SINEL'NIKOV, I.D.

Production of table sirups. Sakh.prom. 34 no.5:52-55 My '60.
(MIRA 14:5)

(Sirups)

SINEL'NIKOV, I.D.

Organizing the production of pudding powders (concentrate) at starch factories. Sakh.prom. 34 no.9:62-64 S '60. (MIRA 13:9)

(Flour) (Starch industry)

MARKER, V.E.; MILYUTIN, A.A.; SINEL'NIKOV, I.D.; SHTYRKOVA, Ye.A.; MURASHEVA, O.I., red.; KISINA, Ye.I., tekhn. red.

[Manufacturing starch products from potatoes] Proizvodstvo krakhmaloproduktov iz kartofelia. By V.E.Marker i dr. Moskva, Pishcheprom-izdat, 1961. 147 p. (MIRA 14:11)
(Starch) (Potatoes)

ZHUSHMAN, Anatoliy Ivanovich; SINEL'NIKOV, Ivan Dmitriyevich; SHTYRKOVA, Yevgeniya Aleksandrovna; KRAVCHENKO, S.F., retsenzent; TREGUBOV, N.N., retsenzent; BUKMAN, M.Ye., red.; VOYKOVA, A.A., red.; SATAROVA, A.M., tekhn. red.

[Manufacture of starch products from corn; cornstarch, sago from conrnstarch, pudding starch, and powder starch] Proizvodstvo krakhmaloproduktov iz kukuruzy; maisovyi krakhmal, sago iz maisovogo krakhmala, pudingovye krakhmal i poroshki. Moskva, Pishchepromizdat, 1962. 187 p. (MIRA 15:6)

(Cornstarch)

SINEL'NIKOV, I.D.

Preparing calculations for raw starch production in case of a complex method of potato processing. Sakh.prom. 37 no.2: 62(142)-66(146) F '63. (MIRA 16:5)

(Starch)

TREGUBOV, [illegible] Nikolayevich; [illegible]; BEREZHNOY [illegible], Boris Konstantinovich; [illegible], Mikhail Mikhailovich; KO[illegible], [illegible], inzh., retsenzent; [illegible], [illegible].Ye., inzh., retsenzent; BIRYUKOV [illegible], [illegible], spets. red.; KOVALEVSKAYA, A.I., red.

[Design and planning of the enterprises of the starch and molasses industry] Proektirovanie predpriiatii krakhmalo-patochnoi promyshlennosti. Moskva, Pishchevaia promyshlennost', 1964. 314 p. (MIRA 18:1)

L 17539-66 EWT(1)/EWA(h)
ACC NR: AP6001943 SOURCE CODE: UR/0142/65/008/006/0736/0738

AUTHOR: Yakovlev, V. N.; Sinel'nikov, I. S.

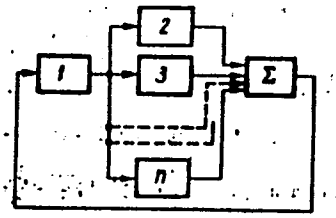
ORG: none

TITLE: Resistive-capacitive FM oscillators with multiloop feedback

SOURCE: IVUZ. Radiotekhnika, v. 8, no. 6, 1965, 736-738

TOPIC TAGS: FM oscillator, oscillator feedback

ABSTRACT: The spurious AM has been one of the principal shortcomings of modern RC FM-oscillators; a frequency deviation of 50% with a negligible AM has been very difficult to achieve. Hence, the use of RC FM-oscillators having a number of parallel selective RC feedback circuits is suggested. Such an oscillator (see figure) comprises amplifier 1, RC-circuits 2, 3, ..., n, and summation device Σ. Simple formulas for calculating such an RC oscillator are developed. Experiments with a 2-feedback-loop oscillator exhibited the possibility of obtaining a 50% frequency deviation with only about 2% spurious AM. Orig. art. has: 3 figures and 11 formulas.



FM oscillator with multiloop feedback

SUB CODE: 09 / SUBM DATE: 05May65 / ORIG REF: 002

Card 1/1

UDC: 621.373.421.15

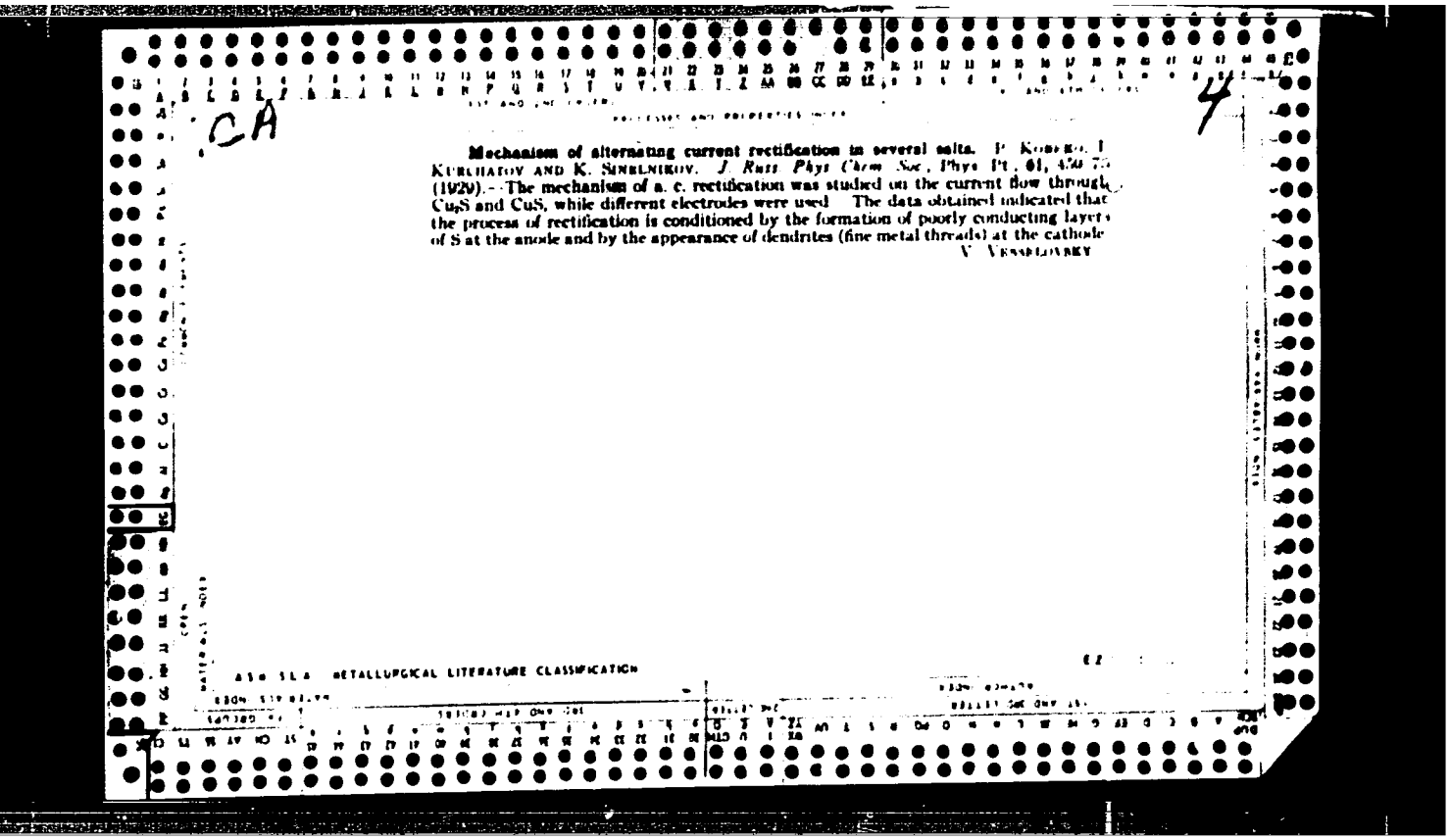
1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Nature of dielectric losses. K. D. [illegible] AND A. F. WALTHER. *Trans. Phys.-Tech. Lab., Leningrad*, No. 8, 72-[illegible](1928).—The study is based on the assumption of identity of dielec. losses with the Joule's heat. Deviations of magnitudes detd. for dielec. losses from those computed for Joule's heat are due to the incorrect method commonly used for the detn. of resistances of dielectrics. This method does not take into consideration the counter e. m. f. of polymerization and therefore the results obtained by the use of it are necessarily wrong. A new method was devised for measurements of dielec. resistances that eliminates the above source of errors completely.

