

SOLOV'YEV, Ye., inzh.

Using monolithic slag concrete in constructing buildings. Sel'.
stroi. 9 no.5:15-17 Ag '54. (MIRA 13:2)
(Farm buildings) (Concrete construction)

SOLOV'YEV, Ye., inzhener

Walls of clay and rushes for farm buildings. Sel'.stroi.10
no.6:11-14 Je'55. (MLVA 8:10)
(Walls) (Building materials)

SOLOV'YEV, Ye., inzhener.

Concrete work under winter conditions. Sel'.stroi.l1 no.3:19-20
Mr 156. (MIRA 9:7)
(Concrete construction--Cold weather conditions)

SOLOV'YEV, Ye., inzhener.

Faster drying of lumber. Sel'.strel. ll no.6:12-15 Je '56.
(Lumber--Drying) (MIRA 9:9)

SOLOV'YEV, Ye., inzhener.

Erecting farm buildings using monolithic slag concrete.
Sel'stroi. 11 no.9:25-27 S '56. (MLRA 9:11)

(Slag concrete) (Farm buildings)

SOLOV'YEV, Ye., inzh.

Laying slag concrete walls between brick columns. Sel'. stroi. 12
no.10:23-25 0 '57. (MIRA 10:11)

(Walls)

SOLOV'YEV, Ye., inzh.

Laying asphalt floors. Sel'. stroi. 12 no.3:23-25 Nr '58.
(Floors, Concrete) (MIRA 11:3)

GERASIMOV, N.A., kand.tekhn.nauk; YANOVSKIY, S.I., inzh.; MALEVANNYY, B.N.,
inzh.; KUPCHIN, D.V., inzh.; SOLOV'YEV, Ye.A., inzh.

Testing the refrigerating plant of "Sevastopol", the refrigerator-
ship. Khol.tekh. 38 no.2:41-44 Mr-Ap '61. (MIRA 14:3)

1. Leningradskiy tekhnologicheskii institut kholodil'noy promyshlen-
nosti (for Gerasimov, Yanovskiy, Malevannyy). 2. Baltiyskiy
sudostroitel'nyy zavod (for Kupchin, Solov'yev).
(Refrigeration of ships)

SHAFRAN, I.G.; PARTASHNIKOVA, M.Z.; MAKAROVA, K.I.; SOLOV'YEV, Ye.A.;
ZELICHENOK, S.I.

Analytical application of calcion (prepared by the Institute
of Chemical Reagents) for complexometric and photolorimetric
determination of calcium. Trudy IREA no.25:203-214 '63.

(MIRA 18:6)

S/020/63/148/002/025/037
B189/B101

AUTHORS: Bozhevol'nov, Ye. A., Solov'yev, Ye. A.

TITLE: Sensitivity increase of the luminescence reactions to cations with organic reagents by freezing the solutions

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 2, 1963, 335-337.

TEXT: A description is given of the determination of gallium and niobium with 2,2',4'-trihydroxy-5-chloro-(1-azo-1')-benzene-3-sulfonic acid (I) and of magnesium with 2-hydroxy-3-sulfo-5-chlorobenzene-(1-azo-1')-2'-hydroxynaphthalene (II) at nitrogen temperature. The fluorescence excited by UV light was measured with a spectrofluorometer. At a 0.0004% concentration of I and with a gallium content of the solution of 4 $\mu\text{g}/\text{ml}$, pH = 2.2, the luminescence of the I-Ga complex at nitrogen temperature was ten times more intense than at room temperature. The adsorption maximum was shifted from 580 $\text{m}\mu$ at room temperature to 546 $\text{m}\mu$ at nitrogen temperature. At the same concentration of I as mentioned above and with an indium content in the solution of 2 $\mu\text{g}/\text{ml}$, pH = 5.8, the luminescence of the I-In complex at nitrogen temperature was 100 times more intense than at room temperature.
Card 1/2

ACCESSION NR: AP4033608

S/0032/64/030/004/0412/0413

AUTHORS: Bozhevol'nov, Ye. A.; Solov'yev, Ye. A.

TITLE: Rapid method for lead determination

SOURCE: Zavodskaya laboratoriya, v. 30, no. 4, 1964, 412-413

TOPIC TAGS: lead analysis, quantitative lead determination, fluorescent lead technique, lead chloride luminescence, freezing lead chloride, lead chloride complex, quartz mercury lamp PRK 4, UFS 2 filter

ABSTRACT: It was found that by freezing solutions containing lead chlorides their fluorescence was greatly enhanced, making it possible to determine (in liquid nitrogen) quantities within the 10^{-4} - 10^{-6} % range. A mixture of 1 ml of the analyzed solution and 0.1 ml HCl (sp. gr. 1.19) was cooled with ice-Na Cl to -20°C or with alcohol-dry ice to -71°C . The luminescence of the frozen samples was then compared with standards under a quartz-mercury lamp PRK-4, with a UFS-2 filter. The samples were placed as close to the lamp as was possible. This method permitted the determination of 1 microgram of lead in 1 ml of the solution.

Card 1/2

ACCESSION NR: AP4033608

No interference was introduced by the presence of Na, K, Be, Mg, Ca, Sr, Ba, Zn, Al, Ga, Ti, Sn, Ta, Cr, Mn, Co, Ni, Bi, and Sb ions. Small concentrations of Fe and Cu, however, extinguished the fluorescence.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov i osobo chistykh khimicheskikh veshchestv (All-Union Scientific Research Institute of Chemical Reagents and Specially Pure Chemicals)

SUBMITTED: 00

DATE ACQ: 28Apr64

ENCL: 00

SUB CODE: CH

NO REF SOV: 002

OTHER: 000

Card 2/2

SOLOV'YEV, Ye.A., SOLOV'YEV, Ye.A.

Rapid luminescence method for determination lead. Zhur. anal.
khim. 20 no.12:1330-1335 '65. (MIRA 12-13)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh
reaktivov i osobo chistykh khimicheskikh veshchestv, Moskva.
Submitted August 8, 1964.

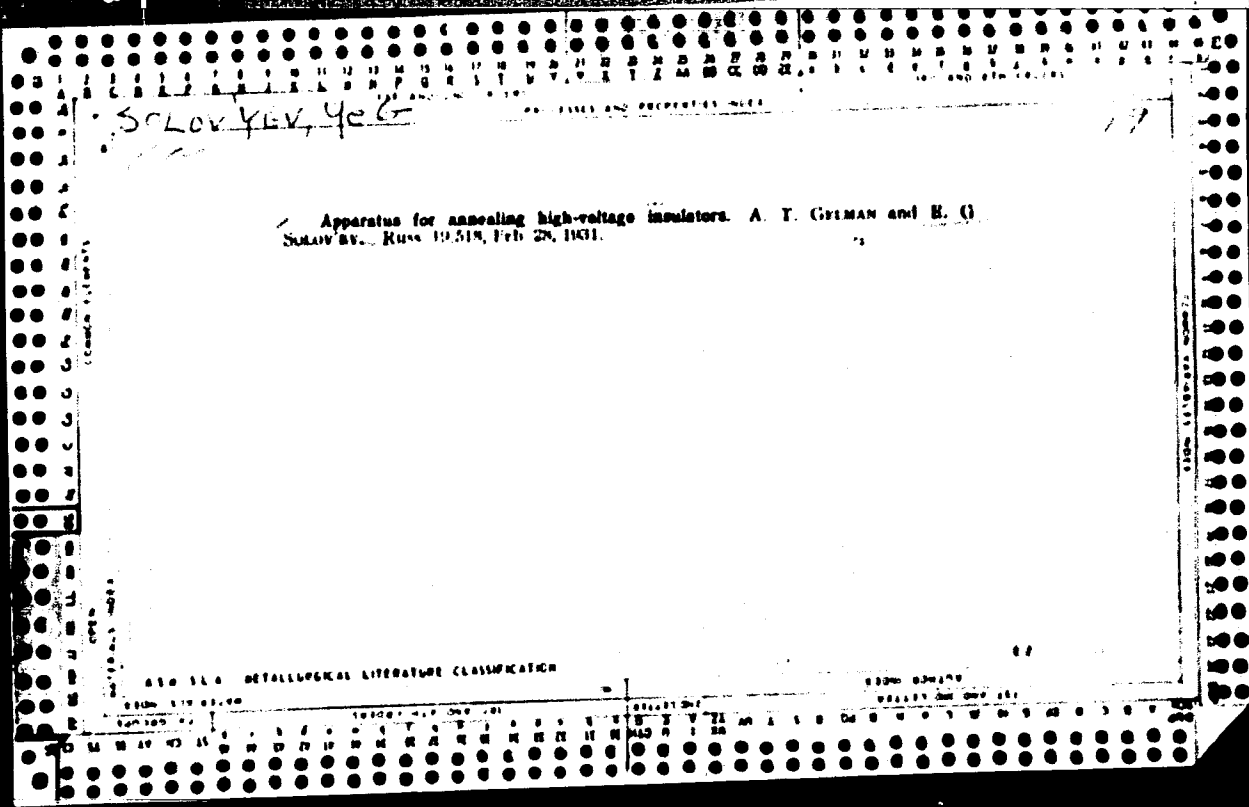
SOLOV'YEV, Ye.F., master

Controlling tuyere performance by the drop in blast pressure.
Metallurg 5 no.7:10-12 J1 '60. (MIRA 13:7)

