SHMULENZON, M.I.; PEREKISLOV, L.N.

Investigating several varieties of summer squash used in the food industry. Kons. i ov. prom. 13 no.7:32-33 Jl '58. (MIRA 11:6)

1. Rostovskiy-na-Donu konservnyy zavod "Smychka" (Shmulenzon).
2. Rostovskiy konservnyy trest (for Perekislov).
(Squash)

KOLDOBSKIY, A.G.; MEDVEDEV, S.I.; PISKOPPEL', F.G.; YAKOBSON, M.G. Prinimali uchastiye: BERKHIN, I.B.; OSLIKOVSKAYA, Ye.S.; PEREKISLOVA, A.M.; LITVIN, V.M.; PARKHOMENKO, Ye.V.; STOTIK, A.M.; SHAPIRO, T.I.; STRUMILIN, S.G., akad., glav. red.; ALEKSENKO, G.V., red.; ANISIMOV, N.I., red.; VOLODARSKIY, L.M., red.; GERSHBERG, S.R., redaktor; red.; PETROV, A.I., red.; POSVYANSKIY, S.S., red.; BAZAROVA, G.V., kand. ekonom. nauk, starshiy nauchnyy red.; KISEL'MAN, S.M., starshiy nauchnyy red.; LIVANSKAYA, F.V., kand. ekonom. nauk, starshiy nauchnyy red.; GLAGOLEV, V.S., nauchnyy red.; NEDBAYEV, V.I., nauchnyy red.; TUMANOVA, N.L., nauchnyy red.; TOVMASYAN, M.E., red.; BLAGODARSKAYA, Ye.V., mladshiy red.; SHUSTROVA, V.M., mladshiy red.; ZENTSEL'SKAYA, Ch.A., tekhn. red.

[The economic life of the U.S.S.R.; chronicle of events and facts, 1917-1959] Ekonomicheskaia zhizn' SSSR; khronika sobytii i faktov 1917-1959. Glav. red. S.G.Strumilin. Chleny red. kollegii: Alekseenko i dr. Moskva, Gos. nauchn.izd-vo "Sovetskaia entsiklopediia," 1961. 779 p. (MIRA 14:10)

1. TSentral'naya nauchnaya sel'skokhozyaystvennaya biblioteka Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk im. Lenina (for Litvin, Parkhomenko, STOTIK, Shapiro).
(Russia--Economic conditions)

PEREKLINA, V. V.

USSR/Chemistry

Card 1/1

Authors : Perekalin, V. V., and Segalina, Z. S.

Title : About azo-dyes from 1, 5-aminonaphthol and some of its derivatives. Part 9.- About the hydrogen bond in some peri-oxyazo (hydroxyazo) dyes.

Periodical : Zhur. Ob. Khim. 24, No. 4. 683 - 687, April 1954

Abstract : Experiments showed that the hydrogen atom of the hydroxyl group in some peri-hydroxyazo dyes, particularly in the first synthesized simple dye of this series - 8-benzene azo-1-naphthol, is lacking in normal mobility. It was assumed that peri-hydroxyazo dyes have an intramolecular hydrogen bond which explains their specific properties. Seven references; 6 USSR since 1943; 1 USA since 1935. Tables, graphs.

Institution : The A. I. Gertsen State Pedagogical Institute and Leningrad Technological Institute in Leningrad.

Submitted : October 9, 1953

PERREKOPSKAYA, T.I. (Chelyabinsk)

Treatment of brucellosis using bee stings (apitoxin).
Kaz. med. zhur. no.5:75-76 S-O '61. (MIRA 15:3)
(BRUCELLOSIS)
(BEE VENOM--THERAPEUTIC USE)

PEREKOPSKIY, L.P.

Linear deformations and flexures of vibrated brick elements under a prolonged load. Stroi. mat., det. i izd. no. 2:43-51 '65 (MIRA 19:1)

1. Nauchno-issledovatel'skiy institut organizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu Akademii stroitel'stva i arkhitektury SSSR.

PEREKOPSKIY, L. P., CAND TECH SCI, "STUDY OF METHODS OF MANUFACTURING VIBRATION-RESISTANT BRICK BLOCKS AND PANELS AND THE effect OF TECHNOLOGY upon THEIR TOUGHNESS AND ELASTIC PROPERTIES." MOSCOW, 1961. (MIN OF HIGHER AND SEC SPEC ED RSFSR. MOSCOW ORDER OF LABOR RED BANNER ENGIN-CONSTR INST IM V. V. KUYBYSHEV). (KL, 2-61, 211).

PERKOPSKIY, L.P., aspirant

Production and strength of lightweight vibrated brick panels. Sbor. trud MISI no.37:107-133 '60. (MIRA 13:8)
(Building blocks) (Building, Brick) (Vibration)

PEREKREST, A.N

38334
S/081/61/000/024/056/086
B102/B100

110130

AUTHORS: Sklyar, V. T., Lebedev, Ye. V., Lizogub, A. P., Zhurba, A. S., Perekrest, A. N., Lebedeva, L. B., Baranovskiy, M. I.

TITLE: Some ways of a more rational reprocessing of paraffin petroleums of Western Ukraine

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24, 1961, 407, abstract 24M63 (Kauchn. zap. Gos. n.-i. i proyektn. in-t ugol'n. rudn. neft. i gaz. prom-sti "Ukrniiproyekt", no. 4, 1961 87 - 112)

TEXT: Results are presented of a study of a possibility of deepest and most rational exploitation of the petroleums of Dolinskoye and Bitkovskoye deposits which are characterized by a high content of light oils (Dolinskoye: 54.4%, Bitkovskoye: 43.1%), high paraffin content (16 and 17%, respectively), and low content of sulfur (0.35 - 0.55%). Thorough investigations of the Dolinskiye petroleums showed that in the deparaffinization of diesel fuel fraction by selective solvents at low temperatures, low-melting paraffin hydrocarbons can be separated which

Card 1/2

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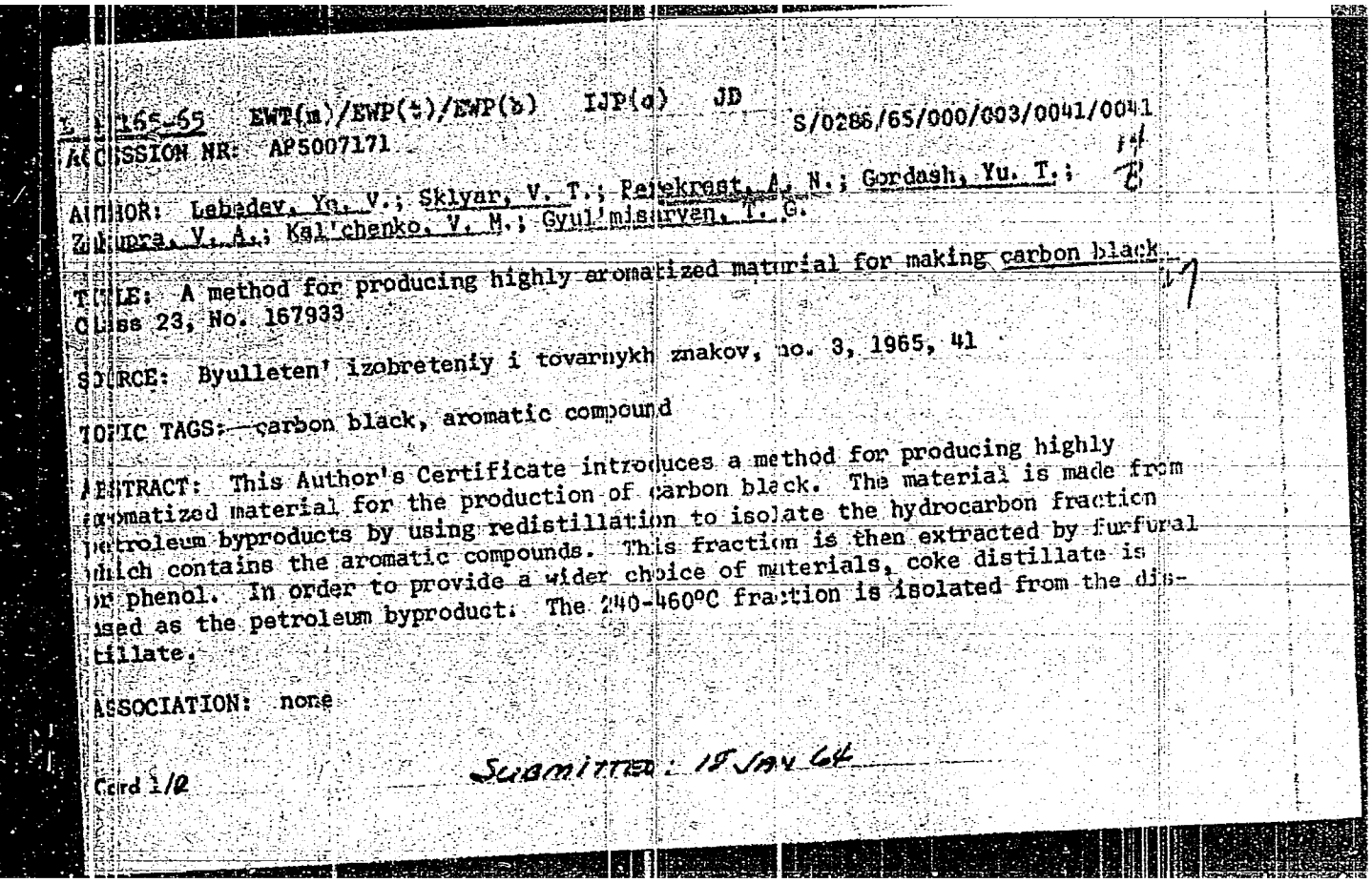
S/081/61/000/024/066/086
B102/B100

Some ways of a more rational...

are a valuable raw material for the petrochemical industry. The quantity separated is 17 - 20% per fraction or 3.5 - 4.1% per petroleum. Deparaffinization of the fractions corresponds to the demands of the GOST (GOST) for diesel summer fuel and special fuel. At low temperatures solid paraffin hydrocarbons were separated in quantities of 20% per fraction or 8% per petroleum by means of selective solvents from the distilled fraction of medium paraffin petroleum. From the deparaffinized part petroleum components of high viscosity can be obtained. From the distilled fraction of heavy paraffin petroleum solid hydrocarbons (14% per fraction), as well as diesel and tractor oils with a viscosity index of 87 can be obtained. High-quality residual oils (~2.6% per petroleum) and ceresins (~0.7% per petroleum), as well as improved-quality bitumens can be obtained from the petroleum asphalts. A possibility of obtaining gas-turbine fuel, plasticizers for rubber and low-sulfur coke is shown. [Abstracter's note: Complete translation.]