V. VESSELOVSKY

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

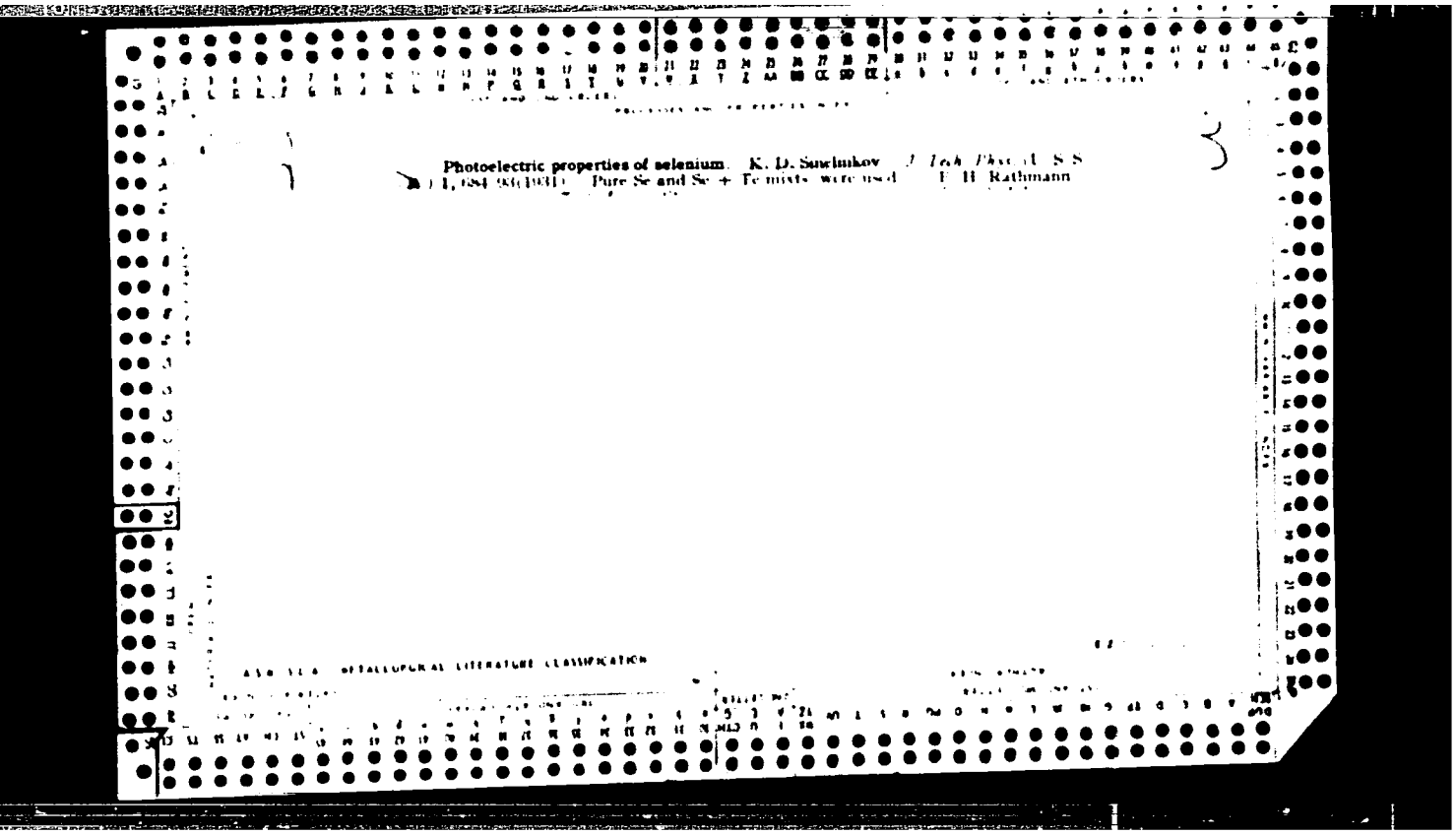


CA

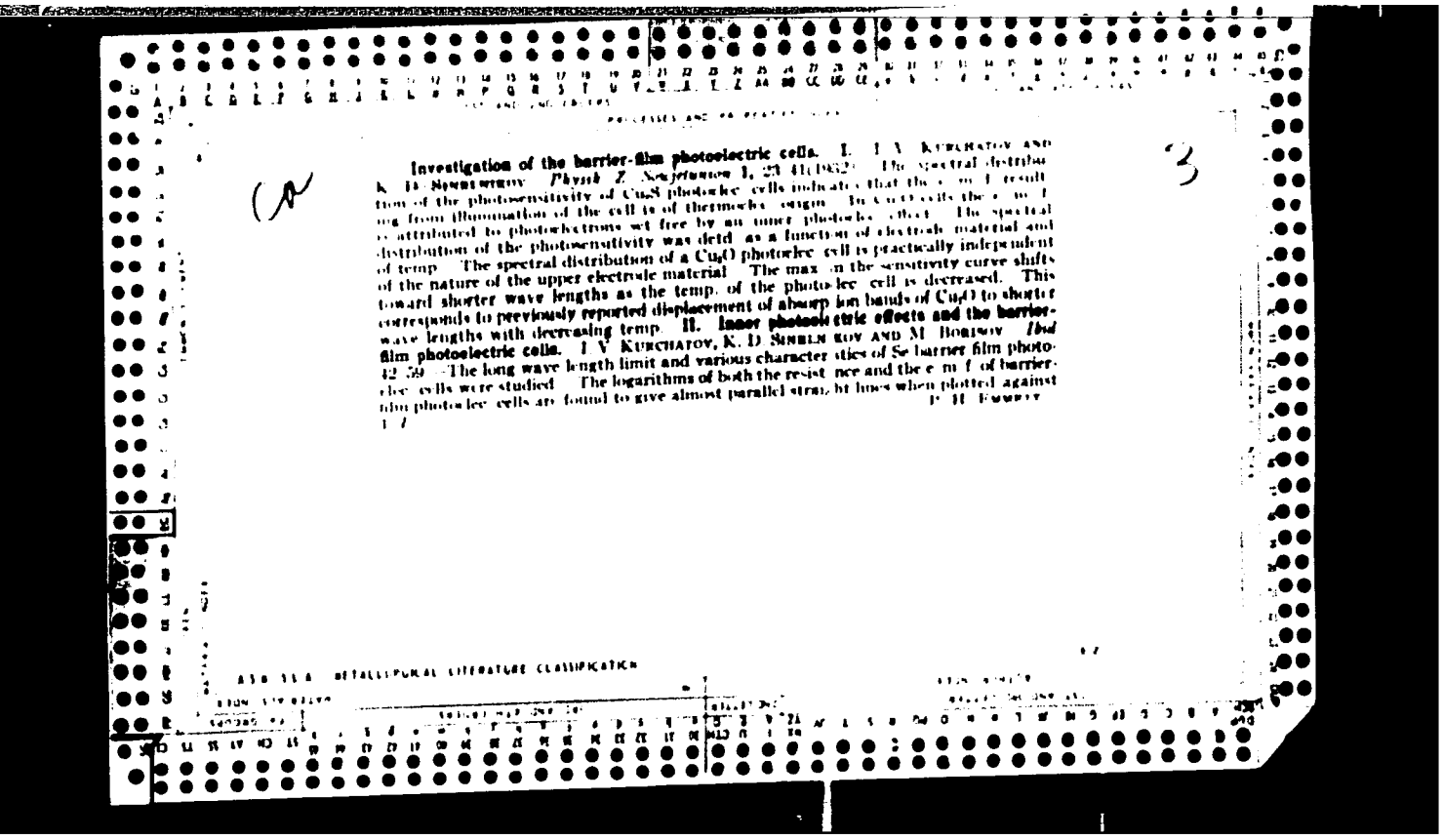
4

Mechanism of alternating current rectification in several salts. P. Kurbatov, I. Kurchatov and K. Sinelnikov. *J. Russ. Phys. Chem. Soc., Phys. Pt.*, 61, 450-7 (1929).—The mechanism of a. c. rectification was studied on the current flow through Cu_2S and CuS, while different electrodes were used. The data obtained indicated that the process of rectification is conditioned by the formation of poorly conducting layers of S at the anode and by the appearance of dendrites (fine metal threads) at the cathode. V. Veselovsky

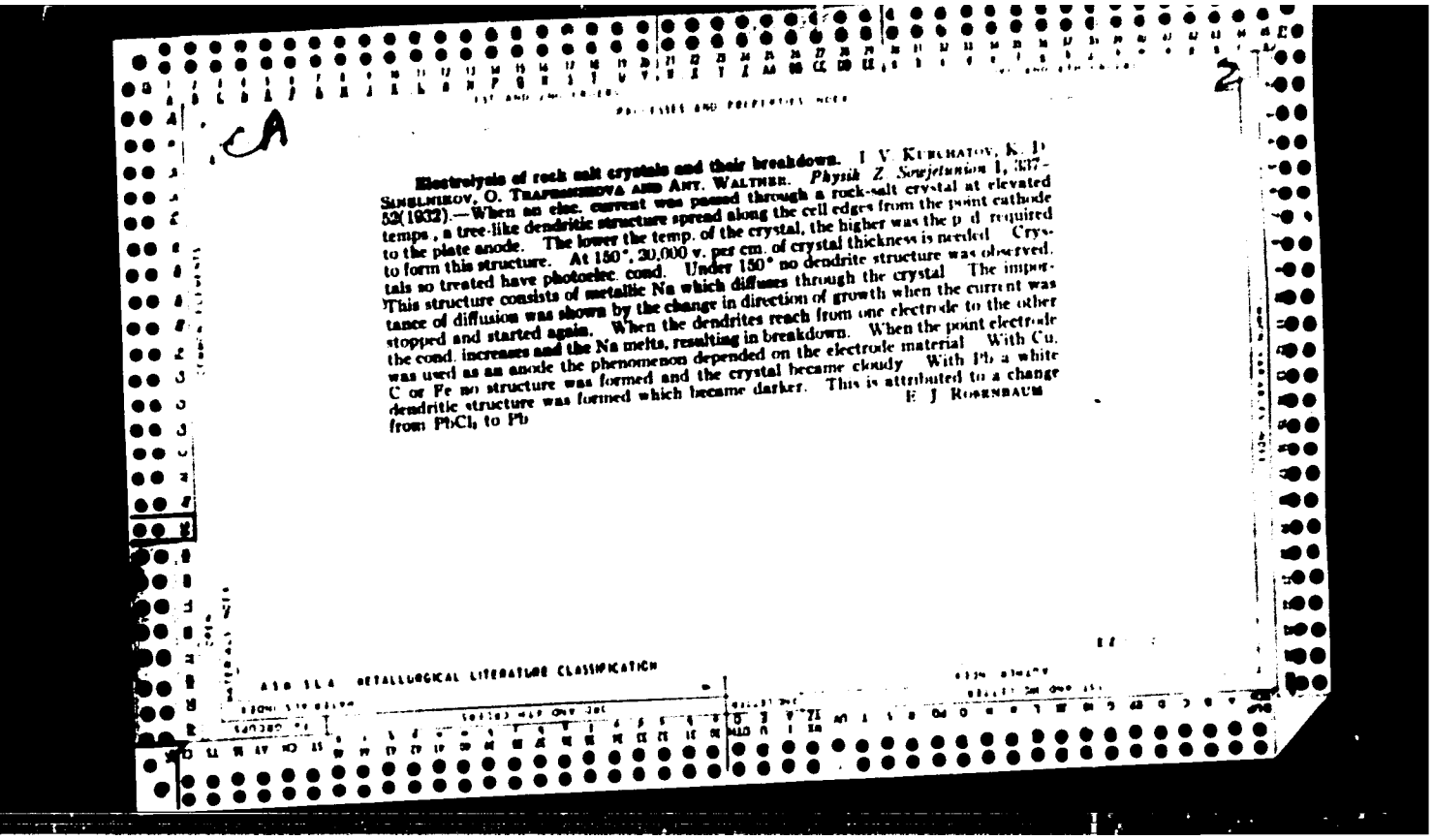
A56 SLA METALLURGICAL LITERATURE CLASSIFICATION



Photoelectric properties of selenium. K. D. Sinelnikov. J. Tech. Phys. (U.S.S.R.) 1, 984-96(1931). Pure Se and Se + Fe mixts. were used. F. H. Rathmann

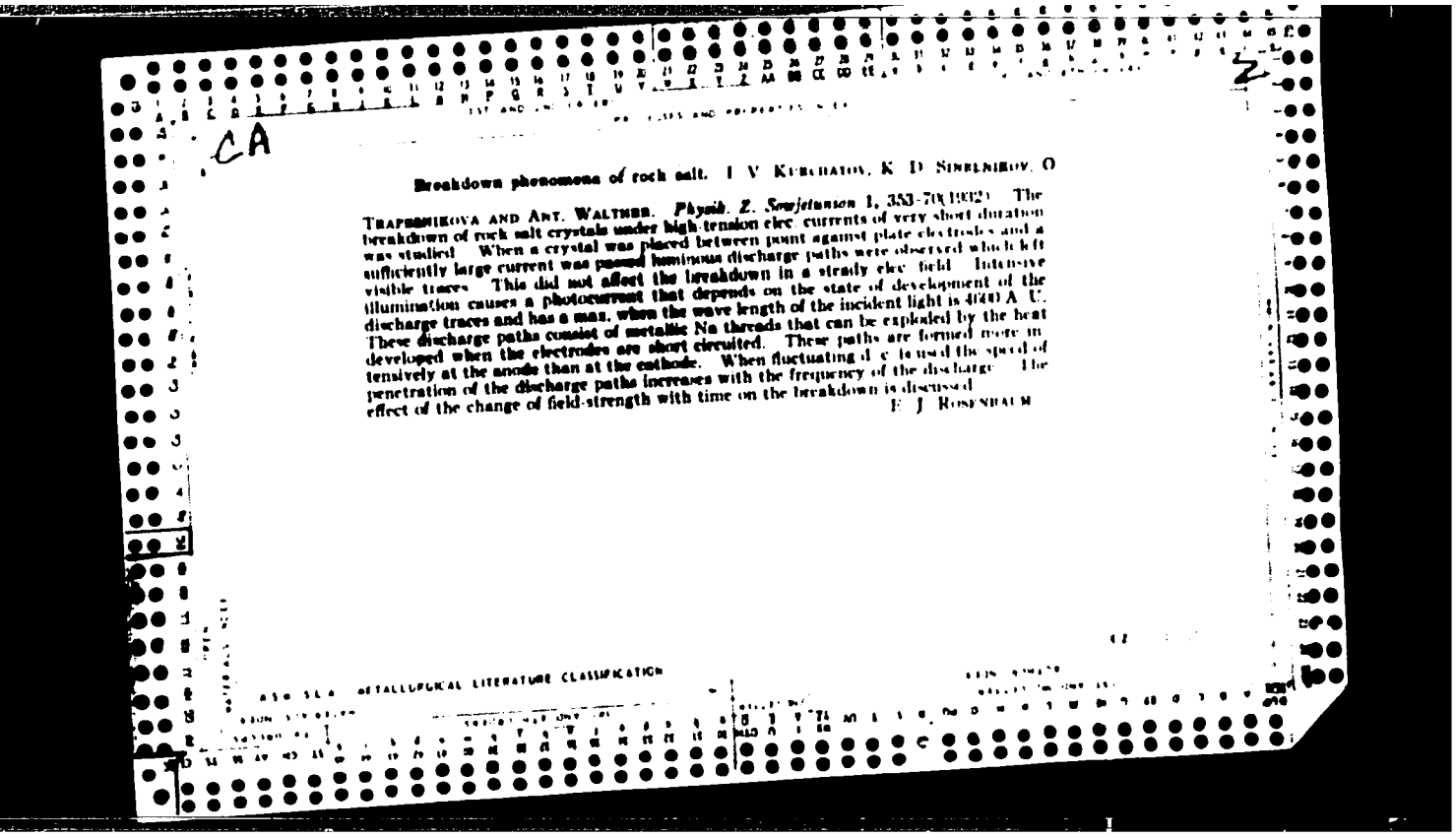


Investigation of the barrier-film photoelectric cells. I. I V KURCHATOV AND K D SINELNIKOV *Physik Z Sowjetunion* 1, 23 41(1932) The spectral distribution of the photosensitivity of Cu_2S photoelec cells indicates that the e m f resulting from illumination of the cell is of thermoelec origin In Cu-O cells the e m f is attributed to photoelectrons set free by an inner photoelec effect The spectral distribution of the photosensitivity was detd as a function of electrode material and of temp The spectral distribution of a Cu_2O photoelec cell is practically independent of the nature of the upper electrode material The max in the sensitivity curve shifts toward shorter wave lengths as the temp of the photoelec cell is decreased This corresponds to previously reported displacement of absorp ion bands of Cu_2O to shorter wave lengths with decreasing temp II. **Inner photoelectric effects and the barrier-film photoelectric cells.** I V KURCHATOV, K D SINELNIKOV AND M BORISOV *Ibid* 42 59 The long wave length limit and various characteristics of Se barrier film photoelec cells were studied The logarithms of both the resistance and the e m f of barrier-film photoelec cells are found to give almost parallel straight lines when plotted against



Electrolysis of rock salt crystals and their breakdown. I. V. KURCHATOV, K. D. SINELNIKOV, O. TRAPESNIKOVA AND ANT. WALTHER. *Physik. Z. Sowjetunion* 1, 537–52(1932).—When an elec. current was passed through a rock-salt crystal at elevated temps., a tree-like dendritic structure spread along the cell edges from the point cathode to the plate anode. The lower the temp. of the crystal, the higher was the p. d. required to form this structure. At 150°, 20,000 v. per cm. of crystal thickness is needed. Crystals so treated have photoelec. cond. Under 150° no dendrite structure was observed. This structure consists of metallic Na which diffuses through the crystal. The importance of diffusion was shown by the change in direction of growth when the current was stopped and started again. When the dendrites reach from one electrode to the other the cond. increases and the Na melts, resulting in breakdown. When the point electrode was used as an anode the phenomenon depended on the electrode material. With Cu, C or Fe no structure was formed and the crystal became cloudy. With Pb a white dendritic structure was formed which became darker. This is attributed to a change from $PbCl_2$ to Pb.