1. TSeĭ kontrol'no-izmeritel'nykh priborov i avtomatiki Chel-
yabinskogo metallurgicheskogo zavoda.
(Blast furnaces--Equipment and supplies)

MAKHON, E.I.; SHVARTS, M.M.; SHAPIRO, Ya.A.

Kinetics of the heat conversion of methane. Gaz. prom. 8 no.8:
40-48 '63. (MIRA 17:11)



SOV/124-59-9-10799

Translation from: Referativnyy zhurnal, Mekhanika, 1959, Nr 9, p 162 (USSR)

AUTHOR: Solov'yev, Ye.G.

TITLE: On the Calculation of Thin-Walled Skew Spar²⁶ Designs

PERIODICAL: Tr. Kuybyshevsk. aviats. in-ta, 1954, Vol 2, pp 90 - 96

ABSTRACT: The article has not been reviewed.

Card 1/1



021 372.31 : 021 315.413 8126
Conical Joint.—F. G. Solov'ev. (*Radiotekhnika*,
Moscow, May/June 1934, Vol. 8, No. 3, pp. 76-78)
The two coaxial connectors considered are (a) a conical
conductor inside a cylindrical conductor, and (b) coaxial
cylindrical conductors with conical internal surface of
external conductor. The wave impedance, defined as
the ratio of the p.d. between the conductors to the
current flowing in one of them, is calculated. The real
part of the expression equals in the first approximation
the characteristic impedance of a coaxial line having the
same dimensions as the conical junction at the given
section, the reactive component depends on the geometry,
the medium, and the wavelength, increasing with
increasing wavelength.

AID P - 4551

Subject : USSR/Electronics

Card 1/2 Pub. 90 - 5/11

Authors : Solov'yev, Ye. G. and L. V. Belous

Title : Theory of the spiral line enclosed in a cylindrical semiconducting envelope.

Periodical : Radiotekhnika, 4, 31-35, Ap 1956

Abstract : The authors investigate methods of suppressing oscillations and stabilizing a traveling-wave tube by applying attenuation. To achieve attenuation of waves reflected at the output and causing oscillations, the authors used semiconducting attenuators uniformly applied along the length of the tube. Best results were obtained with a thin layer of Aquadag applied on the inside of the quartzite envelope in order to be close to the spiral. An analysis of dispersion equations permits finding that there is a point of maximum attenuation. The authors find the dependence of

5000VYAV, 7/8

AID P - 4241

Subject : USSR/Radio Engineering
Card 1/2 Pub. 90 - 7/8
Author : Ye. G. Solov'yev
Title : Propagation of electromagnetic waves between two circular cylindrical surfaces in the presence of longitudinal diaphragms periodically located.
Periodical : Radiotekhnika, v. 11, no. 1, 57-60, Ja 1956
Abstract : Between two conducting coaxial cylindrical surfaces, infinitely thin conducting diaphragms evenly spaced and of equal length are located. They form a periodic structure in the direction of wave propagation. The author approximates the longitudinal field between two diaphragms in terms of traveling waves. He obtains the dispersion equation for the propagation constant. This equation closely coincides with the dispersion equation for a rectangular waveguide with longitudinal diaphragms. One drawing, 2 Soviet references (1953, 1955).

SOLOV'YEV, Y. G. (Sov.) (Insulator Works) and N.P. PAVLENKO (Sov.) (Sov. Sci. Acad.)

"New Types and Designs of Electrical Insulators"

report presented at the First Technical Conference on the Introduction of New
Techniques into the Electrical Insulator Industry, 12-15 Mar 1958, State Sci.
Tech. Committee of Council of Ministers of USSR.

88623

S/147/60/000/004/015/016
E081/E235

10.9110

AUTHOR: Solov'yev, Ye. G.
TITLE: The Question of the Method of Approximate
Calculation of Secondary Stresses in the Complex
Resistance of a Thin-Walled Bar
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,
Aviatsionnaya tekhnika, 1960, No. 4, pp. 142-154
TEXT: The problem of the strength of a complex assembly
consisting of a covering with stringers or ribs is formulated
mathematically, and a deficiency in the approximate method
proposed by Ye.P. Grossman (Ref. 1: "Calculation of the Strength
of Longeron Wings", Trudy TsAGI No. 628, Oborongiz, 1947) is
pointed out. An improved method is suggested and applied to
the calculation of the longitudinal forces R_i in the ribs of a
thin-walled construction, having five identical longitudinal ribs,
fastened in the plane $x = 0$ and loaded by a twisting moment M_x in
the plane $x = l$ (Fig. 3) E and G are respectively moduli of the
first kind of the stringer material and of the second kind of the
wing covering material (Abstracter's note: This is a literal
translation of the definition of E and G on p. 142; E and G are
Card 1/4

X

88623

S/147/60/000/004/015/016
E081/E235

The Question of the Method of Approximate Calculation of Secondary Stresses in the Complex Resistance of a Thin-Walled Bar usually symbols for Young's modulus and shear modulus and it appears from the context that they are used in this sense in the paper) F_i is the cross-sectional area of the i -th longitudinal rib. The results are shown in the following table: X

i	Accurate solution	Ye.P.Grossman's solution		Author's solution	
	R_i kg	$R_i^{(1)}$ kg	$R_i^{(2)}$ kg	$R_i^{(1)}$ kg	$R_i^{(2)}$ kg
1	4.8801	6.7883	-	5.0634	4.8721
3	-5.9733	-0.81975	-2.4542	-6.1125	-5.9701

in which R_i^1 is the first approximation, R_i^2 is the second approximation to the longitudinal force in the i -th rib. A comparison

Card 2/4

88623

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EO81/E235

The Question of the Method of Approximate Calculation of Secondary Stresses in the Complex Resistance of a Thin-Walled Bar

of the exact and approximate solutions is also made for the case in which the third rib has a different cross-section from the others and for a pyramidal thin-walled construction. The conclusions are as follows: (1) Grossman's approximate method can be successfully applied if the covering can be represented as the conjunction of r weakly twisted panels having weak stringer assembly and framed sturdy longitudinal elements. The problem then leads to the compatible solution of $r - 3$ heterogeneous second order differential equations with variable coefficients. (2) The proposed approximate method allows: (a) calculations to be made of a conical caisson by the method of sections; (b) reducing the problem to evaluating axial forces in the elements of longitudinal assembly to the separate integration of the second-degree equations with variable coefficients, regardless of the dependence on the relative thickness of the elements of the longitudinal assembly and of the form of the contour of the cross-section of the construction. (3) The proposed approximate method gives an acceptable degree of error, but it only deals with
Card 3/4

88623

S/147/60/000/004/015/016
E081/E235

The Question of the Method of Approximate Calculation of Secondary Stresses in the Complex Resistance of a Thin-Walled Bar secondary stresses, that is with corrections to the principal stresses as found by elementary methods. There are 5 figures and 4 Soviet references. X

ASSOCIATION: Kazanskiy inzhenerno-stroitel'nyy institut,
Kafedra stroitel'noy mekhaniki
(Kazan' Institute of Construction Engineering,
Department of Structural Mechanics)

SUBMITTED: March 30, 1960

Card 4/4

9.1300

9,2590 (incl. 2105)

21655

S/109/61/006/003/010/018
E140/E135

AUTHORS: Solov'yev, Ye.G., and Karlova, Ye.K.

