

ARTSIMOVICH, G.V., kand. tekhn. nauk; ASYCHENKO, Ye.I., kand. tekhn. nauk;  
STARKOV, V.I., inzh.; MOSKALENKO, V.P., inzh.; FISDMAN, A.I., inzh.

Using hard-alloy tools in boring frozen soils with the EKGM machines.  
Stroj. i dor. mash. 10 no.10:24-25 0 '65.  
(MIRA 18:10)

ALEKSANDROV, V.Ye.; ARTSIMOVICH, G.V., kand. tekhn. nauk; GINZBURG, B.I.,  
gornyy inzhener

Complete use of mining bore bits. Ugol' Ukr. 7 no. 10:27-28  
0 '63. (MIRA 17:4)

1. Nachal'nik upravleniya byuro vzaimnykh raschetov Donetskogo  
soveta narodnogo khozyaystva (for Aleksandrov). 2. Institut  
sverkhtverdykh materialov Gosplana UkrSSR (for Artsisovich,  
Ginzburg).

ARTSIMOVICH, Ivan Lyudvigovich

[Collection of problems on the statistics of Soviet consumers' cooperatives] Sbornik zadach po statistike sovetskoi potrebitel'skoi kooperatsii. Izd.2., perer. i ispr. Moskva, Izd-vo Tsentrsoiusa, 1958. 243 p.  
(Business mathematics) (NIRA 13:3)

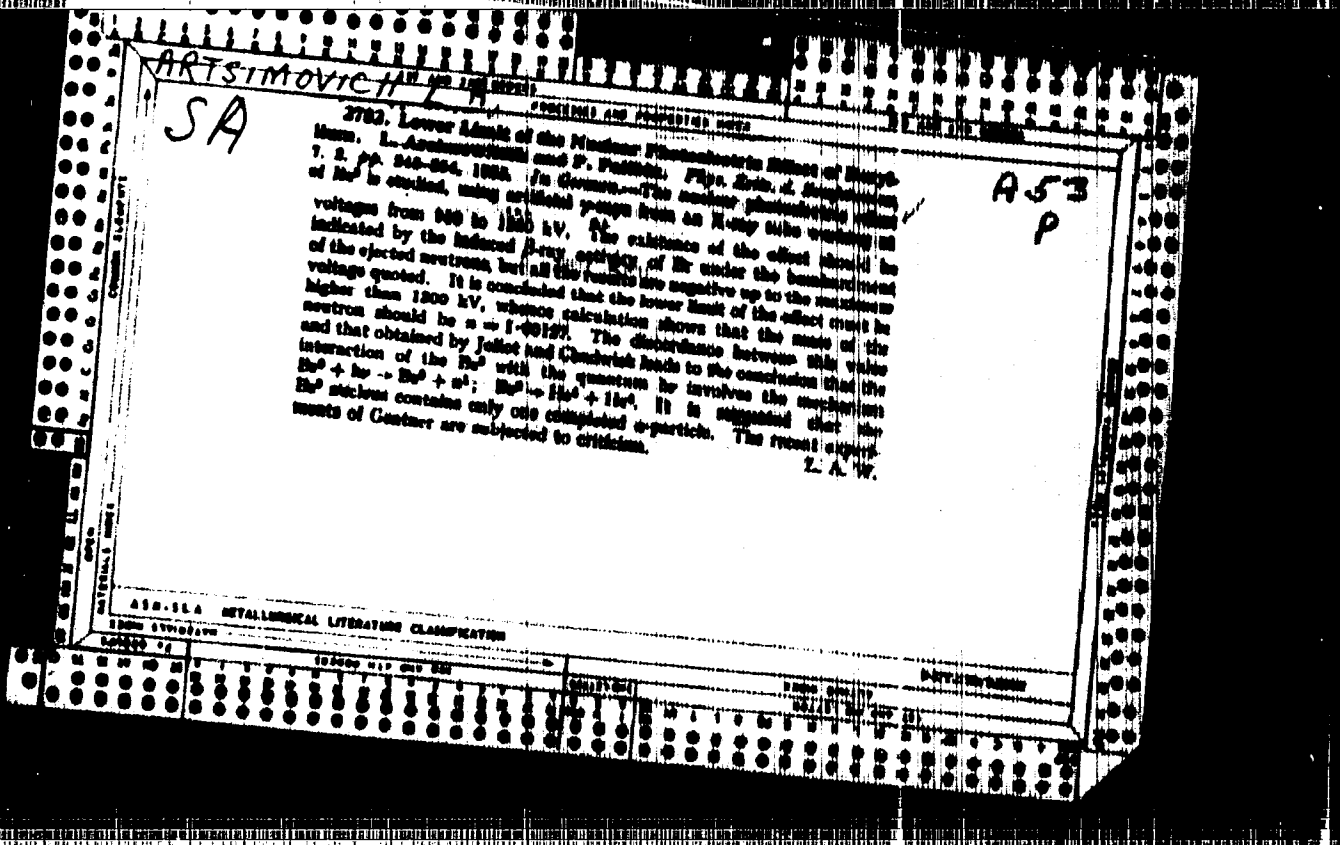
ARTSIMOVICH, K.I., doreshnyy master.