E. J. ROSENBAUM

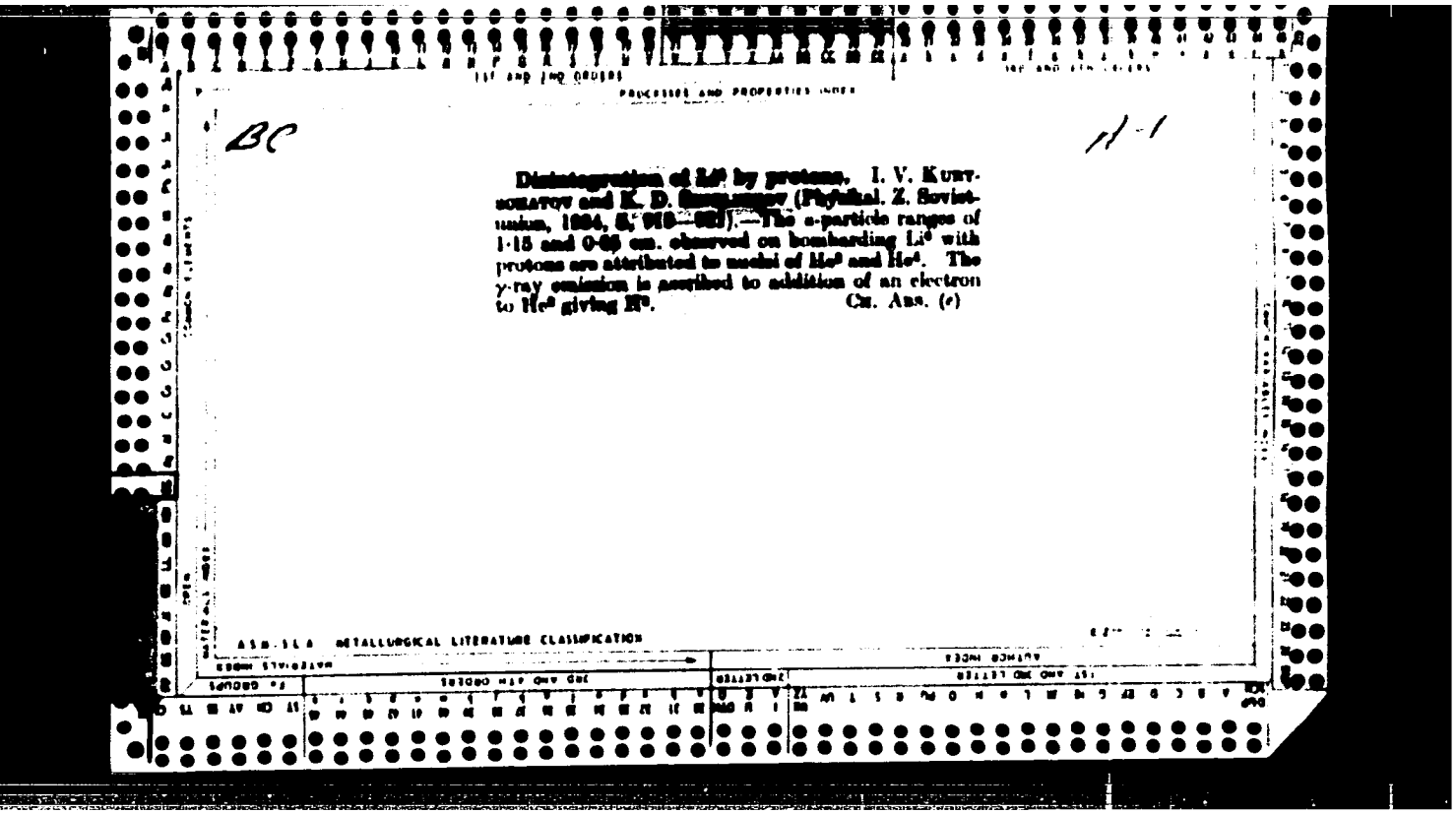


CA

Breakdown phenomena of rock salt. I V KURCHATOV, K D SINELNIKOV, O TRAPEZNIKOVA AND ANT. WALTHER. *Physik. Z. Sowjetunion* 1, 353-70(1932). The breakdown of rock salt crystals under high-tension elec currents of very short duration was studied. When a crystal was placed between point against plate electrodes and a sufficiently large current was passed luminous discharge paths were observed which left visible traces. This did not affect the breakdown in a steady elec field. Intensive illumination causes a photocurrent that depends on the state of development of the discharge traces and has a max. when the wave length of the incident light is 4040 A. U. These discharge paths consist of metallic Na threads that can be exploded by the heat developed when the electrodes are short circuited. These paths are formed more intensively at the anode than at the cathode. When fluctuating d c is used the speed of penetration of the discharge paths increases with the frequency of the discharge. The effect of the change of field-strength with time on the breakdown is discussed.

E. J. ROSENBAUM

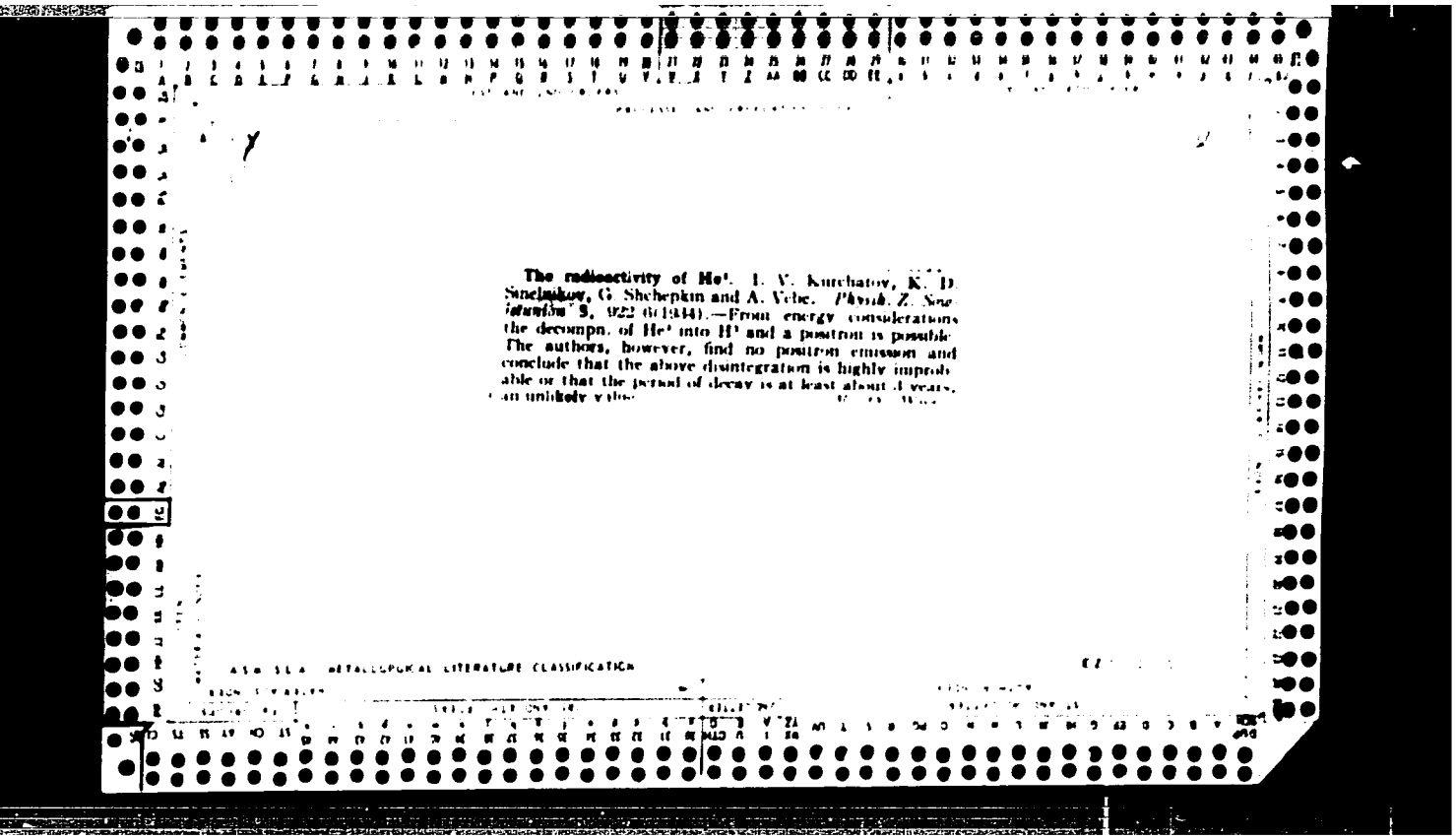
A50 SLA METALLURGICAL LITERATURE CLASSIFICATION



BC

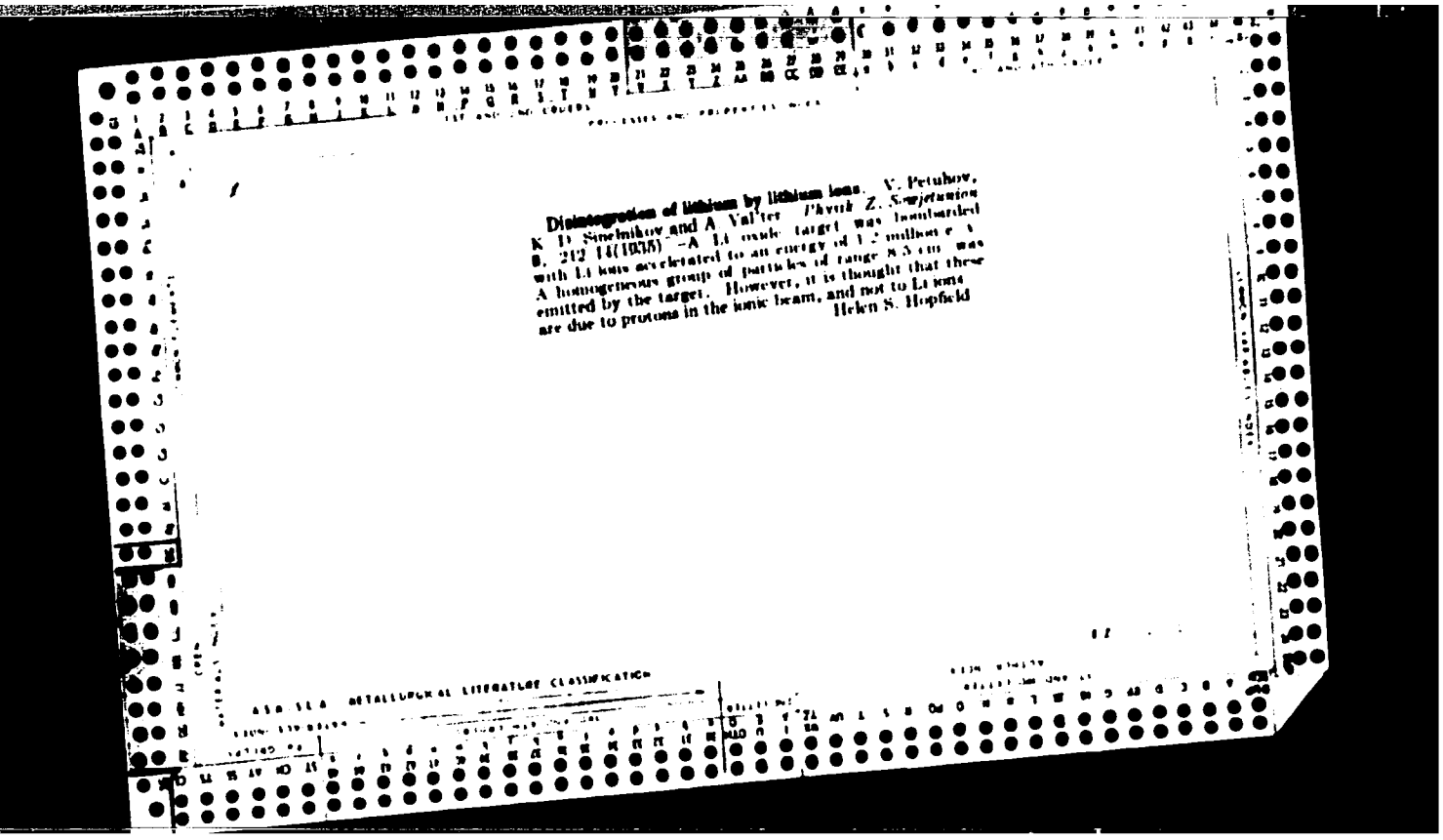
11-1

Disintegration of Li^6 by protons. I. V. Kurchatov and K. D. Sinelnikov (Physikal. Z. Sowjetunion, 1934, 6, 918—923).—The α-particle ranges of 1·15 and 0·65 cm. observed on bombarding Li^6 with protons are attributed to nuclei of He^3 and He^4. The γ-ray emission is ascribed to addition of an electron to He^3 giving H^3. Ch. Abs. (e)

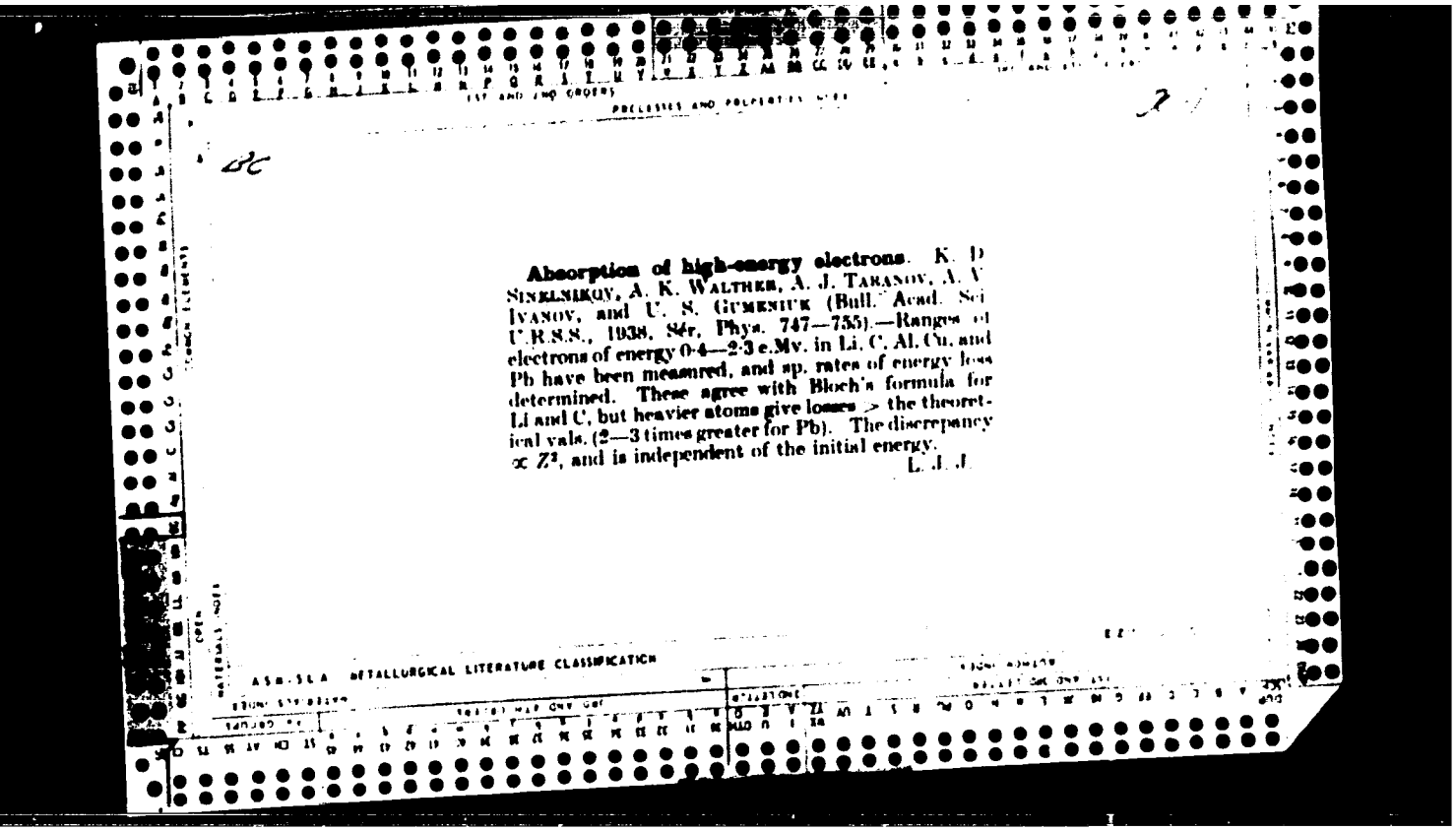


The radioactivity of He^5. I. V. Kurchatov, K. D. Sinelnikow, G. Shchepkin and A. Velic. *Physik. Z. Sowjetunion* **5**, 922 (6/1934).—From energy considerations the decompn. of He^5 into H^3 and a positron is possible. The authors, however, find no positron emission and conclude that the above disintegration is highly improbable or that the period of decay is at least about 1 years.