TITLE: Stub Delay System for Paramagnetic Travelling Wave
Amplifier in the Centimeter Band

PERIODICAL: Radiotekhnika i elektronika, 1961, Vol.6, No.3,
pp. 406-409

TEXT: The article describes work based on that of De Grasse
et al (Ref.1: Bell System Techn.J., 1959, 38, 2, March, 305).
The main difference from the earlier system consists in the wide-
band matching circuit (Fig.3) and the introduction of the pumping
signal. The matching circuit provides smooth transformation of
the high-frequency field of the delay system to the H₁₀-wave in the
rectangular waveguide. The pumping signal is fed through a
rectangular waveguide entering the side wall at the centre of the
delay system on the side of the rose ruby so that the E-pumping
vector would be perpendicular to the side plane of the stub system.
To decouple the working and pumping channels, the planes of
polarization of the two channels were taken mutually perpendicular.
Making the narrow wall of the fundamental waveguide small enough
Card 1/ 5

21655
S/109/61/006/003/010/018
E140/E135

X

Stub Delay System for Paramagnetic Travelling Wave Amplifier in the Centimeter Band

so that at pumping frequency this channel will be a cut-off waveguide, the two channels are sufficiently decoupled. The fundamental signal cannot enter the pumping channel since for it the pumping channel waveguide is also cut off. The entire system was designed for immersion in a Dewar flask. Experimentally obtained dispersion characteristics for a stub system of height 0.222 are given in Fig.4, and the insertion loss of the system in Fig.6.

There are 6 figures and 2 references: 1 Soviet and 1 English.

SUBMITTED: January 29, 1960

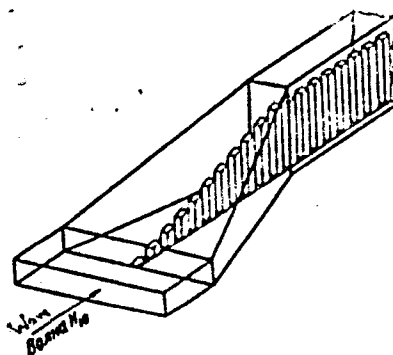
Card 2/5

21655

S/109/61/006/003/010/018
E140/E135

Stub Delay System for Paramagnetic Travelling Wave Amplifier in
the Centimeter Band

Fig. 3



Card 3/5

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E135/E135

Stub Delay System for Paramagnetic Travelling Wave Amplifier in the Centimeter Band

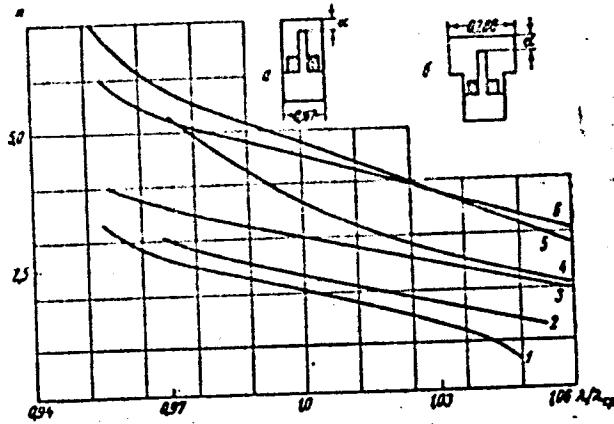


Fig. 4: Curves 1-5 relate to a system with a cross-section as shown in Fig. 4a; Curve 6 to a system with a cross-section as shown in Fig. 4b.

- Curve 1 - $\alpha = 0.065$, $m=23$;
- Curve 2 - $\alpha = 0.045$, $m=21$;
- Curve 3 - $\alpha = 0.030$, $m=20$;
- Curve 4 - $\alpha = 0.065$ with rubies, $m=45$;
- Curve 5 - $\alpha = 0.030$ with rubies, $m=38$;
- Curve 6 - $\alpha = 0.030$ with rubies, $m = 28$.

Card 4/5

21655

S/109/61/006/003/010/018
E140/E135

Stub Delay System for Paramagnetic Travelling Wave Amplifier
in the Centimeter Band

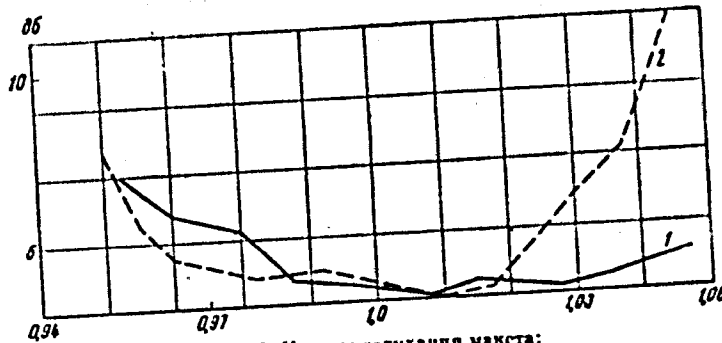


Рис. 6. Кривые затухания макета:
1 — $\alpha = 0,030$; 2 — $\alpha = 0,045$

Fig. 6

Card 5/5

S/108/62/G17/003/002/009
D299/D301

Waveguide with parallelogram ...

field into separate regions, in which the solutions are known; then, either the fields or the impedances are compared at the common boundaries between the separate regions. From the figure it is evident that there are 3 such regions. The problem is simplified by linking the fields not along the entire boundaries, but at dividual points. From the equations for H_{m0^-} and H_{10} fields, and by comparing the impedances at 2 points, one obtains the sought-for dispersion equation:

$$\text{ctg } x_m = \frac{J_1(x_m \alpha)}{J_0(x_m \alpha)} \quad (4)$$

where $x_m = k_{xm} a/2$ is the dimensionless phase constant, and $\alpha =$

$\frac{2b \text{ctg } \varphi}{a_1}$ - the generalized waveguide-parameter. By setting $\alpha = 0$

one obtains the well-known dispersion equation for rectangular waveguides. With small values of $x_m \alpha (\ll 1)$, Eq. (4) reduces to

Card 2/3

S/108/62/017/004/005/010
D288/D301

4.13/0

AUTHOR: Solov'yev, Ye.G.

TITLE: Contribution to the theory of a "comb with oblique teeth"

PERIODICAL: Radiotekhnika, v. 17, no. 4, 1962, 34 - 37

TEXT: When dealing with electromagnetic wave propagation in waveguides of arbitrary cross-section, it is desirable to choose a reference system of which the coordinates line up with waveguide walls. Such a non-orthogonal system is adequately described by following coefficients: $\epsilon_{xx} = 1$; $\epsilon_{yy} = 1$; $\epsilon_{zz} = 1$; $\epsilon_{xy} = \epsilon_{yx} = \sin \theta$, all other coefficients = 0. The Hertzian magnetic vector is written down, and the obtained formula is used to derive expressions for E and H. A difficulty arises in determining the phase constant for the boundary conditions; a first order of approximation is obtained by assuming identical phase constants in the upper open part of the waveguide and in the lower pockets, divided by teeth. It becomes

B

Card 1/2

Contribution to the theory of a ...

S/108/62/017/004/005/010
D288/D301

possible to establish the dispersion equation in terms of physical dimensions of the teeth and their pitch. Two dispersion curves are reproduced, showing retardation vs. wavelength for $\theta = 0^\circ$ and $\theta = 45^\circ$, good experimental verification for the latter case being shown. It is confirmed that a comb with an oblique row of teeth ($\theta \neq 0$) causes less retardation than the conventional waveguide with a straight comb, ($\theta = 0$). There are 2 figures. ✓
R

SUBMITTED: April 26, 1961
July 27, 1961 (after revision)

Card 2/2

AID Nr. 974-6 22 May

GRAPHIC-ANALYTIC SOLUTION METHOD FOR A SYSTEM OF NONHOMOGENEOUS SECOND ORDER DIFFERENTIAL EQUATIONS (USSR)

Solov'yev, Ye. G. Izvestiya vysshikh uchebnykh zavedeniy. Aviatsionnaya tekhnika, no. 1, 1963, 167-175. S/147/63/000/001/020/020

A method of calculating the strength of a thin-walled, slightly tapered stiffener, based on the calculation of the strength of a beam of variable cross section subjected to axial pull and flexural loading, is presented. The problem is reduced to the solution of a system of $n-3$ nonhomogeneous second order differential equations, which are integrated by the successive approximations method and the graphic method of B. Gough. The algorithm for graphic construction of the bending moment diagram and for the elastic curve $w(x)$ by Gough's method is presented for boundary conditions of the first kind. The error of an approximate solution $w(x)$ is estimated. The proposed method makes it comparatively simple to calculate the first approximations of axial stresses in longitudinal strips of thin-walled, slightly tapered stiffeners. Second, third, and higher approximations of axial stresses are similarly obtained. [LK]

