FRISH, S. /E.

Author: Frish, S. E. and Timoreva, A. V.

Title: A course in general physics. 2nd edition, revised and enlarged. Approved by the Ministry of higher education of the U.S.S.R. as a text book for physical and technical faculties of State Universities. (Kurs obshchei fiziki.) Vol. 2, The electrical and electromagnetic phenomena. 591 p.

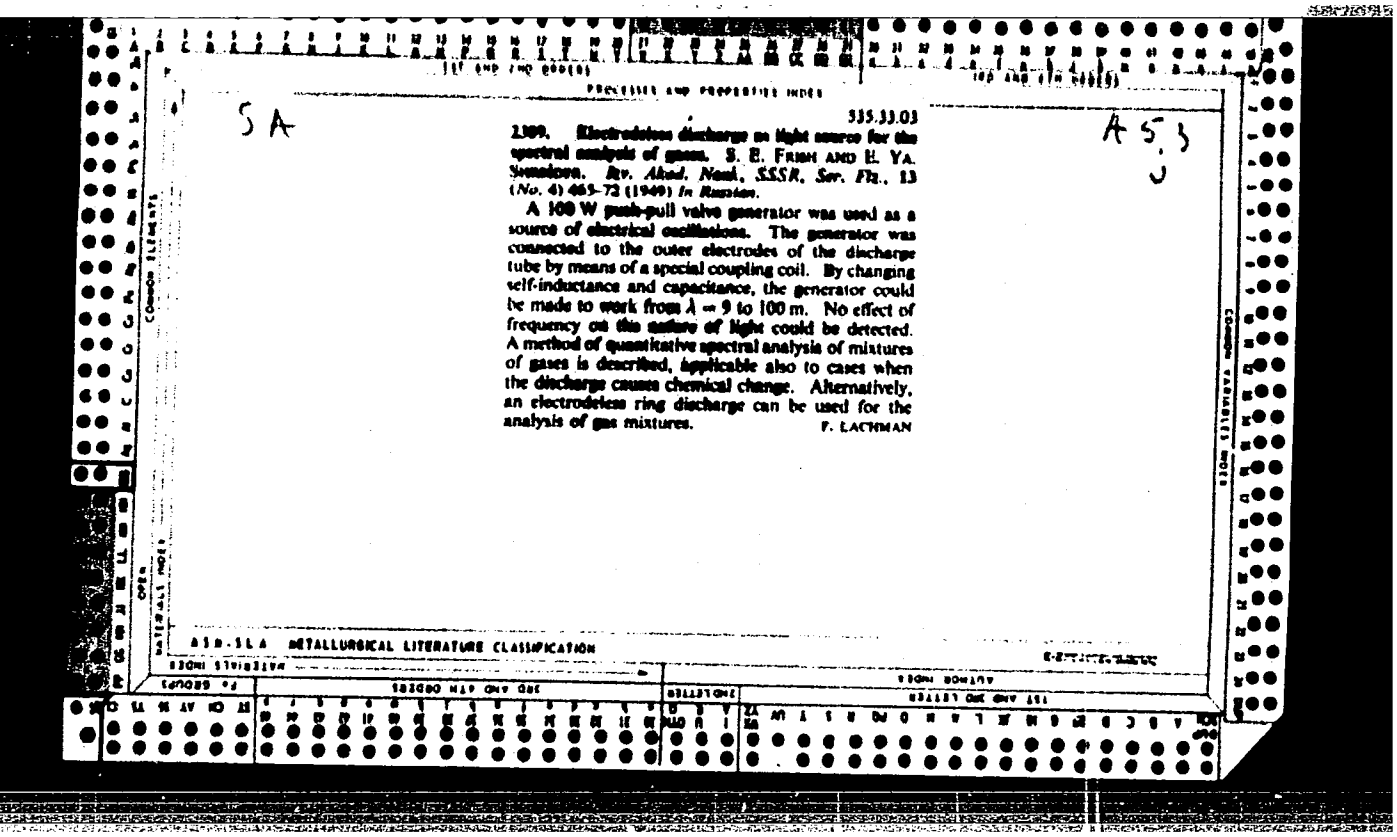
City: Leningrad

Publisher: State Printing House of the Technical and Theoretical Literature

Date: 1949

Available: Library of Congress

Source: Monthly List of Russian Accessions, v. 3, no. 8, page 522



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535.33.03

1309. **Electrodeless discharge as light source for the spectral analysis of gases.** S. E. FRISH AND E. YA. SVESHNIKOVA. *Izv. Akad. Nauk. SSSR, Ser. Fiz.*, 13 (*No.* 4) 465–72 (1949) *In Russian.*

A 100 W push-pull valve generator was used as a source of electrical oscillations. The generator was connected to the outer electrodes of the discharge tube by means of a special coupling coil. By changing self-inductance and capacitance, the generator could be made to work from $\lambda = 9$ to 100 m. No effect of frequency on the nature of light could be detected. A method of quantitative spectral analysis of mixtures of gases is described, applicable also to cases when the discharge causes chemical change. Alternatively, an electrodeless ring discharge can be used for the analysis of gas mixtures. F. LACHMAN

A53

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3

High frequency discharge as a light source for the spectral analysis of gases. S. E. Frish and E. V. Shtchler. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 13, 464-72(1949).

Spectral gas analysis is made difficult because in a low pressure arc discharge the electron temp. depends on the compn. of the gas. Therefore in a mixt., gases with low activation and ionization potentials will be more strongly excited. Chem. reactions and adsorption at the walls may also take place, changing the compn. Both conditions can be improved by using a "step" excitation in tubes with capillary restriction and c.d. of several amp. $\times 10^{-3}$/sq. cm. and by employing outside electrodes and a high frequency generator with $\lambda = 0.100$ m. (the tests were made at $\lambda = 27$ m.). The discharge tubes were made of fused quartz; they had a set of capillaries of decreasing section in series. Calibration was made with mixt. of gases of known compn. and a step filter with known transmission ranges. The probable error of each reading was 2.5-5%. This method can be used in the analysis of gases showing chem. changes under gas discharge. As an example a mixt. of N_2 and CO was investigated which showed bands of N_2, CO, and CN. As analytical pairs were selected CN $\lambda = 3883$ A. and CO $\lambda = 4124$ A.; N_2 $\lambda = 3998$ A. and CO $\lambda = 4302$ A. The calibrations were made at 0.35 mm. pressure, 350 ma. current, a 5 mm. diam. of the capillary tube, 2-8 min. of exposure and N_2 concns. of 0.5-25%. If instead of a capillary an L-shaped tube was used and the electrodes were applied to both ends of the L, the character of the discharge coming lengthwise from the horizontal leg was different from the light coming from the central portion. A high-frequency ring discharge was also tried.

S. Pakswer

FRISH, S. E.

USSR/Physics - Spectroscopy, Reabsorption

Nov/Dec 50

"Phenomena of Light Reabsorption in Gaseous Discharge and Certain of Their Applications," S. E. Frish, Sci Res Phys Inst, Leningrad State U imeni Zhdanov

"Iz Ak Nauk SSSR, Ser Fiz" Vol XIV, No 6, pp 711-15

Discusses problem of spectral line intensities vs light sources. Considers sources that differ only in thickness of light layers, and temperature dependence of ratio of intensities of 2 lines given by one source

170T89

USSR/Physics - Spectroscopy, Reabsorption (Contd)

Nov/Dec 50

for various cesium vapor pressures. Concludes gas mixture under certain conditions can be measured by galvanometer without spectroscope.

[redacted]

170T89

FA 170T89

1. FRISH, S. E.

2. USSR (600)

4. Physics and Mathematics

7. Works on Anomalous Dispersion in Vapors of Metals, D. S. Rozhdestvenskiy; S. E. Frish, Corr-Mem Acad Sci USSR (editor); N. P. Penkin (commentator). ("Classics of Science", Acad Sci USSR Press, 1951). Reviewed by V. A. Fabrikant, Sov. Kniga, No. 7, 1952.

9. [redacted] Report U-3081, 16 Jan 1953., Unclassified.

FRISH S. E.

181T83

USSR/Physics - Spectrography Apr 51

"Some Problems of Intensity of Spectral Lines," S. E. Frish

"Uspekhi Fiz Nauk" Vol XLIII, No 4, pp 512-535

Reviews photometric relations, methods of measurements of intensities of emission and absorption lines, effect of reabsorption on intensities of lines, and describes exptl res in Leningrad U on vapors of cesium.

181T83

Frish, S. E. Dmitrii Sergeevich Rozhdestvenskii (on his 75th birthday). P. 238.

SO: Progress in the Physical Sciences, Vol. XLIV, No. 2, June 1951, (Uspekhi)

FRISH, S.E.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Frish, S.E. Timoreva, A.V.	"Course in General Physics" (Vol I and II, 5th edition; Vol III, 3d edition)	Leningrad State University imeni A.A. Zhadanov

SO: W-30604, 7 July 1954

PHASE I Treasure Island Bibliographic Report 00000034

BOOK

Author: FRISH, S.E. and TIMOREVA, A.V. Call No.: QC21.F734

Full Title: COURSE IN GENERAL PHYSICS, Vol. I. 4th edition.

Transliterated Title: Kurs obshchey fisiki, Tom I

Publishing Data

Originating Agency: None.

Publishing House: State Publishing House for Technical-Theoretical Literature

Date: 1952 No. pp.: 560 No. copies: 100,000

Editorial Staff

Editor: None

Editor-in-Chief: None Technical Editor: None

Appraiser: None

Text Data

Coverage: This textbook describes the physical fundamentals of mechanics (kinematics, dynamics, work and energy, gravitation, motion of solids and liquids), of molecular physics (gases, fundamentals of thermodynamics, molecular phenomenon in liquids and solids), and of vibration, waves, and acoustics. The book requires from the reader some knowledge of general mathematics including calculus.