A S.T.I.A. METALLURGICAL LITERATURE CLASSIFICATION



Disintegration of lithium by lithium ions. K. D. Sinelnikov and A. Val'ter. *Phys. Z. Sowjetunion* 8, 212-14(1935).—A Li oxide target was bombarded with Li ions accelerated to an energy of 1.2 million e. v. A homogeneous group of particles of range 8.5 cm. was emitted by the target. However, it is thought that these are due to protons in the ionic beam, and not to Li ions.
Helen S. Hopfield



Absorption of high-energy electrons. K. D. SINELNIKOV, A. K. WALTHER, A. J. TARASOV, A. V. IVANOV, and U. S. GUMENIUK (Bull. Acad. Sci. U.R.S.S., 1938, Sér. Phys. 747—755).—Ranges of electrons of energy 0·4—2·3 e.Mv. in Li, C, Al, Cu, and Pb have been measured, and sp. rates of energy loss determined. These agree with Bloch's formula for Li and C, but heavier atoms give losses > the theoretical vals. (2—3 times greater for Pb). The discrepancy $\propto Z^2$, and is independent of the initial energy.

L. J. J.

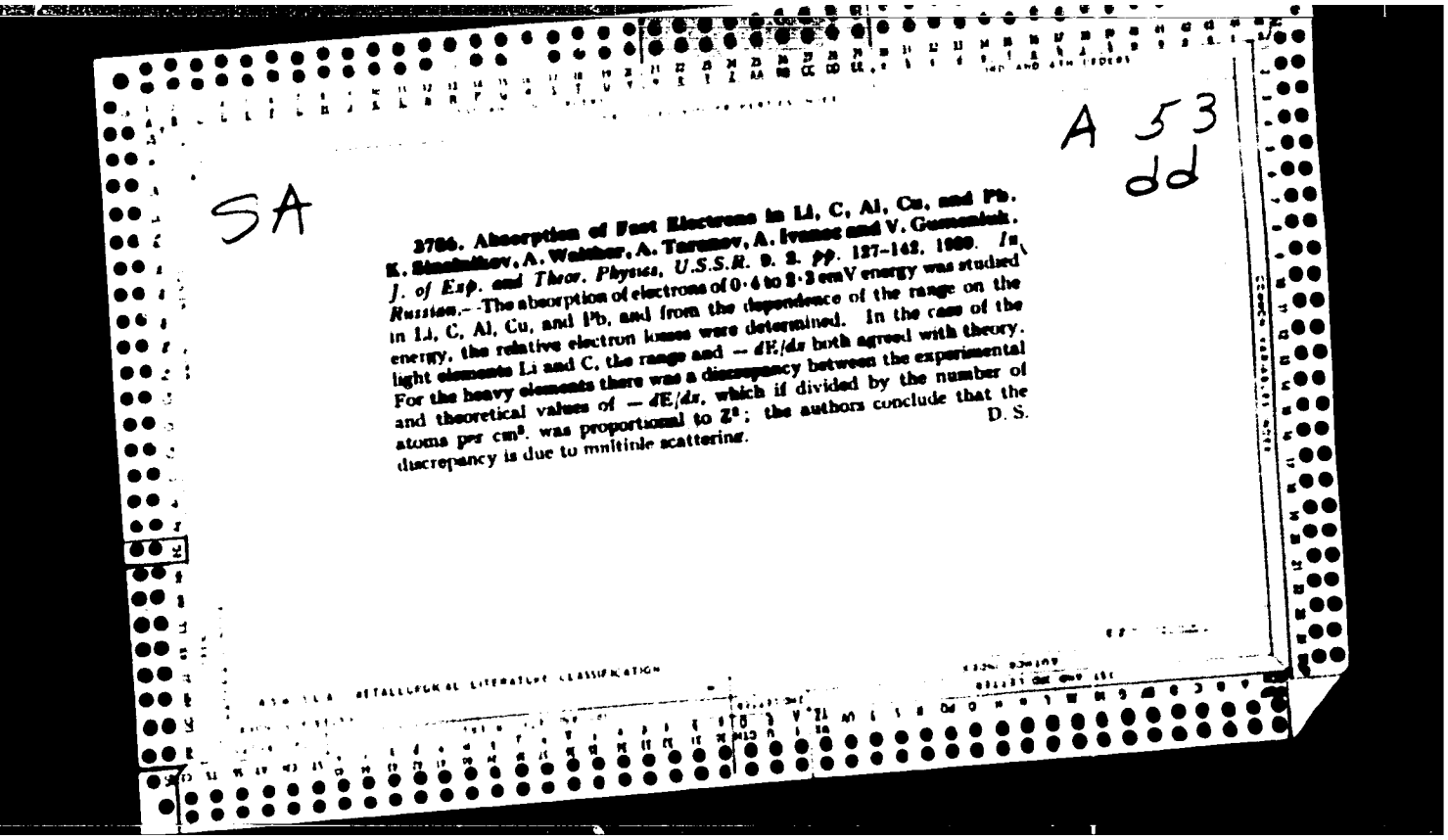
PROCESSES AND PROPERTIES INDEX

Some devices of vacuum technique K. D. Sinel'nikov, A. K. Val'ter, V. S. Gumenyuk and A. Ya. Tarasov. *J. Tech. Phys.* (U. S. S. R.) 8, 1808-22(1938). A vacuum app. contg. almost no glass is described and the advantages of metal are pointed out. Advice is given for detg. the rate of pumping, for cooling, for building of automatic control app. which indicates leakages, insufficient water pressure, etc., for constructing valves and joints, etc. J. J. B[illegible]man

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

SINEL'NIKOV, K. D.

Threshold value of the photoelectric disintegration of beryllium. K. D. Sinel'nikov, A. K. Val'ter, V. S. Gumenyuk and A. F. Tulinov. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 8, 1229–33(1938); *Bull. acad. sci. U. R. S. S., Classe sci. math. nat., Sér. phys.* 1938, 781–4.— Fast electrons obtained by acceleration in a discharge tube fed by an electrostatic generator were used to produce x-rays with which the limit of the nuclear photoeffect was detd. The limiting energy was found to be 1.760 ± 0.015 m. e. v. The authors believe that the Bethe-Peierls theory for the deuterium photoeffect is not applicable to the photon disintegration of Be. F. H. Rathmann



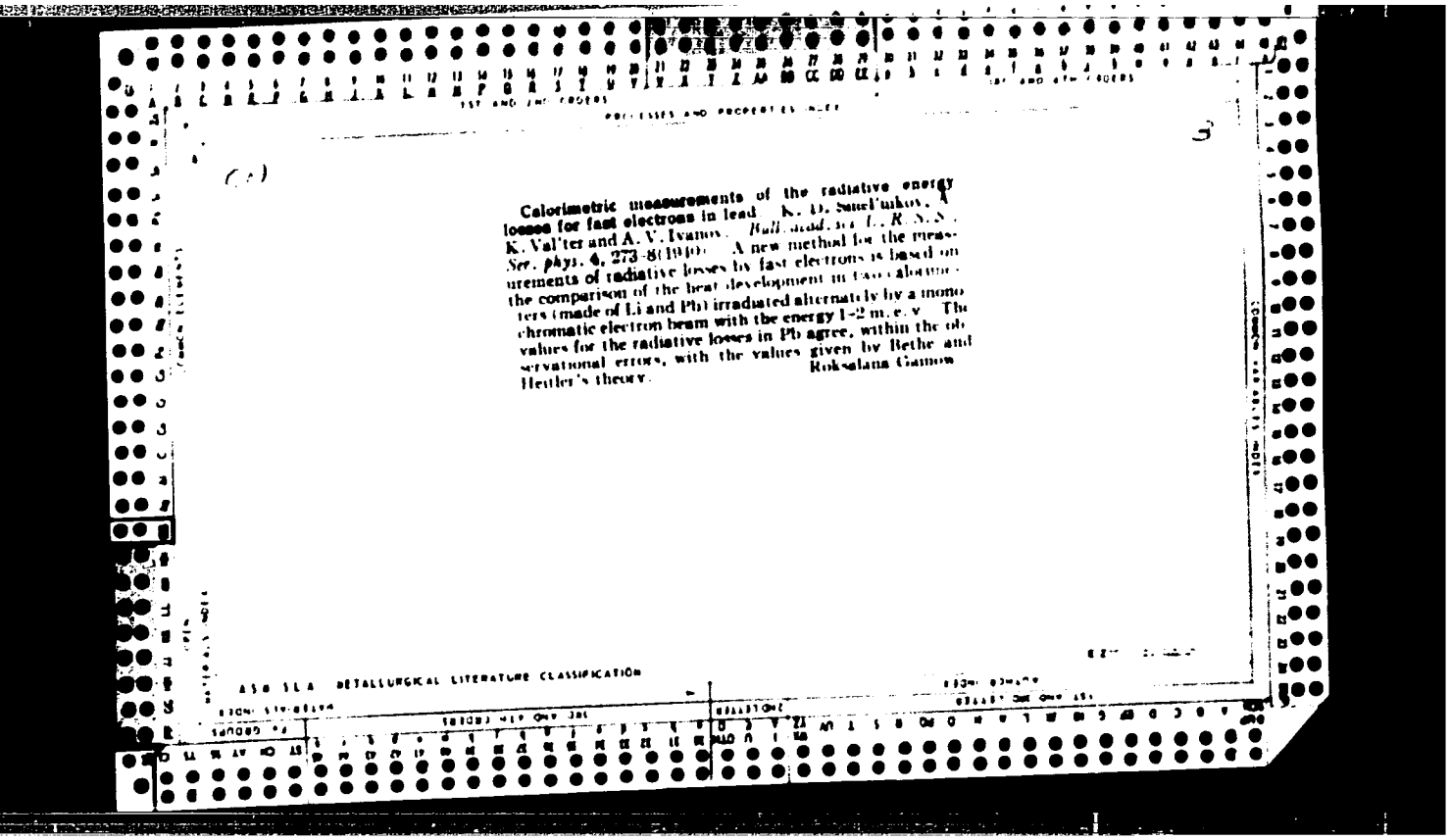
SA

A 53
dd

3786. **Absorption of Fast Electrons in Li, C, Al, Cu, and Pb.** K. Sinelnikov, A. Walther, A. Taranov, A. Ivanov and V. Gammelnik. *J. of Exp. and Theor. Physics, U.S.S.R.* 9. 2. pp. 127–142. 1939. /n Russian.—The absorption of electrons of 0·4 to 2·3 emV energy was studied in Li, C, Al, Cu, and Pb, and from the dependence of the range on the energy, the relative electron losses were determined. In the case of the light elements Li and C, the range and $-dE/dx$ both agreed with theory. For the heavy elements there was a discrepancy between the experimental and theoretical values of $-dE/dx$, which if divided by the number of atoms per cm³, was proportional to Z^2; the authors conclude that the discrepancy is due to multiple scattering. D. S.

SINEL'NIKOV, K. D.

"Concerning the optimum shape of conductors of electrostatic generators," Iz. ak. Nauk, SSSR, Ser. Fiz., 4, No 2, 1940. High-Voltage Laboratory, Ukrainian Physico-Technical Insitute, Kharkov, -1940-.



(c)

3

Calorimetric measurements of the radiative energy losses for fast electrons in lead. K. D. Sinel'nikov, K. Val'ter and A. V. Ivanov. *Bull. acad. sci. U.R.S.S., Ser. phys.* 4, 273-81(1940). A new method for the measurements of radiative losses by fast electrons is based on the comparison of the heat development in two calorimeters (made of Li and Pb) irradiated alternately by a monochromatic electron beam with the energy 1-2 m.e.v. The values for the radiative losses in Pb agree, within the observational errors, with the values given by Bethe and Heitler's theory. Roksolana Gamow

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

[illegible], [illegible], [illegible], [illegible], [illegible], [illegible] ABRAMOVICH, [illegible]

"Investigation of the Radiational Losses [illegible] [illegible] Ztr. [illegible] Teor. Fiz. 1941, Vol. 11, No 1, pp 43-59.
Khar'kov Fiziko-T khnicheskoi Institut USSR

PROCESSES AND PROPERTIES INDEX

C A

1

Fractionating vacuum pumps. K. D. Sinel'nikov, A. K. Val'ter, D. N. Ulesko and A. N. Yamnitskii. *J. Tech. Phys.* (U. S. S. R.) 11, 879-92(1941).—A crit discussion of the principle of the self-fractionating vacuum oil pumps. The problems involved in design and construction of such pumps are presented in detail. Constructional details of the following types of pumps are given: three-stage glass pump of small capacity, three-stage metal pump of 100 l./sec., three-stage metal pump of 40 l./sec. of 90 l./sec., three-stage air-cooled metal pump of 40 l./sec capacity, two-stage air-cooled metal pump of 40 l./sec capacity and a similar one with water cooling, and a single-stage metal pump with 8 l./sec. capacity. Numerous expts. are given in which the effect of fore-vacuum on pumping speed, the purity of oil on pumping speed and the boiler temp. on pumping speed are illustrated for the self-fractionating oil pumps. Illustrations of the pumps described are given in sectional views. O. M. Kondajuff

Pressure drop in the flow of compressible fluids. Walter E. Lobo, Leo Friend and G. T. Skaperdas. *Ind. Eng. Chem.* 34, 821-3(1942).—Pressure drop due to kinetic-energy changes and friction for isothermal flow of compressible fluids in conduits of uniform cross section can be calcd. by means of an integrated formula and a chart based on the Bernoulli and Fanning equations. Accuracy of the method is limited only by small variations in viscosity and friction factor. The method is compared with others and the relative importance of kinetic-energy changes indicated. K. M. Schoenborn

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

SINEL'NIKOV, K. D.
HALKIN, O.O.; SYNEL'NYKOV, K.D., diysnyy chlen.