Card 2/2



L 165-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD S/0286/65/000/003/0041/0041

ACCESSION NR: AP5007171

AUTHOR: Lebedev, Yu. V.; Sklyar, V. T.; Petrekrest, A. N.; Gordash, Yu. T.; Zhumra, V. A.; Kal'chenko, V. M.; Gyul'misaryan, T. G.

TITLE: A method for producing highly aromatized material for making carbon black. Class 23, No. 167933

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 3, 1965, 41

TOPIC TAGS: carbon black, aromatic compound

ABSTRACT: This Author's Certificate introduces a method for producing highly aromatized material for the production of carbon black. The material is made from petroleum byproducts by using redistillation to isolate the hydrocarbon fraction which contains the aromatic compounds. This fraction is then extracted by furfural or phenol. In order to provide a wider choice of materials, coke distillate is used as the petroleum byproduct. The 240-460°C fraction is isolated from the distillate.

ASSOCIATION: none

Card 1/2 SUBMITTED: 15 JAN 64

EYDINOV, M.S.; GAL'CHUN, B.R.; PEREKRESTOV, A.P.; SHESTAKOV, S.K.

Dynamics of heavily loaded Cardan transmissions. Trudy Ural.politekh. inst. no.136:3-11 '64. (MIRA 17:10)

Investigating the wear resistance of heavily loaded Cardan transmissions. Ibid.:12-21

Carrying capacity of tired clutches. Ibid.:22-31

Universal [illegible] experimental investigation of highly loaded Cardan transmissions and tired clutches. Ibid.:120-129

EYDINOV, M.S.; POPICHENKO, M.N.; PEREKRESTOV, A.P.; VEDERNIKOV, B.N.

Investigating the effect of structural parameters of vises on the value of clamping coefficient. Sbor.st.Ural.politekh.inst. no.65:118-128 '58. (MIRA 12:4)
(Vises)

PEREKRESTOV, A.V., inzh.

Simplification of complicated systems of hydraulic drive and hydraulic automation. Sbor. nauch. trud. Dnepr. inzh.-stroi. inst. 18:67-78 '61 (MIRA 17:7)

PEREKRESTOV, A.V.

Sectional distributor. Mashinostroitel' no.9:30 S '63. (MIRA 16:10)

(No subject headings)

PEREKRESTOV, I. G.

"Ulyanovskaya Oblast (Economic-Geographic Characteristics)." Cand Geog Sci, Inst of Geography, Acad Sci USSR, 28 Dec 54. (VM, 20 Dec 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556 24 Jun 55

PEREKRESTOV, P.

Problema korennogo pereustroistva zheleznodorozhnykh vykhodov iz Donbassa na sever. [The problem of radical reconstruction of railroad outlets from Donets basin northward] . (Transport i khozyo, 1928, no. 7, p. 64-74). DLC: HE7.T68

SO: Soviet Transportation and Communications, A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified.

PEREKRESTOV, S. Ye.

PHASE I BOOK EXPLOITATION SOV/5733

Iskanderov, Khakim Mukhametzyanovich, and Stepan Yevdokimovich Perekrestov

Primeneniye plastmassovykh materialov v sudostroyenii i sudoremonte (Application of Plastic Materials in the Building and Repairing of Ships) Moscow, Izd-vo "Morskoy transport," 1960, 112 p. 1500 copies printed.

Eds.: Z. D. Ivanova and T. P. Mosharova; Tech. Ed.: B. A. Sarayev.

PURPOSE: This book is intended for industrial innovators, designers, and technologists.

COVERAGE: The book discusses the compositions, chemical structures, and properties of various types of plastics, and includes information on their Soviet trade names, State Standard designations, and fields of application. The properties of plastic materials and parts used in the building and repairing of ships and examples of the manufacture of synthetic structural elements and parts of

Card 1/4

equipment for ships are given. No personalities are mentioned. There are 13 references, all Soviet.

TABLE OF CONTENTS:

ISKANDEROV, Khakim Mukhametzyanovich; PEREKRESTOV, Stepan Yevdokimovich; IVANOVA, Z.D., red.; MOSHAROVA, T.P., red.; SARAYEV, B.A., tekhn.red.

[Use of plastics in shipbuilding and ship repairs] Primenenie plastmassovykh materialov v sudostroenii i sudoremonte. Moskva, Izd-vo "Morskoi transport," 1960. 112 p. (MIRA 14:4)

(Plastics) (Shipbuilding--Supplies)

ALIMOV, A.G., inzh.; TIKHOMIROVA, K.A., inzh.; BERILOV, N.T., inzh.; PEREKRESTOV, V.I., inzh.; KRIVENKO, P.T., inzh.

Using a steam and oxygen mixture for accelerating the open-hearth smelting process. Stal' 24 no.10:895-896 O '64. (MIRA 17:12)

1. Zavod "Azovstal'".

KOSTYUK, V.A.; PEREKRESTOV, V.I.; BUL'SKIY, M.T. [deceased]; VAL'TER, O.I.; KISLOV, N.A.; TSVETKOV, P.M.; AVRAMOV, V.M.

Rapid repair of the hearth bottom fritting of tilting open-hearth furnaces. Stal' 23 no.8:707-710 Ag '63. (MIRA 16:9)
(Open-hearth furnaces--Maintenance and repair)

PEREKHVATOV, V.K.

Position of the plane of conjugation in combination prestressed elements. Trudy GISI no.30:69-77 '61. (MIRA 16:9)

PEREKRESTOVA, O.; ROMANOV, S.A.

Valuable suggestion made by weaver G. Cheredina. Tekst. prom. 19 no.5:97 My '59. (MIRA 12:10)
(Weaving)

PEREKRESTOVOY, YE P.

VAYNBERG, B. G.; GULAMOVA, V. P.; PEREKRESTOVOY, YE. P.; OSTROVSKOY, S. G.

Uzbek Inst. of Epidemiology and Microbiology, (-1944-)

"On Efficiency of the Vaccine from the Mouse Lungs Against Typhus Exanthematicus prepared after Durand-Krontovskaya,"

Zhur. Mikrobiol., Epidemiol., i Immunobiol., Nos. 7-8, 1944.

DUKHIN,S.S.; BEREZHNAYA, I.N.; SOLYANEK, Ye.G.; PEREKUPKA, I.A.

Role of thermophoretic and diffusion forces in the generation of ice crystals near cold surfaces. Part 2: Theoretical evaluation and experimental measurements of the yield of crystals generated near a spherical dry ice granule and a metallic sphere as dependent on the temperature of their surfaces. Koll. zhur. 26 no.6:662-669 N-D '64 (MIRA 18:1)

1. Ukrainskiy nauchno-issledovatel'skiy gidrometeorologicheskiy institut, Kiyev.

DUKHIN, S.S.; ORLOV, V.N.; PEREKUPKA, I.A.; ZAYTSEVA, K.A.

Flow methods for the determination of sizes and charges of coarse aerosol particles. Koll.zhur. 26 no.1:133-138 Ja-F '64. (MIRA 17:4)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR, Kiyev.

PEREKHVATOV, V.K.

Effect of the adjustment (play and negative allowance) on the stressed state in a bolt joint. Trudy GISI no.44:81-96 '63. (MIRA 17:11)

PEREL', IA. A., ed.

ORLOVSKII, Sergei Nikolaevich.
Red Army and the children. Pod red. IA. A. Perel' i A. A. Liubimova, s predisl. S. N. Orlovskogo. Moskva, Gos. ucheb.-pedagog. izd-vo, 1932. 4p. (Biblioteka "Okhrana detstva i detskoe pravo", vyp. 5)

PEREL, IU. G.

522

11-30

Perel', IU. G., Otkrytie vozrozhdennogo Pulkova. [Inauguration of the revived Pulkovo Observatory.] *Priroda*, Moscow, 43(11):67-72, Nov. 1954. photos. DLC—The inauguration of the rebuilt Observatory, almost completely destroyed during World War II, was celebrated on May 20-22, 1954 in the presence of about 500 Soviet and foreign scientists representing 17 countries and by a session of the Physical and Mathematical Division of the Academy of Sciences with reports and speeches on the importance of the event and the scientific achievements attained at the Observatory. The inauguration was followed by 2 conferences on problems of astronomy, and research on scintillation, variable stars, and cosmogony. The paper includes minutes of addresses delivered at the inauguration and at both sessions. *Subject Headings:* 1. Astronomical observatories 2. Pulkovo Observatory, U.S.S.R.—*A.M.P.*

PEREL, Iv. G.

Iv. G. Perel

Outstanding Russian Astronomers

State Publishing House of Technical and Theoretical Literature, Moscow

1951, 215 pages.

From: Monthly List of Russian Accession, Sept. 1951, Vol. 4, No. 6, page 5
(Trans. Copy)

PEREL, Iv. G.

Iv. G. Perel

Outstanding Russian Astronomers

State Publishing House of Technical and Theoretical Literature, Moscow
1951, 215 pages

From: Monthly List of Russian Accessions
September 1951, Vol. 4, No. 6, page 5

PEREL', T.S.

Some characteristics on the distribution of Lumbricidae in Moldavia. Zool.zhur. 41 no.8:1149-1161 Ag '62. (MIRA 15:9)

1. Laboratory of Forest Science, State Planning Committee of the U.S.S.R., settlement of Uspenskoye, Zvenigorod District, Moscow region.

(Moldavia--Earthworms)

SUKACHEV, V.N., akademik; MOLCHANOV, A.A.; DYLIS, N.V., doktor biol. nauk; TSEL'NIKER, Yu.L.; KARPOV, V.G.; RAFES, P.M.; DINESMAN, L.G.; PEREL', T.S.; YEGOROVA, S.A.; YENIKEYEVA, M.G.; BOL'SHAKOVA, V.S.; ZONN, S.V.; ALEKSANDROVA, V.D.; LEBEDEV, D.V., red.

[Fundamentals of forest biogeocenology] Osnovy lesnoi biogeotsenologii. Moskva, Nauka, 1964. 573 p. (MIRA 18:2)

1. Akademiya nauk SSSR. Laboratoriya lesovedeniya.

GAVRILOV, K.A.; PEREL', T.S.

Earthworms and other invertebrates in forest soils of Vologda Province [with summary in English]. Pochvovedenie no.8:133-140 Ag '58. (MIRA 11:9)

1. Institut lesa AN SSSR i Moskovskiy gosudarstvennyy pedagogocheskiy institut im. V.I. Lenina.
(Forest soils) (Soil fauna)

PEREL' , T. S. Cand Biol Sci -- (diss) "Rain worms as indicators of soil conditions in afforestation." Mos, 1959. 14 pp (Mos State Ped Inst im V. I. Lenin), 160 copies (KL, 48-59, 114)

VALIAKHMEDOV, B.; PEREL', T.S.