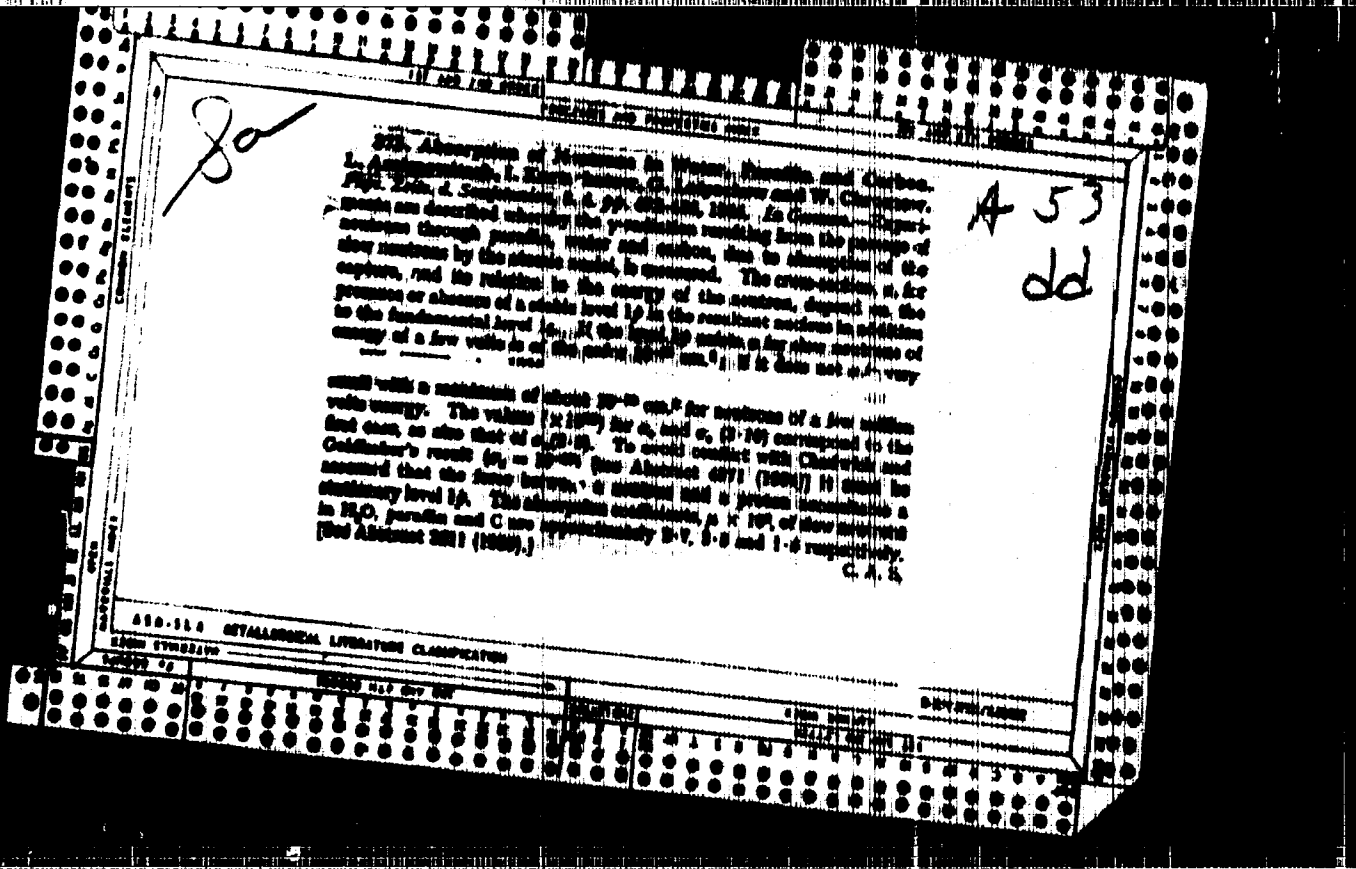
For improving track maintenance in railroad yards, Put' 1 put. kmos.  
no.6:6 Je '58. (MIRA 11:6)

1. Stantsiya Uslovaya Moskovsko-Kursko-Donbasskoy dorogi.  
(Railroads--Track)  
(Railroads--Yards)

ARTSIMOVICH, L.A.  
ARTSIMOVICH, L.A. and ALIKHANOV, A.I.

"Total Reflection of X-Rays by Thin Layers," Zeitschrift für Physik,  
Zhurnal Eksperimental'noi i Teoreticheskoi, Fiziki, Vol. 82, pp 489-506,  
1933.