Superconductors with frequency of $3.5--4.5 \cdot 10^{10}$ hertz. Dop.AN UHSR no.6:453-454 '52. (MLRA 6:10)

1. Akademiya nauk Ukrayins'koyi RSR (for Synel'nykov). 2. Fizyko-tekhnichnyy instytut Akademiyi nauk Ukrayins'koyi RSR (for Halkin).
(Electric conductivity)

1. SHELUKHOV, K.
2. USSR (600)
4. Telegraph lines
7. Broader introduction of the Lomin method among linemen in all branches of communication work, Sov. sviaz., 3, No. 4, 1953.

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

Sinel'nikov, K.D.

K

USSR / Optics

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10340

Author : Sinel'nikov, K.D., Shklyarevskiy, I.N., Skorobogatov, B.S.
Inst : Not Given
Title : Determination of the Optical Constants of Germanium.

Orig Pub: Uch. zap. Kharkovsk. un-ta, 1955, 6, 135-140

Abstract: The index of refraction μ of thin germanium films was measured by the germanium-wedge method, coated in vacuum on glass or on silver. The average value μ in the given region of the wedge thickness was obtained from the equation $\mu = \lambda / 4 (t_{k\,min} - t_{k\,max})$ where $t_{k\,min}$ and $t_{k\,max}$ are the thicknesses of the germanium wedge in the locations of the k'th interference minimum and maximum for a given wavelength. For λ = 590 mμ the value of μ is independent of t all the way up to t on the order of 4 x 10^{-6} cm and equals 3.6 This shows that the structure of the films does not change with thickness. For λ = 690 and 550 mμ, the value of μ is 4.1 and 3.9

Card : 1/2

K

USSR / Optics

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10340

Author : Sinel'nikov, K.D., Shklyarerskiy, I.N., Skorobogatov, B.S.

respectively, and the coefficient of absorption $\mu\chi$ of thick germanium films that are opaque to visible light was determined from measurements of the coefficient of reflection (Avery, D G., Proceedings Physical Society, 1952, B65, 425). For λ = 650, 600 and 550 mμ the value of μ is 3.7, 3.5 and 3.4 while $\mu\chi$ is 1.8, 2.1, and 2.3. In the region from 400 to 1100 mμ the value of $\mu\chi$ was determined from the measurements of the coefficient of transmission, the results are in good agreement with data obtained by the methods described above, and with data by other investigators. For λ = 300 and 500 mμ the values of $\mu\chi$ are independent of the temperature in the range from 20 to 250°, and for λ = 700 to 1100 mμ, there is a linear increase of $\mu\chi$ with the temperature.

Card : 2/2

9 (3) SOV/112-57-5-10953

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1957, Nr 5, pp 199-200 (USSR)

AUTHOR: Sinel'nikov, K. D., Berkhoyer, L. D.

TITLE: Principal Features of the Phenomenon of the Increased Positive Thermionic Emission From Metals in the Presence of Halogens (Ob osnovnykh kharakteristikakh yavleniya uvelicheniya polozhitel'noy termoionnoy emissii metallov v prisutstvii galoidov)

PERIODICAL: Uch. zap. Khar'k. un-t, 1955, Vol 64, pp 103-115

ABSTRACT: Emission of positive ions from an incandescent-metal surface in air and also in the presence of halogens has been studied. Preliminary experiments have established that the nature of the metal and halogen compound has no effect on the qualitative aspect of the phenomenon. Therefore, the investigation has been conducted with one pair only, Ni -- CCl_4. A description is given of the device and the electric connection diagram that permitted

Card 1/3

Principal Features of the Phenomenon of the Increased Positive Thermionic . . . .

determining the ionic current from electrically-heated Ni-tubing with a surface of about 2 cm^2, the current flowing to a Ni cylindrical collector. The device construction permits blowing air through it, adding CCl_4, and exhausting. With emitter heated up to 400°C, a positive thermionic emission 10^{-12} amp. can be observed in the air. The current grows rapidly with the increase in temperature obeying the formula of the type $i = i_o e^{-\lambda/T}$ up to 700°C. Later, the emission droops increasingly rapidly with temperature. Introduction of a small amount of CCl_4 considerably increases the positive-ion emission. After blowing pure air through the device, the emission current does not return to its initial value but exceeds it by an amount depending on CCl_4 concentration. This effect is most pronounced with a fresh surface never previously treated with halogen. Quantitative influence of CCl_4 concentration, temperature, applied voltage, and time period upon the positive thermionic emission has been investigated. The interaction of the hot Ni surface and CCl_4 results in

Principal Features of the Phenomenon of the Increased Positive Thermionic . . . .

the formation of a blooming, on the bulb walls, whose composition found by an analysis corresponds to $NiCl_2$. X-ray diffraction study of the surface film revealed the formation of $NiCl_2 \cdot 2H_2O$ of a few microns thickness. To find out what part the air has taken in the chemical processes, the effect of air pressure on the thermionic current has been studied. It has been found that within 760-5 mm of mercury column, the surplus current depends only on the amount of CCl_4; however, with a further decrease in air pressure the effect becomes weaker. In the absence of air, the effect of CCl_4 on the thermionic emission is very little (1.5-2 times) as compared with the effect of CCl_4 mixed with air (10 times and more). Thus, not only the metal-and-halogen combination is responsible for the increase in thermionic current; the mechanism of this phenomenon could be determined only from the composition of the positive ionic current that could be most conveniently determined by a mass-spectroscopic analysis.

Ye.S.S.

137-58-1-1529

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 203 (USSR)

AUTHORS: Sinel'nikov, K. D., Berkhoyer, L. D.

TITLE: Mass-spectrometric Study of the Duration of Thermionic Emission by Nickel in the Presence of Carbon Tetrachloride Vapors (Mass-spektrometricheskoye izucheniye polozhitel'noy termoionnoy emissii nikelya v prisutstvii parov chetyrekhkhloristogo ugleroda)

PERIODICAL: Uch. zap. Khar'kovsk. un-t, 1955, Vol 64, pp 117-123

ABSTRACT: Mass-spectrometric analysis of the positive ion flux emitted by red-hot Ni (RzhMet 1958, Nr 1, abstract 1528) was performed with a special magnetic mass spectrometer permitting analysis of ions with masses ranging to 200 mass units. In an air atmosphere the ionic flux consisted chiefly of K and Na ions, and, to a considerably smaller extent, of ions of other alkali metals. When CCl_4 vapors are introduced into the emitter chamber, the emission of K^+ and Na^+ diminished, and a maximum appeared corresponding to mass 32. The latter is identified with O_2^+ ions. In addition, ions of mass 18, considered to be H_2O^+, appeared in considerable numbers, and sometimes the C^+, N^+, CN^+ ions

Card 1/2

Mass-spectrometric Study (cont.)

and various other combinations of C, N and perhaps O and H were present. It is held that the emitting surface is a layer of $NiCl_2$ on a Ni backing, in which atomic Cl, O, and other elements have been absorbed. As a result of reaction between O_2 and Cl, formation of O_2^+ and Cl^- occurs. After conversion of all the Cl atoms to Cl^-, further formation of O_2^+ ceases. This state corresponds to the "poisoning" of the emitting surface. If the $NiCl_2$ layer is thin, the ionization process may continue, thanks to the neutralization of Cl^- by the metallic backing. This explains the fact that the effect is highly sensitive to small amounts of halides.

I. D.

1. Nickel---Ion emission 2. Carbon tetrachloride---Applications

Card 2/2

USSR/Fitting Out of Laboratories - Instruments, Their Theory, Construction, and Use, H

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61950

Author: Sinel'nikov, K. D., Nikishova, G. D.

Institution: None

Title: Use of Wedge Interferometer as an Interference Monochromator

Original Periodical: Uch. zap. Khar'kovsk. un-ta, 1955, 64, 125-126

Abstract: Description of a method of utilizing a wedge interferometer with multiple layer dielectric coatings for the segregation of individual components of ultrafine structure of complex spectrum lines. Individual components are segregated by slits formed by foil strips which are cemented to the wedge of the interferometer. The low illuminating power of a wedge interferometer renders this method suitable for use with sources of high luminosity.

Card 1/1

SINEL'NIKOV, K.D.; SHKLYAREVSKIY, I.N.; KENR, E.A.

Interference of light in thin silver foils. Uch.zap. KHGU 64 no.6:127-134 '55. (MLRA 10:7)
(Interference (Light)) (Metallic films--Optical properties)

SINEL'NIKOV, K.D.; SHKLYAREVSKIY, I.N.; SKOROBOGATOV, B.S.

Determination of the optical constants of germanium. Uch.zap. KHGU 64 no.6:135-140 '55. (MLRA 10:7)
(Germanium--Optical properties)

SINEL'NIKOV, K. D.

K-5

USSR/Optics - Physical Optics.

Abs Jour : Referat Zhur - Fizika, No 3, 1957, 7698

Author : Sinel'nikov, K.D., Shklyarevskiy, T.N., Lupa[illegible] Ye.A.

Title : Optical Properties of Intermetallic Compounds. Zinc-Antimony Compound.

Orig Pub : Uch. zap. Khar'kovsk. un-ta, 1955, 64, 141-144

Abstract : The antimonoid of zinc (I) was obtained with S.A. Vekshinskiy's method by simultaneous sublimation of zinc and antimony on glass in vacuum. A portion of the complex film corresponding to I was obtained by measuring the specific conductivity, which for I is 2.5×10^{-3} $ohm^{-1} cm^{-1}$. Such portions have an increased transparency T and at thicknesses t $>$ 1,000 A they have a brown hue in transmitted light. The dependence of T on λ was measured with the SF-4 spectrophotometer in the 350 -- 1100 $m\mu$ region in a large number of films of different t, and the absorption coefficient $\mu\chi$ was calculated

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from the equation $\mu\chi = \lambda \ln (T_1/T_2) / 4\pi (t_2 - t_1)$. Films were selected with such value of t as [illegible] light interference [illegible] to assume [illegible] coefficient of reflection of the various films to be the same. The curve $\mu\chi = f(\lambda)$ increases rapidly towards the shorter waves, indicating the presence of an absorption band in the ultraviolet region of the spectrum. The optical density in the region of 400 -- 1,000 $m\mu$ is independent of the temperature in the range from 20 -- 100°.

Card 2/2

OMEL'YANOVSKIY, M.E., otvetstvennyy redaktor; SINEL'NIKOV, K.D., redaktor; LIFSHITS, I.M., redaktor; OSTRYANIN, D.F., doktor filosofskikh nauk, redaktor; PASECHNIK, M.V., kandidat fiziko-matematicheskikh nauk, redaktor; SHUGAYLIN, A.V., kandidat filosofskikh nauk, redaktor; AGUF, M.A., redaktor izdatel'stva; SIVACHENKO, Ye.K., tekhnicheskiy redaktor

[Philosophical problems in modern physics] Filosofskie voprosy sovremennoi fiziki. Kiev, 1956. 250 p. (MLRA 10:1)

1. Akademiya nauk URSR, Kiyev. 2. Deystvitel'nyy chlen AN USSR (for Omel'yanovskiy, Sinel'nikov) 3. Chlen-korrespondent AN USSR (for Lifshits)

(Physics--Philosophy)

[redacted]

[illegible] of the Linear and Cyclical Methods
of Acceleration

[illegible]-Symposium on High Energy Accelerators and Pion
Physics

Geneva 11-13 June 56
M Branch [illegible]

VEKSLER, V.I.; YEFREMOV, D.V.; MINTS, A.L.; VEYSBEYN, M.M.; VODOP'YANOV, F.A.; GASHEV, M.A.; ZEYDLITS, A.I.; IVANOV, P.P.; KOLOMENSKIY, A.A.; KOMAR, Ye.G.; MALYSHEV, I.F.; MOMOSZON, M.A.; NEVYAZHSKIY, I.Kh.; PETUKHOV, V.A.; RABINOVICH, M.S.; GUBCHINSKIY, S.M.; SILNEL'NIKOV, K.D.; STOLOV, A.M.

Ten Bev energy synchrocyclotron built by the Academy of Sciences of the U.S.S.R. Atom.energ. no.4:22-30 '56. (MLRA 9:12)
(Cyclotron)

USSR/Optics - Physical-Optics, K-5

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35731

Author: Sinel'nikov, K. D., Shklyarevskiy, I. N., Vlasenko, N. A.

Institution: None

Title: Optical Characteristics of Complex Interference Light-Filters

Original Periodical: Zh. tekhn. fiziki, 1956, 26, No 1, 96-101

Abstract: For the green region of the spectrum, complex interference light filters were prepared, consisting of 3 reflecting layers and 2 dielectric layers between them. The dielectric used was barium fluoride, and the reflecting layers were silver. In some cases the third reflecting layer was a multilayer dielectric coating. The optical characteristics of such light filters were investigated using a matching method previously proposed (Uch. zap. Khar'kovsk. gos. un-ta., Tr. fiz. otd., 1955, 6, 147). The transmission band was recorded with a DFS-4 spectrometer with a diffraction grating, having 600 lines/mm. It was shown that the transmission band of

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USSR/Optics - Physical Optics, K-5

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35731

Abstract: complex light filters is 5-10 times narrower than in simple interference filters (30-100 A instead of 200-400 A), and the transparency is 1.5-2 times better (30-60% instead of 20-30%). The use of a multilayer dielectric coating instead of a silver reflecting layer improves the quality of the filters. Further improvement in the optical characteristics lies along the path of replacing of all the silver layers with multiple-layer dielectric coatings.

