RUZICKA, K.

Methods for improving the effectiveness of documentation of public health literature. Cesk. zdrav. 12 no.6:332-335 Je'64

1. Reditel Statniho ustavu pro zdravotnickou dokumentaci a knihovnickou sluzbu v Praze.

RUTKAI, P.

ment

EXCERPTA MEDICA Sec 5 Vol 12/7 General Path. July 59

1963. VASCULAR LESIONS OF THE KIDNEYS IN SCLERODERMA - Gefässveränderungen der Nieren im Scleroderma - Rutkai P. Pathol. Abt., Budapester Ärztefortbildungsinst.. Budapest - ZBL. ALLG. PATH. PATH. ANAT. 1958, 98/9-11 (540-543) Illus. 3

A female patient, 51 yr. old, with a characteristic scleroderma of the face, had developed a progressive hypertension and died of renal insufficiency. There had been only a slight proteinuria and cylindruria. At autopsy the kidneys were of normal weight. The significant lesion was found in the interlobular arteries and consisted of a concentric intimal thickening with a mucoid aspect. Secondary to this there was a glomerular hyalinization and an ischaemic loss of renal tissue. The arterial lesion can be separated from the hypertensive lamellar elastosis and medial necrosis. Moreover, these renal lesions are essentially different from those of the other collagen diseases; there is no inflammation such as in periarteritis nodosa, nor alterations comparable to the wire loops of disseminated lupus erythematosus.

Kooiker - Utrecht

HUNGARY

RICHTER, Robert, Dr, RUTKAI, Pal, Dr; Institute of Postgraduate Medical Education, I. Department of Medicine and Department of Pathological Anatomy and Pathohistology (Orvostovabbkepzo Intezet, I. Belgyogyaszati Tanszek es Korbonctani es Korszovettani Tanszek).

"Malignant Mediastinal Tumor Developed in a Case of Neurofibromatosis."

Budapest, Orvosi Hetilap, Vol 107, No 18, 1 May 66, pages 846-848.

Abstract: [Authors' Hungarian summary] The development of a malignant mediastinal tumor in a case of Recklinghausen's disease is described and the pertinent literature data are surveyed briefly. 2 Hungarian, 9 Western references.

1/1

ZSOLDOS, Gyorgy, dr.; RUTKAI, Pal, dr.; ZAJKAS, Gabor, dr.

Primary amyloidosis. Orv. hetil. 103 no.49:2318-2321 9 D '62.

1. Orvostovabbkepzo Intezet, I. Belosztaly es Korbonctani-Korszovettani Intezet.

(AMYLOIDOSIS)

RUTKAI, PAL, DR.

VECSEI, Anna, Dr.; RUTKAI, Pal, Dr.

Malignant metastases in myocardium. Orv. hetil. 98 no.30:818-821 28 July 57.

1. Az Orvostovabbkepzo Intezet (mb. igazgato: Barsony Jeno dr.) Kortcnctani Intezetenek (foorvos: Vecsei Anna dr) Kozlemenye.

(HEART, neoplasms
metastatic, autopsy findings in myocardium (Hun))

RUTKAI, P.

Acute thrombosis of the vena portae. Kiserletes orvostud. 10 no.4:437-440 Aug 58.

1. Orvostovabbkepzo Intezet Korbonctani es Korszovettani Intezete.
(THROMBOSIS, pathol.
vena portae, acute, histopathol., case reports (Hun))
(VEINS, PORTAL SYSTEM, dis.
thrombosis of vena portae, acute, histopathol., case reports (Hun))

RUTKAI, Pal, Dr.

Renal changes in scleroderma. Orv. hetil. 99 no.33:1151-1153 17 Aug 58.

1. Az Orvostovabbkepzo Intezet (mb. igazgato: Barsony Jeno dr.) Korbonctani es Korszovettani Intezetenek (foorvos: Vecsei Anna dr.) kozlemenye.

(SCLERODERMA, pathol.
kidneys (Hun))
(KIDNEYS, pathol.
in scleroderma (Hun))

U-3

HUNGARY/General Problems of Pathology - Comparative Oncology.
Tumors of Man.

Abs Jour : Ref Zhur - Biol., No 16, 1958, 75557

Author : Vocsei, Anna; Rutkai, Pal
Inst : -
Title : Metastases of Malign Tumors into the Myocardium.

Orig Pub : Orv. hetilap., 1957, 98, No 30, 818-821

Abstract : No abstract.

Card 1/1

HUNGARY

ZSOLDOS, Gyorgy MD; RUTKAI, Pal MD; and ZAJKAS, Gabor MD, of the Division of Internal Medicine No 1 (I. Belosztaly) of the Medical Postgraduate Institute (Orvostovabbkepzo Intezet) and the Institute of Pathological Anatomy and Pathological Histology (Korbonctani- es Korszovettani Intezet).

"Primary Amyloidosis"

Budapest, Orvosi Hetilap, Vol 103, No 49, 9 Dec 62; pp 2318-2321.

Abstract: [Authors' Hungarian summary] Authors describe a case of primary amyloidosis which was diagnosed in vivo. The clinical picture of the case corresponded to a nephrotic syndrome, but the illness did not respond to any form of treatment. A tentative diagnosis of primary amyloidosis was made which was subsequently confirmed clinically by the strongly positive Congo-Red test. The diagnosis was further verified by the pathological anatomic- and pathological histological examination. In this case all requirements were present which make the diagnosis of primary amyloidosis possible; at the same time it served as a proof in regard to the problem of the occurrence of primary amyloidosis. [21 references, predominantly Western].

1/1

RUTKAI, Pal.

Case of glomerulosclerosis caused by cortisone. Kiserletes orvostud. 8 no.2:334-336 May 56

1. Szaboles utcai Allami Korhaz Korbonctani es Korszovettani Intezet.

(CORTISONE, inj. eff.
Kimmelstiel-Wilson synd., pathol. (Hun))
(NEPHROSCLEROSIS
Kimmelstiel-Wilson synd., caused by cortisone, pathol. (Hun))
(DIABETES MELLITUD, compl.
same)

KOPANYI, Gyorgy, dr.,; RUTKAI, Pal, dr.

Case of hydrocephalus, caused by a cyst in the third cerebral ventricle. Orv. hetil. 96 no.41:1147-1148 9 Oct 55.

1. A Szabolcs utcai Allami Korhaz (igazgato) Doleschall Frigyes dr.) Gyermekosztalyanak (foorvos: Steiner Bela dr.) es Korbonctani es Korszovetani Intez etenek (foorvos: Vecsei Anna dr.) kozlemenye.

(HYDROCEPHALUS, etiology and pathogenesis
cyst in cerebral ventricle in infant)
(CEREBRAL VENTRICLES, cysts
causing hydrocephalus in infant, pathol)
(CYSTS
cerebral ventricle, causing hydrocephalus in infant, pathol.)

RUTKAS, A.G.

30291

S/109/61/006/011/00[illegible]/021
D201/D304

9,2550

AUTHOR: [illegible]tkas, A.G.

TITLE: Iterated network synthesis of a reactance multi-pole

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 11, 1961, 1839 - 1845

TEXT: In the present article passive reactance 4 m-poles are considered. They consists of lumped parameters L and C, operating in a steady state, connected into the external electric circuit in such a manner that input and output currents at each pair of terminals are equal. The modern matrix methods are used for realizing the matrix $A(\omega)$ of the transfer function of the 4m-pole in the form of simpler 4m-terminal networks. Disregarding degeneration it is assumed that currents and voltages at the input of the 4m-pole are linearly independent (both currents and voltages being complex) In the n-dimensional linear space $H(n = 2m)$ the transfer matrix $A(\omega)$ is defined as the matrix function of frequency ω, representing the vector at the output $\bar{X}'$ by that of the input $\bar{X}$. It is shown

Card 1/5

30291

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Iterated network synthesis of a ...

that $A(\omega)$ has the properties

$$J - A^{*}JA \geqslant 0, \quad \mathrm{Im}\,\omega \geqslant 0. \tag{2}$$

The elements of the transfer matrix are analytic (rational) functions of ω. Two multi-pole networks are defined as equivalent if their transfer matrices coincide. In order to synthesize matrix $A(\omega)$ from simpler 4m-poles, the matrix $A(\omega)$ is factorized

$$A(\omega) = UB_{n}(\omega) \ldots B_{2}(\omega)\, B_{1}(\omega), \tag{3}$$

In it U - J - unit operator independent of ω; $B_{j}(\omega)$ - operator function having properties of Eq. (2) and calculated from

$$B_{j}(\omega) = I - \frac{i}{\omega - \omega_{0}} Q_{\alpha_{i}}, \tag{4}$$

in which $Q_{\alpha_{i}}$ has the form either

$$Q_{\alpha_{i}} = - 2\mathrm{Im}\,\omega_{0}R_{\alpha_{i}} = - 2\mathrm{Im}\,\omega_{0}JC^{*}(P_{\alpha_{i}}CJC^{*})^{[-1]}C \tag{5}$$

Card 2/5

30291
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D201/D304

Iterated network synthesis of a ...

or $$Q_{\alpha_i} = JC^*[P_{\alpha_i}(-iDJC^*)]^{[-1]}C, \quad Q^2_{\alpha_i} = 0. \quad (6)$$

In Eq. (5) $R^2_{\alpha_i} = R_{\alpha_i}$, C - the most significant coefficient of Laurent series about the pole ω_0 ($\mathrm{Im}\,\omega_0 \neq 0$) of the operator-function $A_{j-1}(\omega) = A(\omega)B_1^{-1}(\omega)\,B_2^{-1}(\omega)\ldots B_{j-1}^{-1}(\omega)$; $CJC^* \leq 0$; α_i - one of the eigenvalues of the selfconjugate operator CJC^*; P_{α_i} - the operator of projection onto the one-dimensional invariant sub-space of the CJC^* transformation, corresponding to the eigenvalue α_i. In Eq. (6) $A_{j-1}(\omega) = (\omega - \omega_0)^{-k}C + (\omega - \omega_0)^{-k+1}D + \ldots$ ($\mathrm{Im}\,\omega_0 = 0$), $C \neq 0$, $CJC^* = 0$; $DJC^* = -CJD$; $DJC^* \geq 0$. An important case is considered eventually when the elements of $A(\omega)$ have the following form: $a_{ik}(\omega) = P_{ik}(\omega) + q_{ik}(1/\omega)$ where P_{ik}, q_{ik} - certain polynomials. It may be shown that in this case every factor $B_j(\omega)$ in Eq. (3) may be