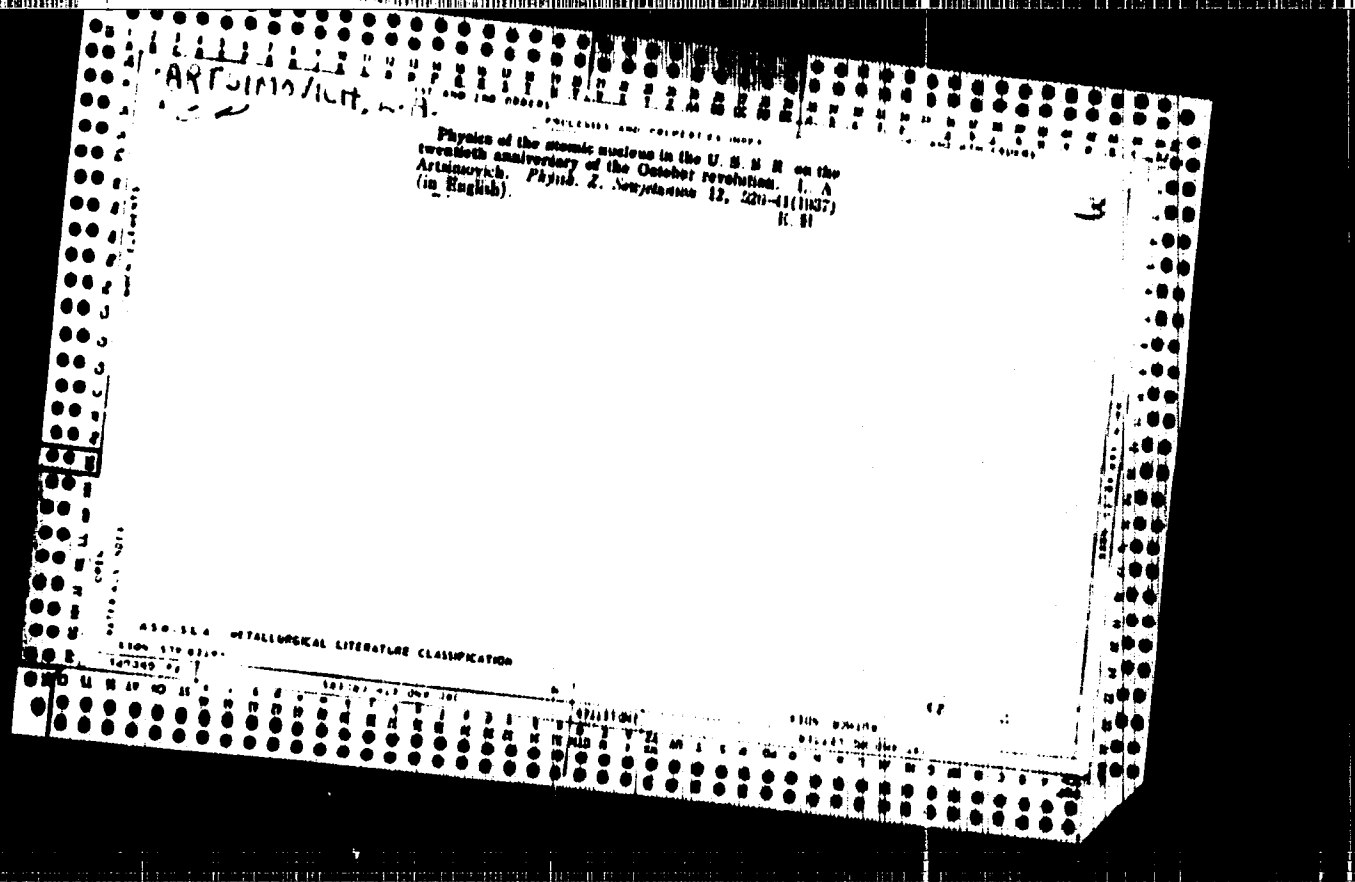


ARTSINOVICH, L.A.

The Law of Conservation of Momentum by the Annihilation of Positrons. A.I. Alihan'yan, A.I. Alikhanov, and L.A. Artsinovich. Soviet. Acad. Sci. USSR (U.S.S.), 1, 277-8 (1936) in German.

In the annihilation of positrons two quanta are emitted in opposite directions, which is in accord with the law of conservation of momentum.  
D. Eitzenberg





ARTSIMOVICH, L. A.

CP

Demonstration effect for high energy electrons  
 A. Artsimovich and V. A. Khranov. *J. Nucl. Energy*  
*Phys. (C)* 1964, 10, 113-114 (1964). The bremsstrahlung  
 produced by high energy electrons from a thin  
 (B + C) target was investigated by means of a magnetic  
 spectrometer. The relation between the intensity of the  
 radiation and the at. no. of the element (from lead to  
 lead and soft components of the radiation (from lead to  
 C, Al, Cu, Sn, Pb), the initial intensity and energy of the  
 electrons, the angular distribution of the photons produced  
 and the absorption of the radiation, are compared with  
 the predictions of the Dirac-Heisenberg relativistic  
 quantum theory (C. A. 28, 1140) V. H. K.

