.

53.551 : 532.51

3347. The flow birefringence of concentrated solutions of linear macromolecules. A. PETERLIN. Letter in *Bull. sci. Cons. Acad. Yougoslave*, C. 1951 (July, 1953) *In French.*

The linear relationships existing between viscosity, flow birefringence and velocity gradients in the case of dilute solutions fail as the concentrations increase. This is due to the increased interaction effects of the macromolecules. To explain this the viscosity of the solvent, which is usually considered to be the decisive factor in flow, is replaced by an effective viscosity η^* defined by the equation $\eta^* = (\eta - \eta_0)/c(\eta)$, where η and η_0 are the viscosities of the solution and solvent respectively, (η) is the intrinsic viscosity and c the concentration. Using this concept some of the orientation effects found in the flow of concentrated solutions are explained. H. O. JERRARD

PETERLIN, A.

YUGO

Streaming birefringence of moderately concentrated solutions of polyisobutylene. A. Peterlin and M. Čopič. *Slovenian Acad. Sci. and Arts, "J. Stefan" Inst. Phys. Repts.* 1, 65-73(1953)(in English).—The effective viscosity η^* is defined by the equation $\eta = \eta_0 + c[\eta]\eta^*$, where η, η_0, and $[\eta]$ are the viscosities of the soln., of the solvent, and the intrinsic viscosity and c is the concn. Use of η^* rather than η_0 gives rise to equations for the birefringence and extinction angle of concd. solns. similar to those for dil. solns. The exptl. results of Zvetkov and Frisman (cf. *C.A.* 40, 798[5]) on solns. of some polyisobutylenes are used to check the hypotheses. The birefringence is in satisfactory agreement. However, the extinction angle shows an unexpected concn. dependence. The polydispersity of the samples may have been responsible. Herabel Markovitz

PETERLIN, A.

Viscous behavior of moderately concentrated macromolecular solution. A. Peterlin (J. Stefan Inst. Phys., Ljubljana, Yugoslavia). *Proc. Intern. Congr. Rheol.* 2, 343-8, discussion 348-9(1953) (Pub. 1954); cf. *C.A.* 48, 1050a.—The av. effective viscosity of fluid in the space where the flow is affected by one solute macromol. is denoted by η^*, which is defined by the relation $\eta^* = (\eta - \eta_1)/c[\eta]$, in which η, c, and $[\eta]$ are the viscosity, concn., and specific viscosity of the soln., and η_1 is the viscosity of the pure solvent. If this value is used instead of η in the flow birefringence equations, the theory previously applicable only to extremely dil. solns. becomes reasonably satisfactory for values of relative viscosities about 1000.

Oscar T. Quimby

PETERLIN, A.

Influence of solvent on the optical anisotropy of macromolecules. A. Peterlin (Univ. Inst. "J. Stefan", Ljubljana, Yugoslavia). *Makromol. Chem.* 12, 102(1954).—The streaming double refraction of a dil. high-mol. soln., $\Delta n/n = (1/5)[(n^2 + 2)/3n]^2[(\gamma_1 - \gamma_2)/kT]G[\eta]q$, with q = slope, $[\eta]$ = viscosity. The optical anisotropy $\gamma_1 - \gamma_2$ of the individual mols., obtained from measured values, shows a quadratic dependence on the n of the soln. Such a relation can also be derived from a more exact treatment of fiber mols., if the optical effect of the fiber units is considered. Around any random portion of the chain is formed an axially sym. distribution of the remaining members of the chain that resembles an ellipsoid becoming progressively thinner toward the outside. For 1 mol. with end-point distance h, $(\gamma_1 - \gamma_2) = (3/5)(\alpha_1 - \alpha_2)n^2/R^2 + (3M/4\pi pN_0)^2(1/R^3)[(n^2 - n_0^2)^2/n_0^2](h/R)$, in which n is the refractive index for the solid substance and n_0 that of the solvent. The first term provides for the characteristic anisotropy, and the second for the effect of the solvent, which gives the experimentally found dependence of $(n^2 - n_0^2)$ correctly.

Patricia H. Moyer

PETERLIN, A.

PETERLIN, A. The 31-mv betatron. In Germam. P. 53

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So: East European Accession, Vol. 6, No. 3, March 1957