Card 1/1

AID Nr. 990-9 14 June SOLOV'YEV, Ye. G.
TW MASER FOR AMPLIFICATION IN THE 3-cm BAND (USSR)

Karlova, Ye. K., N. V. Karlov, A. M. Prokhorov, and Ye. G. Solov'yev.
Prirody i tekhnika eksperimenta, no. 2, Mar-Apr 1963, 107-110.
S/120/63/000/002/025/041

Performance and construction details are described for a 3-cm traveling-wave maser which used a waveguide section containing two ruby rods attached along the base of a comb delay array on opposite sides of the teeth. The ruby had a Cr^{3+} concentration of about 0.07% and was 2 mm in diameter by 100 mm long; the red (isolating) ruby rod had a Cr^{3+} concentration of 1 to 2%. The external hf magnetic field was elliptically polarized in the plane of the comb, with its major axis normal to the traveling-wave line of propagation, in such a manner that at an eccentricity of 1.5 the energy density of the forward wave on one side of the comb array exceeded backward-wave density by 25 times. Measurement of energy density in the delay section was achieved by comparison of the EPR absorption line intensity in a DPPH sample, when the latter was located alternately in the feed-in and delay sections of the waveguide. The amplifier was

Card 1/2

AID Nr. 990-9 14 June

TW MASER FOR AMPLIFICATION [Cont'd]

S/120/63/000/002/025/041

operated in a nitrogen-free He cryostat, type KP-09, which included magnetic shim disks to achieve a uniformity of external field of ± 1 gauss over the 100-mm working length. Amplifier performance, with a pumping wavelength of 1.2 cm and external field of 4300 gauss showed 10 db of clean gain at 4.2°K He temperature, and 21 db at 1.8°K. The bandwidth exceeded 20 Mc. Critical dimensions and alignments of the maser elements are discussed. Photographs of the delay element as well as the overall enclosed system are included. [SH]

Card 2/2

L 14922-63

EWT(d)/EWT(1)/BDS AFFTC/ASD

ACCESSION NR: AP3004087

S/0108/63/018/007/0020/0024

AUTHOR: Solov'yev, Ye. G.

TITLE: Theory of a nonuniform helical line

SOURCE: Radiotekhnika, v. 18, no. 7, 1963, 20-24

TOPIC TAGS: helical line, nonuniform line

ABSTRACT: Propagation of electromagnetic waves in a helix with a continuously varying pitch, as used in TWtubes, is theoretically considered in the article. A method for calculating amplitudes and phase velocities of electromagnetic waves along such a helix, based on the principle of variations, is offered. The method permits determining field components of the nonuniform helix at any cross section. Orig. art.has: 1 figure and 23 formulas.

ASSOCIATION: none

SUBMITTED: 17Feb62

DATE ACQ: 05Aug63

ENCL: 00

SUB CODE: 00

NO REF SOV: 001

OTHER: 000

Card 1/1

L 32444-65 EWT(d)/EWT(m)/EWP(w)/EWP(v)/T-2, EWP(k)/EWA(h) Pf-4/Feb
IJP(c) EM

ACCESSION NR: AP4048516

S/0147/64/000/004/0117/0120

AUTHOR: Solov'yev, Ye. G.

23
B

TITLE: Designing thin-walled hulled rods by the method of successive approximations

SOURCE: IVUZ. Aviatitsennaya tekhnika, no. 4, 1964, 117-120

TOPIC TAGS: thin walled construction, successive approximation, aircraft design, Hardy Cross method, secondary stress, beam analog, hulled rod

ABSTRACT: An attempt is made to overcome the difficulties encountered in the integration of the system of equations developed earlier by Yu. G. Odnokov which apply to the problem of designing weakly-conic, thin-walled hulled rods with an open or closed cross-sectional outline. A beam analog is used and applied to a sample problem for which computational results are tabulated. This method, even in first approximation, permits secondary stresses in the elements of a longitudinal assembly to be obtained with an accuracy acceptable for practice. Two to three approximations are completely sufficient for practical purposes. Higher orders of approximation are associated with carrying out elementary operations on cumbersome expressions. In the method of successive approximations the A_{ik} coefficients and their ratio are comparable to the distribution

Card 1/2

L 32444-65

ACCESSION NR: AP4048516

coefficients of the well-known Hardy Cross method. In this connection the method of successive approximations may be considered as a similitude of the Hardy Cross method applicable to discretely continuous systems. The graph-analytic method makes it possible, with a relatively small expenditure of labor, to find in first approximation the secondary axial stresses in elements of the longitudinal assembly of a weakly-conic, thin-walled rod with grooves. Orig. art. has: 1 table, 3 figures and 7 formulas. 0

ASSOCIATION: none

SUBMITTED: 08May64

ENCL: 00

SUB CODE: AS, ME

NO REF SOV: 008

OTHER: 000

Card 2/2

ACC NR: AP6001578

SOURCE CODE: UR/0120/65/000/006/0124/0125

AUTHOR: Abazadze, Yu. V.; Solov'yev, Ye. G.

ORG: none

TITLE: Measuring the group velocity in delay systems of quantum paramagnetic amplifiers

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1965, 124-125

TOPIC TAGS: paramagnetic amplifier, quantum amplifier, electric measuring instrument, delay circuit

ABSTRACT: An outfit is briefly described which is intended for measuring the group-velocity delay in the middle of the passband (about 50% of the band). The measurements are carried out at a fixed modulating frequency and, therefore, no error due to frequency variation (usual in earlier methods) is introduced. The outfit, consisting of standard instruments including an oscilloscope showing brightness marks on its screen, has an error of 2% or less. "The authors wish to thank Kh. Saberov and Yu. V. Pavlov for their participation in the experiments." Orig. art. has: 1 figure and 3 formulas.

SUB CODE: 09 / SUBM DATE: 16Dec64 / ORIG REF: 003

Card 1/1

UDC: 621.375

L 38191-66 SEC(k)-2/EWP(k)/EWT(1)/EWT(m)/FBD/T/EWF(t)/ETI IJP(c)

ACC NR: AP6023867

SOURCE CODE: UR/0109/66/011/007/1196/1199

WG/JD/JG

AUTHOR: Solov'yev, Ye. G.; Abazadze, Yu. V.; Isayev, S. K.; Stepanova, Ye. G.; Krynetskiy, I. B.

ORG: none

TITLE: Traveling wave ²⁵maser using chromium-doped rutile and a magnet with superconducting windings ¹

SOURCE: Radiotekhnika i elektronika, v. 11, no. 7, 1966, 1196-1199

TOPIC TAGS: solid state maser, traveling wave amplifier

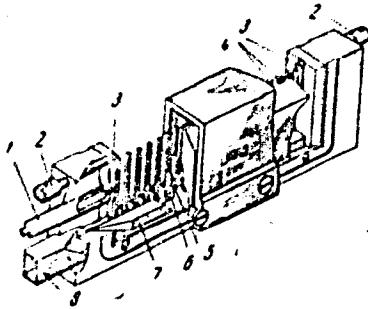
ABSTRACT: A traveling-wave maser using a rutile crystal doped with Cr^{3+} is described. The maser uses a magnet with superconducting windings and is designed to work at the lower end of the decimeter band at a temperature of 4.2K. The device is placed either in a kryostat or in a helium microcooler. The maser uses a dielectrically loaded delay comb structure (see Fig. 1), and was found to have the following characteristics: tuning range, 100 Mc; amplification, 15 to 20 db; bandwidth (at a 3-db level), 10-12 Mc; pumping power, 100 mw.

Card 1/2

UDC: 621.378.5.029.63

L 38191-66

ACC NR: AP6023867



Several ways of increasing the gain of the device are given. Orig. art. has: 4 figures. [IV]

Fig. 1. Basic maser components

- 1 - Coaxial cable; 2 - teflon screw; 3 - excitation pin;
- 4 - teflon filling; 5 - ferrite disks; 6 - teflon holder;
- 7 - active crystal; 8 - pumping waveguide.

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ATD PRESS: 5045

Card 2/2 JS

AFONSKIY, S.I., professor, zaslushennyy deyatel' nauki Tat. ASSR.; SOLOV'YEV,
Ye.I., redaktor; GUBER, A., tekhnicheskiiy redaktor.