Card 2/2

SINEL'NIKOV, K.D.

CARD 1 / 2 PA - 1779

SUBJECT USSR / PHYSICS
AUTHOR ESEL'SON,V.N., LAZAREV,B.G., SINEL'NIKOV,K.D., ŠVEC,A.B.
TITLE On Some Peculiarities of Rotating He II.
PERIODICAL Žurn.eksp.i teor.fis,31,fasc.5,912-912 (1956)
Issued: 1 / 1957

At first several previous works dealing with this topic are cited. An experimental confirmation of the dependence of the inertia moment of rotating He II on velocity and an estimation of relaxation time would be most desirable. This problem could be solved by studying the damping of the rotation of a glass with He II which is the nearest approach to the continuous equilibrium between the normal and the supraconductive component. As relaxation time was not known, the rotating system had to have a sufficiently low damping. For this purpose a plexiglass vessel was suspended in a magnetic field which warranted rotation of the vessel for several hours after an initial velocity of several revolutions per second had been imparted to it. The vessel (R = 1,5 cm) contained about 300 light aluminium disks which were arranged at a shorter distance than the depth of penetration of the viscous wave. With the help of a rotating magnetic field the rotation velocity of the vessel containing the He II was brought up to the assumed value, after which the field was switched off. Under these conditions only the normal component of the He II could at first be taken away with the disks, but with its supraliquid component this was possible only after relaxation time. If relaxation time exceeds the time of screwing-out (?), it was obvious that, with a growing distance of the supraliquid component, a considerable (about 25%) was to be expected, which would mean a modification of rotation velocity.

However, the investigation of the damping of the rotating vessel containing the He II showed no noticeable change of velocity, which is illustrated by an attached diagram for the dependence of rotation [illegible] T = 1,5° K for a duration of screwing out (?) of 10, and for 2 seconds. The same tests make it possible to determine the dependence of the inertial moment of He II on rotation velocity. It was found that at velocities of more than 0,5 rotation per second there is no such dependence.

Thus, the lack of the extraction of the supraconductive component on the occasion of experiments with an oscillating stack of disks when small amplitudes are used can by no means be explained by too long a relaxation time. Hitherto, the problem of the dependence of relaxation time on velocity has not yet been solved. The authors' attention was drawn to this fact by L.D.LANDAU.

INSTITUTION: Physical-Technical Institute of the Academy of Science of the Ukrainian SSR.

51-4-20/25

AUTHORS: Sinel'nikov, K.D., Shklyarevskiy, I.N. and Vlasenko, N.A.

TITLE: Complex interference optical filters with improved characteristics. (Slozhnyye interferentsionnyye svetofil'try s uluchshennymi kharakteristikami).

PERIODICAL: "Optika i Spektroskopiya" (Optics and Spectroscopy) 1957, Vol.2, No.4, pp.534-536 (U.S.S.R.)

ABSTRACT: This note describes construction of several types of optical filters and is the continuation of earlier work by Sinel'nikov et al. (Uchenye zapiski Kharkovskogo gosudarstvennogo Universiteta, Trudy fizicheskogo otdeleniya, Vol.6, 147, 1955; Zh. tekh. Fiz., Vol.26, 96, 1956). $M_1D_1M_2D_2M_3$ filters (M's are reflecting layers and D's dielectric layers) were prepared as follows: to an $M_1D_1M_2$ filter (D_1 of barium fluoride) an M_3 layer in the form of a glass plate was attached and D_2 was a wedge-shaped layer of air between M_2 and M_3. The filter was made "consistent" by illumination with white light, observation of the resulting interference pattern via a spectroscope and appropriate adjustment of D_2. No numerical values of the characteristics are given. $M_1D_1M_2D_2M_2D_1M_1$ filters, with D_1 of barium fluoride and D_2 a layer of air, similar to those of A.Hermansen (Nature, 174, 218, 1954) were prepared. With reflection coefficients R_1 = 83% and

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Complex interference optical filters with improved characteristics. (Cont.)

R_2 = 93% for M_1 and M_2 respectively, an overall transmission of 30% was obtained with a pass band (centred on 5000 Å) of only 45 Å and "contrast" of about 10^5. A method of preparation of filters, similar to that for Fabry-Perot etalons, is also described. Two high-quality glass flats were covered with the usual layers (silver and barium fluoride) by vacuum evaporation; they were the $M_1D_1M_2$ systems. A wedge-shaped layer of air D_2 was left between the two plates. Light from a monochromator (of wavelength of the maximum of the filter pass-band) was made parallel by means of a lens focussed on the exit slit of the monochromator. This light was directed on to the filter. When D_2 was wedge-shaped hundreds of interference lines were visible. When the two surfaces M_2 became parallel the lines disappeared and the illumination became uniform. Then, keeping the plates parallel, they were adjusted by screws to give maximum uniform illumination ("consistent state). There are 1 table and 6 references (4 of which are Slavic.)

ASSOCIATION: Kharkov State University.(Khar'kovskiy Gosudarstvennyy Universitet.
SUBMITTED: September 15,1956.
AVAILABLE: Library of Congress

51-5-16/26

AUTHORS: Sinel'nikov, K.D., Shklyarevskiy, I.N. and Vlasenko, N.A.

TITLE: Double Refraction of Fluoride Films. (Dvoynoye Lucheprelomleniye plenok ftoridov)

PERIODICAL: Optika i Spektroskopiya,1957, Vol.2, Nr 5, pp.651-657 (USSR)

ABSTRACT: Studies of films obtained by vacuum deposition show that they consist of microcrystallites separated by pores. Both the form and the orientation of these microcrystallites depend on the nature of the substance, thickness of the film and the conditions at deposition (speed of evaporation, pressure in the vacuum system, temperature and nature of the base, direction of the evaporated beam). It is known that a substance consisting of correctly oriented isotropic particles of a refractive index μ_1 and with the pores filled by a medium with a refractive index μ_2 is anisotropic if at least one of the particle dimensions and the distances between them is small compared with the wavelength of light. Double refraction produced in such circumstances is called the double refraction of form. The optical properties of such a body are determined by the refractive indices of its component parts and by the relative volumes of these parts.

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Double refraction of fluoride films. 51-5-16/26

The absolute size of the particles, so long as it is smaller than light wavelength, is not important. For many substances the dimensions of microcrystallites and the distances between them are considerably smaller than visible light wavelength, and therefore in that region one would expect anisotropy of the film. Double refraction was, in fact, found by the authors in films of CaF_2, BaF_2, LiF, PbS, V_2O_5 and other substances obtained by deposition on a glass base in vacuum. On introducing such a film between two crossed nicols one can observe fairly strong transmission in the field of vision. This transmission is at maximum when the glass with film on it is so oriented that the direction given by the cross section of the plane of the base with the plane of incidence of the evaporated molecular beam is at an angle of 45° to the direction of polarisation of the nicols. Wetting of the film by liquids of various refractive indices decreases the intensity of the transmitted light. The transmission becomes zero on wetting with a liquid whose refractive index is equal to the refractive index μ_1 of the bulk substance. Double refraction of the fluoride films may be also studied by an interferometric method. On a glass plate a semi-transparent silver layer is deposited. On silver a calcium fluoride layer in a form of a

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symmetrical hill is deposited which is then covered by another semitransparent silver layer. In monochromatic light a system of double rings is observed (Fig.2). The equal chromatic order lines are split in a similar way. (Fig.3). The results show that the fluoride layers possess biaxial double refraction and that the plane of the optical axes coincides with the plane of incidence of the molecular beam. The orientation of the refractive index ellipsoid relative to the layer of the film depends on the angle of incidence of the molecular beams on to the base in the process of the deposition of the film. The magnitude of the double refraction also depends on this angle of incidence. The results are shown in Figs.6 - 10. There are 10 figures, and 11 references, of which 8 are Slavic.

ASSOCIATION: Kharkov State University (Khar'kovskiy Gosudarstvennyy Universitet)

SUBMITTED: October 15, 1956.

AVAILABLE: Library of Congress

Card 3/3

AUTHOR: Shklyarevskiy, I. N. 51-6-13/25

TITLE: A New Interferometric Method for Determination of the Optical Constants of Metals. (Novyy interferometricheskiy metod opredeleniya opticheskikh postoyannykh metallov.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol. III, Nr. 6, pp. 638-640. (USSR)

ABSTRACT: This paper describes a new interferometric method for determination of the optical constants of metals, based on the measurement of the difference of phase-shifts of the p- and s-components of polarized light at two angles of incidence onto a surface of the metal studied (deposited on interferometer plates). On oblique incidence of light on the interferometer plates a splitting of the equal-chromatic-order lines is observed (Refs.3,4). The magnitude of this splitting depends on the angle of incidence φ, increasing with increase of that angle. The long-wavelength components obtained on splitting are found to be polarized in the plane of incidence, and the

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A New Interferometric Method for Determination of the Optical Constants of Metals.

short-wavelength ones - perpendicularly to the plane of incidence. Splitting of the interference lines is due to the difference of the phase-shifts of the p- and s-components, which are produced on reflection from the metal. Splitting of the equal-chromatic-order lines can be used to find Δ, the difference between the phase-shifts of the p- and s-components, for any angle of incidence φ. From two pairs of values of Δ and φ the refractive index μ and the absorption coefficient $\mu\varkappa$ may be found at any given wavelength using the well-known equation relating Δ, φ, μ and $\mu\varkappa$ (Eq.6 on p.639). This equation is valid for bulk metal, while the layers on the interferometer plates are thin and semitransparent. To avoid errors due to the thinness of the interferometer layers the following method was adopted. Measurements were made on two identical semitransparent silver films at two angles of incidence.

A New Interferometric Method for Determination of the Optical Constants of Metals. 51-6-13/25

Then a thick layer of the metal studied was deposited on one of the plates and such a plate was used in conjunction with the second plate, and again measurements were made at two angles of incidence. From curves of relative dispersion of p- and s-components the value of Δ for the metal studied was found. The method described may be used both in the visible and ultraviolet regions. The author adds that the effect of oxide layers on metal films should be allowed for if such oxides are present. The author thanks Member of the Academy of Sciences of the Ukrainian SSR Prof. K. D. Sinel'nikov for his interest. There are 4 Russian references.

ASSOCIATION: Kharkov University. (Khar'kovskiy universitet.)

SUBMITTED: May 21, 1957.

AVAILABLE: Library of Congress.

Card 3/3

AUTHOR: KAGANOV,M.I., LIVSHITS,I.M., SINEL'NIKOV,K.D. PA - 2980

TITLE: On the Possibility of the Observation of the Modification of the Chemical Potential of Metal Electrons in the Magnetic Field. (O vozmoshnosti nabludeniya izmeneniya khimicheskogo potentsiala elektronov metalla v magnitnom pole, Russian)

PERIODICAL: Zhurnal Eksperim. i Teoret.Fiziki, 1957, Vol 32, Nr 3, pp 605-607 (U.S.S.R.)

Received: 6 / 1957 Reviewed: 7 / 1957

ABSTRACT: The order of magnitude of the potential difference caused by this effect between two samples of one and the same metal, the one of which is located in a strong magnetic field, is evaluated according to a formula from the work by I.M.LIVSHITS and A.M.KOSEVICH (Zhurnal Eksperim.i Teoret.Fiziki, 29, 730, 1955): in the case of $H=10^4$ G it amounts to about 10^{-6} V. The influence exercised by the mosaic structure of the crystal on the order of the effect is discussed. The modification of the chemical potential of the electron gas in the magnetic field leads to a dependence of the emission current (of cold as well as of thermoelectric emission) upon the magnetic field (ROSENTSVEIG, Zhurnal Eksperim. i Teoret. Fiziki 31, 520, 1956). The thermocurrent is given under special assumptions (magnetic field vertical to the surface of the metal, dispersion

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PA - 2980

On the Possibility of the Observation of the Modification of the Chemical Potential of Metal Electrons in the Magnetic Field.

law quadratic and isotropic). It results that, according to the behavior of the effective electron mass towards the mass of the free electrons, the thermocurrent in strong magnetic fields may decrease as well as increase, and in the case of these masses being equal and with $\beta H \gg kT$ it increases linearly with the magnetic field. An experimental investigation of the thermocurrent in the magnetic field is very difficult as current density at low temperatures is very low. (2 Citations from Works Published).

ASSOCIATION: Physical-Technical Institute of the Academy of Science of the Ukrainian SSR

PRESENTED BY:
SUBMITTED: 27.9.1957
AVAILABLE: Library of Congress

Card 2/2

20-1-21/54

AUTHOR: Sinel'nikov, K.D., Academician, Ukrainian SSR Academy of Sciences, Zarudnov, B.G., Abovskiy, Yu. S.

TITLE: Separation of Isotopes When an Atomic Beam Passes Through Ionization Space
(Razdeleniye izotopov pri prokhozhdenii atomnogo puchka cherez prostranstvo ionizatsii)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 1, pp. 80 - 83 (USSR)

ABSTRACT: Simple theoretic considerations speak in favour of the possibility of the separation of isotopes on the occasion of the passage of an atomic beam consisting of an isotopic mixture through a space in which this beam is bombarded with electrons. The atomic beam is said to consist of the masses m_1 and m_2 ($m_1 < m_2$) and to have the temperature T at its leaving. Then the particles have the mean kinetic energy $(3/2)kT$ and $v_1/v_2 = \sqrt{m_2/m_1}$, where v_1^2 and v_2^2 are the mean quadratic velocities of the corresponding isotopes. Through such a beam the electrons are said to pass with a temperature sufficient for the ionization of the beam and the ions developing on this occasion are to be transported out of the beam. A formula is deduced for the decrease of the beam in the ionization space.