Differences in earthworm population in dark Sierozem and meadow-swamp soils and the effect of soil cultivation on the changes in their population in Tajikistan. Zool. zhur. 40 no.12:1808-1814 D '61. (MIRA 15:3)

1. Institute of Soil Science, Academy of Sciences of the Tajik S.S.R., Dushanbe, and Laboratory of Forest Sciences, U.S.S.R. Academy of Sciences, Uspenskoye, Moscow Region.
(Tajikistan--Earthworms)

PEREL', T.S.

A new species of earthworm Eisenia malevici sp.n. (Oligochaeta, Lumbricidae) from Western Siberia. Zool. zhur. 41 no.3:454-456 Mr '62. (MIRA 15:3)

1. Laboratory of Forest Science, State Planning Committee of the U.S.S.R. (Settlement of Uspenskoye, Zvenigorod district, Moscow region).

(Siberia, Western--Earthworms)

PEREL', V.I.

6227
CONCENTRATION OF METASTABLE ATOMS IN THE POSITIVE COLUMN OF A LOW-PRESSURE DISCHARGE.
Yu. M. Kagan and V. I. Perel. Zhur. Eksp'l'. i Teoret. Fiz. 24, 313-25(1953) Mar. (In Russian). 2p 3

In an attempt at calculating the concentration of metastable atoms when the free path for collisions between metastable atoms and normal atoms exceeds the radius of the tube, expressions are developed for this concentration in the positive column of a low-pressure discharge. Allowance is made for the second-kind collisions with electrons. No secure data being available so far for the cross sections of the processes of formation and decomposition of metastable atoms, the theory proposed is only compared qualitatively with experimental data obtained by Kaptzov, Polacek, and Zirg and Kagan and Pashin. The results of comparison are satisfactory. (Science Abstracts)

9-11-54 Mnd

PEREL', V. I.

USSR/Physics - Ion Current 21 Aug 53

"Theory of Ion Flow into a Probe at Low Voltages," Yu. M. Kagan and V. I. Perel', Karelo-Finnish State Univ

DAN SSSR, Vol 91, No 6, pp 1321-1324

State that Langmuir's theory of probe characteristics (which proceeds from the assumption that a space-charge layer surrounds the probe and from the assumption that the plasma outside this layer is quasineutral and that the electrical field

275T96

equals zero and the motion of the particles is without order) leads to considerable divergences from experience when the theory is applied to the ion saturation flow toward a negatively charged probe. Acknowledge assistance of P. Ripatti and V. Slyasskiy in the measurements. Presented by Acad A. A. Lebedev 26 Jun 53.

PEREL', V. I.

USSR/Physics - Plasma sounding

Card 1/1 Pub. 153-18/28 FD-578

Author : Kagan, Yu. M., and Perel', V. I.

Title : Theory of sounding in plasma. I

Periodical : Zhur. tekh. fiz. 24, 5, 889-894, May 1954

Abstract : Derive expressions for the electric flow toward a spherical sounding probe for the case of a potential in space in terms of the concentration of electrons in a nondistrubed plasma. The formulas obtained contain an explicit dependence on the pressure and on the size of the sounding probe. Thanks Prof. S. E. Frish, Corr. Mem Acad. Sci USSR, and Prof. L. E. Gurevich for their evaluation of results.

Institution :

Submitted : November 9, 1953

PEREL', V.I.

KAGAN, Yu.M.; PEREL', V.I.

Theory of the Langmuir ball-probe in the plasma. Dokl.AN SSSR 95 no.4:765-768 Ap '54. (MLRA 7:3)

1. Karelo-finskiy gosudarstvennyy universitet. 2. Karelo-finskiy pedagogicheskiy institut. (Nuclear physics)

PEREL', V.I.

USSR/Physics

Card 1/1 : Pub. 22 - 17/49

Authors : Kagan, Yu. M., and Perel', V. I.

Title : On the movement of positive ions in their own gas

Periodical : Dok. AN SSSR 98/4, 575-578, Oct. 1, 1954

Abstract : Computations of the velocities of positive ions moving in their gas in a strong and a weak-field are presented. Nine references (1946-1953). Graphs.

Institution : Karelo-Finnish State University, Karelo-Finnish Pedagogical Institute

Presented by : Academician A. A. Lebedev, February 25, 1954

PEREL', V. I.

PEREL', V. I. -- "On the Movement of Positive Ions in Their Own Vapor." Leningrad State Pedagogical Inst imeni A. I. Gertsen. Chair of Theoretical Physics. Leningrad, 1955. (Dissertation for the Degree of Candidate of Physicomathematical Sciences.)

SO: Knizhnaya letopis', No. 4, Moscow, 1956

Perl', V.I.

KAGAN, Yu.M.; PEREL', V.I.; RIPATTI, P.O.

Determining the parameters of plasma by means of a cylindrical probe. Vest.Len.un. 10 no.8:129-135 Ag '55. (MLRA 9:1)

1.Karelo-Finskiy gosudarstvennyy universitet i Karelo Finskiy pedagogicheskiy institut.
(Electric discharges through gases)

PEREL, V. I.

USSR/Physics - Probe theory

FD-2888

Card 1/1 Pub. 146 - 25/26

Author : Kagan, Yu. M.; Perel', V. I.

Title : Langmuir theory of probes (sondes)

Periodical : Zhur. eksp. i teor. fiz., 29, August 1955, 261-263

Abstract : Certain assumptions of the Langmuir theory of probes have been criticized earlier by the writers (DAN SSSR, 91, 1321, 1953) and others (R. Boyd, Proc. Roy. Soc., A 201, 329, 1950; F. Wenzl, Zs. angew. Phys., 2, 59, 1950). The task of the writers in the present note is to clarify the interrelationship between the Langmuir theory and the strict theory of the spherical probe proposed by the writers (DAN SSSR, 95, 765, 1954) for low pressures and for the case of negative probe potentials. They restate the principal assumptions under these conditions as given by V. L. Granovskiy (Elektricheskiy tok v gaze [Electrical current in a gas], GITTL, 1952). Five references: e.g. Mott-Smith and Langmuir, Phys. Rev., 28, 1926.

Institution : Karelo-Finn State University

Submitted : April 9, 1955

USSR/Physics - Recharging of slow ions FD-3271

Card 1/1 Pub. 146 - 30/44

Author : Kagan, Yu. M.; Perel', V. I.

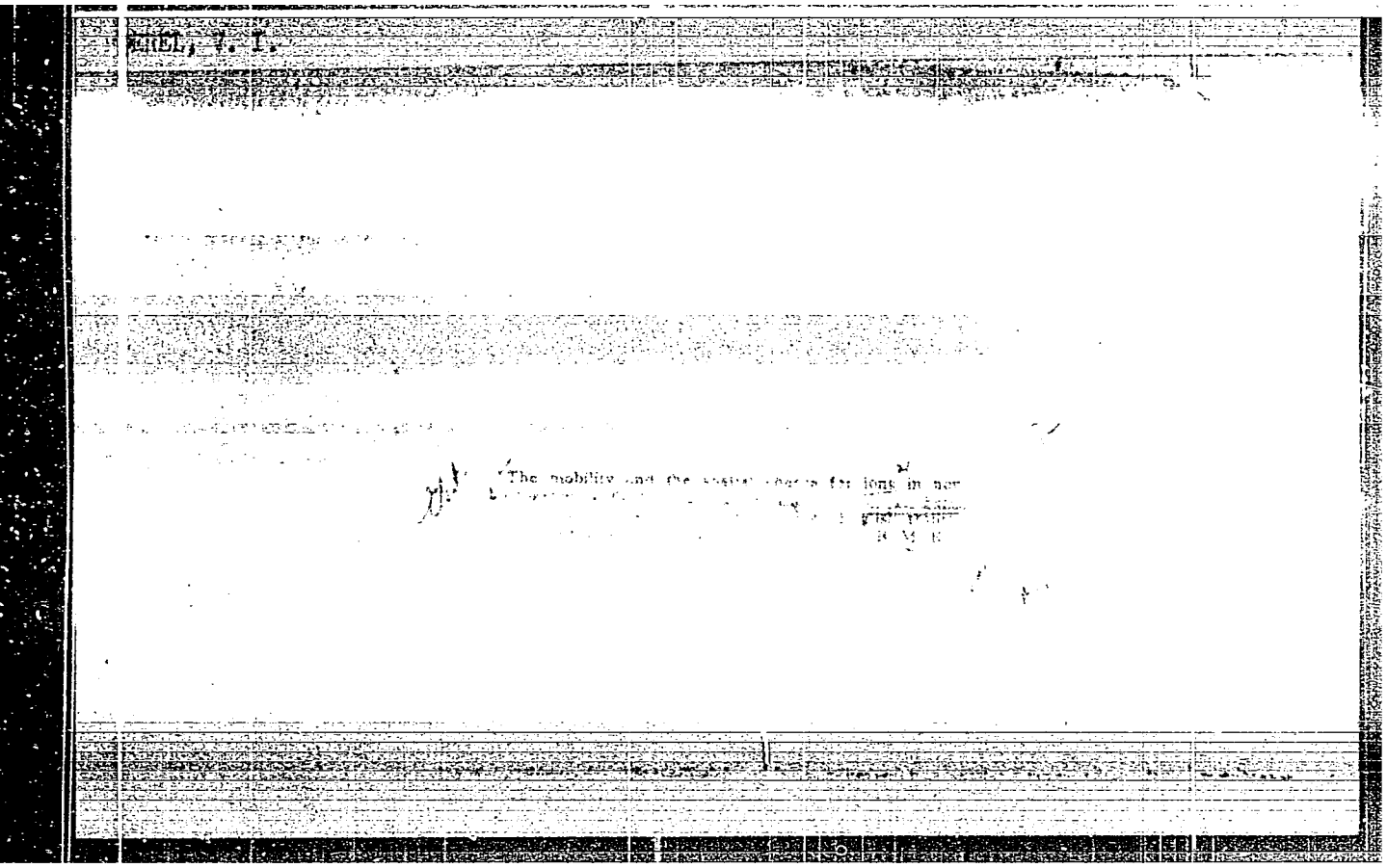
Title : Cross section of overcharging of slow ions in its own gas

Periodical : Zhur. eksp. i teor. fiz., 29, No 6(12), Dec 1955, 884-886

Abstract : The authors compare the various values of overcharge of He, Ne, A, Kr, and Xe ions as obtained by different investigators, Western and USSR. They discuss the derivation of the formula for overcharge q cross-section by others. Fifteen references: e.g. Yu. N. Demkov, Uch, zap. LGU, No 146, ser. fiz. nauk, 8, 74, 1952; the authors, DAN SSSR, 98, 575, 1954; etc. (mostly Western references).

Institution: Karelo-Finnish State University

Submitted : May 30, 1955



Peral, V. I.

phys ✓ Cross section of overcharged slow (s in their own gas. Yu. M. Kagan and V. I. Perel. Soviet Phys., JETP 2, 761-2(1956)(English translation).—See C.A. 50, 12347i. B. M. R. 2

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001240010005-8"

VAGNER, S.D.; KAGAN, Yu.M.; PERREL', V.I.