3

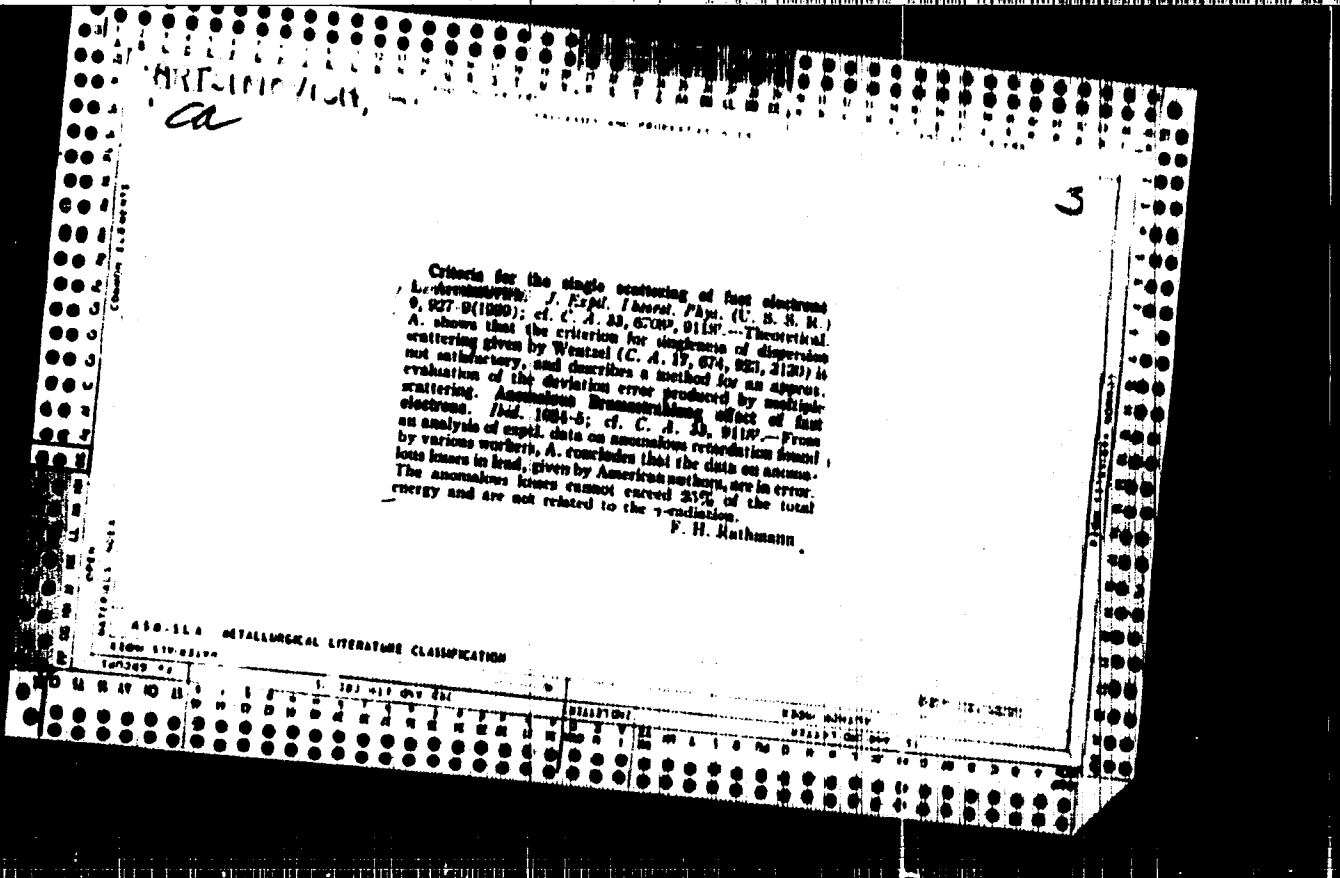
ARTIMOVICH, L.A.

BC

Energy losses of fast electrons. L. A. Artimovich and V. A. Chumakov (Bull. Acad. Sci. U.R.S.S., 1958, *Nv. Phys.*, 757-760).—Results in agreement with theory have been obtained for energy losses of electrons of energy 1-2.5 e.Mv. in C, Al, Cu, and Pb, by the use of a double focusing magnetic monochromator. L. J. J.