Card 3/8 5

physically reproduced. Taking n = 4, m = 2 (an eight-pole) $B_j(\omega)$ will be the matrix-function of one of the four types

$$I.\quad B_j(\omega) = I - \frac{i}{\omega}\left(\frac{0\,|\,q}{0\,|\,0}\right),$$

$$II.\quad B_j(\omega) = I - \frac{i}{\omega}\left(\frac{0\,|\,0}{q\,|\,0}\right),$$

$$III.\quad B_j(\omega) = I + i\omega\left(\frac{0\,|\,q}{0\,|\,0}\right),$$

$$IV.\quad B_j(\omega) = I + i\omega\left(\frac{0\,|\,0}{q\,|\,0}\right),$$

where $q = \begin{pmatrix} \rho_1 & \rho_2 \\ \rho_3 & \rho_1 \end{pmatrix}$; ρ_1, ρ_2, ρ_3 - real numbers such that $\rho_2 \geqslant 0$, $\rho_3 \geqslant 0$, $\rho_1^2 = \rho_2\rho_3$. Accepting that $B_j(\omega)$ are transfer matrices, they will be represented by the eight poles I - IV (Fig. 1). The values of K, L and C are tabulated. If any of the coefficients ρ_1, ρ_2, ρ_3 become zero, the above eight-poles degenerate so as to form two non-connected four-poles: 121'2' and 343'4'. Thus every eight- (or

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Iterated network synthesis of a ... D201/D304

four) pole with a transfer matrix as shown above may be represented by the equivalent iterated eight-poles of the form I - IV (see Fig. 1) which cannot be simplified further. In the case of an arbitrary transfer matrix $A(\omega)$, it becomes necessary to group by two or four the factors $B_j(\omega)$ as corresponding to the poles of $A(\omega)$ which are symmetrical with respect to the coordinate axes. This is illustrated by determining the equivalent iterated eight-poles of type I-IV for an eight-pole network with an arbitrary transfer matrix. The author acknowledges the interest in this work by M.S. Livshits. There are 2 figures, 1 table and 9 references: 7 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: A. Talbot, New method of synthesis of reactance networks, Proc. I.E.E., 1954, 101, pt. 4, Monograph No. 77, p. 73.

SUBMITTED: March 3, 1961

Card 5/6

RUTKAS, A.G.

Transfer matrix of a passive multiterminal network. Nauch. trudy KHGI 11:94 '62. (MIRA 16:11)

RUTKAUSKAS, M.I.

S/123/61/000/008/010/013
A004/A104

AUTHORS: Borisevich, Ye.S., Gal'vidis, N.M., Zhilevich, I.I., Pauzha, A.S., Rutkauskas, M.I.

TITLE: Utilization of electrographic methods in recording oscillographs and optical recorders

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 8, 1961, 7, abstract 8D86 (V sb. "Elektrofotogr. i magnitografiya", Vil'nyus, 1959, 84-92, Lithuanian summary)

TEXT: The Nauchno-issledovatel'skiy institut elektrografii (Scientific Research Institute of Electrography) together with the Institut fiziki Zemli AN SSSR (Institute of Physics of the Earth AS USSR) has developed the mockup of an electrographic oscillograph consisting of the simplified ОП-6 (OP-6) oscillograph specially made for this purpose, which permits to record electric processes on an electrographic tape with the aid of a light beam, and the electrographic attachment to the oscillograph. The overall dimensions of the OP-6 device are 220x150x x210 mm, the weight being 5.5 kg. The OP-6 device incorporates 3 combined common magnetic systems of the ГБ-3 (GB-3) galvanometer with 3 x 2 mm mirrors in the il-

Card 1/2

luminator of which a СИ-73 (SIs-78) tube is placed. The attachment has the following overall dimensions: 180 x 150 x 200 mm, weight - 5.5 kg, required power - 15 w, paper width - 100 mm, pulling speed, actuated from the oscillograph electromotor - 2 cm/sec; the generator is supplied from a 15 v accumulator. The authors describe the recording process on photoconductive paper and present the circuit diagrams of the electrographic attachment with liquid and dry development. Both development methods make it possible to obtain positive or negative pictures. The authors point out the possibility of utilizing electrographs for geophysical investigations and in other fields of science and technology at a frequency of the processes being recorded of 20-50 cycles and amplitudes up to 20 mm. One version of electrograph is analyzed which possesses a magnetic memory and is intended for the recording of breakdown processes of various assemblies, turbines, machines, during the recording of earthquakes etc.

V. Merkulov

[Abstracter's note: Complete translation]

L 7892-66 EWT(m)/EPF(c)/EWP(j)/T/EWA(c) RPL JW/RM

ACC NR: AP5024960 SOURCE CODE: UR/0286/65/000/016/0021/0021

AUTHORS: Kutkevichus, S. I.; Lakshtauskas, Yu. I.; Rutkauskas, S. I.

ORG: none

TITLE: Method for dyeing natural and chemical fibers. Class 8, No. 173708

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 21

TOPIC TAGS: dyeing, fiber, natural fiber, synthetic fiber, diazotization, amine, epoxide

ABSTRACT: This Author Certificate presents a method for dyeing natural and synthetic fibers by modifying them with epoxy derivatives of aromatic amines and subsequent development by diazotization. To widen the assortment of modifiers, the o - β, γ- epoxy propyl derivatives of aromatic amines are used as modifiers. To speed up the dyeing process, the modification of fibers is carried out at high temperatures up to 200C.

SUB CODE: 11,07/ SUBM DATE: 21Jun63

nw

Card 1/1 UDC: 677.842.313.23:841.15:547.233

CZECHOSLOVAKIA / Human and Animal Physiology. The Nervous System. T

Abs Jour: Ref Zhur-Biol., No 9, 1958, 41742.

Author : ~~Rutkay-Nedecky, I.~~; Kelleroya, .E.
Inst : Not Given.
Title : The Mean Error in the Determination of Localizations of Tactile Stimulations as a Functional Test.

Orig Pub: Ceskosl. fysiol., 1956, 5, No 4, 484-486.

Abstract: The author modified the method of Baber: the tactile stimulation (TS) was applied to the dorsal surface of the hand with the aid of a handle with a ball pen (weighing 46 g, the diameter of the point - 1 mm) suspended by a thread. The subject, lying in a horizontal position, with his eyes closed, has to touch, within 5 seconds after the application of TS, the point of contact, using

Card 1/3

CZECHOSLOVAKIA / Human and Animal Physiology. The Nervous System. T

Abs Jour: Ref Zhur-Biol., No 9, 1958, 41742.

Abstract: the index finger of the opposite hand. The stimulation was applied 50 times consecutively to both hands. The error in the localization was measured by the distance from the center of the white spot produced by the pressure of the finger of the subject to the mark left by the ball pen,(with an accuracy of 1/2 cm). Fifty-two hundred investigations were carried out on 27 patients. The material was statistically compiled. The values of the mean error of localization are projected along the Gauss' curve, with the maximum in the order of projections in the range of 0.5-0.75 cm. The

Card 2/3

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Apparatus for gas analysis. P. F. Rutke. Russ. 33,100, Sept. 30, 1933. In an app. of the Orsat type the glass rods are placed on a spiral to prevent the gas from penetrating into the lower end of the absorption vessel.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

RUTKEVICH, B. N., CHERNYI, B.M., SINELNIKOV, K.D., SAFRONOV, B. G., FEDORCHENKO, V.D.

"Investigations of Magnetic Traps with a Space - Charge."

paper presented at the Fourth International Conference on Ionization Phenomena in Gases, 17-21 Aug 59, Uppsala, Sweden.

24.3000

75327
SOV/57-29-10-4/18

AUTHORS: Fedorchenko, V. D., Rutkevich, B. N., Chernyy, B. M.

TITLE: Movement of an Electron in a Spacially Periodic Magnetic Field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1959, Vol 29, Nr 10, pp 1212-1218 (USSR)

ABSTRACT: The subject matter of the paper is a study of the movement of an electron in a magnetic field that is constant in time but is subject to a weak modulation in a longitudinal direction. The study is both of a theoretical mathematical as well as of an experimental nature. When an electric particle moves in a magnetic field that is being periodically but slowly changed, its magnetic moment, which is a ratio of the energy of the Larmor rotation of the particle to the intensity of the magnetic field, remains almost constant. In a movement of a particle in a spacially periodic field the total energy of the Larmor rotation of the particle remains constant, but while this energy decreases in the longitudinal direction it increases in the transverse direction, so that the velocity vector of the particle

Card 1/3

Movement of an Electron in a Spacially Periodic Magnetic Field

75327
SOV/57-29-10-4/18

rotates with reference to the direction of the magnetic field. This phenomenon is being made use of when a modification of the magnetic moment of charged particles in a modulated magnetic field is desired. The major factor affecting the rotation of the velocity vector of the particle is the transverse component of the magnetic field. The force acting on the particle--an electron in this case--is proportional to the frequency ω of oscillations of the field. When this frequency equals the cyclotronic frequency ω_{II} ($\omega = \omega_{II}$), which represents a condition of resonance, the energy of the particle increases. When this total energy remains constant, then the more the velocity vector rotates the greater becomes the transverse component of velocity. Mathematical development of such a condition leads to a Mathieu equation. The experimental equipment used consisted of a copper cylinder in which a pressure of 10^{-5} to 10^{-6} mm Hg was maintained and over which the magnetic coils were wound. The constant magnetic field did not exceed 200 oersteds, and the maximum value of the modulating field was [illegible] oersteds. The measurements show that as the electrons pass through the modulated field their energy in the longitudinal

Card 2/3

direction decreases. This is shown both on curves and on oscillograms. Curves show also that the average energy in the transverse direction increases with the increase in the intensity of the modulating field. Sinel'nikov, K. D., and Stepanov, K. N., contributed to the experiment by their advice. There are 6 figures and 4 references, 2 British, 1 German, and 1 non-Soviet.