Purpose: Approved by the Ministry of Higher Learning in the USSR as a textbook for physical and physico-engineering faculties of state universities.

Facilities: None.

No. Russian and Slavic References: None.

Available: Library of Congress.

PHASE I Treasure Island Bibliographic Report

00000116

BOOK

Call No.: QC21.F734

Author: FRISH, S.E. and TIMOREVA, A.V.
Full Title: COURSE OF GENERAL PHYSICS, VOL. II, 4th edition
Transliterated Title: Kurs obshchey fisiki, Tom II

Publishing Data

Originating Agency: None
Publishing House: State Publishing House for Technical-Theoretical Literature.
Date: 1952 No. pp.: 616 No. copies: 100,000
Editorial Staff
Editor: None
Technical Editor: None
Editor-in-Chief: None
Appraiser: None

Text Data

Coverage: This textbook presents the fundamentals of electrostatics (basic phenomena in dielectrics and non-dielectrics), direct current (basic laws and electrolysis), electromagnetic phenomena (magnetic field currents, deflections in electric and magnetic fields), and electromagnetic inductions, oscillations and waves. The book requires from the reader a knowledge of general mathematics including calculus.

Purpose: Approved by the Ministry of Higher Learning in the U.S.S.R. as a textbook for physical and physico-engineering faculties of State Universities.

Facilities: None.

No. Russian and Slavic references: None

Available: Library of Congress

FRISH, S.E.

The reabsorption of light in discharge in cesium vapors. S. E. Frish and L. P. Bordagova (A. A. Zhdanov State [illegible] Leningrad). *Paniyati Sergeya Ivanovicha Vavilova, Akad. Nauk S.S.S.R.* 1952, 220-30.—The reabsorption of light by the source was studied under conditions of gas discharge. Expts. were carried out with Cs at vapor pressures of 4.3×10^{-4}, 1×10^{-3}, and 2.6×10^{-3} mm. The coeff. of absorption, k_ν, was detd. for different spectral lines.

J. Rovtar Leach

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1. FRISH, S. YE.

2. USSR 600

4. Physics

7. Presentation of mass and energy in contemporary physics, Usp. fiz. nauk, 48, No. 2, 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

FRISH, S.E.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 426 - I

BOOK Call No.: AF618857

Authors: FRISH, S. E. and TIMOREVA, A. V.
Full Title: TEXTBOOK ON GENERAL PHYSICS. Vol. III. OPTICS. ATOMIC PHYSICS. 3rd rev. ed.
Transliterated Title: Kurs obshchey fiziki. Tom III. Optika. Atomnaya fizika. 3 izdaniye ispravlennoye

Publishing Data
Originating Agency: None
Publishing House: State Publishing House of Technical and Theoretical Literature
Date: 1953 No. pp.: 644 No. of copies: 50,000
Editorial Staff: None

Text Data
Coverage: The book contains the last two parts of a university course in theoretical physics as supplemented with accounts of recent developments in the field of light and atomic physics. The first part, that on light, describes recently advanced theories covering light passage through isotropic and anisotropic media refraction, diffraction, spectroscopy, interfrential measurements and electronic emission. The second part, that on atomic physics, presents a general description of the fundamental ideas of modern nuclear science with a minimum of mathematical explanation.

Kurs obshchey fiziki. Tom III. Optika AID 426 - I
Atomnaya fizika. 3 izdaniye ispravlennoye PAGES

PART EIGHT - ATOMIC PHYSICS

5/7

Kurs obshchey fiziki. Tom III. Optika
Atomnaya fizika. 3 izdaniye ispravlennoye

AID 426 - I

PAGES

(Work of Kurchatnov, Rusinov and Grinberg)7. 378. Nuclear moments. 379. Structure of atomic nuclei. 380. Nuclei division. Chain reaction. 381. Cosmic rays. 382. Mesons. Origin of cosmic rays.

Appendix 633
Index 637

Purpose: The book is approved by the Chief Board of Higher Education of the Ministry of Culture of the USSR as a textbook for physical and physico-technical faculties of state universities.

Facilities: None

No. of Russian and Slavic References: None

Available: A.I.D., Library of Congress.

7/7

FRISH, S.E.

[Dmitrii Sergeevich Rozhdestvenskii; his life and work] Dmitrii Sergeevich Rozhdestvenskii; zhizn' i deiatel'nost'. Leningrad, Izd-vo Leningradskogo universiteta, 1954. 26 p. (MLRA 8:11)
(Rozhdestvenskii, Dmitrii Sergeevich 1876-1940)

FRISH, S.E.

V.I.Lenin's book "Materialism and empirio-criticism" and modern physics.
Vest.Len.un.9 no.2:3-10 F '54. (MLRA 9:7)
(Dialectical materialism) (Physics)

USSR/Physics - Spectral analysis

Card 1/1 Pub. 43 - 11/97

Authors : Frish, S. E.

Title : Quantitative spectral analysis of gaseous mixtures

Periodical : Izv. AN SSSR, Ser. fiz. 18/2, page 251, Mar-Apr 1954

Abstract : Brief review is presented of certain problems connected with quantitative analysis of gaseous mixtures carried out by means of a method based on the utilization of a high-frequency discharge at low pressure in a quartz tube with external electrodes. One of the basic difficulties of the method was found to be the change in the analysis of the gaseous mixture caused by the adsorption and liberation of gas by the walls of the discharge tube. A second highly important problem is the creation of optimum conditions for the excitation of the spectrum of the analyzed admixtures. Various ways of overcoming these difficulties are suggested.

Institution : The A. A. Zhdanov State University, Physics Institute, Leningrad

Submitted : .....

FRISH, S. E.

USSR/Physics - Conferences

Card 1/1 Pub. 43 - 1/62

Authors : Frish, S. E.

Title : Introductory address

Periodical : Izv. AN SSSR. Ser. fiz. 18/6, 627-629, Nov-Dec 1954

Abstract : Introductory address and greeting of delegates to the 9-th All-Union Conference on Spectroscopy held during July 5-11, 1954 in Tartu, Est SSr.

Institution : .....

Submitted : .....

FRISH, S. E.

USSR.

Determination of the excitation functions of the energy levels of mercury from the optical excitation functions. S. E. Frish and I. P. Zapesochnyĭ (Phys. Inst., A. A. Zhdanov State Univ., Leningrad). *Doklady Akad. Nauk S.S.S.R.* 98, 971-4(1954).—Optical excitation functions, which represent the dependence of the intensity of Hg lines upon the energy of the exciting electrons, have been detd. experimentally. For the lines 5461 A. ($6^3P_2 - 7^3S_1$), 4916 A. ($6^1P_1 - 8^1S_0$), 4108 A. ($6^3P_1 - 9^3S_1$), and 4078 A. ($6^3P_2 - 7^3S_1$) these functions are represented graphically. The first max. of these curves can be ascribed to the higher energy levels of these transitions; further max., which in some cases are stronger than the first max., are ascribed to other energy levels. The excitation functions of these energy levels are obtained by analysing the optical excitation functions. B. Gora

162

BOCHKOVA, Ol'ga Pavlovna; SHREYDER, Yelena Yakovlevna; FRISH, S.E., professor, redaktor; ORLOVA, L.I., redaktor; BOLCHOK, K.M., tekhnicheskiy redaktor

[Spectrum analysis of gaseous mixtures] Spektral'nyi analiz gazovykh smesei. Pod red. S.E.Frisha. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1955. 183 p. (MLRA 9:2)

1. Chlen-korrespondent AN SSSR (for Frish)
(Gases--Spectra)

FRISH, S. E.

USSR/ Scientists - Obituary

Card 1/1 Pub. 127 - 13/13

Authors : Frish, S. E.

Title : P. I. Lukirskiy

Periodical : Vest. Len. un. Ser. mat. fiz. khim. 10/2, 203-204, Feb 1955

Abstract : Eulogy is presented honoring the death of the prominent Soviet physicist academician Petr Ivanovich Lukirskiy (1894-1954).

Institution : .....

Submitted : .....

FRISH, S.E.

Spectrum apparatus with two prisms of constant-deviation angle.
Vest.Len.un. 9 no.8:151-155 Ag '54. (MLRA 8:7)
(Spectroscope)

FRISH, S.E.

Quantitative spectrum analysis of gaseous mixtures. Vest.Len.un. 9 no.8:157-162 Ag '54. (MLRA 8:7)
(Spectrum analysis)

MYASNIKOV, L.L.

"Course of general physics, vol 2." S.E. Frish, A.V. Timoreva. Reviewed by L.L. Miasnikov. Vest.Len.un. 9 no.8:189-191 Ag '54. (Physics--Textbooks) (Frish, S.E.) (Timoreva, A.V.) (MLRA 8:7)

FRISH,S.E.; ZAPESOCHNYY,I.P.

Role of cascade transitions in the excitation of spectral lines. Izv. AN SSSR. Ser. fiz. 19 no.1:5-6 Ja-F '55. (MLRA 8:9)

1. Fizicheskiy institut Leningradskogo gosudarstvennogo universiteta imeni A.A.Zhdanova

(Spectrum analysis) (Spectrometer)

FRISH, S. E.

USSR/Physics - Sensitized fluorescence

Card 1/1 Pub. 22 - 14/51

Authors : Frish, S. E., Member-correspondent, Acad. of Sc., USSR; and Kraulinya, E. K.