Determination of plasma parameters by the double probe method. Vest. Len.un.11 no.22:75-78 '56. (MLRA 10:2)
(Electric discharges through gases) (Electrons)

SUBJECT USSR / PHYSICS
AUTHOR KAGAN, JU.M., PEREL', V.I.
TITLE On the Mobility and the Space Charge of Ions in an Inhomogeneous Field.
PERIODICAL Dokl.Akad.Nauk, 108, fasc. 2, 222-225 (1956)
Issued: 7 / 1956 reviewed: 9 / 1956

The most important interaction process of ions with atoms of the same gas is the pure charge exchange without any important modification of the velocity of the particles concerned. In some cases of practical interest the fields in the layers are so strong that the average energy of the heat motion of atoms is small against the energy taken by the ion on a free path. Therefore the atoms may be considered to be at rest, and the product of the δ-functions of the velocity components v_x, v_y, v_z may be taken as velocity distribution function. At first, the kinetic equation is given for the case that the direction of the field (E(z) is at every point identical with the positive direction of the Z-axis. This kinetic equation is then transformed and adapted to initial conditions. The solution found is explicitly given and specialized for the limiting case of a constant field E = const.
Next, the expressions for the drive velocity and the concentration of the ions for inhomogeneous fields are given. The usual opinion that the drive velocity at a given point depends only on the field strength at this point is correct only if the modification of field strength along the free path is small as against the field strength itself. In this case the expression for the driv.

FEREL', V. I.

KAGAN, Yu. M.
and
FEREL', V. I.

"On the Limited Movement of Ions in the Vicinity of a Sounding Balloon," pp 69-71, 5 ref

Abst: The article examines a sounding ballon located in a plasma at such a low pressure that it is possible to disregard collisions of charged particles with atoms of the gas. It is shown that a limitation of movement is possible under ordinary conditions if it is assumed that the potential changes gradually.

SOURCE: Uchenyye Zapiski Petrozavodskogo Gas. Un-ta (Scientific Notes of the Petrozavodskiy State University), Volume 4, No 4 -- Physical-Mathematical Sciences, Petrozavodsk, State Publishing House of Karel' - skaya ASSR, 1957

Sum 1854

Perel', V I

AUTHORS: Kagan, Yu. M. and Perel', V. I. 51-3-3/24

TITLE: On the motion of ions and the shape of their (spectral) lines in a positive-discharge column. I. The directed motion of ions in a low-pressure discharge. (O dvizhenii ionov i konture ikh liniy v polozhitel'nom stolbe razryada. I. Napravlennoye dvizheniye ponov v razryade nizkogo davleniya).

PERIODICAL: "Optika i Spektroskopiya" (Optics and Spectroscopy), 1957, Vol.2, No.3, pp.298-303 (U.S.S.R.)

ABSTRACT: Theoretical paper. It is usually assumed that ions move in an infinite homogeneous medium under the action of an electric field constant in magnitude and direction. In a real positive-discharge column, in addition to the applied longitudinal field, there is also a transverse electric field and ions escape towards the walls. This effect is more pronounced at low pressures. It shows up in the pressure dependence of the displacement and the width of ionic emission lines when observed along the axis of the discharge tube. A kinetic equation for the ionic motion is solved to find the velocity distribution function of the positive ions in a cylindrical discharge tube. It is assumed that the ions are formed inside the tube and that they perish at the tube walls. Collisions of the ions with atoms are neglected (this is

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On the motion of ions and the shape of their (spectral) lines in a positive-discharge column. I. The directed motion of ions in a low-pressure discharge. (Cont.) 51-3-3/24

permissible at low pressures only). A transverse electric potential in the form given by Tonks and Langmuir (Phys. Rev., 34, 876, 1929) is used. This potential is calculated on the assumption that the longitudinal field does not affect the ionic distribution and that the ions have zero initial velocities. Both these assumptions are shown to be at least approximately true for the low-pressure case considered here. From the distribution function, determined using the Tonks and Langmuir potential, the authors find the average ionic velocity $\overline{v_z}$ and the average of the ionic velocity squared $\overline{v_z^2}$ along the longitudinal axis (z-axis) of the discharge tube. These quantities on the z-axis are given by

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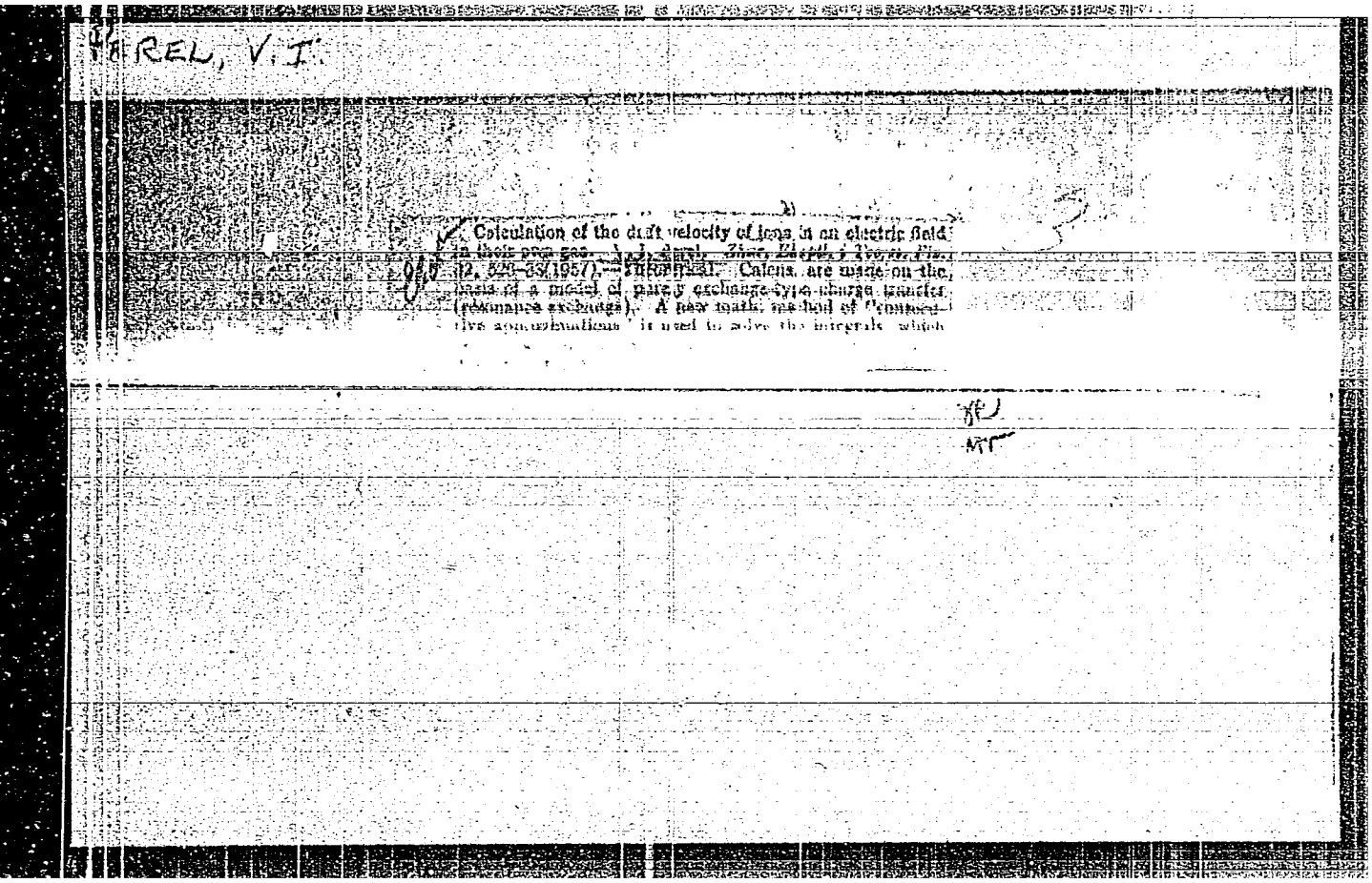
$$\overline{v_z} = 0.69\, a/z \quad \text{and}$$

$$\overline{v_z^2} = kT/M + 0.82\, a^2/z^2,$$

where $a = eE/M$ = the longitudinal ionic acceleration, z = the number of ions formed by one electron in unit time,



FAREL, V. I.

Calculation of the drift velocity of ions in an electric field in their own gas. [In Russian.] Zhur. tekh. fiz. 27, No. 12, 2626-33(1957).—Theoretical. Calcns. are made on the basis of a model of pure y exchange-type charge transfer (resonance exchange). A new mathematical method of "successive approximations" is used to solve the integrals which

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PEREL' V. I.

51-4-1-1/26

AUTHORS: Kagan, Yu. M. and Perel', V. I.

TITLE: On the Motion of Ions and the Shape of Ionic Lines in the Positive Column of a Discharge. II. Radial Motion of Ions in a Low-Pressure Discharge.

(O dvizhenii ionov i konture liniy ionov v polozhitel'nom stolbe razryada. II. Radial'noye dvizheniye ionov v razryade nizkogo davleniya.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol. IV, No. 1, pp. 3-8. (USSR)

ABSTRACT: In Part I (Ref.1) the authors solved the kinetic equation for a distribution function for ions in a cylindrical low-pressure discharge tube, taking into account both the longitudinal and transverse fields, volume ionization and loss of ions at the walls. The present paper deals with radial motion of ions and with calculation of the effective temperature for motion of ions across the tube. An approximate method

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On the Motion of Ions and the Shape of Ionic Lines in the Positive Column of a Discharge. II.

is described and used for determination of the radial part of the velocity distribution function of ions in the positive column of a low-pressure discharge. It was assumed that at low pressures the radial part of the distribution function does not depend on the longitudinal field. By means of this approximate method, velocity of the radial drift of ions and the effective ionic temperature were found as functions of distance from the discharge tube axis. An expression for the effective temperature was found in terms of the shape of ionic lines observed across the tube. The observed shape of ionic lines (under Doppler conditions) depends essentially on the nature and lifetime of the excited ionic state. There are

On the Motion of Ions and the Shape of Ionic Lines in the Positive Column of a Discharge. II.

two simple cases: (1) Formation of excited ions in atom-electron collisions and instantaneous radiation. In this case the shape of ionic lines does not differ from that of atomic lines. (2) Formation of excited ions occurs in ion-electron collisions, and radiation is instantaneous. In this case the shape of ionic lines will be determined by the velocity distribution function for ions, and this distribution can be obtained from spectroscopic observations. In case (2) the ionic line shape observed across the tube should be strongly broadened, compared with the atomic line shapes. Such a broadening was observed in argon (Ref.3), but not at low pressures. No low-

On the Motion of Ions and the Shape of Ionic Lines in the Positive Column of a Discharge. II.

pressure experimental data seems to exist. The results obtained in this paper, using the approximate method, could also, in principle, be obtained from the general expressions of Ref.1. The authors show that for (A) the distribution of potential across the tube, (B) the radial velocity distribution of ions, and (C) the mean and mean square values of the radial velocity of ions, the approximate method gives results which are very close to those given by the exact theory. The approximate method, besides being simpler to apply, has the advantage that it can be generalized to the case of high pressures. The present paper is entirely theoretical. There is

51-4 -1-1/26

On the Motion of Ions and the Shape of Ionic Lines in the Positive Column of a Discharge. II.