ASSOCIATION: Technical Physics Institute, Academy of Sciences, USSR (Fiziko-tekhnicheskiy institut, AN SSSR)

SUBMITTED: April 30, 1959

24.2150,24.2120

17835
SOV/57-30-3-1/15

AUTHORS: Sinel'nikov, K. D., Rutkevich, B. N., Fedorchenko, V. D.

TITLE: Motion of Charged Particles in a Spacially Periodical Magnetic Field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 249-255 (USSR)

ABSTRACT: As known, charged particles may be confined to a limited volume by means of magnetic fields of special shape (I. V. Kurchatov, Atomnaya energiya, 5, 105, 1958; G. I. Budker, Fizika plazmy i problema upravlyayemykh termoyadernykh reaktsiy (Plasma Physics and Problems of Controlled Thermonuclear Reactions) Vol III, Izd. AN SSSR, 1958). If the motion is adiabatic, the magnetic moment remairs conserved. In such a case, charged particles remain indefinitely inside a cylindrically shaped magnetic field whose intensity increases at its ends, provided the angle between the velocity vector of the particle and the direction of symmetry (z-direction) of the

Card 1/3

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magnetic trap is sufficiently large. However, the same kind of particles are also unable to enter into the trap, and to obtain trapping, one has to provide ways for making the motion inside the trap non-adiabatic. One possibility consists in working with fields which change slightly during the time of the Larmor precession of the particle:

$$\left|\frac{1}{H}\frac{dH}{dt}\right| \ll \omega_H, \qquad (2)$$

where

$$\omega_H = \frac{eH}{mc}$$

is cyclotron frequency. The authors investigated the motion of single particles in such weakly space-modulated fields, which they denote by $H_o + H_\sim$ where H_o is a strong magnetic field in the Z direction, and $H_\sim$ is the variable component. They described the modulating field by means of the vector

$h = H\sim/H_0$ with components:

$$h_x = \varepsilon h_1 \sin \nu z, \tag{5}$$

$$h_y = -\varepsilon h_2 \cos \nu z, \tag{6}$$

where h_1 and h_2 can be considered constant and $\varepsilon \ll 1$ for not too large displacements of the particle. A particle moving in such a combined field is subjected to a periodic force, and expermients showed (V. D. Fedorchenko, B. N. Rutkevich, B. M. Chernyy, ZhTF, XXIX, 1212, 1959) that a particle entering the system parallel to the Z-axis moves along a helix which spirals outwards. After a few periods of the $H\sim$ field, approximately half the total energy of the particle goes over into the energy of the Larmor precession. The particle velocity may ultimately reach a direction making a sufficiently large angle with the Z-axis to be trapped in the magnetic trap, and the variable field would, therefore, enable a successful injection of particles into the trap, provided the particle does not find its way out of the trap immediately after the first reflection. By varying the distance between the end of the periodic region and magnetic stopper, one can control the phase angle θ with which the particle is returning back into the periodic region, and achieve reflection also from the magnetic stopper at the entrance into the trap. To investigate the motion, one has to work with nonlinear equations of motion, which in the case of weak modulating fields H ~ can be solved using asymptotic methods. The authors start from the equations of motion for the particle:

$$\frac{dv_x}{dt} = \omega_H [v_y (1 + \varepsilon h_1 \sin \nu z) + v_z \varepsilon h_2 \cos \nu z], \qquad (7)$$

$$\frac{dv_y}{dt} = -\omega_H v_x (1 + \varepsilon h_1 \sin \nu z), \qquad (8)$$

$$\frac{dv_z}{dt} = -\omega_H v_x \varepsilon h_2 \cos \nu z. \qquad (9)$$

and deduce a system of equations for the velocity of the Larmor precession a and for the phase shift θ :

$$\frac{da}{dz} = \varepsilon \frac{\omega_H h_2}{2} \cos \theta, \qquad (32)$$

$$\frac{d\theta}{dz} = \frac{\omega_H}{v_\parallel} - \nu - \varepsilon \frac{\omega_H h_2}{2a} \sin \theta. \qquad (33)$$

After introducing:

$$a = \frac{u}{v_0} \text{ and } \Omega = \frac{\omega u}{\gamma v_0}.$$

they note that there exist singular values a_o and θ_o, functions of Ω, for which one obtains Larmor precession of particles on circles of constant radius. Trajectories are then discussed with respect to this special case. The authors supply on Fig. 2 the variation of the transverse velocity of particles entering into the periodic system parallel to the Z-axis. Depending on the value of initial energy, the transverse component first increases, and after reaching its maximum value goes back to zero.

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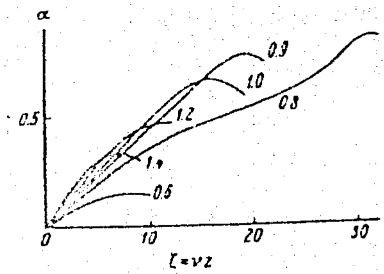
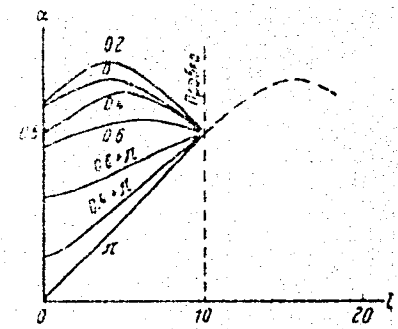


Fig. 2. Change in velocity of Larmor precession of particles entering spacially periodical field parallel to the Z-axis. Numbers on graph denote values of the parameter $\Omega = \omega_H / \nu v_0$.

Figure 3 shows the change in a for particles which reflect from the magnetic stopper at the moment when the energy of transverse motion reached half of the total energy. One sees that there exists a region of $\Delta\theta$ values (close to π in the present case) for which the particle leaves the trap after only one reflection. Varying $\Delta\theta$ by changing the distance between the modulated field region and the magnetic

Fig. 3. Variations in Larmor precession velocity of returning particles for various values of the jump in phase shift θ at reflection from a magnetic stopper.



stopper, one may achieve a maximum trapping time. However, in case of presence of many charged particles, interaction effects start playing an important role, especially near the magnetic stopper, where the velocities are small and particles spend an appreciable amount of time. The quantity $\Delta\theta$ is no longer unique for all particles, and there exists then a finite probability that a particle acquires a "dangerous" value of $\Delta\theta$. The trapping time of the trap depends under these circumstances on the magnitude of that probability. The authors investigated experimentally the possibility of accumulation of particles in traps with space-periodic magnetic fields. There are 3 figures; and 5 references, 4 Soviet, 1 German.

ASSOCIATION: Physico-Technical Institute AN UkrSSR, Khar'kov (Fiziko-tekhnicheskiy institut AN USSR, Khar'kov)

SUBMITTED: November 5, 1959

9.3150, 24.2120

77836
SOV/57-30-3-3/15

AUTHORS: Sinel'nikov, K. D., Fedorchenko, V. D., Rutkevich, B. N., Chernyy, B. M., and Safronov, B. G.

TITLE: Investigations of a Magnetic Trap

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 256-260 (USSR)

ABSTRACT: The authors investigated accumulation of charged particles in a magnetic trap with a space-periodic magnetic field. In general, a particle stays inside the trap if the angle φ between velocity vector and axis of the trap satisfies the inequality:

$$\sin^2\varphi > \frac{H_0}{H_n}, \quad (1)$$

where H_o/H_n is the stopper ratio. To get a particle into the trap, one applies a space-periodic modulation

Card 1/11

of the magnetic field of the trap along its axis. As shown earlier (V. D. Fedorchenko, B. N. Rutkevich, B. M. Chernyy. ZhTF, XXIX, 1212, 1959. K. D. Sinel'nikov, B. N. Rutkevich, and V. D. Fedorchenko. ZhTF, XXX, 249, 1960), the magnetic moment of the particle is not conserved if magnetic field H_o and period of modulation L satisfy the condition:

$$\nu = \omega_H, \qquad (2)$$

where $\nu = 2\pi/L$ and $\omega_H = eH_o/mc$ - the cyclotron frequency. Particles injected in a direction parallel to the axis of the trap perform a Larmor precession with increased radius and, at the same time, decrease their longitudinal velocity. This results in a bending of the velocity vector with respect to the Z-axis, and putting a magnetic stopper at a sufficient distance from the entrance, so condition (1) is satisfied, the particle gets reflected and begins a reverse motion. In general, it does not repeat the trajectory in the reverse direction and, therefore, need not cross the entrance stopper out, may stay inside the trap. This possibility of accumulation of particles was investigated by the authors using a device described earlier (Fedorchenko and others) and shown on Fig. 1.