Title : Determination of the effective cross-sections of impacts of the second type from sensitising fluorescence

Periodical : Dok. AN SSSR 101/5, 837-840, Apr. 11, 1955

Abstract : A theoretical method supported with properly arranged experiments is described for the purpose of determining the effective cross-sections of the second type impacts of sensitized fluorescence. A mixture of nitrogen and mercury vapors was chosen for the experiments. Data were calculated taking into consideration a probability for the energy transition. Three references: 1 USSR and 2 German (1929-1954). Table; graphs.

Institution : A. A. Zhdanov State University, Institute of Physics, Leningrad

Submitted : January 7, 1955

FRISH,S.E.; PROKOF'YEV,V.K.

Ninth Conference on Spectroscopy; proceedings of the second and third sessions. Usp. fiz. nauk 56 no.1:131-142 My '55.
(MIRA 8:6)

(Spectrum analysis--Congresses)

FRISH, Sergey Eduardovich; TIMOREVA, Aleksandra Vasil'yevna; NOVOZHILOV, Yu.V., redaktor; ORLOVA, L.I., redaktor; VOLCHOK, K.M., tekhnicheskiy redaktor

[A course in general physics] Kurs obshchei fiziki. Izd. 7-oe, ispr. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry. Vol.1. [Physical principles of mechanics. Molecular physics. Vibrations and waves] Fizicheskie osnovy mekhaniki. Molekuliarnaia fizika. Kolebaniia i volny. 1956. 463 p. (MLRA 9:9)
(Physics)

FRISH, [redacted]; TIMOREVA, Aleksandra Vasil'evna; ORLOVA, L.I., redaktor; VOLCHOK, K.M., tekhnicheskiy redaktor

[A course in general physics] Kurs obshchei fiziki. Izd. 6-oe, ispr. Moskva, Ges. izd-vo tekhniko-teoret. lit-ry. Vol. 2. [Electrical and electromagnetic phenomena] Elektricheskie i elektromagnitnye iavleniia. 1956. 504 p. (MLRA 10:4)
(Electricity)

FRISH, S.

"Effect of Stepwise Transitions on Excitation of Spectral Lines", a paper Presented at the Sixth International Spectroscopical Colloquium, Amsterdam, 14-19 May 1956.

Academy of Sciences of the USSR, Moscow

Translation-[illegible]

[redacted], A., and [redacted], I., [redacted]

"Spektroskopische Untersuchungen der Ionen-bewegung in der Positiven Säule der Gasentladung," a paper submitted at the Third International Conference on Gaseous Electronics, Venice, 11-15Jun 57

601665

FRISH, S., and KAGAN, I., Moscow

"Ion Velocities and Positive Column of Discharge," a paper presented at the Third International Conference on Ionization Phenomena, in Gases, Venice, 11-15 Jun 57,

SO:B-3,087,498

[redacted]; TIMOREVA, Aleksandra Vasil'yevna; ORLOVA, L.I., redaktor; VOLCHOK, K.M., tekhnicheskiy redaktor

[A course in general physics] Kurs obshchei fiziki. Izd. 4-oe, perer. Moskva, Gos.izd-vo tekhniko-teoret.lit-ry. Vol.3. [Optics, nuclear physics] Optika atomnaia fizika. 1957. 608 p. (MLRA 10:10)
(Optics) (Nuclear physics)

Frish, S. E.

51-5-5/11

AUTHORS: Penkin, N.P. and Frish, S.E.

TITLE: A Study of Emission and Absorption Spectra of Uranium. (Issledovaniye spektrov ispuskaniya i pogloshcheniya urana)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr 5, pp.473-479 (USSR)

ABSTRACT: Absorption and emission spectra of uranium have been studied, using thermal excitation of uranium atoms in a King furnace in the temperature range 2800-3000°K. 167 emission lines and 47 absorption lines were observed. All the lines observed fall into the series scheme of Kiess et al (Ref.1). The experimental apparatus consists of a source of continuous spectrum (carbon arc), focussing lenses, high temperature vacuum furnace and an objective which focusses the radiation emitted by the furnace on the slit of the spectrograph. The furnace has already been described in Ref.(5). The uranium spectrum was photographed on the spectrograph ИСП-22 in the region 2300-3800 Å, and using an autocollimating spectrograph with a plane diffraction grating (50 000 lines) in the region 3800 to 6600 Å. Spectrograms were taken in the 2nd order of the grating where the dispersion was approximately 5.5 Å per mm. Uranium in the form of powder or filings was placed in a graphite tube

Card 1/3

A Study of Emission and Absorption Spectra of Uranium.

by an asterisk. Studies of absorption and emission spectra obtained by thermal excitation (high temperature vacuum furnace of King) have confirmed the classification given by Kiess et al in Ref.(1). It is concluded that uranium atoms do not have any levels lying deeper than 5L6 . In the uranium emission spectrum observed in King's furnace there are no lines corresponding to wavelengths less than 2900 Å, which again is in agreement with results of Kiess et al.
There are no figures, 3 tables and 6 references, 2 of which are Slavic.

ASSOCIATION: Scientific and Research Institute of Physics of the Leningrad State University (Nauchno-issledovatel'skiy fizicheskiy Institut Leningradskogo gosudarstvennogo universiteta)

SUBMITTED: July 1, 1957.

AVAILABLE: Library of Congress.

a mercury discharge the conclusion is drawn that the cross sections of the direct excitation of an ion and of the step-by-step excitation from the basic state have the same order of magnitude. Finally the paper under review computes from experiments on sensibilized fluorescence the relative cross sections for shocks of the second kind.
(17 reproductions, 3 charts, 17 references).

ASSOCIATION
PRESENTED BY
SUBMITTED
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Card 2/2

KALININ, S.K.; MARZUVANOV, V.L.; FRISH, S.E., red.; EVENSON, I.M., tekhn. red.

[Atlas of spark and arc spectra for iron from 3718 to 9739 Å] Atlas dugovogo i iskrovogo spektrov zheleza ot 3718 do 9739 A. Pod red. S.E. Frisha. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1958. 47 p. and 21, xvii plates (in portfolio). (MIRA 11:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Frish).
(Iron--Spectra)

FRISH, Sergey Eduardovich; TIMOREVA, Aleksandra Vasil'yevna; ORLOVA, L.I., red.; POL'SKAYA, R.G., tekhn. red.

[Course in general physics] Kurs obshchei fiziki. Vol.2. [Electric and electromagnetic phenomena] Elektricheskie i elektromagnitnye iavleniia. 1958. 509 p. Izd. 7., ispr. Moskva, Gos. izd-vo fiziko-matematicheskoi lit-ry. (MIRA 11:8)
(Electricity) (Electromagnetism)

FRISH, S.E.; BOGDANOVA, I.P.; KRAULINYA, E.K.

Importance of effective atomic cross sections in the excitation of spectra. Fiz.sbor. no.4:54-56 '58. (MIRA 12:5)

1. Fizicheskiy institut Leningradskogo ordena Lenina gosudarstvennogo universiteta imeni A.A.Zhdanova.
(Spectrum, Atomic)

FRISH, S.E.

51-4-3-20/30

AUTHORS: Frish, S.E. and Yakhontova, V.Ye.

TITLE: New Data on Excitation Functions of Helium Lines. (Novyye dannyye o funktsiyakh vozbuzhdeniya liniy geliya.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3, pp.402-404 (USSR)

ABSTRACT: The authors measured optical functions of excitation (by electrons) for 13 lines of HeI by means of the apparatus described in Ref.3. The latter apparatus was altered by introduction of automatic recording of excitation curves. Fig.1 gives the optical excitation functions F(V) for three singlet lines of HeI: 5047 (curve 1), 5016 (curve 2) and 4922 Å (curve 3). Fig.2 gives the excitation functions for three triplet lines of HeI: 4713 (curve 1), 3889 (curve 2), 4471 Å (curve 3). The abscissae in Figs.1 and 2 give the logarithms of the energy of exciting electrons. More detailed results are given in the table on p.404 in which the excitation potentials and position of maxima on the excitation curves are given in volts. The excitation functions obtained do not allow us to make definite conclusions about separate energy levels

Card 1/3

New Data on Excitation Functions of Helium Lines.

of helium, in the same was as it was done for mercury. However, one may make a number of probable conclusions. Thus, for example, the 5016 Å line has an upper 3^1P level; cascade transitions to this level are possible from n^1S and n^1D levels. The contribution of the cascade transitions to the optical excitation function for the 5016 Å line is given by curve 2 in Fig.3. Curve 1 in Fig.3 gives the experimental values of the optical excitation function for the 5016 Å line. The difference between curves 1 and 2 represents the excitation function for a single 3^1P level of helium (curve 3). Fig.4 gives the experimental excitation function for the 2^3P-4^3S line (4713 Å) as curve 1. Cascade transitions from n^3P levels should occur to the upper 4^3S level of the 4713 Å line. A probable contribution of these cascade transitions is given as curve 2 in Fig.4. Then the excitation function of the 4^3S level of helium is given by curve 3 in Fig. 4. Two maxima in the excitation functions of the 5047, 4438, 4922, 4388 and 4143 lines are not due to the

New Data on Excitation Functions of Helium Lines.

cascade transitions but are inherent in the excitation functions of the n^1S and the n^1D levels. V.I. Ochkur found, by a theoretical calculation, two maxima in the excitation functions of S and D levels in hydrogen, in contrast to the excitation function of the P level of hydrogen which has only one maximum. There are 4 figures, 1 table, 3 references of which 2 are Soviet and 1 Western (composite reference consisting of 2 English and 2 German papers).

ASSOCIATION: Physics Research Institute, Leningrad State University. (Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gosudarstvennogo universiteta.)

SUBMITTED: June 27, 1957.

1. Helium lines—Excitation 2. Optic functions—Measurement
3. Electrons—Excitation—Mathematical analysis

SOV/51-5-1-18/19

AUTHORS: Bochkova, O.P., Razumovskaya, L.P. and Frish, S.E.