1 figure, 1 table, and 3 references, 2 of which are Russian and 1 American.

ASSOCIATION: Leningrad Institute of Precision Mechanics and Optics. (Leningradskiy institut tochnoy mekhaniki i optiki.)

SUBMITTED: March 5, 1957.

AVAILABLE: Library of Congress.

1. Ions-Motion

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pp 1

51-4-3-1/30

AUTHORS: Kagan, Yu.M. and Perel', V.I.

TITLE: On the Motion of Ions and the Shape of their Lines in a Positive Discharge Column. III. A Directed Motion of Ions in a Discharge at an Arbitrary Pressure. (O dvizhenii ionov i konture ikh liniy v polozhitel'nom stolbe razryada.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3, pp.285-288 (USSR).

ABSTRACT: In the preceding papers (Refs.1-2) the authors considered motion of ions in a positive column of a low-pressure discharge, taking into account longitudinal and transverse fields, bulk ionization and loss of ions at the walls. The present paper deals with directed motion of ions near the axis of a cylindrical discharge tube working at an arbitrary pressure. The method of dealing with the problem is the same as that in Ref.2. The authors obtain an expression for the velocity of directed motion of ions. From the expression the projection of the velocity on the discharge-tube axis v_z can be found. For low pressures the average value of v_z which follows

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On the Motion of Ions and the Shape of their Lines in a Positive Discharge Column. III

from the expression obtained in this paper is given by $\bar{v}_z = a/z$, where a is the acceleration of ions in the longitudinal constant electric field, and z is the number of ionizations per unit time. The exact value of $\bar{v}_z$ for low pressures obtained in Ref.1-2 is given by $\bar{v}_z = 0.69\ a/z$. For high pressures the expression obtained in the present paper yields the value $\bar{v}_z = 3\sqrt{2\pi}\, a\lambda/16u_0$, where $u_0^2 = 2kT/M$, T is the gas temperature, M is the ionic mass, and λ is the mean free path of the ion. Because of lack of experimental data quantitative comparison of theory with experiment is not possible. The authors point out that the results obtained in the present paper hold only near the discharge-tube axis. In the approximate deduction of these results terms containing squares and higher powers of the acceleration a were included. It was assumed that

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On the Motion of Ions and the Shape of their Lines in a Positive Discharge Column. III. 31-4-5-1/30

either the longitudinal field was small or that $l/z \leq \lambda/u_c$ at any value of the longitudinal field.

The paper is entirely theoretical. There are 6 Soviet references.

ASSOCIATION: Institute of Precision Mechanics and Optics. (Institut tochnoy mekhaniki i optiki.)

SUBMITTED: July 11, 1957.

1. Ions--Motion

Card 3/3

AUTHORS: Kaliteyevskiy, N. I., Perel', V. I., Chayka, M. P. SOV/48-22-6-14/28

TITLE: On the Accuracy of the Determination of Constants of the Hyperfine Structure From Optical Measurements (O tochnosti opredeleniya konstant sverkhtonkoy struktury iz opticheskikh izmereniy)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 6, pp. 692-695 (USSR)

ABSTRACT: In the introduction it is pointed out that this problem has not found the attention it deserves in publications in spite of its great importance which is due to the fact that knowledge of the constants of hyperfine structure makes it possible, without quantum-mechanical calculation to determine important nuclear constants as e.g. the relation of the magnetic- and quadrupole moments of two isotopes of an element. The theories relating to this problem are discussed (Refs 1-8). In this connection it was found that the results obtained for the constants of hyperfine structure obtained by various methods show satisfactory agreement with respect to magnetic nuclear moments, but that, with respect to quadrupole moments these values (B) differ by up to the

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On the Accuracy of the Determination of Constants of the Hyperfine Structure From Optical Measurements

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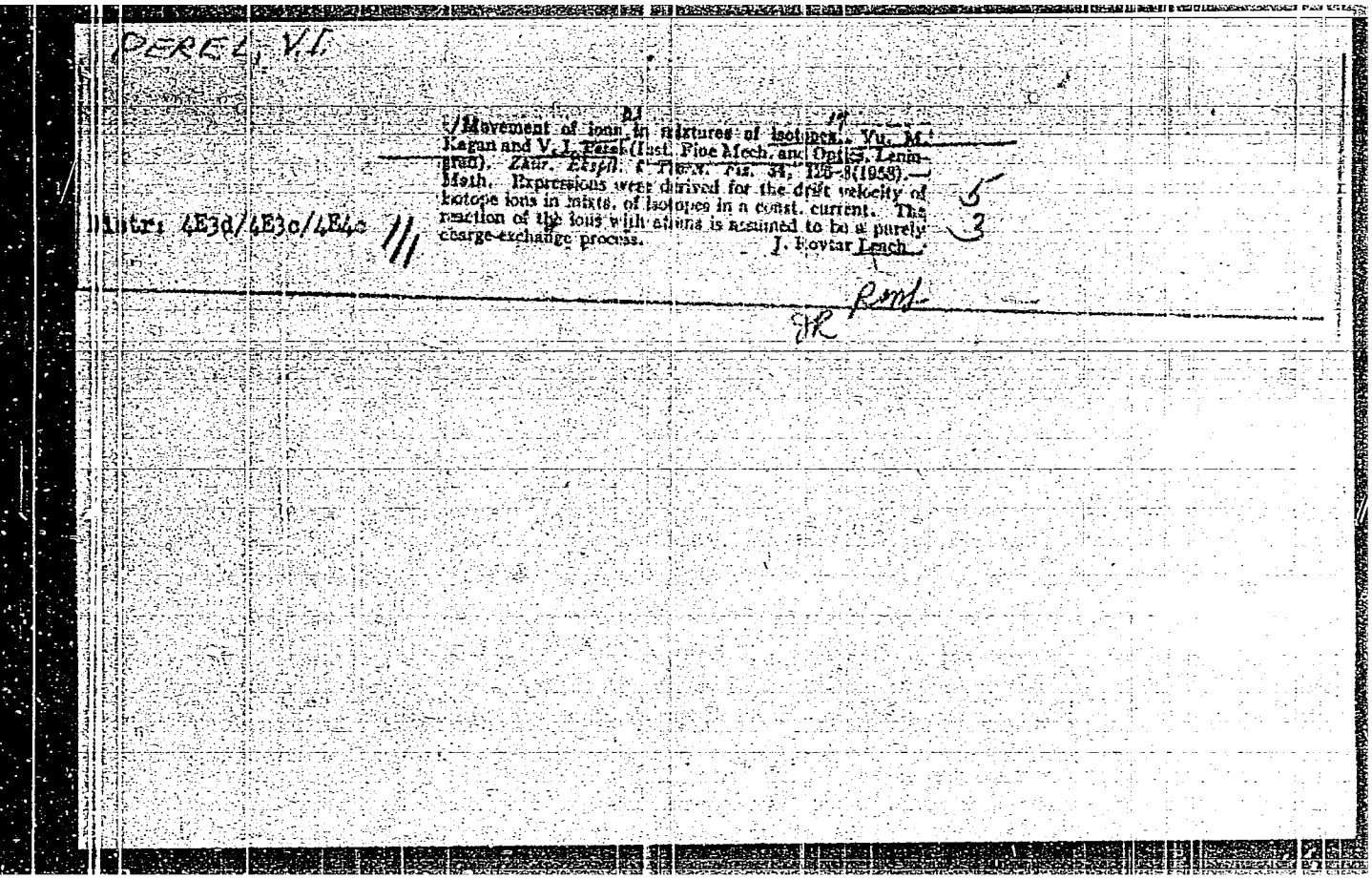
1.5-fold. Therefore the conclusion is drawn that the accuracy of optical measurements when determining moments of higher order (e.g. octupoles) are unreliable. By way of an example it is mentioned that the value computed in this paper for A_3 for the term $^2D_{3/2}$ for copper apparently does not represent octupole interaction but must be considered to be caused by systematic errors in measuring the position of sublevels of hyperfine structures. There are 1 table and 9 references, 3 of which are Soviet.

ASSOCIATION: Fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova (Institute of Physics, Leningrad State University imeni A. A. Zhdanov)

1. Materials--Structural analysis 2. Materials--Optical analysis
3. Structural analysis--Effectiveness

Card 2/2



PEREL', V.I.

Intr: 4E3d/4E3c/4E4c

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Movement of ions in mixtures of isotopes. Yu. M. Kagan and V. I. Perel' (Inst. Fine Mech. and Optics, Leningrad). *Zhur. Eksptl. i Teor. Fiz.* 34, 125-8(1958).—Math. Expressions were derived for the drift velocity of isotope ions in mix(s). of isotopes in a const. current. The reaction of the ions with atoms is assumed to be a purely charge-exchange process. J. Hovtar Leach

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PERKL', V.I.

Wave functions of many-electron systems [with summary in English].
Zhur. eksp. i teor. fiz. 35 no.3:685-690 S '58. (MIRA 12:3)

1. Leningradskiy gosudarstvennyy universitet.
(Electrons) (Wave mechanics)

SOV/56-35-3-19/61

24(5)

AUTHOR: Perel', V. I.