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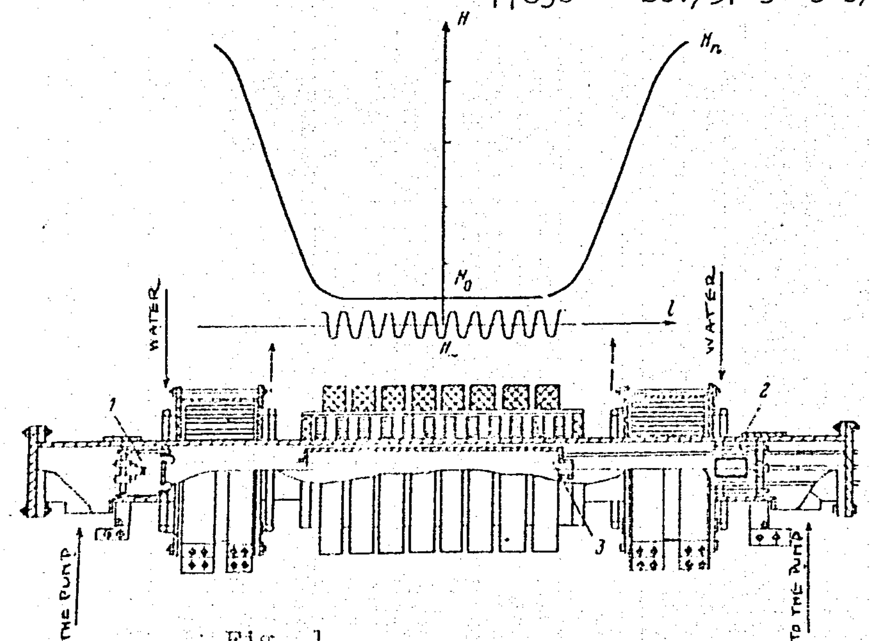

Fig. 1.

Card 4/11
See Fig. 1 caption on Card 5/12

Fig. 1. Diagram of the experimental set-up: (1) electron gun; (2) collector; (3) resonator.

The energy of the injected electrons could be varied 1-2 Kev. Magnetic field H_o between the stoppers was between 200-300 gauss. Experiment showedit was sufficient to have H_n/H_o = 2-3. Space modulation was achieved by a system of opposing coils. L was 5-7 cm, number of periods n = 5. The modulating magnetic field was 20-30 gauss; the vacuum chamber was 9 cm diam; the distance between the stoppers, 100 cm. The electron gun was producing a tubular electron beam 3.0 cm diam, and the electron current could reach 100 ma. Working pressure in the system was maintained at 2.10^{-6} mm Hg. The authors detected accumulation of electrons by shift in resonant frequency of the measuring space resonator in Fig. 1. A 10^{10} cm^3 electron density was measured at a pressure of 10^{-5} mm

Investigations of a Magnetic Trap

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Hg of hydrogen in the chamber. Charges were trapped only when condition (2) was satisfied. Figure 2 shows the relation between space-charge potential and magnitude of the injection current.

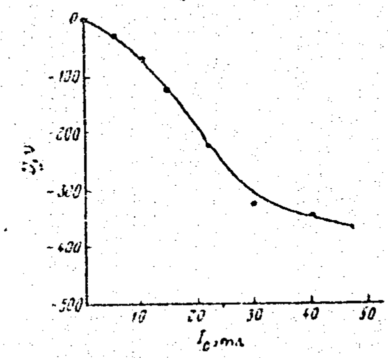

Fig. 2. Relation between potential at a distance of 2.5 cm from axis and magnitude of injected current. $P = 2 \cdot 10^{-6}$ mm Hg.

Card 6/11

The authors also measured potential along axis of the system by a probing electron beam modulated at 200 c/sec for easier detection, and potential was deduced from the beam energy necessary to get it through the trap to the collector. Results along the axis agree with Fig. 2. The negative space charge accumulated in the trap can be used as a potential well for ions, and Fig. 4 shows decrease of negative potential because of filling of the well by positive ions.

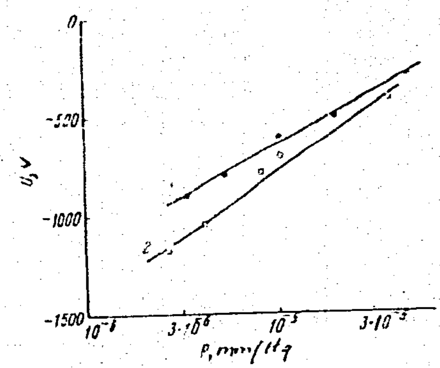

Fig. 4. Decrease of negative potential along axis of the trap with increase in the hydrogen pressure in it, $I_o = 75$ ma. (1) $U_o = 1{,}500$ v; (2) $U_o = 2{,}000$ v.

The electron beam probe was also used to measure radial component of the noncompensated space charge field because of electron plasma. The effect of beam drift in crossed E_r and H_o field was observed by a fluorescent screen placed inside the trap. Figure 5 shows that the radial field component builds to considerable magnitude. It is, however, difficult to explain the trapping mechanism for the particles. The injected electrons should be showed down by the space charge field and should, therefore, come out of phase with the magnetic field of the system. At the same time, experiment showed space modulation of magnetic field continues to play an important role; in absence of that field plasma disappears. The authors conclude that their notions about the trapping mechanism based on analysis of the single-particle motion are completely inadequate and additional investigations are needed before one could explain the influence of a space modulated magnetic field on a partially noncompensated plasma. The presence of crossed electric

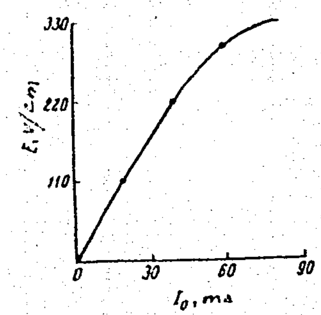

Fig. 5. Average value of radial component of space charge field of plasma in the trap at a distance of 2.5 cm from axis as function of injection current. Field was measured through asymuthal drift of probing beam. $P=3\cdot10^{-6}$ mm Hg.

and magnetic fields seems to create conditions for the retention of particles resulting from the ionization of the gas by the electron beam. These particles may acquire energies in the mentioned fields comparable to those of the injected electrons. Using the system described in the present paper the authors hope it is possible to investigate properties of a partially noncompensated, fairly hot plasma. There are 5 figures; and 4 Soviet references.

ASSOCIATION: Physico-Technical Institut AS UkrSSR, Khar'kov (Fiziko-tekhnicheskiy institut AN USSR, Khar'kov)

SUBMITTED: October 27, 1959

20667

S/057/61/031/001/012/017
B104/B204

26.2321

AUTHORS: Glazov, O. A., Dubovoy, L. V., and Rutkevich, B. N.

TITLE: Excitation of ionic cyclotron oscillations in a plasma by electron beams

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 1, 1961, 84-86

TEXT: In the high-frequency heating of a plasma by means of ionic cyclotron resonance, the efficacy of the conventional method is considerably reduced when using larger volumes and stronger magnetic fields. The excitation of ionic cyclotron oscillations by modulated electron beams offers certain advantages. The authors suggest using electron beams modulated in such a manner that the beams of electrons passing through the plasma form spirals moving along the magnetic field with the velocity $v_{\parallel}$. It is assumed that the magnetic field H_0 is applied along the z-axis. The fundamental frequency of the azimuthal current of this beam may then be expressed by

$$j_{\varphi} = j_0 \delta(r - r_0) e^{i(k_3 z - \omega t)} \qquad (1),$$

Card 1/4

where $k_3 = \omega/v_{\parallel}$, ω - the modulation frequency of the beam, r, φ, z - the cylindrical coordinates, and r_0 - the Larmor radius of an electron. The problem is studied in hydrodynamic approximation; the gravitational force is supposed to be negligibly low, pressure is equal to zero, and the plasma consists of electrons having the mass m_e and charge -e, as well as of one kind of positive ions having the mass m_i and the charge Ze. Further, the plasma is assumed to be electrically neutral in undisturbed condition, and the density of the plasma is assumed to be sufficiently great. The equations describing the interaction between waves in the frequency range $\omega \lessapprox \omega_i$ (ω_i - ionic cyclotron frequency) in the plasma and the electron beam assume the form

$$\left.\begin{aligned} \operatorname{rot} \mathbf{E} &= -\frac{1}{c}\frac{\partial \mathbf{H}}{\partial t}; \quad \operatorname{div} \mathbf{H} = 0, \\ \operatorname{rot} \mathbf{H} &= \frac{4\pi}{c}(\mathbf{j} + \mathbf{j}^{(\text{o. n.})}); \quad \operatorname{div} \mathbf{j} = 0; \end{aligned}\right\} \quad (2)$$

$$\rho_0 \frac{\partial \mathbf{v}}{\partial t} = \frac{1}{c}[\mathbf{j}, \mathbf{H}_0]; \quad (3)$$

$$\mathbf{E} + \left[\frac{\mathbf{v}}{c}, \mathbf{H}_0\right] - \frac{1}{en_e c}[\mathbf{j}, \mathbf{H}_0], \quad (4)$$

$$\left.\begin{aligned} E_\varphi^{I} &= C_1 J_1(k_1 r)\, e^{i(k_3 z - \omega t)}, \\ H_z^{I} &= C_1 \frac{ck_1}{i\omega} J_0(k_1 r)\, e^{i(k_3 z - \omega t)}, \end{aligned}\right\} \quad (5)$$

As solutions of these differential equations one obtains

for $r < r_0$ and

$$\left.\begin{aligned} E_\varphi^{II} &= C_2 H_1^{(1)}(k_1 r)\, e^{i(k_3 z - \omega t)}, \\ H_z^{II} &= C_2 \frac{ck_1}{i\omega} H_0^{(1)}(k_1 r)\, e^{i(k_3 z - \omega t)}, \end{aligned}\right\} \quad (6)$$

for $r > r_0$,

$$k_1^1 = \left(\frac{\omega_i^2}{c^2}\right) \frac{\left(\frac{\Omega_i^2}{\omega_i^2}\right)^2 \left(\frac{\omega^2}{\omega_i^2}\right)^2 - \left[2\frac{k_3^2 c^2}{\omega_i^2}\frac{\Omega_i^2}{\omega_i^2} + \left(\frac{k_3^2 c^2}{\omega_i^2}\right)^2\right]\left(\frac{\omega^2}{\omega_i^2}\right) + \left(\frac{k_3^2 c^2}{\omega_i^2}\right)^2}{\left(\frac{\Omega_i^2}{\omega_i^2} + \frac{k_3^2 c^2}{\omega_i^2}\right)\left(\frac{\omega^2}{\omega_i^2}\right) - \frac{k_3^2 c^2}{\omega_i^2}}; \quad (7)$$

where

Card 3/4

20667

Here, $J_n(k_1r)$ are Bessel functions; $H_n^{(1)}(k_1r)$ are Hankel functions of first kind; $\Omega_i^2 = 4\pi n_i Z^2 e^2/m_i$ is the plasma ion frequency. The mean energy value in time per unit length of the electron beam is given by

$$W = \frac{2\pi^3\omega}{c^2} r_o^2 J_1^2(k_1 r_o) j_o^2 \qquad (9).$$

From this formula it follows that at a sufficiently high current density j_o, the intensity of interaction between the electron beam and the plasma is very high. The authors thank K. D. Sinel'nikov for advice and a discussion. There are 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR, Khar'kov (Institute of Physics and Technology AS UkrSSR, Khar'kov)

SUBMITTED: July 15, 1960

S/057/61/031/005/005/020
B104/B205

9,3130 (1532, 1163, 1538)

AUTHOR: Rutkevich, B. N.