TITLE: A Simple Method of Spectral Analysis of Purity of Inert Gases (Uproshchennyy metod spektral'nogo analiza inertnykh gazov na chistotu)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 1, pp 93-94 (USSR)

ABSTRACT: The authors describe a simple photoelectric method of spectral analysis which is fairly accurate and it takes only 2-3 minutes to complete. The apparatus is shown in Fig 1. The gas to be analyzed is drawn in by means of a rotary pump (N) through a vessel for removal of excess gas (S) and a furnace with a trap (P) to a discharge tube in the form of a capillary (Tr) of 1 mm diameter. Pressure in the capillary is controlled by means of a U-type manometer and taps 1 and 2. Emission of the gas in the capillary is excited using a high-frequency generator VG-2. The emission is condensed by a lens (L) on to a photomultiplier and is recorded, without amplification, by a microammeter (μA). The nitrogen bands in the region 3600 Å are separated out by a glass light-filter F. Using known mixtures a calibrating graph is obtained, in which the

Card 1/3

abscissa axis gives the concentration of nitrogen in percent and the ordinate axis gives the microammeter readings (α) which are proportional to the intensity of emission by the nitrogen bands. This method was used to determine the amount of nitrogen in argon of various degrees of purity. In technical-purity argon (with 9-15% N_2) the nitrogen bands are excited already at pressures of the order of 1-3 mm Hg. The calibration graph for these pressures is shown as curve 1 in Fig 2. Curve 2 in Fig 2 is the calibration graph for discharge-tube pressures of the order of 10 mm Hg. Pure argon should not contain more than 0.8% of N_2. In this case pressures of 100 mm Hg are necessary in the discharge tube in order to excite nitrogen bands. For argon of spectral purity (less than 0.01 % of N_2) discharge-tube pressures of several hundred mm Hg are necessary for a reliable analysis. Fig 3 shows the calibration curves for nitrogen in argon with 0.1-1% of N_2 (Fig 3a) and 0.01-0.1% of N_2 (Fig 3b). Instead of recording microammeter readings (α) which are proportional to the emission by the nitrogen bands one can use the ratio α/α_0, where α_0 is the total emission obtained without using the filter F. The

A Simple Method of Spectral Analysis of Purity of Inert Gases

ratio α/α_0 can be measured directly using the apparatus shown in Fig 4 where M is a splitting mirror FEU 1 and FEU 2 are the photomultipliers and EPP 09 is an automatic recorder. It was found that small amounts of oxygen and carbon dioxide do not affect the analysis. The method described is used for analysis of argon in the Balashikha Oxygen Plant (Ref 4). The authors thank senior laboratory assistant N.V. Chernysheva for construction of the calibration curves. There are 4 figures and 4 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet, fizicheskiy institut
(Leningrad State University, Physics Institute)

SUBMITTED: February 18, 1958

Card 3/3 1. Inert gases - Spectrographic analysis 2. Inert gases - Excitation
3. Spectroscopy - Equipment

SOV/51-5-5-22/23

AUTHORS: Bochkova, O.P., Razumovskaya, L.P. and Frish, S.E.

TITLE: Spectral Analysis of Micro-Quantities of Gas (Spektral'nyy analiz mikrokolichestv gaza)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 624-626 (USSR)

ABSTRACT: In analysing very small amounts of gas the necessary pressures in the discharge tube, used to obtain the spectrum, were produced in two ways: (a) compression in a capillary using Tepler's pump, and (b) addition of an inert gas to the analysed mixture. Both these methods were employed in analysis of small amounts of air to find the proportions of oxygen, argon and nitrogen present in them. The apparatus and technique were described in Refs 5, 6. Fig 1 gives calibration curves for determination of oxygen and argon in air. Air was initially at a pressure of 10^{-4} mm Hg occupying 250 cm^3. It was compressed into a capillary of 0.5 mm diameter and emission was excited by means of a high-frequency generator. The line pair O I at 7772 Å and N I at 7468 Å was used in determination of oxygen, while the line pair A I at 7503 Å and N I at 7468 Å was used in determination of argon. The change in the amount of argon in the mixture did not affect the relative intensity of the O--N lines and consequently it did not affect the calibration graph shown in Fig 1a. Change in the oxygen concentration altered the relative

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Spectral Analysis of Micro-Quantities of Gas

intensity of the A--N lines, leading to a parallel displacement of the calibration lines shown in Fig 1b. The mean error in determination of oxygen was 15% and in determination of argon was 8%. Employing the second method the authors used helium as an inert gas diluent, since helium has the highest excitation potential of all gases. Addition of helium considerably increases the total mass of gas used in the analysis, and minimizes the effects due to sorption and desorption of gas by the discharge-tube walls. This improves the precision of the analysis. To the original amount of air (at 10^{-4} mm Hg pressure in a volume of 250 cm^3) 3, 5, 10, 100 times that amount of helium was added. Better reproducability is obtained when the amount of helium added is five times the original amount of air. The error in determination of oxygen is then lowered to 10-12% and the error in determination of argon decreases to 5%. Addition of helium in amounts of 100 and more times the original amounts of gas to be analysed makes it possible to make a quantitative spectral analysis of amounts of the order of 0.01 mm^3 at atmospheric pressure. Fig 2 gives calibration curves for analysis of argon and oxygen in air (3×10^{-5} mm Hg pressure in a volume of 250 cm^3)

with helium added in the proportion of 80:1. On addition of helium a change in the oxygen concentration does not affect the calibration curves for argon but the error in determination of argon increases to 20%. This is because the partial pressure of argon in such a mixture is very small. There are 2 figures and 8 references, 4 of which are Soviet, 3 German and 1 other.

SUBMITTED: June 24, 1958

Card 3/3 1. Gases--Quantitative analysis 2. Gases--Spectra 3. Oxygen --Determination 4. Nitrogen--Determination 5. Argon--Determination

AUTHOR: Frish, S. E. SOV/48-22-6-2/28

TITLE: The Development of Soviet Spectroscopy in the Course of 40 Years (Razvitiye sovetskoy spektroskopii za 40 let)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 6, pp. 650-653 (USSR)

ABSTRACT: After the Russian Revolution 3 groups of Soviet scientists who worked in the field of optics were formed. The heads of these groups were the most prominent specialists within the field of optical sciences in the USSR: D. S. Rozhdestvenskiy, L. I. Mandel'shtam, and S. I. Vavilov. It was by their advice that the optical institute and the physical-technical-radiological institute were founded (end of 1918). Rozhdestvenskiy, as the principal initiator, set himself the task of replacing the antiquated Russian optical science by a new one which was to be in close contact with practice as a "truly socialist science" which was to have nothing in common with "capitalist mercantilism". An important part was played in the development of Soviet science by the planning system, which also explains the outstanding success achieved in the field of nuclear science and by the

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launching of the "Sputniks". Also today planning is an important factor in Soviet science. In the Soviet Ministry of Higher Education and its Scientific and Technical Council plans are being drafted for the future. The Academy of Sciences carries out its planning through special commissions which must seek the cooperation of wide scientific circles for the purpose of solving important problems. The author further expresses the opinion that Soviet successes may also be explained by the close connection established between experiments and theory as well as between physics and chemistry. This is also Rozhdestvenskiy's opinion, who said that it is the task of chemistry to comprehend processes and to control atoms like a chauffeur who controls his car. It is mainly due to Rozhdestvenskiy that atomic spectroscopy developed the way it did and that a solid basis was laid for the development of the optical industry. Mandel'stam contributed much to the development of molecular spectroscopy and to research work carried out with respect to matter. Vavilov developed the special fields of optics including luminescence. Landsberg developed spectral analysis and its application in industry. Finally, the

author mentions also the faults of the aforementioned development such as insufficient contact between the Central Office of the Academy of Sciences and its branches in the various Soviet republics as well as with similar institutions in the peoples' republics and with scientists of other countries. It is further mentioned as a disadvantage that there is not sufficient contact between Soviet scientific institutes and Soviet industrial plants.

1. Spectroscopy---USSR 2. Spectroscopy--Development 3. Scientific personnel--Performance

AUTHORS: Frish, S. E., Bogdanova, I. P. SOV/48-22-6-4/28

TITLE: The Excitation of Spectral Lines in the Negative Luminescence of a Gas Discharge (Vozbuzhdeniye spektral'nykh liniy v otritsatel'nom svechenii gazovogo razryada)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 6, pp. 659-661 (USSR)

ABSTRACT: In earlier works (Ref 1) the existence of a surplus of fast electrons near the cathode had been ascertained by measurements carried out with probes. As these electrons influence the excitation of neutral atoms, it must be assumed that, within the range of negative luminescence, a different energy distribution of atoms and also a different distribution of intensity in the spectrum must take place. For the purpose of discussing these phenomena, the present paper investigates the gas spectra forming in the interior of a hollow cathode. Neon tube discharges were used for this purpose. The measurements mentioned as being carried out in the paper by Bogdanova and Chen-Gi-Tkhek (Ref 2), who used a discharge tube with hollow cathode (15 mm diameter and 130 mm length) are referred to. In the interior of the cathode a

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small porcelain and magnetically adjustable disk was fitted. In this way it was possible to adjust the length of the column of light and thus to attain the line-reabsorption value which was assumed as a basis for calculations (Ref 3). For states of higher energies relating to the neon-electron-configuration $2p^5\,3p$ the absolute intensity lines are taken into account. Three diagrams illustrate the concentration of neon atoms in various states and at pressures of 0,7 torr. There are 4 figures and 3 references, 3 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova (Scientific Research Institute for Physics of Leningrad State University imeni A.A.Zhdanov)

1. Gas discharges--Spectra 2. Atomic spectra 3. Atoms--Energy

24(3) SOV/20-122-3-14/57

AUTHORS: Frish, S. E., Corresponding Member, Academy of Sciences, USSR; Matveyeva, N. A.