TITLE: On the Wave Functions of Many-Electron Systems (O volnovykh funktsiyakn mnogoelektronnykh sistem)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 9, pp 685-690 (USSR)

ABSTRACT: It is the aim of the present paper to deduce a general form of a wave function that is the eigenfunction of S^2 and S_z and satisfies the Pauli principle, and further, the derivation of an expression for the Schroedinger (Shredinger) function of a many-electron system which consists of single-electron functions. In his introduction the author speaks about the problem; in many quantum-mechanical problems concerning many-electron systems it is possible to neglect the dependence of the Hamiltonian of the system on spin variables in first approximation. Determination of the wave function of the system then leads to an approximate solution of the Schroedinger equation, which contains only spatial coordinates. Fok (Ref 1) laid down the symmetry conditions which the Schroedinger wave function

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must satisfy in order that the total wave function of the system be an eigenfunction of S^2 ($\vec{S}$ = total spin operator), and in order that it may satisfy the Pauli principle. He showed that the product of the determinants from one-electron functions may satisfy these conditions; it is, however, not possible even in one-electron approximation to operate with pure products of determinants if two electrons with different spins assume two different states (e.g. singlet in the case of rare earths). In such cases it is often difficult to set up a Schroedinger function that satisfies Fok's condition and a suitable total wave function of a system (cf. also Yung (Ref 2) and Abarenkov (Ref 3)). In the present paper it is shown that it is possible to construct the Schroedinger- and the total wave function from given approximated solutions by using operators that can be reduced to any functions in the eigenfunction of J^2 and J_z ($\vec{J}$ = spin, orbital or total momentum of the system in $\hbar$ units). First, the author determines the eigenoperators for J^2 and J_z and discusses their properties; in the second paragraph the

On the Wave Functions of Many-Electron Systems SOV/56-35-3-19/61

eigenoperators for S^2 and S_z are set up ($\vec{S}$ = spin vector in the N-electron system in $\hbar$ units) and the Schroedinger wave function is constructed from single-electron functions by making use of the Slater determinants. The author finally thanks M. I. Petrashen', E. Ye. Fradkin, Yu. N. Demkov, and Ye. D. Trifonov for discussing the problem. There are 8 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: March 26, 1958

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24(7)

AUTHORS: Kagan, Yu. M., Perel', V. I.

SOV/54-59-3-9/21

TITLE: On the Influence of the Finite Life on the Contour of the Ion Lines of the Positive Discharge Column

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1959, Nr 3, pp 49-50 (USSR)

ABSTRACT: The finite life of the excited state of an ion may cause a line shift if the ion in an excited state in the electric field assumes a velocity comparable to thermal velocity. In the present paper the problem of the line contour is dealt with under conditions which make it necessary to take the finite life of the excited ion state into account. The authors proceed from the distribution function of the particle velocity $f(v_{xo}, v_{yo}, v_{zo})$. If a particle radiates after the time t after excitation, it attains the velocity $v_z = v_{zo} + \frac{eE}{m}t$ during this period. An expression for $F(v_x v_y v_z)$ is found (1) for the distribution function of the velocity of radiating particles which in its contour coincides with the observed line contour.

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The expression $\overline{v_z} = \overline{v_{zo}} + \tau\frac{eE}{m}$ (2) is obtained for the mean velocity in the field direction by partial integration and in similar way, the mean square velocity in the field direction:

$$\overline{v_z^2} = \iiint v_z^2 F(v_x v_y v_z)\,dv_x\,dv_y\,dv_z = \overline{v_{z_o}^2} + 2\overline{v_{z_o}}\tau\frac{eE}{m} + 2\left(\tau\frac{eE}{m}\right)^2 \quad (3)$$

τ denotes the mean life of the excited state. The formulas 1-3 cannot be used if the duration of the excited state is longer than the period between the collisions of excited ions and atoms. In this case the collisions must be taken into account, however, formula (2) may be used for a rough calculation, and the time between the collisions may be substituted for τ. In a vertical field action v_{z_o} becomes equal to zero in the formulas. The line shift is then brought about by the finite life of the excited state.

PEREL', V.I.

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SOV/109-4-8-22/35

AUTHORS: Granovskiy, V.L., Luk'yanov, S.Yu., Spivak, 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 8, pp 1339 - 1358 (USSR)

ABSTRACT: The conference was organised by the Ac.Sc.USSR, the Ministry of Higher Education and Moscow State University.

A.A. Timofeyev - "Measurement of the Gas Density During the Dynamic Operation of a Discharge" (see p 1306 of the journal). A.V. Nedospasov - The Nature of a Striated Positive Column".

V.I. Perel' and Yu.M. Kagan - "The Theory of Probes for Arbitrary Pressures".

Yu.M. Kagan et al. - "The Positive Column of a Discharge in a Diffusion Regime".

M.V. Konyukov - "Influence of the Processes of the Annihilation of the Negative Ions on Their Concentration in the Column".

M.D. Gabovich and L.L. Pasechnik - "Anomalous Scattering, Excitation of Plasma Oscillations and Plasma Resonance"

Yu.L. Klimontovich - "Energy Lost by Charged Particles for the Excitation of the Oscillations in Plasma (the Langmuir paradox)" and "The Theory of Non-linear Plasma Oscillations".

Ye.G. Martinkov and I.G. Nekrashevich - "Dependence of the Temperature in the Near-electrode Region of a Pulse Discharge on the Material of the Electrodes".

V.A. Neratina and B.N. Klyarfel'd - "Formation of Light Spots on the Anode of a Gas Discharge (see p 1301 of the journal).

N.A. Matveyeva - "Distribution of Binary Mixtures of Inert Gases in a d.c. Discharge".

V.G. Stepanov and V.P. Zakharchenko - "Some Phenomena in Rarified Plasma".

V.G. Stepanov and V.I. Razel' - "The Possibility of Obtaining Highly Concentrated Plasmas".

G.V. Smirnitskaya and E.M. Reykhrudel' - "Some Characteristics of the Discharge in an Ion Pump and in a Magnetic Ionisation Vacuum Gauge".

Ye.T. Kucherenko and O.K. Nazarenko - "Properties of a Discharge with Electron Oscillations in a Magnetic Field" (see p 1253 of the journal).

The paper by L.M. Biberman and B.A. Veklenko considered the approximate methods for determining the concentration of atoms at the radiation levels.

I.I. Sobel'man and L.A. Vaynshteyn read a paper on "A Non-stationary Theory of the Stark Broadening of the Spectral Lines in Plasma".

N.A. Mazing and S.L. Mandel'shtam - "The Broadening and the Shift of Spectral Lines in a Gas-discharge Plasma".

R. Lunt (England) - "The Kinetics of Electron Collisions Leading to the Excitation of the Molecular Hydrogen in a Hydrogen Discharge".

V.N. Kolesnikov et al. - "Some Properties of the Arc Discharge in an Atmosphere of Inert Gases".

A.A. Mak and N.P. Yanyukov - "Production of High Temperatures By Means of Spark Discharges".

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SOV/48-23-8-14/25

24(3)
AUTHORS: Zakharova, V. M., Kagan, Yu. M., Perel', V. I.

TITLE: The Positive Column of Discharge in the Diffusion Procedure

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 8, pp 999-1003 (USSR)

ABSTRACT: In the introduction of the present paper some older articles of non-Russian scientists on the positive discharge column at low pressures are mentioned in addition to articles published by B. N. Klyarfel'd. An equation for the balance of electrons and ions (1) introduced by L. Frost is given, This article intends to obtain some relations by Frost's theory for a comparison with experiments, and to apply the comparison to the positive column of Hg, Ar, and K. In the first part, the drift velocity (2) is given by Frost's approximation, besides the approximation for potential distribution and concentration (4). By means of the latter the balance equation (7), a formula for the number of ions per unit of length of the column, and a formula for the ion current density (9) are developed. In the second part, experiments of Langmuir and Tonks (Ref 2) are referred to, and the equations (11) for the plasma boundaries

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The Positive Column of Discharge in the Diffusion Procedure

are given. Formulas (12) deliver the drift velocity and ionic concentration near the plasma boundary, equation (13) gives the average velocity of ions. An approximate formula (16) is given for calculating the thickness of the layer. Equation (17) supplies the potential difference between axis and wall of the tube. In the third part, the calculated results are compared to experimental results. The temperature of the electron gas was determined by means of a search electrode, the electron density was found by formula (18). The charges measured in Hg-, Ar-, and K-vapor are summarized in the diagrams of figures 1 to 3, and it was found that there is good agreement with theoretical values as long as diffusion procedure may be assumed. There are 3 figures and 13 references 5 of which are Soviet.

SOV/56-37-3-29/62

24(5)

AUTHORS: Konstantinov, O. V., Perel', V. I.

TITLE: The Quantum Theory of the Spatial Dispersion of Electric and Magnetic Susceptibility

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 786-792 (USSR)

ABSTRACT: In the introduction several publications dealing with the investigations of spatial dispersion effects occurring during the passage of electromagnetic waves through matter are discussed. Ginzburg (Ref 2) as well as Agranovich and Rukhadze (Ref 3) built up the tensor of the dielectric constant in consideration of spatial dispersion on a phenomenological basis, whereas Shafranov (Ref 4) and Klimontovich (Ref 7) derived this tensor for a classical gas of charged particles. Also a number of other authors worked with the particle model. Also two Japanese papers are briefly discussed. In the present paper the authors derive expressions, on the basis of the selfconsistent field method, for the magnetic susceptibility and conductivity in consideration of spatial dispersion, and investigated the general interrelations between conductivity

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The Quantum Theory of the Spatial Dispersion of Electric and Magnetic Susceptibility

and magnetic susceptibility. The first part of the paper deals with the averaging of current density; by employing a method similar to that used by Nakajima, a formula describing the average current density is deduced: $\Delta\vec{j}(\vec{x},t) = \vec{j}^{(1)}(\vec{x},t) + \vec{j}^{(2)}(\vec{x},t)$. In the second part of the paper the properties of the aftereffect function are investigated (symmetry properties, the properties in the case of coincidence, interrelations between aftereffect function and correlation functions). Part 3 deals with the investigation of the properties of the magnetization current as $j^{(2)}$ is called. In the following part the special case is investigated, in which the medium is located in an electric field which harmonically varies with time ($E_\mu(x,t) = E_\mu(x)e^{-i\omega t}$). Part 5 finally deals in a more detailed manner with the case of a homogeneous medium. It is shown that the electromagnetic phenomena in a homogeneous medium may be described by a conductivity dependent on frequency and wave vector and by a magnetic susceptibility which depends only on

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the wave vector. For the relation of magnetic susceptibility and the specific magnetic moment in a constant homogeneous field it holds that $\chi_{ln}(0) = \partial M_l(\vec{H})/\partial H_n$. The authors finally thank Professor L. E. Gurevich for advice and discussions. There are 12 references, 7 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physico-technical Institute of the Academy of Sciences, USSR)

SUBMITTED: April 9, 1959

Card 3/3

S/057/60/030/04/07/009
B004/B002

AUTHORS: Zakharova, V. M., Kagan, Yu. M., Mustafin, K. S., Perel', V. I.