TITLE: Instability of a system of two electron beams in a magnetic field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 5, 1961, 539-548

TEXT: A study has been made of the stability of a system of two electron beams in a magnetic field, particular attention being paid to the transverse motion of electrons. Pierce (IRE Transaction. ED. 3, 1956) and Siegman (J. Appl. Phys., 31, 17, 1960) have shown that the motion of electrons must not be neglected in studies of this kind. It is now shown that a system of two electron beams will become unstable in a magnetic field, not only because of longitudinal oscillations (waves of the volume charge) but also on account of interacting transverse oscillations along with the cyclotron rotation of electrons. For the sake of simplicity, two hollow, coaxial electron beams (Fig. 1) are considered, which are so thin that the field distribution in the walls may be neglected. In deriving the equations for the inner and outer beams, the author assumes that the Coulomb forces are compensated by magnetic forces, and that the mean distance between electrons and axis is constant. The motion of the inner beam is described by the equations

$$E_{qr}(r_1) - E_{ir}(r_1) = 4\pi\sigma_{1\sim}, \qquad (5)$$

$$E_{qz}(r_1) - E_{iz}(r_1) = -\frac{4\pi\sigma_1\gamma}{\Omega_1} v_{1r\sim}. \qquad (6)$$

$$E_1 = \frac{1}{2}[E_q(r_1) + E_i(r_1)]. \qquad (7)$$

$$\frac{\partial v_{1z\sim}}{\partial t} + v_1 \frac{\partial v_{1z\sim}}{\partial z} = \frac{e}{m} E_{1z}, \qquad (11)$$

$$\frac{\partial v_{1r\sim}}{\partial t} + v_1 \frac{\partial v_{1r\sim}}{\partial z} + \frac{\omega_H^2}{i\Omega_1} v_{1r\sim} = \frac{e}{m} E_{1r}. \qquad (12)$$

and

$$\frac{\partial \sigma_{1\sim}}{\partial t} + v_1 \frac{\partial \sigma_{1\sim}}{\partial z} + \sigma_1 \frac{\partial v_{1z\sim}}{\partial z} + \sigma_1 \frac{v_{1r\sim}}{r_1} = 0. \qquad (14)$$

The outer beam is given by an analogous system. The dispersion relation for the oscillations considered reads

$$4\,\frac{-Q_{11}I_1(\gamma r_1)\,I_0(\gamma r_1)+Q_{21}I_0^2(\gamma r_1)-\gamma r_1 Q_{11}I_1^2(\gamma r_1)}{-\frac{1}{\gamma r_1}+Q_{11}\left[I_0(\gamma r_1)\,K_1(\gamma r_1)-I_1(\gamma r_1)\,K_0(\gamma r_1)\right]+2\gamma r_1 Q_{11}K_1(\gamma r_1)\,I_1(\gamma r_1)+2Q_{21}K_0(\gamma r_1)\,I_0(\gamma r_1)-Q_{11}Q_{21}}=$$

$$=\frac{-\frac{1}{\gamma r_2}+Q_{12}\left[I_0(\gamma r_2)\,K_1(\gamma r_2)-I_1(\gamma r_2)\,K_0(\gamma r_2)\right]+2Q_{22}K_0(\gamma r_2)\,I_0(\gamma r_2)+2\gamma r_2 Q_{12}I_1(\gamma r_2)\,K_1(\gamma r_2)-Q_{12}Q_{22}}{Q_{12}K_1(\gamma r_2)\,K_0(\gamma r_2)+Q_{22}K_0^2(\gamma r_2)-\gamma r_2 Q_{12}K_1^2(\gamma r_2)}. \quad (34)$$

In the case of small wavelengths, the motion of this system is usually very complicated. Under definite conditions, it can be divided into longitudinal and transverse oscillations. "Partial" oscillations are studied separately, a coupling is taken into account, and the coupled system is analyzed. A weak coupling of oscillations of different types is warranted by the condition $\gamma r_1 \gg 1$, $\gamma r_2 \gg 1$, and $\gamma(r_2 - r_1) \gg 1$. Using Bessel functions the dispersion relation (34) can be written in the form

22774

$$\left[(1-\gamma r_1 Q_{11})(1-Q_{21})-\frac{Q_{11}}{2\gamma r_1}\right]\left[(1-\gamma r_2 Q_{12})(1-Q_{22})-\frac{Q_{12}}{2\gamma r_2}\right]= \\ =\alpha(Q_{21}-\gamma r_1 Q_{11})(Q_{22}-\gamma r_2 Q_{12}), \quad (38)$$

where

$$\alpha=e^{-2\gamma(r_2-r_1)}. \quad (39)$$

In the limiting case of weak coupling, α is equal to zero and (38) consists of two independent relations for waves in the first and the second beam. If the couplings in the beams are neglected (brackets), the dispersion relation will acquire the simple form

$$\frac{\alpha(Q_{21}-\gamma r_1 Q_{11})(Q_{22}-\gamma r_2 Q_{12})}{(1-\gamma r_1 Q_{11})(1-Q_{21})(1-\gamma r_2 Q_{12})(1-Q_{22})}=1. \quad (47)$$

The vanishing of one of the brackets does not lead to any increasing solutions. If two brackets pertaining to different beams vanish, either the volume charges of the two beams will be coupled, or the cyclotron oscillations of the two beams or, finally, the waves of the volume charge of one beam will be coupled with the cyclotron oscillations of the other beam. The author considers the last-mentioned problem and derives the

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following equations for the boundaries of the region of stability:

$$1 - \frac{\gamma_2 j}{\gamma_1 i} = \pm 2 \sqrt{\alpha M \frac{\gamma_2 j}{\gamma_1 i}} \qquad (57)$$

$$\frac{\gamma_2 j}{\gamma_1 i} = 1 \pm 1 \sqrt{\alpha M} \qquad (58).$$

The case where the waves in the plasma are large as compared to the radius of the beams is considered analogously. Here, the dispersion relation has the form

$$\left(-\frac{1}{\gamma r_1} + \frac{\omega_1^2}{2\gamma r_1(\Omega_1^2 - \omega_H^2)} + \frac{\omega_1^2 \gamma r_1 l_1}{\Omega_1^2} - \frac{\omega_1^4 \gamma r_1}{4\Omega_1^2(\Omega_1^2 - \omega_H^2)}\right) \times$$
$$\times \left(-\frac{1}{\gamma r_2} + \frac{\omega_2^2}{2\gamma r_2(\Omega_2^2 - \omega_H^2)} + \frac{\gamma r_2 \omega_2^2 l_2}{\Omega_2^2} - \frac{\omega_2^4 \gamma r_2}{4\Omega_2^2(\Omega_2^2 - \omega_H^2)}\right) =$$
$$= \left(\frac{\gamma r_1 \omega_1^2}{\Omega_1^2} - \frac{\gamma r_1 \omega_1^2}{2(\Omega_1^2 - \omega_H^2)}\right)\left(\frac{\omega_2^2(l_2 - 1)}{\gamma r_2(\Omega_2^2 - \omega_H^2)} + \frac{\omega_2^2 \gamma r_2 l_2^2}{\Omega_1^2}\right), \qquad (64)$$

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where $l = \ln \frac{1,12}{\gamma^2}$. In these relations, the couplings of the waves of the first beam are expressed by the terms with ω_1^4 and those of the second beam by the terms with ω_2^4. The couplings between the two beams are proportional to $\omega_1^2 \omega_2^2$. A coupling exists only if the propagation constants of the two waves are approximately equal, whereas the couplings in one and the same beam are insignificant. The coupling of the waves of volume charges has already been considered (traveling-wave tubes with interacting electron beams). For the case of interaction between waves of the volume charge of the inner beam and cyclotron waves of the outer beam, the following inequalities are obtained for the regions of instability:

$$(\omega v_1 + P r_1)^2 < \omega^2 (v_1^2 - \omega_1^2 r_1^2 l_1)$$

$$\text{or} \quad \frac{r_1^2}{4 r_2} \frac{\omega_2^2 \omega_1^2}{\omega v_1} < \omega_{H}^2 - \omega^2 + \frac{\omega_2^2}{2} < \frac{l_2 - 1}{l_1} \frac{\omega_2^2 v_1}{\omega r_2}. \qquad (76)$$

Professor K. D. Sinel'nikov is thanked for his interest in the work.

There are 1 figure and 5 references: 1 Soviet-bloc and 4 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: July 15, 1960

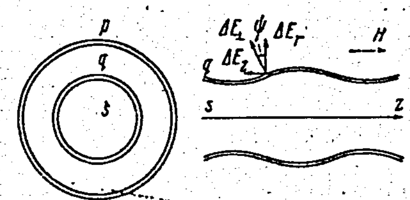

Fig. 1

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ACC NR: AT6020396 SOURCE CODE: UR/0000/65/000/000/0005/0016

58
B

AUTHOR: Sinel'nikov, K. D.; Rutkevich, B. N.