TITLE: The Investigation of the Mechanism of the Separation of Inert Gases in a Discharge of Constant Amperage (Issledovaniye mekhanizma razdeleniya inertnykh gazov v razryade postoyannogo toka)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 3, pp 375-377 (USSR)

ABSTRACT: The passing of a constant electric current through a mixture of gases causes their separation. There are 2 hypotheses concerning the mechanism of this separation: 1) The separation is caused by the transfer motion of the positive ions towards the cathode. 2) The separation is caused by a transfer motion of neutral atoms (which appear under the influence of ele tron collisions) towards the anode. The existence of a transfer motion of the ions in the separation of the gases is proved, but the experimental material available is not sufficient for the total explanation of the mechanism of the separation of gases by an electric discharge. The authors, therefore, systematic-

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The Investigation of the Mechanism of the Separation of Inert Gases in a Discharge of Constant Amperage

ly investigated the separation of gases by a discharge in a mixture of inert gases. The discharge tube used for these experiments is discussed in short. After the beginning of the discharge, the concentration of the components varies rapidly and reaches a steady value. The time necessary for reaching the equilibrium increases linearly with the pressure of the mixture, and it slightly depends on the amperage and on the composition of the mixture. The time necessary for the separation increases with the length of the discharge tube. Also the time necessary for the intermixing of the separated mixture after the beginning of the discharge was determined. The following dependences were found by the authors: 1) The degree of the separation increases linearly if the tube becomes longer. 2) In the region of low pressures (0,5 - 1,5 mm), an increase of pressure noticeably intensifies the separation. 3) An increase of the amperage of the discharge current intensifies the degree of separation. Initially, this increase is a linear one, but later it becomes slower. 4) If the concentration of the easily ionizable mixture increases, the degree of the separation decreases, and its pressure dependence

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becomes less distinct. 5) The dependence of the separation on the ionization potential of the mixture components cannot be found in a pure form. The results given above may be explained (qualitatively) by the assumption that the separation of the gases is caused mainly by the transfer motion of the ions. The higher the difference of the ionization potentials of the mixture components, the higher the difference of the concentration of their ions and the more distinct will be the separation effect. For a more detailed explanation of the observed laws, the dependence of the velocity of the transfer motion of the ions on the discharge conditions and the role of the diffusion have, at the same time, to be taken into account. There are 2 figures and 4 references, 2 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gosudarstvennogo universiteta im. A. A. Zhdanova (Scientific Physics Research Institute of Leningrad State University imeni A. A. Zhdanov)

ALEKSEYEVA, A.I.; GRINMAN, I.G.; KALININ, S.K.; KUSHNIKOV, Yu.A.; MARZUVANOV, V.L.; FRISH, S.E., prof., red.; SUVOROVA, R.I., red.; ROROKINA, Z.P., tekhn.red.

[Spectral lines of mercury] Atlas spektra rtuti. Alma-Ata, 1959. 6 p. (MIRA 12:10)

1. Akademiya nauk Kazakhskoy SSR. 2. Chlen-korrespondent AN SSSR (for Frish).

(Mercury--Spectrum)

ALEKSEYEVA, A.I.; GRINMAN, I.G.; KALININ, S.K.; KUSHNIKOV, Yu.A.; MARZUVANOV, V.L.; FRISH, S.E., prof., red.; SUVOROVA, R.I., red.; RORKINA, Z.P., tekhn.red.

[Atlas of the spectrum of mercury] Atlas spektra rtuti. (MIRA 14:1)
Alma-Ata, 1959. 1 v.

1. Akademiya nauk Kazakhskoy SSR. Fiziko-tekhnicheskiy institut.
2. Chlen-korrespondent AN SSSR (for Frish).
(Mercury--Spectra)

FRISH, S. E.

21(9),24(0) PHASE I BOOK EXPLOITATIO' SOV/...

Akademiya nauk SSSR. Fizicheskiy institut

Issledovaniya po eksperimental'noy i teoreticheskoy fizike; [sbornik] (Studies on Experimental and Theoretical Physics; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 304 p. Errata slip inserted. 2,300 copies printed.

Ed.: I. L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; Eds. of Publishing House: A. L. Chernyak and V. G. Berkgaut; Tech. Ed.: Yu. V. Rylina; Commission for Publishing the Collection in Memory of Grigoriya Samuilovich Landsberg: I. Ye. Tamm (Chairman), Academician; M. A. Leontovich, Academician; P. A. Bazhulin, Doctor of Physical and Mathematical Sciences; S. L. Mandel'shtam, Doctor of Physical and Mathematical Sciences; I. L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; F. S. Landsberg-Baryshanskaya, Candidate of Physical and Mathematical Sciences; and G. P. Motulevich (Secretary), Candidate of Physical and Mathematical Sciences.

PURPOSE: This book is intended for physicists and researchers engaged in the study of electromagnetic radiations and their role in investigating the structure and composition of materials.

COVERAGE: The collection contains 30 articles which review investigations in spectroscopy, sonics, molecular optics, semiconductor physics, nuclear physics, and other branches of physics. The introductory chapter gives a biographical profile of G. S. Landsberg, Professor and Head of the Department of Optics of the Division of Physical Technology at Moscow University, and reviews his work in Rayleigh scattering, combat gases, spectral analysis of metals, etc. No personalities are mentioned. References accompany each article.

SOV/51-6-6-25/34

24(7), 5(2)

AUTHORS: Bochkova, O.P., Razumovskaya, L.P., Frish, S.E. and Chernysheva, N.V.

TITLE: Simple Methods of Spectral Analysis o. Inert Gases for Impurities (Uproshchennyye metody spektral'nogo analiza inertn,ch gazov na primesi)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 6, Nr 6, pp 818-820 (USSR)

ABSTRACT: The authors described earlier (Ref 3) a simple method of spectroscopic determination of the nitrogen content of argon, suitable for use under industrial conditions. The spectral instrument was replaced by a filter which separated out the required part of the spectrum. The discharge was excited in a capillary by a high-frequency oscillator and argon was drawn continuously through the capillary by means of a mechanical pump. Emission proportional to the amount of nitrogen was recorded by means of a photomultiplier FEU-19 connected to a microammeter. The sensitivity of the method was 0.01% and its precision ~10%. This simple method of analysis was applied also to determination of the amount of hydrogen in helium, neon in helium and neon-helium mixture in nitrogen. A table on p 820 gives the range of impurity concentrations which could be measured, the filters and the receivers used as well as the diameters of the capillary and pressures in it. Since only small amounts of the gases were available the discharge tubes used in the investigation reported here had capillaries closed at one end; such a capillary is denoted by

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Simple Methods of Spectral Analysis of Impurities in Inert Gases

3 in Fig 2 (1 and 2 are electrodes). The discharge was excited by one of the following: (1) an oscillator VG-2, (2) a low-power oscillator based on the GU-29 tube and whose working frequency was 30 Mc/s, (3) a pulse magnetron which produced 3 cm waves. The reproducibility of the results was 5-6% when (2) or (3) were used but it fell to ~10-15% when the oscillator VG-2 was employed. To construct calibration curves (microammeter current v. concentration, Fig 1) the authors used standards in the form of mixtures of known compositions. There are 2 figures, 1 table and 3 Soviet references.

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24(7) SOV/30-59-9-15/39

AUTHOR: Frish, S. E., Corresponding Member, Academy of Sciences, USSR

TITLE: Applied Spectroscopy in China

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 9, pp 73-75 (USSR)

ABSTRACT: The First All-Union Conference on Spectroscopy was held last November; the results of work hitherto achieved were summed up, and the future development of research in this field was outlined. 280 representatives of 144 Chinese institutions were present at the Conference, as well as a delegation of the Academy of Sciences, USSR, consisting of V. I. Malyshev, the author of the present paper, and the experts A. A. Demidov and A. G. Krest'yaninov who arrived in China already earlier. Wu Yu-hsün', Vice-president of the Academy of Sciences of the People's Republic of China, reported on the organization of spectroscopic research in China and its further prospects. After the end of the Conference the Soviet experts made themselves acquainted with the work of spectral laboratories of the institutes of the Academy of Sciences, People's Republic of China, Peking University, and other scientific institutions. The greater part of laboratories in Shanghai, Canton, Ch'ang-chun, and Mukden were well equipped, mainly with special apparatus

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from the Soviet Union. There are, however, also apparatus from East Germany, Czechoslovakia, Hungary, England, Italy, and Western Germany. All scientific institutions have good libraries at their disposal which are regularly provided with scientific periodicals from all countries. Scientific cadres play an important role in China. At all universities the young generation, many women among them, are trained in physics, chemistry, and other fields of science. Great efforts are made towards the production of scientific apparatus, e.g. also optical and spectral devices in China . In this connection the following works and institutions are mentioned: the Optical Works in Shanghai, the Institute of Fine Mechanics and Optics in Ch'ang-ch'un Wang Ta-hai, Director of the Institute, was several times in the USSR and is well acquainted with the achievements of optics in the Soviet Union. Students assist also in practical work. An exposition showing the relations between universities and production was opened in Peking. The Institute of Applied Chemistry (Director: Wu Hsuch-chao) possesses well-equipped laboratories for atomic and molecular spectroscopy. The automobile works in Ch'ang-ch'un has a central spectroscopic laboratory and two laboratories equipped with styloscopes in the casting departments. The members of the

24 (7)

AUTHOR: Frish, S. E. SOV/53-68-1-2/17

TITLE: Publications on Nuclear Spectroscopy in the USSR (Raboty po atomnoy spektroskopii v SSSR)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 68, Nr 1, pp 3-12 (USSR)