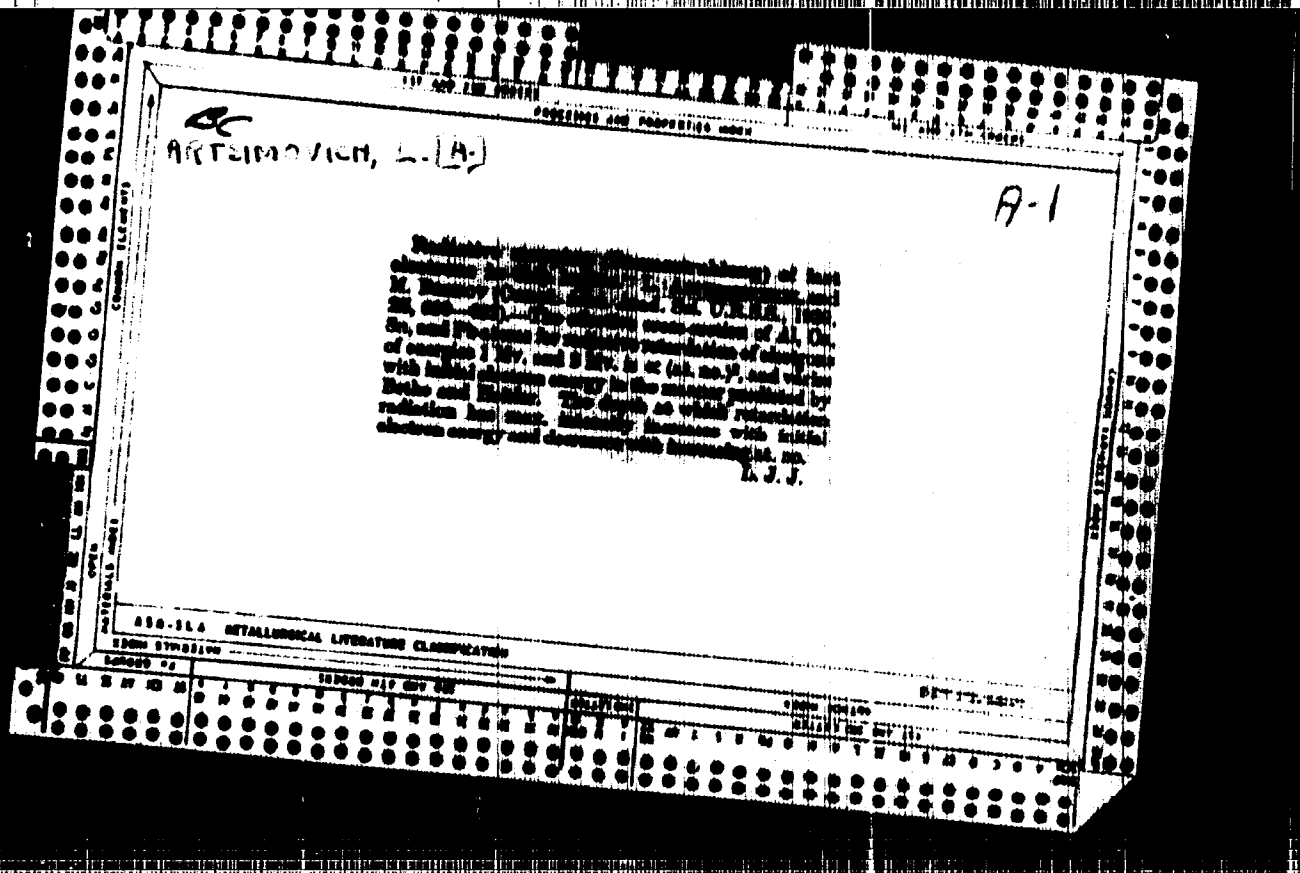
see also Compt. Rend. Acad. Sci. URSS, 1958, No. 18, p. 415