ORG: none

TITLE: Transverse injection of a plasma in a magnetic field

SOURCE: AN UkrSSR. Issledovaniye plazmennykh sgustkov (Study of plasma clusters). Kiev, Naukova dumka, 1965, 5-16

TOPIC TAGS: plasma injection, plasma charged particle, particle collision, dielectric constant, plasmoid, plasma magnetic field

ABSTRACT: Making use of the laws of conservation of the number of particles, of the energy, and of the momentum, the authors calculate the drift velocity, the components of the dielectric tensor, the field energy density, the plasma velocity, the flux density of the energy of orbital motion of the electrons and the ions, and other parameters of a plasma injected transversely into a magnetic field. Special attention is paid to the spreading of the plasma along the magnetic field, and it is shown that this effect is not due to collisions alone, but also to the effect of the electric fields which result from the distortion of the magnetic field at the point where the plasma is injected. Orig. art. has: 2 figures and 41 formulas.

SUB CODE: 20/ SUBM DATE: 11Nov65/ ORIG REF: 004

L 07409-67 EWT(1) IJP(c) GD/AT

ACC NR: AT6020573 (N) SOURCE CODE: UR/0000/65/000/000/0118/0126

AUTHOR: Fedorchenko, V. D.; Muratov, V. I.; Rutkevich, B. N.

52
51
B+1

ORG: none

TITLE: Exchange of energy high and low frequency oscillations in plasma

SOURCE: AN UkrSSR. Vysokochastotnyye svoystva plazmy (High frequency properties of plasma). Kiev, Naukovo dumka, 1965, 118-126

TOPIC TAGS: plasma heating, plasma oscillation, plasma beam interaction

ABSTRACT: Interaction between high and low frequencies of plasma oscillations was investigated experimentally and theoretically. A simple model is assumed to provide the relationship between these two frequencies and the intensity of the magnetic field. The theoretical results were tested experimentally using an electron beam (20-40 ma) moving through a gas at pressures in the 10^{-6} mm Hg range. The interaction of the waves was studied under the condition where the external excitation field: 1) did not coincide with either electron plasma or electron cyclotron frequency; 2) coincided with electron plasma frequency; and 3) coincided with electron cyclotron frequency. The intensities of the excited blue- and red-shifted satellites were found to be different indicating coupling to low frequencies and their relative intensity increased with the increase of excitation signal intensity. The increase of the ex-

Card 1/2

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ACC NR: AT6020573

ternal magnetic field intensity increased the coupling of the external signal to the ion oscillations. The experiments show that electron oscillations transfer their energy into the ion component of the plasma, leading to net plasma heating. Orig. art. has: 6 figures, 20 formulas.

SUB CODE: 20/ SUBM DATE: 19Nov65/ ORIG REF: 003

Card 2/2

ACC NR: AP6036029 SOURCE CODE: UR/0057/66/036/011/1964/1970

AUTHOR: Fedorchenko, V. D.; Muratov, V. I.; Rutkevich, B. N.

ORG: none

TITLE: The interaction of ionic cyclotron waves with high frequency oscillations of a plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 11, 1966, 1964-1970

TOPIC TAGS: nonlinear plasma, turbulent plasma, plasma oscillation, plasma electromagnetic wave, nonlinear effect, plasmon, krypton, air, helium, electron beam

ABSTRACT: The work described in this paper is a continuation of earlier work of the authors (ZhTF, 32, 958, 1962; 34,458,1964; 35,2021,1965; Yadernyy sintez, 4,300,1964) on the nonlinear interaction of waves in plasmas. Plasmas were excited in krypton, air, or helium at pressures of the order of 10^{-4} mm Hg within a 9 cm diameter 100 cm long metal tube in a longitudinal magnetic field of from 0.4 to 1.0 kOe by a 2 cm diameter 50 cm long 200-250 mA beam of 160 eV electrons which was received by a floating collector. Under these conditions oscillations with a frequency of about 12 kHz developed in the plasma. These oscillations were investigated with the aid of adjustable electric probes, a magnetic probe, and an electron beam traversing the chamber parallel to and 2 cm from its axis, and it was concluded that they represent helical ionic cyclotron waves with the propagation vector almost perpendicular to the magnetic field. High frequency power from an external oscillator with a frequency

ACC NR: AP6036029

near the electron Langmuir frequency of about 0.5 kMHz or near the ion Larmor frequency of about 1.4 kMHz was injected at one end of the discharge chamber and the high frequency signal from the plasma was observed with the aid of an electric probe. When the high frequency power was turned on the amplitude of the ionic cyclotron oscillations increased and there appeared oscillations at frequencies equal to the sum and the difference of the frequencies of the high frequency oscillations and the ionic cyclotron oscillations. The low frequency satellite was stronger than the high frequency one. In a brief review of the present and the earlier work it is noted that in all the investigated cases of interaction between low and high frequency oscillations in plasmas there appeared oscillations at the combination frequencies and that, in accord with the concept of plasmon breakup and combination, the low frequency oscillations were strengthened or weakened by the presence of the high frequency oscillations according as the low or high frequency satellite was the stronger. The behavior of the combination frequency oscillations is sensitive to turbulence of the plasma and it is suggested that study of the combination frequency oscillations may prove to be useful in the investigation of plasma turbulence. Orig. art. has: 3 formulas and 7 figures.

SUB CODE: 20 SUBM DATE: 30Jul65 ORIG. REF: 007

Card 2/2

ACC NR: AP6033417 SOURCE CODE: UR/0057/66/036/010/1819/1825

AUTHOR: Demidenko, I. I.; Lomino, N. S.; Padalka, V. G.; Rutkevich, B. N.; Sinel'nikov, K. D.

ORG: none

TITLE: Investigation of the motion of a plasma burst in a nonuniform transverse magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 10, 1966, 1819-1825

TOPIC TAGS: hydrogen plasma, plasma magnetic field, transverse magnetic field, nonhomogeneous magnetic field, plasma injection

ABSTRACT: This paper begins with a brief theoretical discussion in the drift approximation of the adiabatic motion of a plasma in a nonuniform transverse magnetic field. It is shown that the plasma is decelerated on entering a region of high transverse magnetic field strength and accelerated on leaving such a region, owing to the transformation of kinetic energy of forward motion into kinetic energy of rotation and vice versa. If the magnetic field becomes strong enough the plasma can be reflected. The authors tested their theoretical conclusions by firing plasmas from a conical plasma gun through an 80 cm long 7 cm diameter drift tube across a transverse magnetic field of up to 0.2T produced by a solenoid in a 12 cm diameter transverse tube. The magnetic field gradient was adjusted with the aid of soft iron shields within the plasma drift tube; these shields were covered with glass tubes to prevent the plasma from coming

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ACC NR: AP6033417

in contact with them. The plasma gun was powered by the 15 kV discharge of a 15 microfarad capacitor and produced plasmas containing 70% hydrogen ions with densities of about 10^{14} cm^{-3} and velocities of about 2.5×10^4 m/sec. The theoretical linear relation between the square of the plasma velocity and the strength of the transverse magnetic field was confirmed by the experiments. Plasmas with densities as low as 10^{12} cm^{-3} were obtained with the aid of an iris mounted in the drift tube. These plasmas did not conform to the adiabatic theory, but were to a considerable extent entrapped in the transverse magnetic field, particularly when the field gradient was high. It is concluded that low density hydrogen plasmas can be entrapped by a transverse magnetic field of considerable strength. The authors thank B.G.Safronov and N.A.Khizhnyak for valuable discussions. Orig. art. has: 10 formulas and 6 figures.

SUB CODE: 20 SUBM DATE: 11Oct65 ORIG.REF: 006 OTH REF: 004

Card 2/2

L 10667-66 EWT(1)/ETC/EPF(n)-2/EWG(m) IJP(c) GG/AT

ACC NR: AP5028316

SOURCE CODE: UR/0057/65/035/011/2021/2027

44,55 44,55 44,55

AUTHOR: Fedorchenko, V.D.; Muratov, V.I.; Rutkevich, B.N.

ORG: none

80
62
B

TITLE: Interaction between high frequency oscillations in a plasma and ionic sound

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35 no. 11, 1965, 2021-2027

TOPIC TAGS: discharge plasma, plasma electromagnetic wave, plasmon, plasma oscillation, nonlinear effect, magnetic field

ABSTRACT: The authors have investigated the interaction in a plasma of ionic sound with modes having frequencies near the electron Larmor or electron Langmuir frequencies. The plasmas were produced at pressures of the order of 10^{-4} mm Hg in a 9 cm diameter 100 cm long metal tube in a 400 to 1000 Oe longitudinal magnetic field by oscillating discharge between an electron gun producing a 50 cm long 2 cm diameter hollow beam of 160 eV electrons and a collector held near the floating potential. The cathode current was 200-250mA. Under these conditions there were spontaneously produced low frequency oscillations with frequencies of the order of 10 kHz. Investigations with the aid of a movable probe of the frequency and intensity distribution of these oscillations as functions of the magnetic field strength, length of the plasma column, and nature of the gas, and observation of longitudinal ejection of ions from the column, indicated that these oscillations were due to standing waves

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ACC NR: AP5028316

18

of ionic sound. The plasmas were excited at frequencies near the electron Larmor or the electron Langmuir frequencies with the aid of an antenna located at one end of the discharge tube. Standing waves were formed in both frequency regions. The electromagnetic oscillations excited at frequencies somewhat below the Larmor frequency were found to be slow extraordinary waves, having a phase velocity less than that of light. The plasma oscillations excited near the Langmuir frequency were also slow. When the intensity of the high frequency oscillations was sufficiently increased, low and high frequency satellite lines appeared in their spectra/frequencies equal to the sum and difference of the excitation frequency and the frequency of ionic sound. The relative intensities of these satellites were different in different portions of the pass bands, and under some conditions one or the other satellite was very intense. When the low frequency satellite was very intense, the intensity of the ionic sound increased when the high frequency excitation was applied; when the high frequency satellite was very intense, the intensity of the ionic sound decreased when the high frequency excitation was applied. This is to be undeestood in terms of the interaction of elementary plasma excitations (plasmons), the satellites being formed by absorption or emission of a low frequency (ionic sound) plasmon by a high frequency plasmon. The randomization of phases with the consequent formation of wave packets necessary for the validity of the analysis in terms of plasmon interactions may result from interaction with different kinds of fluctuations. The authors thank K.D.Sinel'nikov, V.T.Tolok, Ya.B.Faynberg, and B.G.Safronov for discussing the results. Orig. art. has: 4 formulas and 12 figures.