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Separation of Isotopes When an Atomic Beam Passes Through Ionization Space

For the determination of this effect, a system had to be used which would make possible the ionization of the atomic beam as well as the transport of the ions and their absorption. The demands are satisfied by the LM-2 triode-pressure-gauge-tube. The atomic beams are ionized by the electrons emitted by the cathode and accelerated by the grid potential when passing LM-2. The boundaries of the ionization space and the distribution of the potentials in LM-2 are shortly described. The system used by the authors, consisting of 5 LM-2 valves arranged in series, is shortly described. Mercury served as material. The ion fluxes corresponding to the isotopes 198 and 204 were measured one after another and then their ratio was calculated. The results of the measurements as well as of the calculations are represented in a diagram. The experimental data coincide well within the measuring fault limits, but all magnitudes measured are greater than those calculated. With this system of valves also measurements for the determination of the duration of saturation were carried out. There are 3 figures and 1 table.

20-1-21/54

Separation of Isotopes When an Atomic Beam Passes Through Ionization Space

ASSOCIATION: Physico-Technical Institute, Ukrainian SSR Academy of Sciences (Fiziko-tekhnicheskiy institut Akademii nauk Ukr. SSR)

PRESENTED BY:

SUBMITTED: February 25, 1957

AVAILABLE: Library of Congress

Card 3/3

VEKSLER, V.J.; VODOPJANOV, A.F.; JEFREMOV, D.V.; MINC, A.Z.; VEISBEIN, M.M.; GASEV, M.G.; ZEJDLIC, A.J.; IVANOV, T.P.; KOLOMENSKIJ, A.A.; KOMAR, E. G.; MALYSEV, J.E.; MOMOSZON, M.A.; NEVJAZSKIJ, J.Ch.; PETUCHOV, V.A.; RABINOVIC, V.A.; RUBCINSKIJ, S.N.; SINITSNIKOV, K.D.; STOLOV, A.M.; KULT, Karel, inz.

The synchrophasotron for particle acceleration to 10 BeV energy of the Soviet Academy of Sciences. Jaderna energie 3 no.1:5-9 Ja '57.

1. Ustav jaderne fysiky (for Kult).

STELNIKOV, K. D., ZEYDLIK, P. M., FAYNBERG, Ya. G., NERKASHEVICH, A. M., ZAVGORODNOV, O. G., SAFRONOV, B. G., DUBOVOY, L. V. add LUTSENKO, E. I.

"Experimental Research of High Frequency Properties of Plasma and Magnetohydrodynamic Shock Waves."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

SINELNIKOV, K. D., IVANOV, V. E. and ZELENSKIY, V. F.

"Magnesium-LBeryllium Alloys as Materials for Nuclear Reactors."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

KHRISTENKO, P. I., PETROV, P. A., MITROPOLEVSKIY, V. A., SINELNIKOV, K. D., IVANOV, V. E. and ZELENSKIY, V. F.

"Pin Fuel-Element for Gas-Cooled Heavy-Water Power Reactor."

paper presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

STRELNIKOV, K. D., IVANOV, V. E., AMONENKO, B. M. and BURLAKOV, V. D.

"Refining Beryllium and Other Metals by Condensation on Heated Surfaces."

paper to be presented at 2nd UN INtl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

CHRISTENKO, P.I. [Khristenko, P.I.]; PETROV, P.A.; MITROPOLEVSKIJ, V.A. [Mitropolevskiy, V.A.]; SINELNIKOV, K.D. [Sinel'nikov, K.D.]; IVANOV, V.J. [Ivanov, V.Ye.]; ZELENSKIJ, V.F. [Zelenskiy, V.F.]; MARVART, J. [translator]; KLIK, F. [translator]

Pin fuel-element for gas cooled heavy water power reactors. Jaderna energie 4 no.11:330-338 N '58.

S/058/60/000/006/004/040
A005/A001

26.2332

Translation from: Referativnyy zhurnal, Fizika, 1960, No. 6, p. 30, # 13142

AUTHORS: Sinel'nikov, K.K., Zeydlits, P.M., Nekrashevich, A.M., Bolotin, L. I., Shutskever, Ya.S., Akshanov, B.S., Kovpak, N.Ye., Leontovich, K.A., Akhiyezer, A.I., Lifshits, I.M., Faynberg, Ya.B., Rozentsveyg, L.N., Lyubarskiy, G.Ya., Kaganov, M.I., Pargamanik, L.E.

TITLE: A 20.5-Mev Linear Proton Accelerator /9

PERIODICAL: Tr. Sessii AN UkrSSR, po mirn. ispol'zovaniyu atomn. energii. Kiyev, AN UkrSSR, 1958, pp. 5-15

TEXT: The physical substantiation of the parameter choice is presented and the design of a linear proton accelerator with a drift tube at 20.5 Mev energy is described; the accelerator was constructed in the Fiziko-tekhnicheskiy institut AN UkrSSR (Institute of Physical Engineering of the AS UkrSSR). The main computational data of the accelerator are the following: the operational wave length is λ = 215 cm; the injection energy is 1.7 Mev; the length of the accelerator is 1,446.8 cm; the synchronous phase is 20°; the length of the first half-tube is 4.875 cm; that of the last one is 16.725 cm; the length of the first gap is

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A 20.5-Mev Linear Proton Accelerator

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A005/A001

3.380 cm; that of the last one is 11.150 cm; the length of the first drift tube is 0.145 cm; that of the last one is 32.955 cm. Altoghether, the number of drift tubes is 50, that of the half tubes is 2; the acceleration system begins and ends with the latter. At the entrance of every drift tube, focusing grids are fixed consisting of parallel tungsten wires of 0.07 mm thickness; their total geometric transmittance amounts to 30%. The drift tubes are installed within the resonator by means of a suspension system; the resonator is made as a 1,446.8-cm long regular 16-face prism. The resonator is fed from 20 h.f. generators. The Q-factor of the resonator in the loaded state is equal to $6.5 \cdot 10^4$ in consequence of which the h.f. power needed for accelerating particles to the rated energy amounts to 1.2 Mw. An electrostatic generator operating by pulses with the pulse duration of 500 μ sec at about 1 ma current intensity and 1.7 mv voltage serves as proton injector. The principal circuit and the design of the individual accelerator units are presented.

ASSOCIATION: Fiz.-tekhn. in-t AN UkrSSR (Physico-Engineering Institute of the Ukrainian Academy of Sciences)

A.P. Fateyev

Translator's note: This is the full translation of the original Russian abstract.

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84096

S/058/60/000/006/003/040
A005/A001

26.2340

Translation from: Referativnyy zhurnal, Fizika, 1960, No. 6, p. 29, # 13140

AUTHORS: Sinel'nikov, K.D., Zeydlits, P.M., Grishayev, I.A., Kitayevskiy, L.Kh., Akhiyezer, A.I., Faynberg, Ya.B., Selivanov, N.P., Khizhnyak, N.A.

TITLE: An Electron Accelerator With 3.5 Mev Output Energy

PERIODICAL: Tr. Sessii AN UkrSSR po mirn. ispol'zobaniyu atomn. energii. Kiyev, AN UkrSSR, 1958, pp. 16-23

TEXT: The authors describe a linear electron accelerator with a travelling wave of 3.5 Mev energy. A waveguide loaded with disks is used as accelerating system. The necessary law of wave phase velocity variation is brought about by variation of the diameter of the apertures in the disks. The 280-cm long waveguide is divided into three sections. In the first section, the phase velocity is varied from 0.5 to 0.97 c; in the second and third section it is equal to 0.98 and 0.99 c respectively. The electron equilibrium phase increases during the acceleration process; its initial value is equal to 45° and is chosen according to the optimum capture condition. The computational value of the h.f. power at the

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A005/A001

An Electron Accelerator With 3.5 Mev Output Energy

accelerator input is 900 kw; the accelerator field intensity amounts hereat to 16.5 kv/cm. The accelerator output power (about 600 kw) is absorved in a steel load with water cooling; approximately 300 kw are dissipated in the waveguide walls. An additional axisymmetrical magnetic field with an intensity up to 400 Gs is developed by solenoids for focusing the electrons along the waveguide axis. An electron gun with three electrodes serves as electron source, it operates pulsing synchronously with the magnetron generator and provides for a beam of 5-6 mm diameter at the accelerator input. The output parameters of the accelerator measured are; the current is about 20-30 ma in the pulse of 2 μsec duration, the average current is about 20-30 μ a; the beam diameter is 3-4 mm with the divergence angle of 7.10^{-4} - 3.10^{-3} radian; the energy beam half-width is about 8%.

ASSOCIATION: Fiz.-tekhn. in-t AN UkrSSR (Physico-Engineering Institute of the Ukrainian Academy of Sciences)

A.P. Fateyev

Translator's note: This is the full translation of the original Russian abstract.

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S/058/60/000/02/07/023

Translation from: Referativnyy zhurnal, Fizika, 1960, No. 2, p. 26, # 2740

AUTHORS: Sinel'nikov, K. D., Ivanov, V. Ye.

TITLE: Magnetron Lenses

PERIODICAL: Tr. Sessii AN UkrSSR po mirn. ispol'zovaniyu atomn. energii. Kiyev, AN UkrSSR, 1958, pp. 50-53

TEXT: For the focusing of ion beams of a linear 20-Mev accelerator, it was proposed to use as electronic lens a negative space charge of high density which forms in a magnetron operating under critical conditions. The focusing properties of the space charge were tested on an electronic lens consisting of a cylindrical anode (of 38 mm in diameter, 80 mm long) and a tungsten cathode in the form of a loop placed near the anode and coaxially with the latter. Two electrodes with a zero potential restrict the lens. The magnetic field of the lens was produced by four coils with a total number of windings of about 9,000; one of the outer coils had a field of opposite sign. The cathode was placed at the joint of two opposite fields in the zero line. The beams of positive particles were fixed on a fluorescent screen. It was detected by experiment that the field of the space charge of the lens produces a focusing effect on the beams of lithium ions and

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Magnetron Lenses

S/058/60/000/02/07/023

protons accelerated to an energy of 50-60 kev, in which case the value of the focus length depends linearly on the energy of the particles. The same dependence was also detected for a beam of protons accelerated to energies of 2 and 20 Mev. The anode of the lens in this case was 180 mm long; the field intensity of the lens was 700 oersted and the potential on the anode 17-18 kev. It was shown that for obtaining an equal focusing effect, the magnetic field of the magnetron lens should have an intensity by $\sqrt{M/2m}$ times lower than the field of a usual magnetic lens (M is the mass of the ion, m the mass of the electron). It was established by sounding the cloud of electrons with narrow ionic beams that in the magnetron lens the density of the space charge in the cloud is distributed uniformly, and the intensity of the electrical field increases linearly in the direction to the anode if magnetic field intensity is above the critical value.

V. A. Khramchenkov

Card 2/2

Sinel'nikov, K.D

CHEMISTRY AND PHYSICAL CHEMISTRY OF REACTOR MATERIALS AND PROCESSES

"On the Iodide Method of Purifying Zirconium," by K. D. Sinel'nikov, F. I. Busol, and G. I. Stepanova. Atomnaya Energiya, No 2, February 1958, pp 169-174.

A method is proposed for determining the equilibrium constants k and k' for the reaction $Zr + TI_2 - ZrI_4 = 0$ and $2I - I_2 = 0$. It is based on measuring the amounts of iodine over zirconium liberated during the decomposition of zirconium tetraiodide on a heated surface during the establishment of the equilibrium. Decomposition of tetraiodide was carried out on a tungsten filament at 900 to 600 degrees. The temperature distribution between the filament and walls of the vessel was not taken into account.

The authors have determined the dependence of the sum of the pressures of the atomic and molecular iodine $p_I + p_{I_2}$ on the pressure of the zirconium tetraiodide p_{ZrI_4} at 1430° C, and on the temperature at 50 mm

Card: 1/2

AUTHORS: Sinel'nikov, K.D. and Ryazanov, A.N. SOV/51-5-2-14/26

TITLE: On the Increase of the Resolving Power of Optical Systems (K voprosu o povyshenii razreshayushchey sposobnosti opticheskikh sistem)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 2, pp 184-190 (USSR)

ABSTRACT: In 1943 Schelkunoff (Ref 1) showed that it is possible to increase the directivity of a radiator (an aerial) consisting of a linear chain of vibrators by means of a suitable choice of the phases and amplitudes in each vibrator. In 1952 Toraldo di Francia (Ref 3) applied Schelkunoff's methods to calculation of the resolving power of an objective consisting of several concentric rings. It is difficult to prepare such an objective and, therefore, the present authors discuss theoretically and apply experimental checks to a simpler system consisting of a series of slits. Such a series of slits may be prepared by evaporating an opaque layer of aluminium on to a glass plate and by ruling the slits on it. The system discussed consists of one or more pairs of slits and the theoretically required ratios of intensities

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between the various pairs of slits may be obtained by varying the width of the slits. The theoretically required phase relationships between the slit pairs can be produced in practice by evaporating a layer of ZnS or cryolite of required thickness onto such a slit system. The advantage of using pairs of slits can be seen from Fig 4 which shows the zero maximum on diffraction from a single slit 4 mm wide (Fig 4a) and the diffraction image produced by two narrow slits 0.04 mm wide separated from each other by 4 mm (Fig 4b). In Fig 4b the central maximum is half the width of the central maximum in Fig 4a. Fig 5 shows the results obtained using three (Fig 5a) and four (Fig 5b) pairs of slits. Fig 5v shows the results for three pairs of slits with correct phase relationships between them. Fig 6 shows an image of two closely spaced slits observed using a uniform objective (Fig 6a) and an objective consisting of three pairs of slits (Fig 6b). Fig 6v and g show the image produced by objectives consisting of four pairs of slits with correct amplitude and phase relationships respectively. The results obtained indicate that considerable improvement of the resolving power may be obtained by using objectives consisting of pairs of slits. For

example Fig 6 shows that a uniform objective fails to resolve two closely spaced objects, which can be easily resolved using three or four pairs of slits. The authors suggest a correction to the Rayleigh criterion for the resolving power. There are 6 figures, 1 table and 6 references, 4 of which are Soviet, 1 Italian and 1 American.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet (Khar'kov State University)

SUBMITTED: September 16, 1957

Card 3/3 1. Optical systems--Theory 2. Optical systems--Design 3 Optical systems--Test results

AUTHORS: Sinel'nikov, K. D., Ivanov, V. Ye., 56-2-9/51
Safronov, B. G., Azovskiy, Yu. S., Aseyev, G. G.