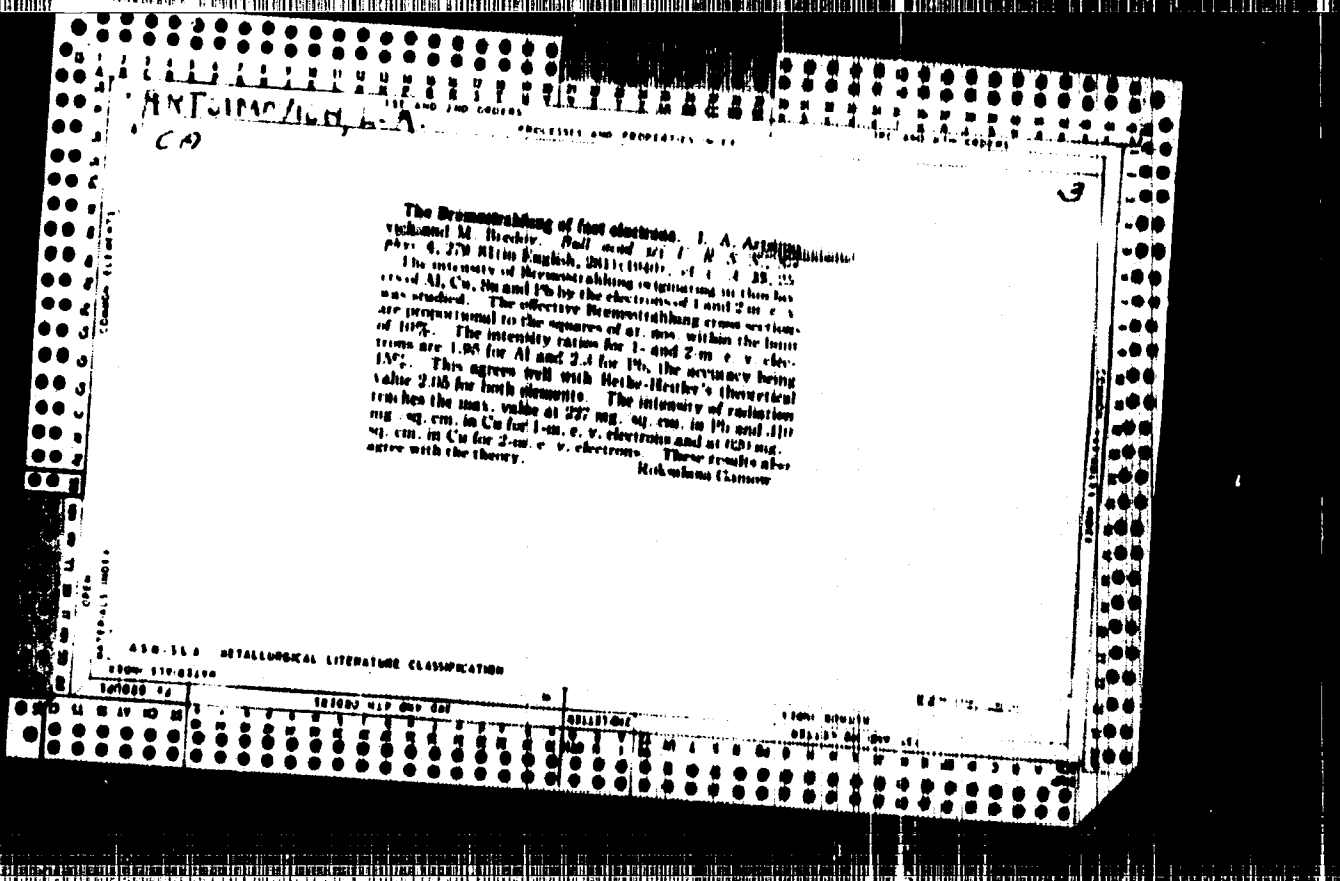
INTERNATIONAL METALLURGICAL LITERATURE CLASSIFICATION

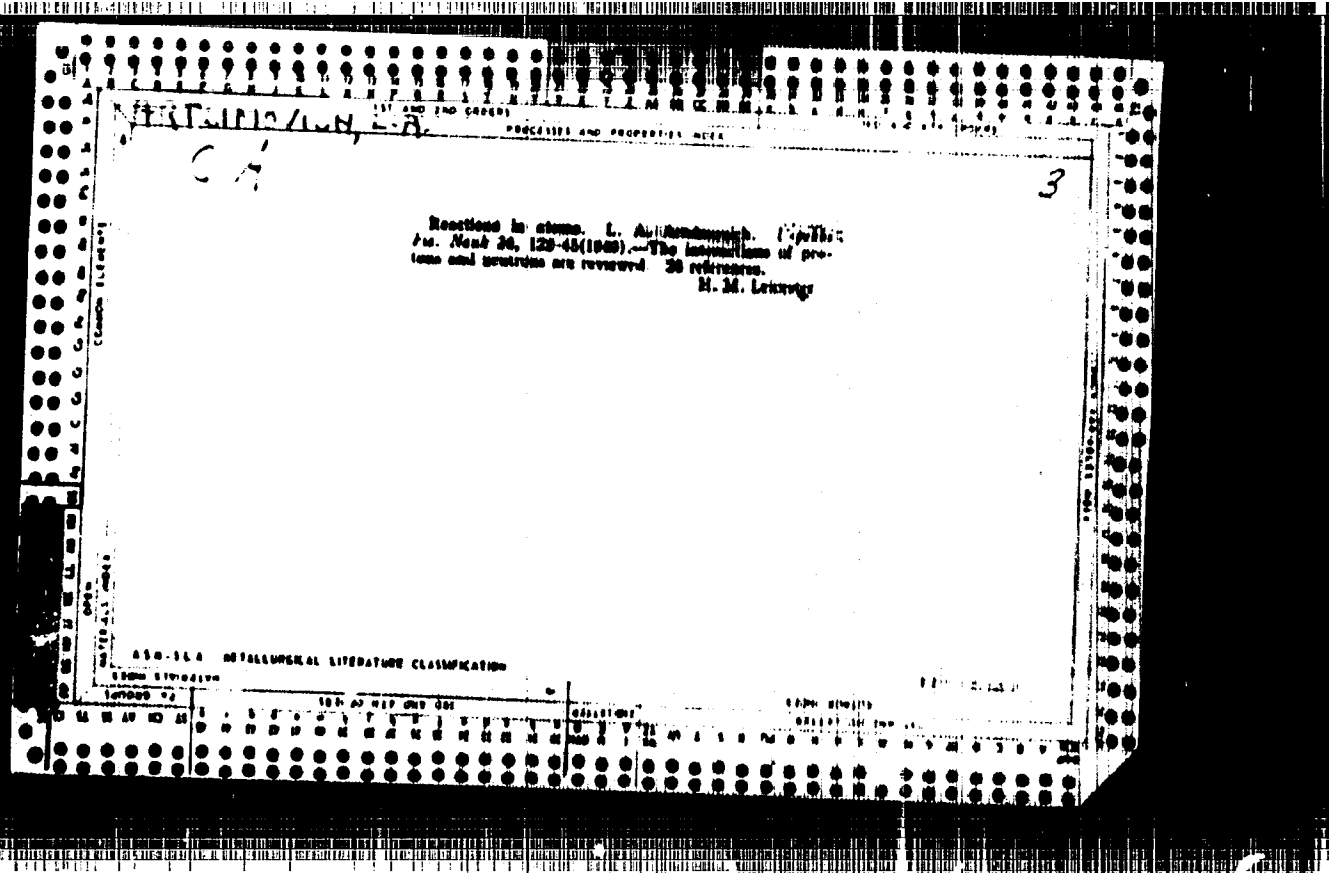


ARTSIMOVICH, L. A.