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(Chemistry, Physical and theoretical) (Colloids)

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469-476 '67. (MIRA 18:7)

KOSTYUK, N.S.; BUZUK, A.A.; SOLOV'YEV, Ye.M.

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AN BSSR 8:106-113 '59. (MIRA 13:12)
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SOLOV'YEV, Yevgeniy Mikhaylovich; POGODIN, L.L., nauchnyy red.;
SMIRNOV, Yu.I., red.; TSAL, R.K., tekhn.red.

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SO: SUN No. 356, 25 Jan 1955

Solov'yev, Ye. M.

AID P - 1094

Subject : USSR/Engineering
Card 1/1 Pub. 78 - 5/21
Author : Solov'yev, Ye. M.
Title : The problem of reasonable wear of bits
Periodical : Neft. khoz., v. 32, #10, 18-19, 0 1954
Abstract : Discussion is presented of B. S. Fedorov's analytical determination of the wear of the bit as related to reduction of its productive drilling speed. The author's discussion of Fedorov's basic equations indicates the erroneous nature of the latter's interpretation and conclusion. Five Russian references (1949-1951).
Institution : None
Submitted : No date

SOLOV'YEV, Ye.M.

More on the criteria of effectiveness of the operation of bits. No. 4,
khoz. 33 no.2:26-28 P '55. (MLRA 8:4)
(Boring machinery)

SOLOV'YEV, Ye.M.

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Method of calculating well cementing. Izv. vys. ucheb. zav.; neft'
i gaz no. 5:43-48 '59. (MIRA 11:8)

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(Oil well cementing)

DUKHININ, Aleksey Pavlovich, dotsent [deceased]; SOLOV'YEV, Yevgeniy
Matvovayevich, dotsent. Prinsipal uchastiye: BORISENKO, L.V.,
kand.tekhn.nauk. TIMOFETEV, N.S., inzh., retsenzent; PETROVA,
Ye.A., vedushchiy red.; FEDOTOVA, I.G., tekhn.red.

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LEONIDOVA, A.I.; SOLOV'YEV, Ye.M.

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Trudy MINKHIGP no.40:114-124 '63. (MIRA 16:4)
(Cement--Permeability)

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(MIRA 16:7)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika Gubkina.

(Oil well cementing)

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discussion. Neft. khoz. 40 no.12:27-32 D '62. (MIRA 16:7)

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(MIRA 17:5)

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МОСКВИ-7, 10.М.

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akademika I.M. Gubkina.

SHADRIN, L. I.; SECRET; G. M.

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clay sands and gravel quarry. Inv. exp. sheet. Sav. 1000/1
gok T no. 10:10-10-102 (1000-10:10)

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nordt imeni akademika I. M. Gubkina.

SHADRIN, L.N.; SOLOV'YEV, Ye.M.

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interval. Neft. khoz. 42 no.11:45-48 N '64 (MIRA 18:2)

Баранов, С.С.; Бульвар, И.М.

Effect of additives on the mobility of cement slurry. Burenie
no.7:23-27 '64. (MIRA 18:5)

1. Ufimskiy neftyanoy nauchno-issledovatel'skiy institut i Moskovskiy ordena Trudovogo Krasnogo Znameni institut neftekhimicheskoy i gazovoy promyshlennosti im. akad. Gubkina.

SOLOV'YEV, Ye.M.; LEONIDOVA, A.I.; SHORYGINA, N.N.; IZUMBUKOVA, T.V.

Nitrolignin as a reducer of the viscosity and water loss of
cement slurry. Izv. vys. ucheb. zav.; neft' i gaz 8 no.3:25-28
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im. akad. Gubkina i Institut organicheskoy khimii AN SSSR.

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Machine for transverse rib-veneer glueing. Der.prom.4 no.6:25-26
Je '55. (MLRA 8:10)

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(Veneers and veneering)(Woodworking machinery)

SOLOV'YEV, YE. P.

PA 233T76

USSR/Metallurgy - Foundry, Equipment

Sep 52

"Mechanism for Closing the Bottom of a Cupola," Ye. P. Solov'yev, Engr

"Litey Proizvod" No 9, p 16

Stating that existing constructions for opening and closing bottom of a cupola are unsatisfactory, briefly describes new improved mechanism for 5-ton cupola. Mechanism is simple to make, dependable, and safe to operate. Includes drawing.

233T76

SOLOV'YEV, Yuriy Pavlovich; MYAKISHEV, Irinarkh Sergeevich,
red. [deceased]

[Selection and hookup diagrams of auxiliary thermo-
mechanical equipment of industrial electric power plants
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24(7)

PHASE I ROCK EXPLOITATION 80V/1365

L'vov. Universitet

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Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po spektroskopii. Ed.: Gazer, S.L.; Tech. Ed.: Saranyuk, T.V.; Editorial Board: Lavitsers, G.S., Academician (Resp. Ed., Deceased), Neporent, B.S., Doctor of Physical and Mathematical Sciences, Fabelinskiy, I.L., Doctor of Physical and Mathematical Sciences, Fabrikant, V.A., Doctor of Physical and Mathematical Sciences, Kermitavily, V.G., Candidate of Technical Sciences, Rayskiy, S.M., Candidate of Physical and Mathematical Sciences, Klimovskiy, L.K., Candidate of Physical and Mathematical Sciences, Piliyanchuk, V.S., Candidate of Physical and Mathematical Sciences, and Olsberman, A. Ye., Candidate of Physical and Mathematical Sciences.

Card 1/30

Novak, I.I., and Ya. S. Solov'yeva. Rotational Isomerism and the Effect of Temperature on the Infrared Absorption Spectra of Some Paraffins

419

Fostovskaya, A.P., I.A. Salimov, A.S. Kus'minskiy, and V.M. Tatevskiy. Variation in Structure of Sodium Butadiene Rubber in the Process of Light Oxidation

423

Klausen, W.A., and B.A. Dogadkin. Infrared Spectroscopy Used to Study the Interaction of Rubber and Sulfur

428

Slovokhotova, N.A. Study of the Chemical Variations of Tetrafluoroethylene ("teflon") Under the Influence of Ionizing Radiation by Means of Infrared Spectroscopy

430

Mel'son, K.V., and I. Ya. Podubnyy. Spectroscopic Study of the Microstructure of Some Diene Polymers

433

Card 27/30

SOLOV'YEV, Ye. S.

7 1-40 12
2
3/13

Temperature dependence of infrared absorption spectra of normal paraffins as related to rotational isomerism. I. J. Novak and E. S. Solov'ev (Phys. Tech. Lett., Acad. Sci. U.S.S.R., Leningrad). *Optika i Spektroskopiya* 2, No. 1 62-74 (1957).—Infrared spectra of dodecyl (I), hexadecane (II), tetradecane (III), decane (IV), and octane (V) were studied as a function of temp. near the 7- μ wave-length region. The absorption spectrum of I at 20° possessed only one band, 1379 cm^{-1} , but at 75° there were present 1379-, 1370-, 1350-, and 1340- cm^{-1} bands. On heating I from 75° to 163° transmission in the 1370- and 1379- cm^{-1} bands increased, and in the 1350- and 1340- cm^{-1} bands decreased. This phenomenon was shown to be related to the redistribution in the case of rotational isomers. From the slope of the plot of $\log D_1/D_2$ vs. $1/T$ (here, D_1 and D_2 = optical ds. at temp. T), the energy of the rotational isomers were found to be: $\Delta H(1379, 1350) = 1230$, $\Delta H(1379, 1370) = 445$, $\Delta H(1379, 1340) = 1470$, $\Delta H(1370, 1350) = 785$ kcal./mole. The spectrum of cryst. II had bands at 1332 and 1370.6 cm^{-1} ; the liquid at 1312, 1343, 1352.6, 1370.6, and 1379 cm^{-1} . The changes in the intensities of the 1312-, 1343-, 1352.6- cm^{-1} , and the 1370- and 1379- cm^{-1} bands were in opposite direction to each other when the temp. of II was raised from 20° to 220°. The energy of rotational isomers was $\Delta H(1379, 1370) = 600$, $\Delta H(1379, 1352.6) = 1060$, $\Delta H(1379, 1343) = 1040$, $\Delta H(1370.6, 1352.6) = 600$, $\Delta H(1370, 1343) = 620$; and $\Delta H(1379, 1312) = 750$ kcal./mole. The spectrum of III at 20° contained 1379-, 1355-, 1343-, and 1311- cm^{-1} bands, and also a weak 1370- cm^{-1} band; in the cryst. state only the 1370- cm^{-1} band. On heating III from 20° to 200° the true transmission of 1355- and 1343- cm^{-1} bands decreased, and that of 1311- and 1370- cm^{-1} increased. The energies