TITLE: The Separation of Isotopes in a Non-Steady Molecular Flow (Razdeleniye izotopov pri nestatsionarnom molekulyarnom techenii)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1956, Vol 34, Nr 2, pp 327-330 (USSR)

ABSTRACT: In the non-steady molecular flow of mercury vapor a change of the content of isotopes in the flow is observed. The scheme of the measuring arrangement is shown by a diagram. As material served mercury which was in a steel ampoule and could be separated from the system by means of a valve. The content of mercury isotopes was measured by means of the one-jet method for the lightest and for the heaviest isotope, and from these measurements $\beta = I_{198}/I_{204}$ was calculated. The standard ratio β_o does not change within 2 days. The just discussed measurements were carried out by means of an iron tube and analogous measurements were then carried out by means of a glass tube and a copper tube. The results

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obtained by the glass-and the iron tube are shown in a diagram. The mercury flow is enriched with the lighter isotope immediately after its appearance and it takes about 8 hours to return again to the standard composition. The desorbed mercury is enriched with the heavy isotope. The time necessary for the formation of the steady flow as well as for the standard-like isotope composition decreases at T = 29o°C. For a glass tube at T = 2o°C this time is one tenth of that of an iron tube. Another diagram shows the results of measurements of the flow as well as of the isotope composition in a copper tube at T = 2o°C. The course of the curves coincides qualitatively for copper and iron. The solution of the absorption problem found by P. Clausing (reference 1) coincides well with the experimental curve, which speaks in favor of the applicability of such calculations for the flow of mercury vapors through a glass tube. The analogous calculations for a copper tube proved the impossibility of the description of the change of flow and of the composition of isotopes by means of Clausing's equation. The difference of curves for the flows through an iron and through a copper tube are probably based on the solution of the diffusion of mercury into the depth of the

walls of the copper tube. Thus it was shown that the different sorption times lead to a separation of isotopes. This phenomenon must be considered a source of error in exact mass-spectroscopic measurements. There are 3 figures and 2 references, 1 of which is Slavic.

SUBMITTED: August 30, 1957

AVAILABLE: Library of Congress

1. Isotopes-Separation 2. Mercury vapor-Molecular flow-Applications 3. Mercury isotopes-Measurement

"Investigation 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.

SINELNIKOV, K.D.

SIN.L'N.LOV, ..D.; SH..LY..OVSKIY, ...; G..D..OV.., ...

Colors of wrinkled transparent films on metal surfaces. Opt. i spektr. 7 no. 6:846-848 D '59. (MIRA 14:2)
(Films (Chemistry))

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001550730001-9"

SINEL'NIKOV, K.D.; KHIZHNYAK, N.A.; SAFRONOV, B.G.

[Motion of a flexible current-carrying coil in a non-uniform magnetic field] O dvizhenii gibkogo tokovogo vitka v neodnorodnom magnitnom pole. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 145-157 p. (MIRA 17:2)

SINEL'NIKOV, K.D.; SAFRONOV, B.G.; AZOVSKIY, Yu.S.; ASEYEV, G.G.; VOYTSENYA, V.S.

[Magnetic properties of a plasma behind the front of a strong shock wave] Izuchenie magnitnykh svoistv plazmy za frontom sil'noi udarnoi volny. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 89-105 p. (MIRA 17:1)

SINEL'NIKOV, K.D.; SAFRONOV, B.G.; TIMOFEYEV, A.T.; FANKRAT'YEV, Yu.I.

[Interaction between ions and electrons in an accelerated ion beam] Izuchenie vzaimodeistviia mezhdu ionami i elektronami v uskorennom puchke ionov. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 209-214 p. (MIRA 17:1)

SINEL'NIKOV, K.D.; RUTKEVICH, B.N.; FEDORCHENKO, V.D.

[Motion of charged particles in a space-periodic magnetic field] Dvizhenie zariazhennykh chastits v prostranstvenno-periodicheskom magnitnom pole. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 229-242 p.
(MIRA 17:2)

SINEL'NIKOV, K.D.; RUTKEVICH, B.N.; SAFRONOV, B.G.; SELIVANOV, N.P., otv. za vyp.

[Nonadiabatic traps for charged particles] Neadiabaticheskie lovushki zariazhennykh chastits. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 479-494 p. (MIRA 17:2)

SINEL'NIKOV, K.D.; SAFRONOV, B.G.; TOPOLIA, N.V.

[Magnetic moment of plasma clots] O magnitnom momente plazmennykh sgustkov. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 134-144 p. (MIRA 17:2)

SINEL'NIKOV, K.D.; SAFRONOV, B.G.; SIDORKIN, V.A.; TRUBCHANINOV, S.A.

[Motion of plasma clots across a magnetic field] Dvizhenie plazmennykh sgustkov poperek magnitnogo polia. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 183-200 p.
(MIRA 17:3)

SINEL'NIKOV, K.D.; SAFRONOV, B.G.; GUZHOVSKIY, I.T.; YAREMENKO, Yu.G.

[Propagation of plasma clots in a space devoid of fields] Rasprostranenie plazmennykh sgustkov v svobodnom ot polei prostranstve. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 158-181 p. (MIRA 17:3)

SINEL'NIKOV, K.D.; SAFRONOV, B.G.; FEDORCHENKO, V.D.; RUTKEVICH, B.N.; CHERNYY, B.M.

[Study of a magnetic trap with a volume charge] Issledovanie magnitnoi lovushki s ob"emnym zariadom. Khar'kov, Fiziko-tekhn. in-t AN USSR, 1960. 243-254 p. (MIRA 17:5)

AUTHOR: Sinel'nikov, K. D., Rukhadze, A. A., Pelovchenko, V. D.

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

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, No 3, pp 289-295 (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 remains 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

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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:

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

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

$$h_x = h_1 \sin \varphi, \tag{5}$$

$$h_y = -h_1 \cos \varphi. \tag{6}$$

[illegible] periodic [illegible] magnetic [illegible] periodic [illegible] magnetic [illegible] $\mathbf{H} \sim$ [illegible]:

$$\frac{dv_x}{dt} \; [illegible] \; [v_y(1 + h \sin \nu z) + v_z h_y \cos \nu z] \quad (7)$$

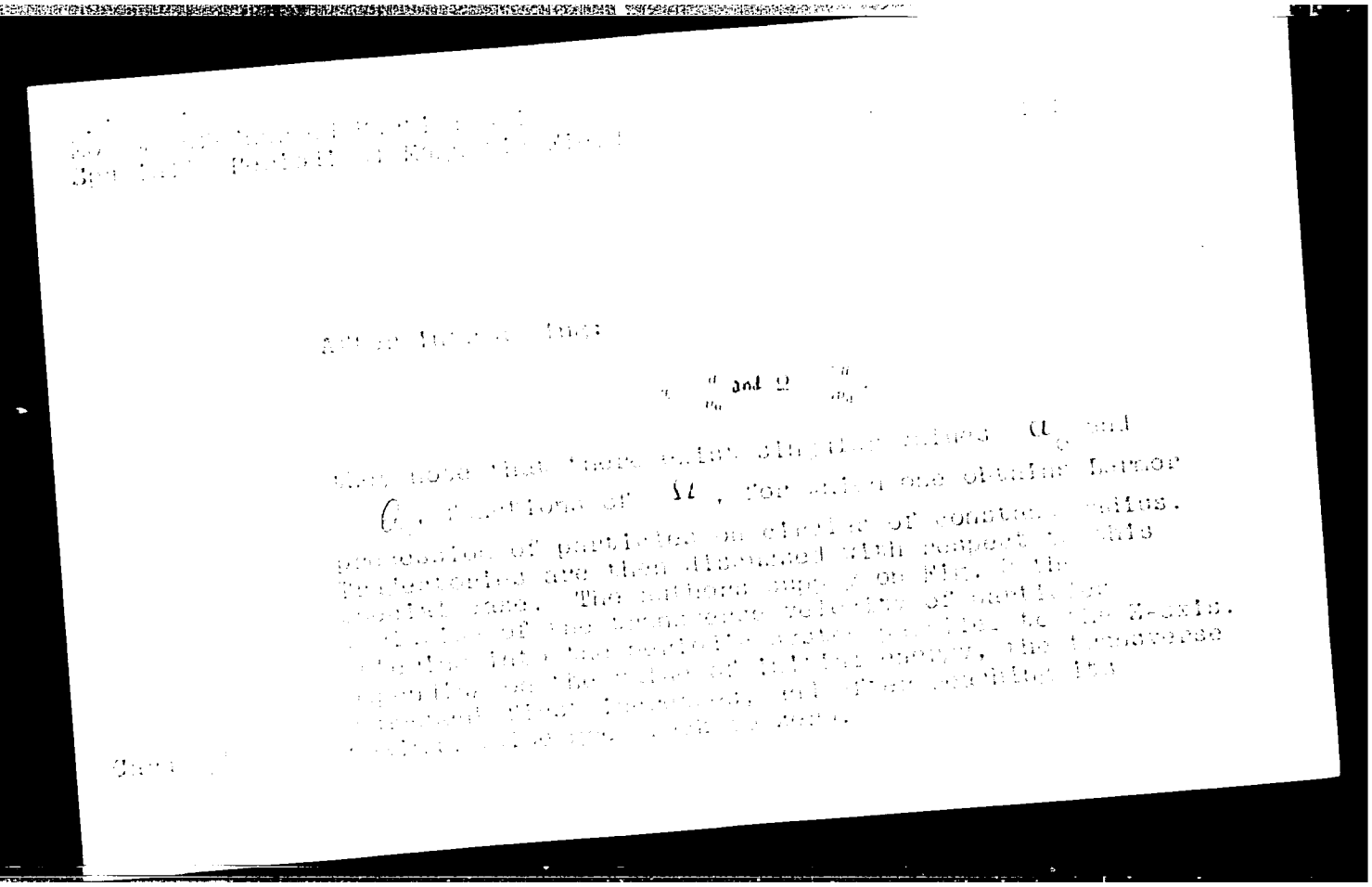
$$\frac{dv_y}{dt} \; [illegible] \; v_x(1 + h \sin \nu z), \quad (8)$$

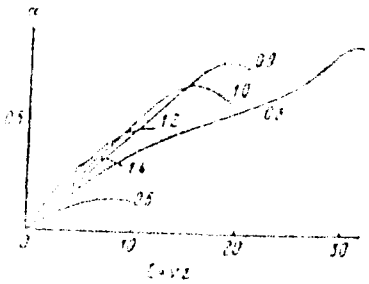
$$\frac{dv_z}{dt} = [illegible] \, v_x h_y \cos \nu z. \quad (9)$$

[illegible] velocity of [illegible] ζ:

$$\frac{d}{dz} \; [illegible] \; \frac{h}{2} \cos \zeta, \quad (32)$$

$$\frac{d}{dz} \; [illegible] \; \sin \zeta \quad (33)$$





Motion of Charged Particles in a Spatially Periodic Magnetic Field

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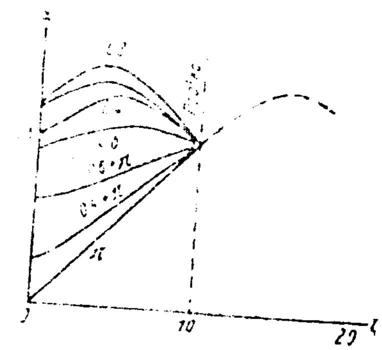
Fig. 3. Variations in Larmor precession velocity of returning particles for various values of the jump in phase shift θ at reflection from a magnetic stopper.



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

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Motion of Charged Particles in a Spatially Periodical Magnetic Field

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finite probability that a particle acquires a "dangerous" value of $\Delta\theta$. The trapping time of the beam beyond 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 6, 1957

Card 3/3

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SOV/57-30-3-3/19

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:

$$\sin^2\varphi > \frac{H_0}{H_n}. \qquad (1)$$

where H_0/H_n is the stopper ratio. To get a particle into the trap, one applies a space-periodic modulation

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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

reverse motion. In general, it does not repeat the trajectory in the reverse direction and, therefore, need not cross the entrance stopper but, 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.

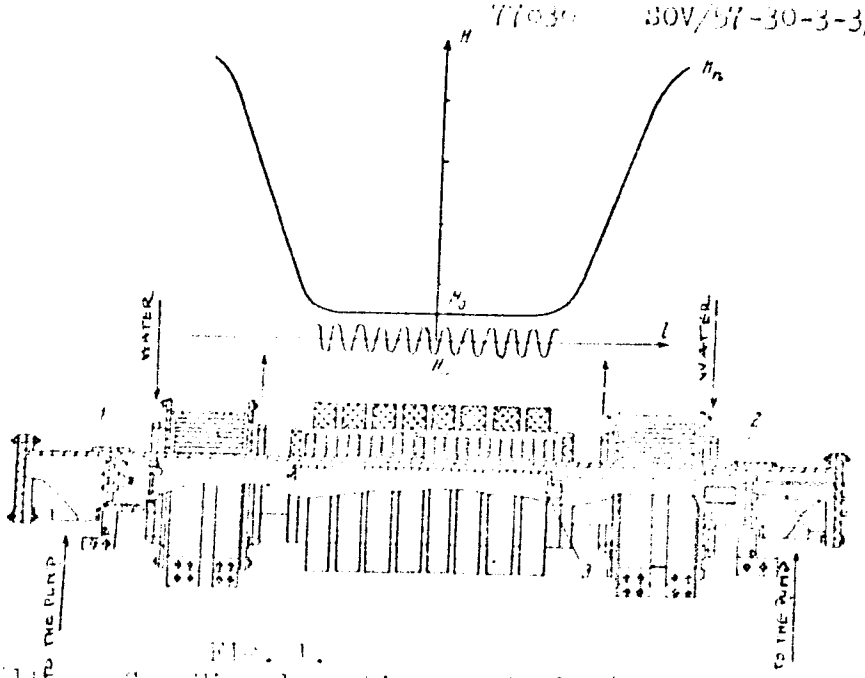

Fig. 1.

Card 4/12 See Fig. 1 description on Card 5/12