"Anomalous Bremsstrahlung Effect of Fast Electrons," Zhur. Eksper. i Teoret  
Fiz., No.9, pp 1034-35, 1939









ARTSINOVICH, D. A.

"Electron-Optical Properties of Emission Systems," Bull. Acad. Sci. URSS, Ser. Phys., 1944, Vol. 8, No. 6, pp. 313-329.

Apparatus in which an electron-optical image of an object emitting slow electrons is obtained can be divided into three classes according to whether the image is (a) greatly magnified, e. g., an emission electron microscope used for studying thermo- and photo-cathodes, (b.) of approximately the same dimensions as the object, e.g., in devices used in television, or (c) reduced to a point e.g. in the electron gun. A brief survey of each class is given. This is followed by a detailed mathematical analysis of the formation and focusing of electron beams by electrostatic methods. Equations are derived determining the trajectories of the electrons and approximate solutions indicated. Chromatic aberration, transverse as well as longitudinal, is calculated and the plane of the optimum image found in the depth of focus, determining the accuracy of focusing, is examined. Further possible defects of electron-optical systems, such as spherical aberration, curvature of the image, and astigmatism, are also discussed. A Technically ideal system would use purely electrostatic focusing, with two electrodes only. An Analysis of its operation is given and possible applications are discussed.

ARTIMOVICH, L.

GA

COMMON ELEMENTS

OPEN  
CALL INDEX

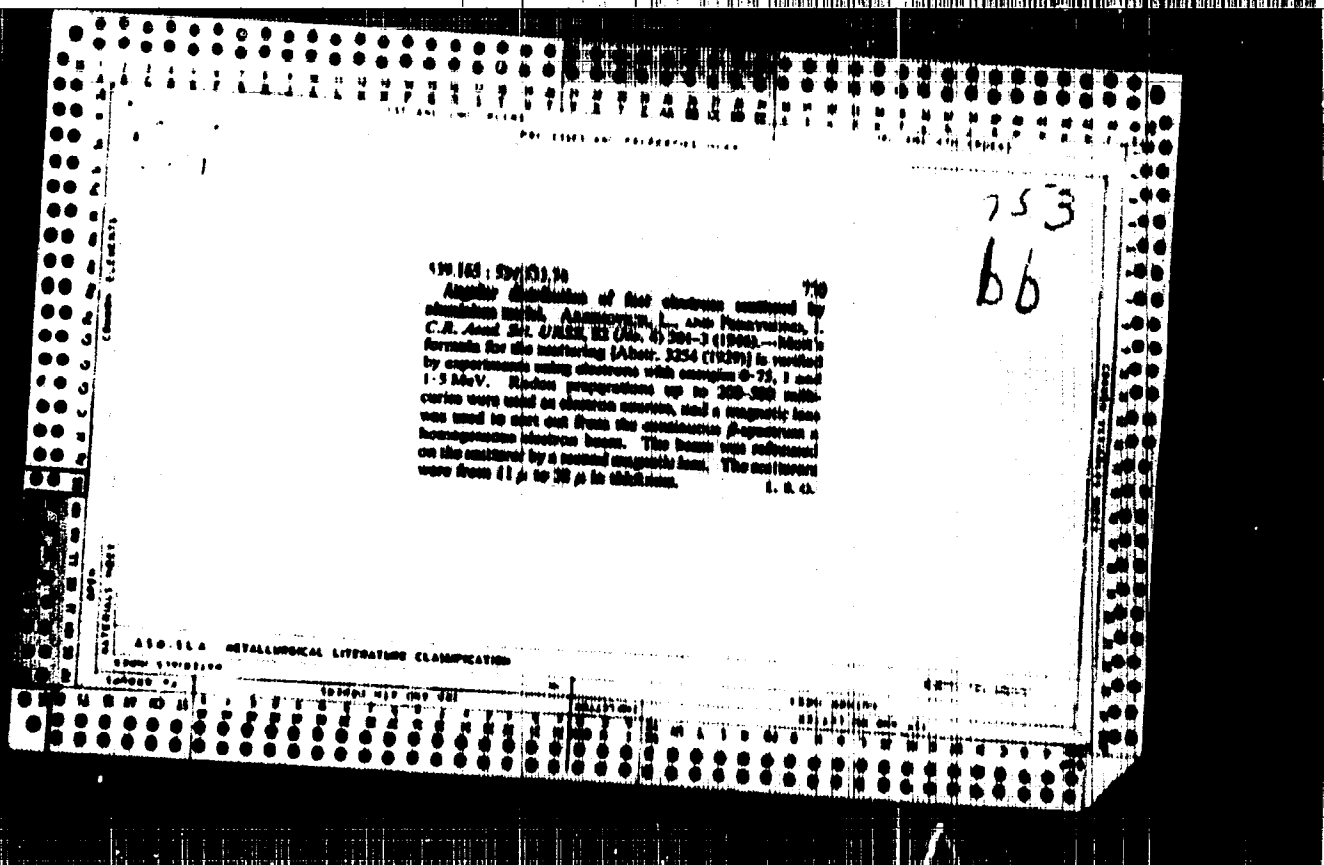
~~Radiation of fast electrons in a magnetic field. The angular and the spectral distribution of the radiation emitted by fast electrons accelerated in a magnetic field is treated mathematically. Practically all the energy of the radiation is shown to be concentrated in the orbital plane. The frequency spectrum is shown to consist of equidistant lines. The main part of the radiation occurs in the region near the wave length that is equal to the radius of the orbit divided by  $(W/mc)^2$ , where  $W$  = energy of the electron. An idea on interaction between electrons can be disregarded and antineutrino~~