TITLE: Probe Measuring Under Middle Pressures

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 4, pp. 442-449

TEXT: It was the purpose of the present paper to investigate the applicability of the Langmuir probe for measuring the characteristic plasma values at pressures higher than 1 torr. The authors derived equations (4), (5) for the ion currents directed upon spherical and cylindrical probes with strong negative charges, and their current densities (equations 8-10). Furthermore, equation (11) is given for the plasma potential V_o. The following method of measuring the characteristic plasma values is suggested: a) the electron temperature T_e is determined by means of the two-probe method given in Ref. 11; b) the electron concentrations are determined by means of equations (4), (5) and by applying the electron section of the characteristics. The effective cross

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sections of the ion overcharge, gas temperature, and concentration of the normal atoms must be known for the determination of the ion concentration n_∞. The theoretical calculations are experimentally proven in Hg vapor at 10^{-1} to 1 torr. Table 1 shows that the values n_∞ of spherical and cylindrical probes are in good agreement with calculations. Furthermore, plasma measurements were carried out in neon and argon at 1 to 20 torr, 50, 200, and 400 ma, and in Hg at 10 torr, 0.5, 1.0, 1.5, and 2.0 a. Table 2 gives the field voltages of Ne and Ar, Table 3 the values of T_e, Table 4 the density of the ion current, and Table 5 the values of n_∞. The T_e values were taken according to Ref. 14 and measurements by O. P. Bochkova. The dependence of the electron concentration distribution on pressure in the case of Ne and Ar, is given in Figs. 1 and 2. These Figs. show that a pressure increase is accompanied by a compression along the axis, and differs for Ne and Ar. The column contraction observed, and the difference between calculated and measured wall current related thereto, indicate that the Schottky theory no longer holds true for the pressures applied. The authors finally investigate the

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possible effect of electron- and photon emission on the result of their method, and prove this effect to be very low. They mention a paper by N. P. Penkin, and thank Professor S. E. Frish for the interest he took in this paper. There are 2 figures, 5 tables, and 16 references: 10 Soviet, 3 American, 1 British, and 1 Japanese.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: July 16, 1959

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S/057/60/030/012/011/011
B019/B056

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24.2120 (1155, 1482, 1160)

AUTHORS: Konstantinov, O. V. and Perel', V. I.

TITLE: Energy Distribution of Fast Neutral Atoms Emitted by Plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 12, pp. 1485 - 1488

TEXT: It was the purpose of the present work to find a relation between the energy distribution of emitted neutral atoms and the ion distribution in plasma. Proceeding from the kinematic equation

$$v_x \frac{\partial f(x,\vec{v})}{\partial x} = N(x)\overline{v_e \sigma_i(v_e)} f(x,v) - f(x,\vec{v})N(x)\int \varphi(v')\sigma_n(|\vec{v} - \vec{v}'|)|\vec{v} - \vec{v}'|\,d\vec{v}' + N(x)\varphi(\vec{v})\int f(x,\vec{v}')\sigma_n(|\vec{v} - \vec{v}'|)|\vec{v} - \vec{v}'|\,d\vec{v}' \qquad (1),$$

the authors obtain a relation for the density of the atomic flux, composed of three terms: $j(v) = j_1(v) + j_2(v) + j_3(v)$, $j_1(v)$ is the fraction produced by the charge exchange of the primary ionic flux.

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Energy Distribution of Fast Neutral Atoms Emitted by Plasma

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$$j_1(v) = \frac{I\varepsilon}{u\sigma} \cdot \frac{v\sigma_{\pi}(v)}{1+v_0\sigma(v)/u\sqrt{3}\sigma} \varphi(v)$$ (8) holds. $j_2(v)$ is the fraction oc-

curring after a multiple charge exchange.

$$j_2(v) = \frac{I\varepsilon\gamma}{u\sqrt{\sigma\sigma^*_{\pi}}} \cdot \frac{v\sigma_{\pi}(v)}{1+\sigma(v)/\sqrt{3}\sqrt{\sigma\sigma^*_{\pi}}} \varphi(v)$$ (9) holds. $j_3(v)$ is the fraction that comes immediately from the opposite wall. It holds that

$$j_3(v) = \frac{\sqrt{3}\,Iv}{v_0} F_0(v)\exp(-N_0\sigma(v)a)$$ (10). In this formula $f(x,\vec{v})$ is the distribution function of the atoms, $N(x)$ the ion concentration, $\varphi(v)$ the normalized distribution function of the ions, $\sigma_{\pi}(v)$ is the charge exchange cross section, $\sigma_i(v_e)$ is the electron ionization cross section. I is the total density of the atomic flux from the wall, v_0 the mean velocity of the atoms coming from the wall. D. N. Zubarev and

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87464
S/057/60/030/012/011/011
B019/B056

Energy Distribution of Fast Neutral Atoms Emitted by Plasma

V. N. Klimov are mentioned. The authors thank L. E. Gurevich for discussions. There are 3 references: 2 Soviet and 1 US.

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

SUBMITTED: July 15, 1960

Card 3/3

KONSTANTINOV, O.V.; PEREL', V.I.

Possibility of the passage of electromagnetic waves through metals in a strong magnetic field. Zhur. eksp. i teor. fiz. 38 no.1: 161-164 Jan '60. (MIRA 14:9)

1. Leningradskiy fiziko-tekhnicheskiy institut AN SSSR.
(Electromagnetic waves) (Magnetic fields)

KONSTANTINOV, O.V.; PEREL', V.I.

Graphical technique for computation of kinetic quantities. Zhur. eksp. i teor. fiz. 39 no. 1:197-208 Jl '60. (MIRA 13:12)

1. Leningradskiy fiziko-tekhnicheskiy institut. AN SSSR.
(Mechanics, Analytic)

S/056/60/039/003/040/045
B006/B063

26.1410

AUTHORS: Konstantinov, O. V., Perel', V. I.

TITLE: Collision of Particles in a High-temperature Plasma

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 3(9), pp. 861-871

TEXT: Following a previous paper (Ref. 1) in which the authors derived a generalized equation of motion for electrons interacting with one another, with phonons, and with neutral impurity centers, the authors now apply the method developed in Ref. 1 to a quasi-neutral plasma. The ordinary equation of motion, which takes only pair collisions into account, is not applicable as the total bremsstrahlung scattering cross section in the case of Coulomb interaction diverges logarithmically. The transition probability for a fast electron passing through an equilibrium electron gas whose volume charge is compensated by a blurred positive charge, was exactly calculated by A. I. Larkin (Ref. 2). The authors of the present article frequently refer to this paper. The question as to whether the collision term in the equation of motion can only be described by the

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Card 1/2

Collision of Particles in a High-temperature Plasma

S/056/60/039/003/040/045
B006/B063

introduction of pair collisions is examined next. The motion of ions is taken into account, and the part played by it in the screening of the interaction is investigated. It is found that the effect of ions on the interaction screening should be taken into account for electron - ion collisions. The collision cross sections for electron - electron and electron - ion interactions are calculated without artificial cutoff of the interaction. The role played by plasma oscillations in plasma kinetics is also studied. The equations for the single-particle density matrix of a system of interacting electrons and ions are derived in the first section. The second section deals with the calculation of the impact term and with the renormalization of graphs. The third section discusses the self-consistent field and the free term in the equation of motion. In the fourth section, the equation of motion is written down and discussed. In the fifth section, the authors discuss the range of application of the relations obtained. L. E. Gurevich is thanked for advice and discussions. There are 11 figures and 4 references: 3 Soviet and 1 Dutch.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

SUBMITTED: April 30, 1960

Card 2/2

32528
S/051/61/011/006/011/012
E039/E385

24.7120

AUTHORS: Zakharova, V.M., Kagan, Yu.M. and Perel', V.I.

TITLE: Spectroscopic observation of the rotation of a positive column discharge in a magnetic field

PERIODICAL: Optika i spektroskopiya, v.11, no.6, 1961, 777-779

TEXT: It has been shown that, in powerful arc discharges at low pressures in a magnetic field, the ions rotate about the axis of the arc. This azimuthal motion is explained as the effect of the action of the magnetic field on a radial current of ions In this work an argon discharge was studied in a tube 1.5 cm in diameter and 180 cm long. The pressure range covered was 0.5 to 2.5 mm Hg. The discharge current was 1.6 A and the magnetic fields used were 250, 600 and 1 000 Oe. Two solenoids 60 cm long were placed on the centre of the tube with a space of 1.5 cm for the spectroscopic observations. The speed of rotation of the atoms was measured by observing the displacement of the 4 300 and 4 044 Å lines using a specially designed spectrograph and a Fabry-Perot etalon. It was shown that the direction of the rotation of the atoms was the same as for the positive ions and

Card 1/2

9.9845
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S/056/61/041/003/015/020
B125/B102

AUTHORS: Perel', V. I., Eliashberg, G. M.

TITLE: Absorption of electromagnetic waves in plasma

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 3(9), 1961, 886-893

X

TEXT: The absorption coefficient for electromagnetic waves in high-temperature plasma is exactly calculated. The plasma investigated consists of singly ionized positive ions. To determine the absorption coefficient it is necessary to calculate the real part of the electronic conductivity of the plasma. The graph technique suggested by A. A. Abrikosov, L. P. Gor'kov, I. Ye. Dzyaloshinskiy (ZhETF, 36, 900, 1959) will furnish, for the function $G_{pp'}(\vec{k},\omega)$, which appears in the general expression $\sigma_{\mu\nu}(\vec{k},\omega) = \left(\frac{e\hbar}{m}\right)^2 \int p_\mu G_{pp'}(\vec{k},\omega) p'_\nu \frac{d^3p\,d^3p'}{(2\pi)^6}$ (1), the following relation:

$$G_{pp'}(\vec{k},\omega) = \left\{K^R_{pp'}(\vec{k},\omega) - K_{pp'}(\vec{k},0)\right\} / i\omega \quad (4);$$

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where

$$K^R_{pp'}(\mathbf{k},\ \omega) = \int_{-\infty}^{\infty} e^{i\omega\tau}\,\tilde{K}^R_{pp'}(\mathbf{k},\ \tau)\,d\tau, \qquad (5),$$

$$K_{pp'}(\mathbf{k},\ \omega_n) = \frac{1}{2}\int_{-1/T}^{1/T} e^{\hbar\omega_n\lambda}\,\tilde{K}_{pp'}(\mathbf{k},\ \lambda)\,d\lambda, \quad \hbar\omega_n = 2\pi i n T, \quad n = 0, \pm 1\ldots, \qquad (6),$$

$$\tilde{K}^R_{pp'}(\mathbf{k},\tau) = \theta(\tau)\,\partial\tilde{G}_{pp'}(\mathbf{k},\ \tau)/\partial\tau = (i/\hbar)\,\langle[A_{p',k}(\tau),\ A_{p,-k}(0)]\rangle\,\theta(\tau), \qquad (7),$$

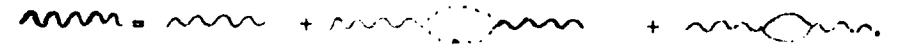
$$\tilde{K}_{pp'}(\mathbf{k},\ \lambda) = \langle T_\lambda (A_{p',k})_\lambda (A_{p,-k})_0\rangle; \qquad (A)_\lambda = e^{\lambda H'} A e^{-\lambda H'}, \qquad (8).$$

$\vec{k}$ wave vector of the electromagnetic wave, ω its frequency, $\vec{p}$, $\vec{p}'$ wave vectors of the electrons, e electron charge, m electron mass. $K_{pp'}(\vec{k},\omega_n)$ represents a sum of graphs, some of which are shown in Fig. 1. The graph 1a, for instance, denotes the conductivity without particle interaction. Because of the Coulomb divergence it is necessary to renormalize the