SUB CODE: 20 SUBM DATE: 09Mar65/ ORIG.REF: 006 OTH REF: 004

Card 2/2

ACCESSION NR: AT4036041 S/2781/63/000/003/0044/0054

AUTHORS: Fedorchenko, V. D.; Muratov, V. I.; Rutkevich, B. N.

TITLE: Investigation of high-frequency oscillations of a plasma by a probing beam

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upravlyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3. Kiev, Izd-vo AN UkrSSR, 1963, 44-54

TOPIC TAGS: plasma oscillations, plasma electron oscillation, electron beam, plasma interaction, plasma magnetic field interaction, space charge

ABSTRACT: This is a continuation of earlier work by the authors (High-frequency Oscillations in a Magnetic Field -- Third Khar'kov

Card 1/5

ACCESSION NR: AT4036041

Conference, 1962; Low-frequency Oscillations of a Plasma in a Magnetic field -- ZhTF v. 32, 958, 1962) and are aimed at measurements of the phase velocity by the method of a probing beam which passes through the main plasma beam and enters an analyzer with a retarding potential. The plasma tested constituted a hollow electron beam 50 cm long and 2 cm in diameter, with an energy that ranged from 200 to 300 volts at 25--50 milliamperes. The working pressure was 1.3×10^{-3}--1.3×10^{-4} n/m^2. The probing beam (1 mm dia, (10--15 μA, and 0--400V) traveled on the beam axis in the injection direction. The potential was measured with the aid of an incandescent probe inserted inside the hollow beam through a break in its annular section. The experiments with the probing electron beam indicate the existence in the plasma of considerable oscillations which modify both the main beam and the plasma. The plasma electrons become accelerated by the high-frequency field of the wave produced in the beam-plasma system, and this causes electrons to escape

Card 2/5

ACCESSION NR: AT4036041

through the ends of the system. The escape of the electrons should be accompanied by an increase in potential in the space occupied by the plasma. However, the situation is complicated by the existence of transverse ion oscillations which cause the ions to move away to the cylindrical surface of the chamber. It is concluded that the plasma oscillations cause formation of an uncompensated charge, the polarity of which depends on which of the processes predominates, the drift of the ions due to the low-frequency transverse oscillations or the drift of the electrons due to their interaction with the longitudinal high-frequency wave. In strong magnetic fields the ion oscillations are suppressed and the longitudinal high-frequency oscillations become predominant. It is therefore to be expected that in a trap in which electrons are injected in sufficiently strong magnetic fields (on the order of (1--2) x 10^5 A/m), the plasma will have a positive potential. "The authors are grateful to K. D. Sinel'nikov, Ya. B. Faynberg, and B. G. Safronov for a discussion of the results." Orig. art. has: 11 figures and 10

ACCESSION NR: AT4036041

formulas.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 21May64 ENCL: 01

SUB CODE: ME NR REF SOV: 003 OTHER: 000

Card 4/5

ACCESSION NR: AT4036041

ENCLOSURE: 01

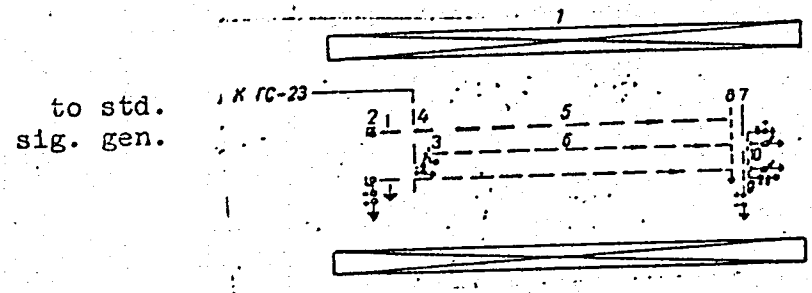

Diagram of experimental set-up

1 - solenoid, 2 - gun for main beam, 3 - gun for sounding beam, 4 - modulating electrode, 5 - main beam, 6 - sounding beam, 7 - collector of main beam, 8 - grid, 9 - analyzer of main beam, 10 - analyzer of sounding beam

Card 5/5

ACCESSION NR: AT4036040 S/2781/63/000/003/0036/0044

AUTHORS: Fedorchenko, V. D.; Muratov, V. I.; Rutkevich, B. N.

TITLE: High frequency plasma oscillations in a magnetic field

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upravlyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3, Kiev, Izd-vo AN UkrSSR, 1963, 36-44

TOPIC TAGS: plasma magnetic field interaction, plasma electron oscillation, plasma ion oscillation, plasma oscillation, plasma research

ABSTRACT: The authors investigate oscillations in electron beams in a longitudinal magnetic field at stronger magnetic fields than in their earlier study (2.38×10^5 A/m as against 1.59--2.38×10^4 A/m;

Card 1/5

ACCESSION NR: AT4036040

see ZhTF v. 32, 958, 1962). The strong magnetic field suppresses the low frequency oscillations and increases the amplitude of the high-frequency oscillations. The spectrum of the high-frequency oscillations was plotted with the aid of a moving electric probe, the output of which was fed to a noise meter. The oscillations had a maximum in the frequency range 25--50 megacycles, the position and height of which depended on the beam energy (for a fixed current), on the magnetic field, and on the pressure in the chamber. It has also been found that an optimal pressure exists at which the amplitude of the oscillations is the largest, and that the optimum value of the pressure depends on the beam energy. The oscillation frequency depends also on the beam energy and the maximum of the spectrum shifts towards higher frequencies with increasing energy. An increase in the amplitude of the ion oscillations leads to the suppression of the electron oscillations, whereas ion oscillations become more intense with increasing amplitude of the electron oscillations. Plots of the following are included: characteristic spectrum

ACCESSION NR: AP4036040

of electron oscillations, spectra of high-frequency oscillations at different pressures, spectra at different electron-beam energy, spectra at high-frequency oscillations at different magnetic fields, amplitude of high-frequency signal as a function of the probe position, role of secondary emission from the collector, amplification of external high-frequency signal applied to the modulating electrode, amplification of external signal at different pressures, amplification of external signal at different magnetic fields, dependence of the amplitude of the high-frequency ion oscillations on the frequency of the external electric field enclosing the ion beam, and dependence of the amplitude of the high-frequency electron oscillations on the frequency of the external alternating electric field for air and for krypton. "The authors are most grateful to K. D. Sinel'nikov, Ya. B. Faynberg, and B. G. Safronov for useful discussions." Orig. art. has: 12 figures.

ASSOCIATION: None

EXCERPTA MEDICA Sec 5 Vol. 10/6 Pathology June 57

1775. RUTKAI P. *Cortison okozta glomerulosclerosis esete. Glomerulosclerosis due to cortisone KISÉRL.ORVOSTUD. 1956, 8/3 (334-336) Illus. 1

A patient with acute leukaemia in the terminal stage was treated with cortisone. Autopsy revealed fibrinoid necrosis of the glomerular loops. The possible relationship between the cortisone treatment and the glomerular-loop necrosis is discussed.

Szinay - Budapest (V, 16)

RUTKOWSKA, H.

4E3d

[illegible]E ISTYTUTUW
Ministerstwh Hutnictwa
[illegible] 6, 1957

H. Rutkowska

[illegible] ...NITU OF [illegible]

Results are given of the [illegible] [illegible] obtained [illegible], 1150 and 1250°C in the air atmosphere [illegible] ... have a markedly [illegible]

RUTKOWSKI, JERZY

RUTKOWSKI, Jerzy; CHWAT, Stefan

Pararenal tumors. Urol. polska 10:135-148 1956.

1. Z II Kliniki Chirurgicznej A. M. w Lodzi. Kierownik prof. dr J. Rutkowski.
(KIDNEYS, neoplasms
pararenal tumors (Pol))

RUTHKOWSKI, S.

EXCERPTA MEDICA Sec.12 Vol.11/9 Ophthalmology Sept 57

1465. RUTHKOWSKI S. Zakł. Fizjoł. Czlowieka A. M., Warszawa. * Z zagadnień keratoplastyki. I. Mechanizm trepanacji rogówki i niektóre nowe trepany okulistyczne. Keratoplasty. I. The mechanism of trepanation of the cornea and certain new ophthalmic trephines KLIN. OCZNA 1957, 27/1 (1-8) Illus. 7

The trephines and their use are discussed. Several personal devices are then presented whose chief purpose is to increase the safety and good effects of the keratoplasty.

Szmyt - Lódź

... from Zinciferous

CA 4

Electropolishing of metals. Othmar Ruthner. Austrian 168,637, July 10, 1951. To the electrolyte finely dispersed, compact inert matter is added (particle size 1-10 μ) until the electrolyte has a pasty consistency. Thereby the electrolytic polishing, which is carried out under continuous stirring, is sustained by the mech. polishing action of the moving dispersed particles in the mixt. F. Epstein

CA

Electrochemistry

Electropolishing silver and its alloys. Othmar Ruthner. Austrian 169,085, Oct. 10, 1951. The aq. electropolishing bath consists of a soln. of $Na_2S_2O_3.5H_2O$ (1-100 g., preferably 8 g./l.). Inert solid particles may be suspended in the bath to aid the electropolishing by mech. polishing.