ABSTRACT: This article which was compiled according to a lecture held by the author at the Joint International Committee of Spectroscopy and the Komissiya po spektroskopii AN SSSR (Committee of Spectroscopy AS USSR) on August 13, 1958 in Moscow gives a survey of the most important research work in the main directions of this field. Far more than one hundred names of Russian scientists are mentioned who cannot be completely enumerated in an abstract. The most important articles on the investigation of the elementary processes of the excitation and emission of spectral lines were published by D. S. Rozhdestvenskiy, N. P. Penkin, Yu. I. Ostrovskiy, Ye. I. Nikonova, V. K. Prokof'yev, G. P. Startsev, L. N. Shabanova, M. I. Petrashen', I. V. Abarenkov, V. A. Fok, G. S. Kvater, L. A. Vaynshteyn, I. P. Zapesochnyy, G. G. Dolgov, G. F. Drukarev, V. I. Ochkur, et al as well as by the author of this article. These authors published also theoretical

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articles dealing with the calculation of level energy. The most important ones were written by V. A. Fok. A. N. Terenin, L. N. Dobretsov, Ye. F. Gross, A. N. Filippov, F. M. Gerasimov, S. E. Frish, N. I. Kaliteyevskiy, M. P. Chayka, A. R. Striganov, Yu. P. Dontsov, A. R. Striganov, et al published articles on spectroscopic methods of determining atomic constants and nuclear moments. Frish, Penkin, A. M. Shukhtin, Yu. M. Kagan, L. M. Biberman, S. L. Mandel'shtam, N. K. Sukhodrev, V. A. Fabrikant, V. P. Perel', N. N. Sobolev, I. I. Sobel'man, L. A. Vaynshteyn, M. A. Mazing, A. M. Shukhtin, and V. S. Yegorov investigated the processes of radiation emission in gases and vapors. Some of these articles are based on Rozhdestvenskiy's fundamental investigations. M. F. Romanova, A. A. Ferkhmin, and N. R. Batarchukova investigated the problem of using light waves for metrological purposes. A. A. Lebedev and M. F. Romanova of the Nauchno-issledovatel'skiy institut metrologii (Scientific Research Institute of Metrology) determined the wavelength of the red line of natural cadmium in the air which is $0.64384687.10^{-6}$m (RMS error 0.0004 Å) and of Cd^{114} which amounts to $0.64384678.10^{-6}$m (RMS error 0.0001 Å). G. S.

Publications on Nuclear Spectroscopy in the USSR SOV/53-68-1-2/17

Landsberg, S. L. Mandel'shtam, V. K. Prokof'yev, Ye. I. Nikonova, A. N. Zaydel', O. B. Fal'kova, N. S. Sventitskiy, O. P. Bochkova, S. E. Frish, Ye. Ya. Shreyder, F. M. Gerasimov, et al investigated the problem of using atomic spectra for analytical purposes. There are 60 references, 57 of which are Soviet and 3 English.

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FRISH, Sergey Eduardovich; TIMOREVA, Aleksandra Vasil'yevna; NOVOZHILOV, Yu.V., red.; ORLOVA, L.I., red.; LUK'YANOV, A.A., tekhn. red.

[Course in general physics] Kurs obshchei fiziki. Izd.10, ispr. i dop. Moskva, Gos. izd-vo fiziko-matem. lit-ry. Vol.1. [Physical foundations of mechanics. Molecular physics] Fizicheskie osnovy mekhaniki. Molekuliarnaia fizika. Kolebaniia i volny. 1961. 466 p. (MIRA 15:2)
(Physics)

ARBUZOV, A.Ye., akad.; VAVILOV, S.I., akad.; VOL'FKOVICH, S.I., akad.; KOCHINA, P.Ya., akad.; LANDSBERG, G.S., akad.; LEYBENZON, L.S., akad.; PORAY-KOSHITS, A.Ye., akad.; SMIRNOV, V.I., akad.; FESENKOV, V.G., akad.; CHERNYAYEV, V.I., akad.; KAPUSTINSKIY, A.F.; KORSHAK, V.V.; KRAVKOV, S.V.; NIKIFOROV, P.M.; PETROV, A.D.; PREDVODITELEV, A.S.; FRISH, S.E.; CHETAYEV, N.G.; CHMUTOV, V.K.; SHOSTAKOVSKIY, M.F.; KUZNETSOV, I.V., red.; MIKULINSKIY, S.R., red.; MURASHOVA, N.Ya., tekhn.red.

[Men of Russian science; essays on prominent persons in natural science and technology: Mathematics, mechanics, astronomy, physics, chemistry] Liudi russkoi nauki; ocherki o vydaiushchikhsia deiateliakh estestvoznaniia i tekhniki: matematika, mekhanika, astronomiia, fizika, khimiia. Moskva, Gos. izd-vo fiziko-matem. lit-ry, 1961. 599 p. (MIRA 14:10)

1. Chleny-korrespondenty AN SSSR (for Kapustinskiy, Korshak, Kravkov, Nikiforov, Petrov, Predvoditelev, Frish, Chetayev, Chmutov, Shostakovskiy). (Scientists)

26763
S/054/61/000/003/001/003
B102/B203

24.3100 (1051, 1106)

AUTHORS: Frish, S. E., Bochkova, O. P.

TITLE: Methods of determining transition probabilities and level populations by self-absorption of radiation

PERIODICAL: Leningradskiy Universitet. Vestnik. Seriya fiziki i khimii, no. 3, 1961, 40 - 58

TEXT: The authors thoroughly discuss some methods of determining the transition probabilities A_{ki} and the populations N_i and N_k of the levels i and k (where k is the upper level). All methods are based on a simple relationship between the absorption coefficient of light within the light source, integrated over the whole line width (self-absorption), and the product $A_{ki}N_i$. Assuming $\frac{g_i}{g_k} \cdot \frac{N_k}{N_i} \ll 1$ (which is justified), this relationship can be formulated as follows: $\int_0^\infty \varkappa(\nu)\, d\nu = \frac{g_k}{g_i} \cdot \frac{\lambda^2_{ki}}{8\pi} A_{ki}N_i$. If, instead of A_{ki}, the oscillator force f_{ik} is used, one obtains in the

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same approximation: $\int_0^\infty \varkappa(\nu)\, d\nu = \frac{\pi l^2}{mc} f_{ik} N_i$; g_k and g_i are the statistical weights. The integral $\int_0^\infty \varkappa(\nu)\, d\nu$ can be determined by self-absorption measurements. A number of methods known for a long time are available for these measurements; they are mainly based on the use of one or two plane or concave mirrors. The authors describe in detail the method using two plane mirrors and a discharge tube of length l as a light source. A condition for the applicability of these methods is that the light-emitting volume be homogeneous, and that the spectral lines have a Doppler form. Then, $\varkappa(\nu) = \varkappa(0)\, e^{-\omega^2}$, $\omega = c\sqrt{\beta}\, \frac{\nu - \nu_0}{\nu_0}$, $\beta = \mu / 2RT$, (μ - atomic weight), and the width of the Doppler line is given by $\Delta\nu_D = \frac{2\nu_0}{c}\sqrt{(\ln 2)/\beta}$; $\varkappa(0)$ and ν_0 are the absorption coefficient and the frequency in the

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middle of the line. For such a line, $\int_{-\infty}^{+\infty} \varkappa(\nu)\, d\nu = \frac{1}{2}\sqrt{\frac{\pi}{\ln 2}}\, \varkappa(0)\, \Delta\nu_D$.
Numerical computations are also possible for any other line forms. The most important functions appearing in computations, such as $F(\varkappa(0), l, r_1, r_2) = F_1 + r_2 F_2$ are tabulated here; F indicates the ratio of light intensities with and without mirror; r_1 and r_2 are the reflection coefficients of the two mirrors. Similar formulas can even be used if the lines have a fine structure. As examples, the authors consider the sodium line $3^2S_{1/2} - 3^2P_{3/2}$, $\lambda 5890\text{Å}$ (where the lower level shows a splitting with $\Delta\lambda = 0.021\text{Å}$) and the red neon lines ($2p^5 3p \rightarrow 2p^5 3s$) which also show a hyperfine structure due to the existence of isotopes. The results obtained are in good agreement with those obtained by other authors. The investigations show that the self-absorption methods are well suited for determining transition probabilities and population numbers, and deliver results with an error of about $\pm 15\%$. The authors mention V. I. Perel' (who supervised part of the computations), as well

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as I. D. Podmoshinskiy, L. D. Kondrasheva, and I. P. Bogdanova. There are 13 figures, 6 tables, and 13 references: 6 Soviet and 7 non-Soviet. The three references to English-language publications read as follows: J. A. Harrison. Proc. Roy. Soc., 73, 841, 1959; J. U. White. JOSA, 32, 285, 1942; R. Ladenburg. Rev. Mod. Phys., 5, 243, 1933.

S/051/61/011/006/001/012
E039/E385

AUTHORS: Bochkova, O.P., Razumovskaya, L.P. and Frish, S.E.

TITLE: Spectroscopic investigations of high-frequency discharges in neon

PERIODICAL: Optika i spektroskopiya, v.11, no.6, 1961, 697-705

TEXT: High-frequency discharges in gases are widely used as light sources for various optical investigations and for spectral analysis. This paper describes a detailed investigation of this type of discharge. Radiation re-absorption and double-probe methods were used to determine the optical and electrical characteristics of an electrodeless high-frequency discharge in neon. The discharges were produced in tubes of 3.5, 12, 40 and 60 mm in diameter and 130 - 300 mm in length. The high-frequency voltage was supplied to external electrodes from a 6 Mc/s, 350 W generator. The tubes were evacuated by a fully trapped high-vacuum system. Natural neon, containing not more than 0.3% helium, was used. Other impurities (O_2, H_2, N_2) did not exceed 10^{-3}%. The spectroscopic observations were made in the visible (red) part of the spectrum and data produced on the population

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Spectroscopic investigations ...