Card 2/6

Absorption of electromagnetic ...

interaction, and the graphs 1б,б have to be replaced by those in Fig. 2. The bold-type wave line satisfies the equation



The graphs 2a,б ,б furnish approximately the expressions for the real part of the conductivity

$$\mathrm{Re}\,\sigma(\omega) = \frac{e^2(2\pi)^{-4}}{3m^2\omega^3}\,\mathrm{sh}\frac{\hbar\omega}{2T}\int \gamma^2 d^3\gamma \int_{-\infty}^{\infty} d\alpha \left[\mathrm{sh}\frac{\alpha}{2T}\,\mathrm{sh}\frac{(\alpha+\hbar\omega)}{2T}\right]^{-1} \times \qquad (18)$$

and

$$\times \{\mathrm{Im}\,[D_\gamma^R(\alpha)P_\gamma^R(\alpha)]\,\mathrm{Im}\,[D_\gamma^R(\alpha+\hbar\omega)\,P_\gamma^{\prime R}(\alpha+\hbar\omega)] -$$

$$-\mathrm{Im}\,[D_\gamma^R(\alpha+\hbar\omega)]\,\mathrm{Im}\,[D_\gamma^R(\alpha)\,P_\gamma^R(\alpha)\,P_\gamma^{\prime R}(\alpha)]\}.$$

$$Q = \left(\frac{2}{\pi}\right)^{1/2}\int_0^\infty \tau^3 d\tau e^{-\tau^2/4}\,\frac{(\tau^2+1)^2\exp(-\omega^{*2}/2\tau^2)}{[\tau^2+\varphi(\omega^*/\tau)]^2+[\psi(\omega^*/\tau)]^2} \qquad (24)$$

$$\times \int_0^\infty e^{-z^2/2}\{[\tau^2+1+\varphi(z)]^2+[\psi(z)]^2\}^{-1}dz.$$

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were $\sigma(\omega) = \sigma_{xx}(\omega)$. The following dimensionless quantities are introduced: $x = (m/T)^{1/2}\alpha/\hbar\gamma$, $\tau = \gamma/\varkappa$, $\eta^2 = \hbar^2\varkappa^2/2mT$, $\varrho^2 = m/M$, $\omega^* = \omega/\omega_0$; ($\varkappa = (4\pi n_0 e^2/T)^{1/2}$ denotes the reciprocal Debye radius, n_0 the electron (ion) concentration, $\omega_0 = (4\pi n_0 e^2/m)^{1/2}$ the electronic plasma frequency). For the limiting case $\mathrm{Re}\sigma(\omega) = (n_0 e^2 m\omega^2)\nu(\omega)$, the effective frequency of collisions is given by $\nu(\omega) = \nu_0(2T/\hbar\omega)\mathrm{sh}(\hbar\omega/2T)Q(\omega)$, where $\nu_0 = \frac{2}{3}\pi(e^2/T)^2 n_0(8T/\pi m)^{1/2}$. A few special cases are treated. There are 4 figures and 7 references: 5 Soviet and 2 non-Soviet. The references to English-language publications reads as follows: Ref. 7: R. Wolf, Proc. Phys. Soc., A 67, 74, 1954; H. Fan, W. Spitzer, R. Collins. Phys. Rev., 101, 566, 1956.

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

SUBMITTED: April 8, 1961

KONSTANTINOV, O.V.; PEREL', V.I.

Precise determination of the kinetic coefficients for a plasma.
Zhur.eksp.i teor.fiz. 41 no.4:1328-1329 O '61. (MIRA 14:10)

1. Leningradskiy fiziko-tekhnicheskiy institut AN SSSR.
(Gases, Kinetic theory of) (Plasma (Ionized gases))

30501
S/051/62/012/003/012/016
E202/E435

24.3200
6.3500

AUTHORS: Kagan, Yu.M., Perel', V.I., Chayka, M.P.

TITLE: Theory of optical signal amplification using a medium with negative absorption

PERIODICAL: Optika i spektroskopiya, v.12, no.3, 1962, 427-433

TEXT: Problems of amplifying an optical signal by means of negative absorption medium are discussed but without references to the generation. Formulae for the integral amplification of the incident signal A, are derived for the Lorentz and Doppler profiles, the integrals being evaluated by means of Bessel's function and power series respectively. In the case of high amplification, i.e. $k_0 l \gg 1$, these are

$$A_{Lor} = \frac{e^{k_0 l}}{\sqrt{\pi k_0 l}} \quad ; \qquad A_{Dopp} = \frac{e^{k_0 l}}{\sqrt{k_0 l}}$$

where k_0 is the amplification coefficient at the centre of the line and l is the thickness of the medium. These considerations are applied to a parallel mirror containing the active medium

Card 1/2

44214

S/057/62/032/012/010/017
B104/B186

24.7170

AUTHORS: Kagan, Yu. M., and Perel', V. I.

TITLE: On the theory of ionic current towards the probe

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 12, 1962, 1479-1482

TEXT: The formulas

$$i_p = cn_0 e \sqrt{\frac{2kT_e}{M}} S, \qquad (1)$$

$$i_p = \frac{4\sqrt{2}}{9} \sqrt{\frac{e}{M}} \frac{V^{3/2}}{\beta^2\left(\frac{r_0}{a}\right)}, \qquad (2)$$

for this were derived on the assumption that the electron concentration in the space layer round the probe can be neglected in comparison with the ion concentration (The characteristics of electrical discharges in magnetic fields, edited by A. Guthrie and R. Wakerling, Yu. M. Kagan, V. I. Perel', DAN SSSR, 91, 1321, 1953). V is the negative potential of the probe, n_0 and T_e are the concentration and the temperature of the electrons in the

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undisturbed plasma, $S_c = 4\pi r_c^2$ is the surface of the space charge layer, a the probe radius, $\beta^2 (r_c/a)$ is the tabulation function by Langmuir and Blodgett (Phys. Rev. 22, 317, 1923, 24, 49, 1924). The distribution of the potential η, of the electron concentration n_e and of the ion concentration n_p (Fig. 1) given by F. Wenzl, lead to the more precise formulas

$$i_p = \alpha n_0 e \sqrt{\frac{2kT_e}{M}} S_p; \quad S_p = 4\pi r_p^2, \tag{7}$$

and

$$i_p = \frac{4\sqrt{2}}{9} \sqrt{\frac{e}{M}} \frac{V^{3/2}}{\beta^2\left(\frac{r_p}{a}\right)}. \tag{8}.$$

With $\gamma \simeq T_p/T_e = 0$ the value of α lies between $\alpha_{min} = 0.43$ and $\alpha_{max} = 0.82$. Elimination of r_p in (7) and (8) gives

$$\eta' = \frac{9}{4} i'_p \beta^2\left(\sqrt{i'_p}\right), \qquad \eta' = \frac{eV}{kT_e}\left(\frac{h^2}{a^2 \alpha_{max}}\right)^{2/3}; \quad i'_p = i_p \frac{h^2}{a^2 \alpha_{max}} \frac{e}{kT_e \sqrt{\frac{2kT_e}{M}}}; \quad h^2 = \frac{kT_e}{4\pi n_0 e^2}. \tag{9}.$$

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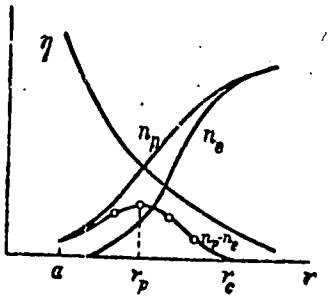
On the theory of ionic current... S/057/62/032/012/010/017
B104/B186

A comparison with numerical results, if $3 \leq a/h \leq 10$ shows that the ionic part of the probe characteristics if described well by (9). There are only deviations with small η'. There are 2 figures.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: July 2, 1962

Fig. 1



Card 3/3

S/057/63/033/003/003/021
B104/B180

AUTHORS: Perel', V. I., and Pinskiy, Ya. M.

TITLE: Effect of the non-uniformity of a variable field on the properties of a high frequency discharge

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 33, no. 3, 1963, 268-275

TEXT: The mean force acting on an electron in high-frequency electrical field with amplitude varying slowly in space is: $F = -e^2 dE^2/4m\omega^2 dx$, where E is the amplitude and ω the frequency. This is generalized for the case where the electron is in collision with gas atoms. For this purpose the collisions are described by means of a friction force and the equation of electron motion is $\ddot{r} = -f(r)\cos[\omega t+\varphi(r)] - \nu\dot{r}$ (2), where $f(r) = eE(r)/m$ and ν is the collision frequency. The result is:

$$\ddot{x}+\nu\dot{x}=\frac{F}{m},\quad F=-\frac{m}{2(\omega^2+\nu^2)}\left[\frac{1}{2}\frac{df^2}{dx}+\frac{\nu}{\omega}f^2\frac{d\varphi}{dx}\right]. \qquad (6)$$

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Effect of the non-uniformity of a ...

In a further investigation of a high-frequency discharge between flat electrodes it is shown that the plasma is concentrated in the central discharge region. The greatest drop in the high-frequency voltage occurs close to the electrode. For the determination of the charged particle concentrations the equation

$$y=\int_{h_0}^{h_1}\psi(h)\left[2\int_{h_0}^{h_1}h\,\psi(h)\,dh\right]^{-1/2}dh, \qquad (14)$$

is obtained, where

$$\psi(h)=\frac{D^*}{D_a}=1+g\frac{h(1+a^2-h)}{[(h-1)^2+a^2]^2}.$$

The balance condition is

$$l=\left(\frac{\pi}{2}+\frac{g}{2h_0}\frac{1+a^2}{a^2}\right)\sqrt{\frac{D_a}{s}}. \qquad (22)$$

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and the volt-ampere characteristic is

$$\frac{V_1(t)}{2} = E_0 \sqrt{\frac{2gD_a}{\varkappa}} \frac{1}{h_0} \ln \frac{2h_0}{g} [\alpha \cos \omega t - \sin \omega t], \quad (25)$$

$$\frac{V_{II}(t)}{2} = E_0 \sqrt{\frac{2gD_a}{\varkappa}} \frac{g}{h_0} \frac{1+\alpha^2}{4\alpha^3} \left[\left(1 + \frac{\alpha\pi}{4}\right) \cos \omega t + \left(\alpha + \frac{\pi}{4}\right) \sin \omega t \right]. \quad (26)$$

The concentration of charged particles in the discharge center and the current passing through the discharge can be found from these equations. Symbols: $h = 4\pi e^2 n/m\omega^2$ is the concentration; $\alpha = \nu/\omega$; D_a is the coefficient of ambipolar diffusion. There are 4 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad
(Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: February 23, 1962

Card 3/3