F. Epstein

CA

Metallurgy Metallography

Alloying metal powders from the vapor phase. Othmar Ruthner. **Austrian 170,270**. Feb. 11, 1952. The metallizing gases, e.g. carbonyls, are led upwards in the reaction tower in parallel or countercurrent flow to the metal powder particles to be superficially alloyed. The temp. of the reaction is preferably 700-1400°. F. Epstein

RUTILEVSKIY, G. L.

Rutilevskiy, G. L. "On the cider ducks of the Novaya Sibir' Peninsulas", Problemy Arktiki, 1948, No. 2, p. 93-98.

SO: U-2888, 12 Feb. 53, (Letopis' Zhurnal 'nykh Statey, No. 2, 1949).

RUTILEVSKIY, G.L.

Narwhal in the region of the drift station "North Pole 5." Probl. Arkt. no.3:116-119 '58. (MIRA 12:1)
(Artic ocean--Dolphins)

RUTILEVSKIY, G.L.

Birds of Greater Lyakhov Island. Probl.Arkt. no.4:79-90 '58. (MIRA 11:12)

(Greater Lyakhov Island--Birds)

RUTILEVSKIY, G.L.; USPENSKIY, S.M.

Biology of the field vole Alticola Lemminus Miller. Probl. Arkt. no.4:101-102 '58. (MIRA 11:12)
(Tiksi Bay region--Field mice)

SISKO, R.K.; RUTILEVSKIY, G.L.

Underground fire in the Arctic. Probl.Arkt.i Antarkt. no.7:64-66 '61. (MIRA 14:10)

(Novaya Sibir' Island--Coal)

SISKO, R.K.; RUTILEVSKIY, G.L.

How islands disappear. Probl. Arkt. i Antarkt. no.8:103-106 '61.
(MIRA 15:3)

(Novaya Sibir' Island--Erosion)

SISKO, R.K.; RUTILEVSKIY, G.L.; SVESHNIKOVA, I.N.; BUDANTSEV, L.Yu.

New materials on the fossil flora of Novaya Sibir' Island.
Trudy AANII 224:222-233 '63 (MIRA 18:1)

EYDUK, Yu.Ya. [Eiduks, J.]; BAUMAN, O.F. [Baumans, O.]; RUTIN', I.Ya.

Practices in the use of polymer gypsum. Stroi. mat. 11 no.6:16 Je '65. (MIRA 18:7)

RUTISKHAUZER, Kh.

BEKUS, Dzh.V. [Backus, T.W.]; BAUER, F.L.; GRIN, Dzh. [Green, T.]; KETTS, S. [Katz, C.]; MAK-KARTI, Dzh. [McCarthy, T.]; NAUR, Peter; PERLIS, E.Dzh. [Perlis, A.T.]; RUTISKHAUZER, Kh. [Rutishauser, H.]; ZAMEL'ZON, K. [Samelson, K.]; VOKUA, B. [Vauquois, B.]; UEGSTEYN, Dz. [Wegstein, T.H.]; VAN-VENGAARDEN, A. [Wijngaarden, A. van]; VUDZHER, M. [Woodger, M.]; KOZHUKHIN, G.I. [translator]; YERSHOV, A.P., red.; KORKIN, A.I., tekhn.red.

[Report on the algorithmic language ALGOL 60] Soobshchenie ob algoritmicheskom iazyke ALGOL 60. Pod red. Petera Naura. Moskva, Vychislitel'nyi tsentr AN SSSR, 1960. 66 p. (ALGOL bulletin supplement, no.2). (MIRA 13:12)

(Logic, Symbolic and mathematical)
(Information theory)

RUTITSKIY, N.Ye. [Rutyts'kyi, N.Ye.]

Restoring frames of DT-54 tractors. Mekh. sil'. hosp. 12 no. 1:23 Ja '61. (MIRA 14:1)

1. Direktor Yarmolinetskoy rayonnoy trakitrnoy stantsii, Khmel'nitskoy oblasti.
(Tractors--Maintenance and repair)

1. RUTYTSKYY YA.B.

2. USSR (600)

4. Topology

7. Some boundry properties of the orbits of a general dynamic system, Dop. AN SSSR no.2. 1951.

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

RUTITSKIY, M.

Receiving point, dispatcher, price list. Mest. prom. i khud. promys. no.5:20 My '63. (MIRA 16:7)

1. Glavnyy inzh. fabriki mekhanizirovannogo remonta obuvi No.2, Kiyev.

(Kiev—Boots and shoes—Repairing)

RUTITSKIY, Ya. B.

Krasnosel skii, M. A., and Ruticki, Ya. B. On the theory of Orlicz spaces. Doklady Akad. Nauk SSSR (N.S.) **81**, 497–500 (1951). (Russian)

Because of their relevance to the study of non-linear operators the Orlicz spaces (W. Orlicz, Bull. Int. Acad. Polon. Sci. Cl. Sci. Math. Nat. Sér. A. Sci. Math. **1932**, 207–220) are discussed. They are the spaces L^*_Φ of measurable functions [illegible] compact subset of Euclidean space [illegible] sup over [illegible]. Here Ψ is the conjugate of a function [illegible] convex function satisfying: [illegible] for $u \neq 0$, $\lim_{u\to 0} \Phi(u)/|u| = 0$, [illegible] known that $\Phi(u) = \int_0^{|u|} p(t)dt$ where [illegible] non-decreasing and continuous on the right, and [illegible] $p(t) = \infty$. [illegible] then Ψ is the conjugate [illegible] Δ_2-condition), certain classes of non-linear operators are no more easily investigated [illegible] for any p. The following [illegible] Δ_2-condition. The conjugate Ψ of Φ satisfies the Δ_2-condition if and only if there is a u_0 and [illegible] $\Phi(u) \geq \Phi(lu)/2l$, $u \geq u_0$. An example [illegible] which satisfies the Δ_2-condition is given. If [illegible] the Δ_2-condition then the bounded [illegible] nowhere dense in L^*_Φ. $L^*_\Phi \subset L^*_{\Phi_1}$ if and only if [illegible] constant s and some u_0, $\Phi(u) \geq \Phi_1(su)$, $u \geq u_0$. The u_n are said to converge weakly whenever $\int c u_n dx$ converges for all c in L^*_Ψ. Since L^*_Ψ is in general a proper subset of the conjugate of L^*_Φ, it follows that this is a non-usual weak convergence. If $u_n(x)$ converge weakly, $\|u_n\|_\Phi$ are bounded. If Ψ satisfies the Δ_2-condition, then every bounded sequence has a weakly convergent subsequence and every weakly converging sequence has a weak limit.

B. Gelbaum (Minneapolis, Minn.).

Source: Mathematical Reviews, Vol 13 No. 4

RUTITSKIY, Ya. B.

Rutic'kil, Ya. B. On a theorem of M. M. Nazarov. Dopovidi Akad. Nauk Ukrain. RSR 1952, 91–95 (1952). (Ukrainian. Russian summary)

The author notices that equation

$$(1) \qquad \varphi(x)+\int_0^1\int_0^1 K(x, s)h(s, t; \varphi(t))dsdt=0$$

is a special case of equation

$$(2) \qquad \varphi(y, x)+\int_0^1\int_0^1 K(y, x, s, t)h(s, t; \varphi(s, t))dsdt=0$$

and using results known for equation (2) formulates an existence theorem for equation (1). *M. Golomb.*

Integral Equations

RUTYTS'KYY, Ya.B.; SHTOKALO, Y.Z., diysnyy chlen.

On one non-linear operator acting in Orlich spaces. Dop.AN URSR no.3:161-166 '52. (MLRA 6:9)

1. Akademiya nauk Ukrayins'koyi RSR (for Shtokalo). 2. Kyyivs'kyy derzhavnyy universytet im. T.H.Shevchenka (for Rutyts'kyy). (Spaces, Generalized)

RUTITS'KIY, Ya.B.

Certain prepertios of orbitals in a generalized dynamic system.
Nauk.zap.Kiev.un.11 no.7:75-82 '52. (MLRA 9:10)
(Dynamics)

RUTITSKIY, YA. B.

USSR/Mathematics - Operators, Linear Integral 1 Jul 52

"Linear Integral Operators in Orlicz Spaces," M. A. Krasnosel'skiy, Ya. B. Rutitskiy

"Dok Ak Nauk SSSR" Vol LXXXV, No 1, pp 33-36

Studies the following linear integral operator: $Au(x) = \int_G K(x,y)u(y)dy$, where $K(x,y)$ is a function measurable on $\bar{G}$ (topological product GxG, where G is a compact set in n-dimensional Euclidean space); also explains when it will be a continuous operator operating from one Orlicz space L_{M_1} (G) to another

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space L_{M_2} (G). A. Zaanen has investigated this operator A (see Ann of Math, 47, No 4, 1946. Submitted by Acad A. N. Kolmogorov 28 Apr 52.

224T85

RUTISKIY, Ya. B.

Mathematical Reviews
Vol. 15 No. 2
Feb. 1954
Analysis

Krasnosel'skiĭ, M. A., and Rutickiĭ, Ya. B. Differentiability of non-linear integral operators in Orlicz spaces. Doklady Akad. Nauk SSSR (N.S.) 89, 601–604 (1953). (Russian)

The operator H defined by $H\varphi(x) = \int_G K(x, y) f(y, \varphi(y))dy$ where G is a compact set in Euclidean n-space, f a non-linear function, is investigated via Orlicz spaces. Conditions are given under which the operator is (a) defined in some sphere of Orlicz space, (b) completely continuous, (c) differentiable (has a Fréchet differential), (d) asymptotically linear. No proofs are offered, but it is alleged that they are based upon results of the authors [Krasnosel'skiĭ, same Doklady (N.S.) 77, 185–188; 79, 389–392 (1951); Krasnosel'skiĭ and Rutickiĭ, ibid. 81, 497–500 (1951); 85, 33–36 (1952); these Rev. 12, 836; 13, 251, 357; 14, 57; Rutickiĭ, Dopovidi Akad. Nauk Ukrain. RSR 1952, no. 3 (unavailable)] and the results of Schauder and Leray. *B. Gelbaum.*

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