$T_e = 100 \times 10^{-3}$ at 1.3 mm to 45×10^{-3} at 6 mm; the electron density n_e, however, is effectively directly proportional to pressure. It is shown that T_e is practically independent of the high-frequency power input while n_e is directly proportional to it. Comparison is made with DC discharges and it is shown that higher values of T_e are obtained in the HF discharge. It is shown that the conditions in a HF discharge are easily varied over a wide range by changing-pressure, power input and diameter of tube, hence making it a very suitable source for all spectral analysis problems. A.A. Zaytsev and Ye.N. Yankovskaya are mentioned in the article for their contributions in this field. There are 9 figures and 20 references: 12 Soviet-bloc and 8 non-Soviet-bloc. The four latest English-language references mentioned are: Ref. 2: A.T. Forrester, K.A. Gundmundsen, P.O. Johnson - J. Opt. Soc. Amer. 46, 339, 1956; Ref. 6: J.A. Harrison - Proc, Phys. Soc., 73, 841, 1959; Ref. 12: mentioned in text; Ref. 19: A.V. Phelps, Phys. Rev., 99 1657, 1955

SUBMITTED March 16 1961

Card 3/3

FRISH, Sergey Eduardovich; TIMOREVA, Aleksandra Vasil'yevna; ORLOVA, L.I., red.; LUK'YANOV, A.A., tekhn. red.

[General physics course] Kurs obshchei fiziki. Izd.9., ispr. i dop. Moskva, Fizmatgiz. Vol.2.[Electric and electromagnetic phenomena] Elektricheskie i elektromagnitnye iavleniia. 1962. 514 p. (MIRA 15:7)

(Electromagnetism)

FRISH, S.E.; BOCHKOVA, O.P.

Additions and corrections to the article "Methods for determining the probability of transitions and the population of levels from the self-absorption of radiation." Vest. LGU 17 no.4:73-74 '62.
(MIRA 15:3)
(Quantum theory)

L 1683-66 EWT(1)/EPA(s)-2/EPA(w)-2/EWA(m)-2

ACCESSION NR: AT5010025 GE/0000/62/000/000/0379/0387

AUTHOR: Bochkova, O. P.; Razumovskaya, L. P.; Frish, S. E.

TITLE: Spectrographic analysis of a high frequency discharge in neon

SOURCE: Physikalische Gesellschaft in der Deutschen Demokratischen Republik. Tagung, Jena, 1960. Optik und Spektroskopie aller Wellenlangen (Optics and spectroscopy of all wave lengths); Tagung der Physikalischen Gesellschaft in der DDR. Berlin, A-V, 1962, 379-387

TOPIC TAGS: neon, gas discharge spectroscopy, line spectrum, line intensity, electron energy level

ABSTRACT: The optic and electrical characteristics of an electrodeless high frequency discharge in neon are studied using radiation reabsorption and the two-probe method. Two molybdenum glass discharge tubes were used--one 12 mm in diameter and 150 mm long, the other 60 mm in diameter and 300 mm long. High frequency voltage was fed from a 6 Mc HF generator with a power of ~350 watts to the external electrodes of the discharge tube. Two molybdenum probes were sealed into the 12 mm tube at the center along the axis. These probes were 0.2 mm in diameter and 5 mm long. The distance between the probes was 15 mm. Data were also obtained on the

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ACCESSION NR: AT5010025

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population of the lower $2p^5 3s^3P_{0,1,2}$, $^1P_1$ and $2p^5 3pY$ levels in neon as a function of pressure (in the 0.5-7 mm Hg range) and as a function of electron concentration. Reabsorption measurements were made across the emitting column in the 12 mm tube and along the column in the 60 mm tube. It was found that the maximum population for $2p^5 3s^3P_{0,1,2}$ levels lies at a pressure of approximately 1.3 mm Hg, while the maximum for $2p^5 3pY$ levels is situated at a higher pressure (2-3 mm Hg). When the concentration of electrons is varied within small limits, an increase is observed in the concentration of excited atoms on all levels. A further increase in the concentration of electrons leads to an extremely flat maximum in the concentration of excited atoms. The relative line intensity varies considerably with pressure. When the pressure is increased, there is a sharp reduction in the intensity of lines where $2p^5 3p^1S_0$ is the upper level. When the lines have upper levels which are lower than this, the intensity maxima lie at pressures in the 1.5-4 mm Hg range. Lines whose upper levels correspond to the $2p^5 4d$ and higher configurations have very low intensities. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: ME, OP

NO REF SOV: 009 OTHER: 006

Card 2/2 OP

FRISH, S.E.; BOCHKOVA, O.P.

Present state of the quantitative emission analysis of gaseous mixtures: (survey). Zav.lab. 28 no.5:550-552 '62. (MIRA 15:6)
(Gases--Spectra)

FRISH, S.E., otv. red.; BOBOVICH, Ya.S., kand. fiz.-matem. nauk, red.; VOL'KENSHTEYN, M.V., doktor fiz.-matem. nauk, red.: GALANIN, M.D., doktor fiz.-matem. nauk, red.; DRUKAREV, G.F., doktor fiz.-matem. nauk, red.; YEL'YASHEVICH, M.A., akademik, red.; KALITEYEVSKIY, N.I., doktor fiz.-matem. nauk, red.; KUSAKOV, M.M., doktor khim. nauk, red.; LIPIS, L.V., doktor tekhn.nauk, red.; PEKAR, S.I., doktor fiz.-matem. nauk, red.; PROKOF'YEV, V.K., doktor fiz.-matem. nauk, red.; SOKOLOV, N.D., doktor fiz.-matem. nauk, red.; FEOFILOV, P.P., doktor fiz.-matem. nauk, red.; CHULANOVSKIY, V.M., doktor fiz.-matem. nauk, red.; SHPOL'SKIY, E.V., doktor fiz.-matem. nauk, red.; YAROSLAVSKIY, N.G., kand. fiz.-matem. nauk, red.; LEKSINA, I.Ye., red. izd-va; PENKINA, N.V., red. izd-va; NOVICHKOVA, N.D., tekhn. red.; KASHINA, P.S., tekhn. red.

[Physical problems in spectroscopy]Fizicheskie problemy spektroskopii; materialy. Moskva, Izd-vo Akad. nauk SSSR. Vol.1. 1962. 474 p. (MIRA 16:2)

1. Soveshchaniye po spektroskopii. 13th, Leningrad, 1960. 2. Chlen-korrespondent Akademii nauk SSSR (for Frish). 3. Akademiya nauk Belorusskoy SSR (for Yel'yashevich).
(Spectrum analysis)

FRISH, S.E.; BOCHKOVA, O.P.

Inversion of the level populations of sodium in the fluorescence of a mixture of sodium and mercury vapors. Zhur. eksp. i teor. fiz. 43 no.1:331-333 Jl '62. (MIRA 15:9)

1. Leningradskiy gosudarstvennyy universitet.
(Quantum theory) (Sodium) (Mercury)

NAGIBINA, Irina Mikhaylovna; PROKOF'YEV, Vladimir Konstantinovich, prof., doktor fiziko-matem. nauk; FRISH, S.E., retsenzent; VASIL'YEVA, V.P., red. izd-va; BARDINA, A.A., tekhn. red.

[Spectroscopic instruments and techniques] Spektral'nye pribory i tekhnika spektroskopii; rukovodstvo po prakticheskim zaniatiiam. Pod red. V.K.Prokof'yeva. Moskva, Mashgiz, 1963. 270 p. (MIRA 16:5)

1. Chlen-korrespondent Akademii nauk SSSR (for Frish).
(Spectrum analysis)

BOCHKOVA, Ol'ga Pavlovna; SHREYDER, Yelena Yakovlevna; FRISH, S.E., prof., red.; ORLOVA, L.I., red.; LUK'YANOV, A.A., tekhn.red.

[Spectrum analysis of gaseous mixtures] Spektral'nyi analiz gazovykh smesei. Izd.2., perer. i dop. Moskva, Gos.izd-vo fiziko-matem. lit-ry, 1963. 307 p. (Biblioteka inzhenera; fizika i tekhnika spektral'nogo analiza) (MIRA 16:12)

1. Chlen-korrespondent AN SSSR (for Frish).
(Gases--Spectra)

FRISH, S.E., otv. red.; FEOFILOV, P.P., red.; SAZONOV, L.S., red.; ZENDEL', R.Ye., tekhn. red.

[Optics and spectroscopy] Optika i spektroskopiia; sbornik statei. Moskva, Izd-vo Akad. nauk SSSR. Vol.1.[Luminescence] Liuminestsentsiia. 1963. 364 p. Vol.2. [Molecular spectroscopy] Molekuliarnaia spektroskopiia. 1963. 346 p. (MIRA 16:4)

1. Akademiya nauk SSSR. Otdeleniye fiziko-matematicheskikh nauk. 2. Chlen-korrespondent Akademii nauk SSSR (for Frish). (Luminescence) (Molecular spectra)

FRISH, Sergey Eduardovich; LUK'YANOV, A.A., tekhn. red.

[Optical atomic spectra] Opticheskie spektry atomov. Moskva, Gos.izd-vo fiziko-matem. lit-ry, 1963. 640 p. (MIRA 16:10)

1. Chlen-korrespondent AN SSSR (for Frish).
(Atomic spectra)

ACCESSION NR: AP4009454 S/0051/63/015/006/0726/0733

AUTHOR: Frish, S.E.; Revald, V.F.