of isomerization of III were $\Delta H(1379, 1356) = 1100$, $\Delta H(1379, 1343) = 900$, $\Delta H(1311, 1343) = 200$, $\Delta H(1311, 1356) = 200$ kcal./mole. The spectrum of IV at room temp. contained 1277-, 1303-, 1343-, 1354-, and 1379-cm.⁻¹ and at -75° 1287-, 1303-, and 1370-cm.⁻¹ bands. The appearance of 1343-cm.⁻¹ and 1354-cm.⁻¹ bands, with the change in the state from solid to liquid, was assigned to the rotational isomers of IV. With an increase in the temp. from 20° to 150, the true transmission of the 1379-cm.⁻¹ band increased from 12% to 18.5% that of 1354- and 1343-cm.⁻¹ bands decreased from 56% to 49% and from 51.5% to 48%,

resp. From the temp.-intensity relation, $\Delta H(1379, 1343) = 780$ kcal./mole and $\Delta H(1379, 1354) = 1050$ kcal./mole. In the spectrum of liquid V were present 1311-, 1313-, 1379-cm.⁻¹, and at -75° 1370-, 1314-, 1282.5-cm.⁻¹ bands. At temps. from 20° to 100° the abs. transmission of the 1379-cm.⁻¹ band increased from 9% to 18.5%, and that of 1311-cm.⁻¹ increased from 57% to 63%. However, because the 1311-cm.⁻¹ band remained in the spectrum of solid V (near 1314-cm.⁻¹), it could not be assigned to the rotation isomer. The $\Delta H(1379, 1343) = 700$ kcal./mole. Detailed diagram of equipment, spectra-grams, and 9 references. A. P. K.

pm m-1388
 1/1/50

57-28-3-25/33

AUTHORS: Flaks, I. P. , Solov'yev, Ye. S.

TITLE: The Determination of Capture Cross Sections of One and Two Electrons in Single Collisions of Double-Charged Ions With Gas Atoms (Opredeleniye secheniy zakhvata odnogo i dvukh elektronov pri odnokratnykh stolknoveniyakh dvukhzaryadnykh ionov s atomami gaza)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp.612-622 (USSR)

ABSTRACT: The capture cross sections of one and two electrons in single collisions of double-charged Ne^{2+} , Ar^{2+} , Kr^{2+} and Xe^{2+} -ions with the atoms of an inert "foreign" gas within the range of the ion-energy T from 6 to 60 keV are here determined in an experimental way. For the determination of the capture cross sections σ_{21} and σ_{20} the mass-spectrometry method of the recording of fast ions and fast neutral atoms (described in Reference 1) was employed. In the investigated energy range the authors observed an increase in the

Card 1/4

57-28-3-26/55

The Determination of Capture Cross Sections of One and Two Electrons in Single Collisions of Double-Charged Ions With Gas Atoms

σ_{21} -cross sections with increasing ion-energy. When $T = 21$ 60 keV the σ_{21} -cross section is largest in the Xe^{2+} -Ar-pair ($\sigma_{21} = 2 \cdot 10^{-15} \text{ cm}^2$) and smallest in Xe^{2+} -He ($\sigma_{21} < 10^{-18} \text{ cm}^2$). The existence of the capture process of two electrons in the case of Ne^{2+} -ions in He, Ar, Kr, Xe, in the case of Ar^{2+} -ions in He, Kr, Xe, in the case of Kr^{2+} in Ar, Xe and in the case of Xe^{2+} in the Ar, Kr was determined in an experimental way. In the case of the enumerated ion-atom-pairs the σ_{21} -cross section increases with increasing ion-energy and is highly dependent on the nature of the ion and of the atom. In all investigated pairs at the same ion-velocity $\sigma_{21} > \sigma_{20}$, but in some pairs the cross sections σ_{21} and σ_{20} are very close to the absolute value. E.g. at $T = 60$ keV for the Ar^{2+} - Kr-pair the cross section $\sigma_{21} = 6 \cdot 10^{-16} \text{ cm}^2$ and $\sigma_{20} = 5 \cdot 10^{-16} \text{ cm}^2$. As a rule σ_{21} and σ_{20} are greater in collisions of light ions with heavy atoms. In two endothermic cases the cross sections of the capture of one electron and in 5 endothermic cases those of the capture of two electrons were measured. In endothermic cases the cross sections σ_{21} and σ_{20} as a rule decrease with increasing absolute value of the "resonance-defect" ΔE .

Card 2/3

57-28-3-2/33

The Determination of Capture Cross Sections of One and Two Electrons in
Single Collisions of Double-Charged Ions With Gas Atoms

In exothermic cases no definite dependence of the cross sections σ_{21} and σ_{20} on the quantity ΔE was found to exist. By comparing the data for "symmetrical" capture processes of two electrons differing by the sign of the quantity ΔE it was found that in case that $|\Delta E| > 10$ eV, σ_{20} in the exothermic case is considerably higher. In case that $|\Delta E| < 6$ eV the magnitude of the σ_{20} -cross section is little dependent on the sign of ΔE . The assumption is expressed that in the exothermic case, ΔE having a considerable value, an excitation of the colliding particles takes place. Data for the total capture cross section $\sigma_{\Sigma} = \sigma_{21} + \sigma_{20}$ are given. These characterize the general weakening of the double charged ion-beams in the different gases.

The authors were advised by N. V. Fedorenko, Doctor of Physical-Mathematical Sciences and V. M. Dukel'skiy, Professor. There are 10 figures, 1 table, and 14 references, 4 of which are Soviet.

Card 3/4

Leningrad Physico-Tech Inst, AS USSR

57-28-3-24/33

AUTHORS: Flaks, I. P., Solov'yev, Ye. S.

TITLE: Measurement of Capture Cross Sections of Electrons for Singly Charged and Doubly Charged Ions of Natural Gases (Izmereniye secheniy zakhvata elektronov odnozaryadnymi i dvukhzaryadnymi ionami v "sobstvennykh" gazakh)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp. 599-611 (USSR)

ABSTRACT: Here the cross section for the capture of one and two electrons by means of doubly charged ions was measured and the dependence of these cross sections on the ion energy was determined. Moreover the cross sections for the resonance capture of the electrons by means of singly charged ions were determined. All measurements referred to the cases of interaction of the ions of inert gases and of the atoms of natural gases. The cross sections in the case of the singly charged ions were measured in the ion energy-range of $3 \frac{e}{e} - 30$ keV and in the case of doubly charged ions in that of $6 \frac{e}{e} - 60$ keV. The here applied method for the determination of the cross sections is based on the recording of fast atoms or ions which had formed from the

Card 1/2

Measurement of Capture Cross Sections of Electrons for Singly 57-28-3-24/33
Charged and Doubly Charged Ions of Natural Gases

ions of the primary beam due to collisions with the gas atoms happening but once, which were accompanied by the capture of the electrons. The cross sections σ_{10} of the resonance capture of the electrons was measured by means of the Ne^+ -, Ar^+ -, Kr^+ - and Xe^+ -ions. The obtained data agree with theory by Firsov (reference 1). The cross sections σ_{21} of the capture of one electron by means of Ne^{2+} -, Kr^{2+} -, Ar^{2+} - and Xe^{2+} -ions were measured. In the energy range investigated the cross sections σ_{21} continuously increase with the ion energy. The existence of the capture process of two electrons by means of Ne^{2+} -, Ar^{2+} -, Kr^{2+} - and Xe^{2+} -ions was experimentally observed. The cross section σ_{20} of the capture of two electrons decreases in all cases investigated with the increase of ion energy. For this reason it was concluded that the capture of two electrons is a resonance process. Doctor of Physical and Mathematical Sciences N. V. Fedorenko advised the authors. Head of the Laboratory, Professor V. M. Dukel'skiy showed permanent interest in this work. There are 17 figures and 22 references, 11 of which are Soviet.

ASSOCIATION: Leningradskiy Fiziko-tekhnicheskii institut, AN SSSR
Card 2/2

Distr: 4E3d

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1204 DETERMINATION OF THE CROSS-SECTION OF CAPTURE OF ONE AND TWO ELECTRONS ON SINGLE COLLISIONS OF DOUBLY CHARGED IONS WITH (FOREIGN) GAS ATOMS 79

L.P. Flaks and E.S. Kolyva

Zh. tekh. Fiz. Vol. 28, No. 1, 612-22 (1958). In Russian.

The cross-sections were measured for 6-60 keV Ne^{2+} , Ar^{2+} , Kr^{2+} and Xe^{2+} ions in (foreign inert gases (e.g. Ke^{2+} in Ar)

9K RML

FEDORENKO, N.V.; PIAN, I.P.; FILIPENKO, L.G.; SOLOVYEV, V.S.

"Electron Capture by Multiply Charged Ions."

report presented at the 4th Intl Conference on Ionization Phenomena in Gases, Uppsala,
17-21 August 1959.

PHILIPSENKO, N.V.; AFRODINOV, V.V.; IM'IN, R.R.; SOLOVYEV, YE.S.

"Ionization of Inert Gases by Protons."

report presented at the 4th Intl Conference on Ionization Phenomena in Gases, Uppsala,
17-21 August 1959.

64/02
504/10
SOL OUYEV, Y. S.

24,3120
AUTHORS: Granovskiy, V.L., Luk'yanchov, S.I., Solov'yev, Y.S., G.V. and Sirotenko, I.G.
TITLE: Report on the Second All-Union Conference on Gas Electronics
PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 6, pp 1359 - 1358 (USSR)

ABSTRACT: The conference was organized by the Acad. Sci. USSR, the Ministry of Higher Education and Moscow State University. It was opened by the Chairman of the organizing committee, A.A. Kishinichuk, Academician. During the plenary sessions of the conference, a number of survey papers were delivered. A.A. Luk'yanchov read a paper on "Production of Ultra-high Voltage in Plasmas".

A survey of the optical method of measurements was given in the papers by V.A. Fabrikant and S.S. Frish. S. Brown of the Massachusetts Institute of Technology gave a survey of the high-frequency methods of the investigation of stationary and non-stationary plasmas (see p 1344 in this issue of the journal). S.V. Fedorenko read a paper entitled "Ionization and Scattering of Electrons During Atomic Collisions".

L.A. Jona and Yu.M. Kuzen deal with "Elementary Processes of Determining the Motion of Ions in Gas". A paper by Ye. Sedarov (Bumalia) dealt with "The Role of Resonance-Feathering in the Kinetics of Ions". I.S. Skakal'nikov considered the initial values of the development of sparks (corona-leader, cath channel and the cath glow) in highly rarified gases. S.M. Klyverfeldt gave a survey of the ignition processes of the discharge in highly rarified gases. The mechanism of the breakdown of a high-vacuum gap was elucidated in a paper by V.L. Granovskiy. L. Teuchs (USA) expounded a theory of the motion of electrons in a magnetic trap (see p 1316 of this Journal). Academician R. Rompe (Eastern Germany) described a number of experiments on non-stationary plasmas conducted by himself.

M. Stamba (Eastern Germany) gave a generalized theory of plasmas. The conference was divided into six sections. The first section was presided over by L.A. Jona and was concerned with the elementary processes in gas discharges. The following papers were read in this section: I.M. Kabanov, "Excitation of Positive Ions into Negative Ions in Rarified Gases"; Ye. M. Petal', with V.A. Abudikov and S.V. Pilyuzhko - "Capture and Loss of Electrons During the Collision of Fast Atoms of Carbon and Hydrogen with the Molecules of Gases"; S.V. Fedorenko et al. - "Dissociation of Molecular Ions of Hydrogen During Collisions in Gas"; I.P. Flaks and I.M. Kabanov - "Capture Cross-sections of Electrons in Multicharged Ions in Inert Gases"; S.N. Kuzhik et al. - "Experimental Investigation of the Resonance Exchange in Certain Single-atom Gases and Metal Vapours"; Qualitative investigation of inelastic collisions; I.M. Kabanov, "Effective Excitation Cross-sections of the General Lines of Potassium and Argon"; Carel/13 I.P. Japanezhny and S.M. Kishinichuk - "Some Results of the Investigation of the Optical Functions of the Excitation Bands of Potassium"; A.A. Kishinichuk and A.G. Vlasov - "Investigation of the Scattering of the Electrons in a Stationary Cathode"; The second section was presided over by S.M. Klyverfeldt and was devoted to the problems of the electrical breakdown in rarified gases and in high vacuum. The following papers were read in this section: S.Ya. Makar-Lisano and Yu.A. Metlitskiy - "Electrostatic Control of the Ignition of Glow-discharge Tubes" (see p 1374 of the Journal); S.V. Pilyuzhko et al. were concerned with the breakdown in a high-voltage mercury rectifier (see p 1378 of the Journal); S.V. Gornya "Ignition of the Discharge in Nonuniform Fields at low Gas Pressure" (see p 1380 of the Journal); A.A. Sedarov and S.M. Klyverfeldt - "The Discharge Phenomena Between a Point and a Plane at Gas Pressures of 10⁻³ - 1 mm Hg".

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AUTHORS: Afrosimov, V. V., Il'in, R. N., Solov'yev, Ye. S.TITLE: Capture of Electrons¹¹ by Protons¹¹ in Rare GasesPERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 6,
pp. 705-710

TEXT: This paper gives the results of the measurement of the full capture cross section in the capture of one electron by protons with an energy of 10 - 180 kev in He, Ne, Kr, and Xe and of the capture cross section in the capture of two electrons in Ar. Furthermore, the elastic and inelastic proton scattering was investigated, which is connected with the transitions $H^+ \rightarrow H^0$ and $H^+ \rightarrow H^-$. A short description of the measuring method is given. For measuring the full capture cross section the condenser method was applied that had been described in the previous paper (Ref. 6) by the authors. The diagrams of Tables 1 - 4 show the curves obtained for the relationship between the energy T and the full capture cross

Card 1/3

Capture of Electrons by Protons in
Rare Cases

S/057/60/030/06/17/023 81596
B012/B064

In previous papers (Refs. 8, 9) issued by the authors' laboratory it was stated that the relative probability of the inelastic processes increases while the distance between the nuclei of the colliding particles decreases. The results of the present paper show that this conclusion can also be applied to the processes in the capture of the electrons and that this seems to be a general law in inelastic atom collisions.

The paper (Ref. 5) by Ya. M. Fogel', R. V. Mitin, V. F. Kozlov, N. D. Romashko, and the paper (Ref. 11) by N. V. Fedorenko and V. A. Belyayev are mentioned. Professor N. V. Fedorenko and Professor V. M. Dukel'skiy showed an active interest in the present paper. There are 6 figures and 16 references: 11 Soviet and 5 English.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, Leningrad
(Institute of Physics and Technology of the AS USSR,
Leningrad) *UH*

Card 3/4

23723
S/057/61/031/006/007/019
B116/B203

26.2312

AUTHORS: Il'in, R. N. and Solov'yev, Ye. S.

TITLE: Ionization of argon by oxygen and nitrogen ions

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6. 1961, 680-687

TEXT: The authors measured the total ionization cross sections (σ_{ion}), the total electron capture cross sections (σ_{e}), and the argon secondary ion production cross sections (σ_{on}) for the ions N^+ , O^+ , N_2^+ , O_2^+ , NO^+ , and NO_2^+ with energies of 15-180 keV in argon. They found that σ_{ion} and the production cross sections of doubly, triply, and quadruply charged argon ions ($\sigma_{\text{O}2^+}$, $\sigma_{\text{O}3^+}$, and $\sigma_{\text{O}4^+}$) increased with an increasing number of atoms in the primary ion. They established a relationship between the capture of two electrons leading to the transition $\text{O}^+ \rightarrow \text{O}^{2+}$ and the formation of multiply charged ions. Argon was chosen as gas target because ionization and electron capture by hydrogen ions have been thoroughly studied for this gas by V. V. Afrosimov, R. N. Il'in, and N. V. Fedorenko (Ref. 2: ZhETF,

Card 1/6

23723

S/057/61/031/006/007/019
B116/B203

Ionization of argon by oxygen and ...

charge, the number of nuclei with given Z is inseparably connected with the total quantity of electrons and the particle dimension, it cannot be stated which of these factors has a determining effect. Without considering the Z of the nuclei, the nuclear quantity itself does evidently not play the main part. The cross section σ_{01} is composed of the cross-section σ_{01}^c of the single-electron charge exchange and the cross section σ_{01}^i of the single-electron ionization. The corresponding processes may be written down in the following manner: $I^+ + A \rightarrow I + A^+$ (1)

$I^+ + A \rightarrow I^+ + A^+ + e$ (2), where I^+ is a primary ion, A a gas atom. The course of the $\sigma_{01}(v)$ curve is mainly determined by (1). This is confirmed by the following characteristics of the curve: (1) The $\sigma_{01}(v)$ - and $\sigma_0(v)$ curves show a certain similarity. (2) At $v < 1 \cdot 10^8$ cm/sec, σ_0 is much smaller than σ_{01} . For all primary ions studied, the σ_{01} differ very slightly in the range of $(5 \div 10) \cdot 10^7$ cm/sec. At the same time, however, σ_0 is smaller and σ_0 larger for atomic ions than for molecular ions. This

Card 3/6

23723

Ionization of argon by oxygen and ...