TITLE: Cross sections for direct and step-by-step excitation of neon atoms

SOURCE: Optika i spektroskopiya, v.15, no.6, 1963, 726-733

TOPIC TAGS: excitation cross section, direct excitation, step-by-step excitation, level population, neon spectrum, neon

ABSTRACT: It has been hypothesized by a number of authors that excitation of high-lying levels of neon occurs not only from the ground state but also via intermediate $2p^53s$ levels, in other words, that there occurs step-by-step excitation. However, the data reported in the literature on the cross sections for step-by-step excitation are conflicting. Accordingly, in the present work there were measured the absolute cross sections for direct excitation of the levels of neon. The direct excitation cross sections were measured by the method of an electron beam, using a tube similar to that described by I.P.Zapesochny*y (Vestnik, LGU,No.11,67,1954). Specifically, there were measured the Ne I lines associated with $2p^53pY \rightarrow 2p^53sX$ transitions. Most of the measurements were made with an accelerating potential of

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48 V; the beam current was 20 to 300 μA; the pressure in the tube 0.01-0.08 mm Hg. On the other hand, there were calculated the line intensities on the assumption that there obtains only direct excitation. Comparison of the calculated data with the experimental values led to the conclusion that in the region of low pressures and low discharge current densities there is a good agreement between the experimental and caclculated results, indicating that direct excitation is predominant. But with increase of the current the calculated intensities are lower than the observed ones, which may be taken as evidence that with increase of current there is an increase in the number of free electrons in the plasma and that step-by-step excitation begins to play a significant role. The value of the cross section for step-by-step excitation ($2p^53sX \rightarrow 2p^53pY$) calculated on the basis of the divergence between the theoretical and experimental line intensities is $\sim 10^{-16}$ cm^2. Orig.art.has: 12 formulas, 5 figures and 3 tables.

ASSOCIATION : none

SUBMITTED: 29Apr63 DATE ACQ: 03Jan64 ENCL: 00

SUB CODE: PH NR REF SOV: 007 OTHER: 002

Card 2/2

L 18144-63 EPF(n)-2/EWP(q)/EWT(m)/BDS AFFTC/ASD/SSD Pu-4 WW/JD/JG
ACCESSION NR: AP3004502 S/0048/63/027/008/1065/1069

66

AUTHOR: Frish, S.E.; Bochkova, O.P.

TITLE: Evaluation of the absolute cross sections for second order impact in a mixture of sodium and mercury vapors / 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, 1065-1069

TOPIC TAGS: second order collision , second order impact, optical pumping, excitation cross section , Na, Hg

ABSTRACT: Back in 1936, S.E.Frish in collaboration with A.A.Ferkhmin (S.E.Frish, Izv.AN SSSR,Ser.fiz.,No.3, 431, 1936 and Ferchmen and S.Frisch, Z.Sow.Union,9,446, 1936) observed a substantial increase in the intensity of some secondary series lines of Na vapor under electron impact in the presence of Hg vapor. Obviously, the effect can be utilized for determining cross sections for second order (atom-atom) impact. The case of excitation of Na atoms as a result of first order impact with electrons and second order impact with Hg atoms is considered and the equation for the steady-state is written. From this the authors derive an expression for

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the cross section for second order impact; this expression was used to calculate the cross section for second order collisions between Na atoms and excited Hg atoms on the basis of the concentrations of Na and Hg atoms in different states and the probabilities for spontaneous transitions between the respective states. The measurements were carried out for pure Na and a mixture of Hg + Na vapor excited by a high-frequency (6 to 50 Mc) discharges in cylindrical molybdenum glass (with sapphire windows) tubes 18 to 25 cm in diameter and 60-80 cm in length with external electrodes; separate tubes with one and two side branches, respectively, were used for the measurements on pure Na and the Na + Hg vapor mixture. Analysis indicates that the most intense excitation due to second order impacts may be expected for the 6P, 7S, and 6D levels of Na in collisions with Hg atoms in the 6^3P_0 state and the 8S, 7D, 7F, 8P, 9S, 8D, and 9P levels of Na in collisions with Hg atoms in the 6^3P_1 state. The increase in line intensity in going from pure Na to Na + Hg depends strongly on the discharge conditions (current density and vapor pressure) which must, therefore, be carefully controlled (this presents some experimental difficulties). As a result of the measurements there were obtained the excitation cross sections for some of the S and P levels of Na (the cross sections for excitation of the D levels could not be determined for lack of knowledge of the population of the F levels from which there occur intense transitions to the D levels).

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ACCESSION NR: AP3004502

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The data show that large cross sections for second order impact excitation obtain only when the energy difference between the levels involved does not exceed a few hundred eV. This suggests the possibility of realizing selective population of individual atomic levels and of obtaining "negative" absorption coefficients. Orig. art. has: 7 formulas, 2 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 26Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 005 OTHER: 000

Card 3/3

ROZHDESTVENSKIY, Dmitriy Sergeyevich, akademik; LINNIK, V.P., akademik, red.; LEBEDEV, A.A., akademik, red.; TUDOROVSKIY, A.I., red.[deceased]; FRISH, S.E., red.; LUIZOV, A.V., doktor fiz.-mat. nauk, red.; RAUTIAN, G.N., doktor tekhn. nauk, red.[deceased]; PENKIN, N.P., doktor fiz-mat. nauk, red.; KIRIKOVA, G.L., red.izd-va; SOROKINA, V.A., tekhn. red.

[Selected works] Izbrannye trudy. Moskva, Izd-vo "Nauka," 1964. 348 p. (MIRA 17:4)

1. Chlen-korrespondent AN SSSR (for Tudorovskiy, Frish, Luizov, Rautian, Penkin).

FRISH, S. E.

In memory of professor Karl Karlovich Baumgart, Vest. LGU
19 no.1 1890-1963 '64. (MIRA 17:7)

FRISH, S.E.

Recent trends in the development of optics and spectroscopy. Vest. AN SSSR 35 no.7:26-32 Jl '65. (MIRA 18:8)

1. Chlen-korrespondent AN SSSR.

ACCESSION NR: AP4035808 S/0020/64/156/001/0054/0056

AUTHORS: Bogdanova, I.P.; Bochkova, O.P.; Frish, S.E. (Corresponding member)

TITLE: The role of molecular ion formation on atomic line excitation spectra

SOURCE: AN SSSR. Doklady*, v. 156, no. 1, 1964, 54-56

TOPIC TAGS: atomic excitation spectra, molecular ion, molecular ion formation, helium sup+ sub 2, helium spectrum, excited helium, continuously activating field, pulsating field, free electron, plasma state

ABSTRACT: The additional maximum observed by I.P. Bogdanova and I. Geytsi (Optika i spektroskopiya, 17, No. 1 (1964)) near the threshold in the optical functions of certain lines of excited helium when hydrogen, krypton or mercury vapor (but not when neon) was added to the helium, was investigated further. The optical function for He (λ 4713Å) was measured in a continuously activating field, and under a pulsating field (10^{-7} sec. activation separated by intervals of 2×10^{-5} sec.). The maximum appeared under continuous excitation, but

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not for pulsed excitation. This maximum is explained by the reaction (where * indicates active state):

$$He + e \rightarrow He^* + e \quad (a)$$
$$He^* + He \rightarrow He_2^+ + e \quad (b)$$
$$He_2^+ + e \rightarrow He^{*2} + He \quad (c)$$

The role of the added gas is to supply "slow" electrons for the step (c). The authors state that the disassociative recombination of step (c) leads to selective activation of the molecules (especially in the S and D levels). This process would explain the energy level of the additional maximum and the time dependency of activation. Reference was made to the work of O.P. Bochkova, L.P. Razumovskaya (Optika i spektroskopiya, 17, No. 1(1964)) where formation of molecular ions was postulated to explain a jump increase in free electrons in the plasma state. At the same time the intensities of the low energy level lines in the spectrum increased by a greater amount than the high energy levels, and this variation in population of the levels was greater than that which would correspond to the conditions of

L 13366-66 EWT(1)/T LJP(c) JT
ACC NR: AP5018612 SOURCE CODE: UR/0030/65/000/007/0026/0032

AUTHOR: Frish, S. E. (Corresponding member AN SSSR)

ORG: none

61
60
B

TITLE: New trends in the development of optics and spectroscopy

SOURCE: AN SSSR. Vestnik, no. 7, 1965, 26-32

TOPIC TAGS: optic research, physics research, spectroscopy, laser, optics

ABSTRACT: In a review of recent developments in optics and spectroscopy, Corresponding Member of the Academy of Sciences S. E. Frish offers some criticism of the Soviet research conducted in these fields. According to Frish the Soviet laser research program is poorly coordinated: experiments already performed are often repeated at other research centers, quite often with poorer results than those obtained in the earlier experiments, and the use of lasers in measuring techniques and physical experiments has been relatively slow. Research in Fourier spectroscopy is also lagging, mainly because of the lack of proper instruments and devices. High-quality interference filters are still not being manufactured in sufficiently large quantities. No Soviet amplitude-modulated devices and instruments are presently available. Western firms, Frish declares, are already producing and selling the types of instruments which will be available in the Soviet Union no earlier than 1966-1970. Frish states

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UDC: 335+543.42

2

FRISH, V.A.

Geological and geomorphological basis of land forms; on the example of the Mezha region in Kostroma Province [with summary in English]. Vest.LGU 13 no.18:91-102 '58. (MIRA 12:1)
(Mezha Valley--Physical geography) (Geology, Structural)

FRISH, V.A.

Economic importance of natural conditions of administrative districts as exemplified by Mezhevskiy District, Kostroma Province. Vest.LGU 14 no.18:68-81 '59. (MIRA 12:8)
(Kostroma Province--Economic geography)