S/057/61/031/006/007/019
B116/B203

suggests that for the molecular ions N_2^+ , NO^+ , O_2^+ , and NO_2^+ the relative role of ionization is considerably larger in the formation of Ar^+ ions. σ_{O1} and σ_{O2} show no dependence on the inner structure of colliding particles. The essential difference between the cross sections σ_{O2} for the ions O^+ and N^+ is related with the fact that doubly charged ions may be formed in three different processes: pure ionization (cross section σ_{O2}^i), ionization with capture of one electron (σ_{O2}^{1c}), and ionization with capture of two electrons (σ_{O2}^{cc}). For the latter process, $I^+ + A \rightarrow I^{2+} + A$ (5) holds. The difference $\Delta\sigma_{O2}$ with equal ion velocity may be ascribed to process (5). This is confirmed by a comparison of the values obtained here with those obtained by Ya. M. Fogel', R. V. Mitin, A. G. Koval' (Ref. 11: ZhETF, 31, 397, 1956): course and order of magnitude of $\Delta\sigma_{O2}(v)$ and $\sigma_{1-1}(v)$ are equal. Also the difference of the cross sections σ_{O3} for O^+ and N^+ can be explained by process (5). The capture of two

Card 4/6

28922
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26.2340

AUTHORS: Afrosimov, V. V., Il'in, R. N., Oparin, V. A., Solov'yev, Ye.S.,
Fedorenko, N. V.

TITLE: Ionization of argon by atoms and by singly and doubly charged
ions of neon and argon

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 4(10), 1961, 1048-1055

TEXT: In order to study the effect of the charge of primary particles upon the total ionization cross section, the authors examined ionization by collision with particles of 20 to 360 kev. Argon bombarded with Ar, Ar⁺, Ar⁺⁺, Ne, Ne⁺, and Ne⁺⁺ was chosen for the experiments. The experimental arrangement is shown in Fig. 1. It is basically the same as that described in earlier publications (N. V. Fedorenko, ZhTF, 26, 1929, 1959 and 1941, 1956). Fast neutral atoms were obtained by resonance charge exchange of a monochromatic ion beam in chamber B. Ions that were left in the beam emerging from B, were eliminated by capacitor K. The total

Card 1/4

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28922

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Ionization of argon by atoms and by ...

collector. There are 10 figures and 14 references: 12 Soviet and 2 non-Soviet. The reference to the English-language publication reads as follows: H. B. Gilbody, J. B. Hasted. Proc. Roy. Soc., A240, 382, 1957. Mention is made of D. M. Kaminker (ZhTF, 25, 1843, 1955) and O. B. Firsov (ZhETF, 36, 1517, 1959).

ASSOCIATION: Leningradskiy fiziko-tehnicheskiy institut Akademii nauk SSSR (Leningrad Physicotechnical Institute of the Academy of Sciences USSR)

SUBMITTED: May 13, 1961

Legend to Fig. 1: - collision chamber, U - measuring capacitor, A - mass analyzer for slow ions, - collector for fast particles; H₁, H₂, and H₃ are pumps evacuating the collision chamber to about $1 - 2 \cdot 10^{-6}$ mm Hg.

Card 3/4

Ionization of gases by fast...

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B117/B112

N. V. Fedorenko, ZhETF, 41, 1048, 1961). Accidental errors did not exceed $\pm 15\%$, except the cross sections σ_{H^+} and $\sigma_{N^{2+}}$ ($\pm 30\%$). Theoretical and

experimental data were comparable only to a limited extent. The stripping cross sections calculated in the Born approximation showed satisfactory agreement for energies above 60 keV. When the energies were lowered, the divergence between the relevant experimental and theoretical curves increased. Analysis of the experimentally obtained ionization cross sections proved the applicability of the Born approximation for the range of high velocities $v > v_0$. For the range of low velocities $v < v_0$, however, it

could not be applied any more, since the cross sections for ionization by fast atoms were always a little greater than those for ionization by protons. In addition, the cross sections for ionization processes of the same kind increased with increasing target atom Z. The stripping curves of the fast atom (cross section σ_1) and the curves of the production of singly charged ions of inert gases (cross section σ_{01}) have shown that in most cases they reach maxima at velocities $v \geq v_0$. The peaks observed at

Card 2/4

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B117/B112

Ionization of gases by fast...

lower velocities are qualitatively interpreted by a quasimolecular model, in which, owing to the drop of ionization potential, the peaks of the ionization cross sections are shifted toward lower velocities $v < v_0$, and where the ionization cross sections are interrelated by $\sigma(H)/\sigma(H^+) > 1$. From the point of view of the quasimolecular model, the proton-atom system of the inert gas seems more stable with regard to ionization than the H-atom-atom system of the inert gas. The probability that a particle will be ionized after the decay of the quasimolecule depends on the electron binding in the atom in question and on the ratio of statistical weights of possible states of charge. These two factors may effect a "competition" between the ionization processes, which must influence the position of the peaks of the ionization cross section. The curves for the production of singly charged ions of inert gases and for the stripping of the hydrogen atom confirmed the assumption that the position of the peaks depends not only on the ionization potential of the relevant atom but also on other factors. The maxima for velocities $v \sim (1 - 1.5)v_0$ were determined for cross sections $\sigma_1(H)$ and $\sigma_1(H^+)$ of ionization by atoms and protons, respectively. The experimentally obtained position of the peaks on the

Card 3/4

~~SOLCV'YEV~~ YE.S., ILIN, R.N., OFANIN, V.A., VEIORENKO, N.V.

Ionization of gases by helium ions and fast helium atoms.

Report submitted to the Third Intl. Conference on Physics of
Electronics and Atomic Collisions,
London, England 22-26 July 1963

SOLOV'YEV, Ye. S.; IL'IN, R. N.; OPARIN, V. A.; FEDORENKO, N. V.

Ionization of Gases by Fast Helium Atoms and Singly-Charged Helium Ions

report presented at the 11th Meeting of the Intl. Committee for Electrochemical Thermodynamics and Kinetics (CITRE) Moscow, 19-25 Aug 1963.

Ioffe Physics-Tech Inst. Acad. Sci. USSR, Leningrad USSR

SOLOV'YEV, Ye.S.; IL'IN, R.N.; OPARIN, V.A.; FEDORENKO, N.V.

Ionization of gases by fast atom and singly charged helium ions. Zhur. eksp. i teor. fiz. 45 no.3:496-502 S '63.

(MIRA 16:10)

1. Fiziko-tehnicheskii institut imeni A.F. Ioffe AN SSSR.
(Ionization of gases) (Helium)

ACCESSION NR: AP4031139

S/0056/64/046/004/1208/1211

AUTHORS: Il'in, R. N.; Kikiani, B. I.; Oparin, V. A.; Solov'yev, Ye. S.; Fedorenko, N. V.

TITLE: Dissociation of positive hydrogen ions in collisions with atoms and gas molecules

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 4, 1964, 1208-1211

TOPIC TAGS: proton cross section, hydrogen, nitrogen, helium, argon, particle collision, ionization phenomena

ABSTRACT: The purpose of the work was to repeat the measurements of the cross section for the production of protons following dissociation of molecular ions H_2^+ with energy 10--180 keV in hydrogen, nitrogen, helium, and argon, using the same setup as previously (ZhETF v. 36, 385, 1959), but with a more thorough elimination of the main sources of the systematic errors. Comparison of the data obtained

Card 1/3