tion follows Thomson's law, interference is absent and the radiation is proportional to the no. of the electrons. A criterion for the negligibility of the interaction is formulated and it is shown that it can be disregarded in the betatron. A formula is derived for the contraction of the orbit owing to radiation damping. Ways of counteracting the effect of the latter in the betatron, particularly with the aid of a supplementary high-frequency elec. field, are indicated.

N. Thon

Modern Physics  
Tube Technology

6



ARTSIMOVICH, L. A.

Bibliography. E. Pollard and V. Davidson. "Applied nuclear physics". Translated by M. N. Flerova under the editorship of L. A. Artsimovich. State Publication of Technico-Theoretical Literature 1947. 328 pp. publ. in 10,000 copies. P. 1186.

A five-page review of the book: Applied Nuclear Physics by E. Pollard and V. Davidson.

SO: Journal of Applied Chemistry (USSR) 21, No. 11 (1948).

ARTSIMOVICH, L. A.

"High Current Gas Discharge and Thermonuclear Reactions," paper read at  
the Symposium on Electromagnetic Phenomena in Cosmical Physics, Stockholm,  
27-31 Aug 56.

AS USSR, M<sub>o</sub>scow

ARTSINOVICH, L.A., akademik

[Program in atomic physics; for the Physics Faculty] Programma po  
atomnoi fizike (dlia fizicheskogo fakul'teta). 1956. 2 p.  
(MIRA 11:3)

1. Moscow. Universitet.  
(Nuclear physics--Study and teaching)

Category : USSR/Nuclear Physics - Nuclear Reactions

C-5

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6073

Author : ~~Antoniuk, A.~~ A., Andriyev, A.M., Bazilovskaya, C.A.,  
Frokhov, Yu.G., Filippov, N.V.

Title : Investigation of Pulse Discharges with High Currents

Orig Pub : Atom. energiya, 1956, No 3, 76-80

Abstract : A brief report on the results of an experimental investigation of high-power pulse discharges with high rates of current rise. A study was made of the pulse discharges in H<sub>2</sub>, D<sub>2</sub>, He, Ar, and Xe at initial gas pressures from 0.005 mm Hg to several millimeters. The maximum current in the discharge was 10<sup>5</sup> to 10<sup>6</sup> amp. The discharge was fed with a voltage from 20 to 50 kv from a capacitor bank ranging in rating from several tens to 400 microfarad. The rate of current rise in the initial discharge phase was 3 x 10<sup>10</sup> - 1.5 x 10<sup>11</sup> amp/sec, and the duration of the current rise from zero to maximum value was 8 - 17 microseconds. The discharge tubes used were porcelain cylinders 60 - 100 cm long and 20 - 40 cm in diameter. The intensity of the magnetic field was measured at various points of the discharge, as was the gas pressure.

Card : 1/3

Category : USSR/Nuclear Physics - Nuclear Reactions

G-5

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6073

The discharge oscillograms are characterized by a sharp discontinuity in the voltage and a break in the current, occurring at a certain instant of time. A graph of the dependence of the time interval  $\tau$  prior to the first such singularity vs. the mass of gas  $M$  in the discharge tube is given for various gases ( $H_2, D_2, He, Xe$ ) over a wide range of masses (approximately  $10^{-6}$  --  $10^{-3}$  g/cm<sup>3</sup>). The resultant points fit quite well on the curve  $\tau \sim M^{1/4}$ . These data are in good agreement with the values of  $\tau$  calculated using the theory developed by M.A. Leontovich and S.A. Osovets (Abstract 6074). The singularities on the oscillograms are connected with compressions of the plasma column. The maximum speed of motion of the plasma ranged from  $1 \times 10^6$  (at high gas densities) to  $1.2 \times 10^7$  cm/sec for discharges in  $H_2$  and  $D_2$ , with an initial pressure 0.01 mm Hg. At the instant of the maximum compression, the energy of the heavy particles reaches values corresponding to a temperature of approximately  $10^6$  degrees, and its pressure in the central zone is on the order of 50 atmospheres.

Card : 2/3



*Handwritten:* 1957, No 3, 84-87

Category : USSR/Nuclear Physics - Nuclear Reactions

C-5

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6075

Author : ~~Artemovich, I. I.~~ Andrianov, A.M., Dobrokhotov, Ye.I.,  
Luk'yanov, B.K., Podgorny, I.N., Simitsyn, V.I., Filippov, N.V.

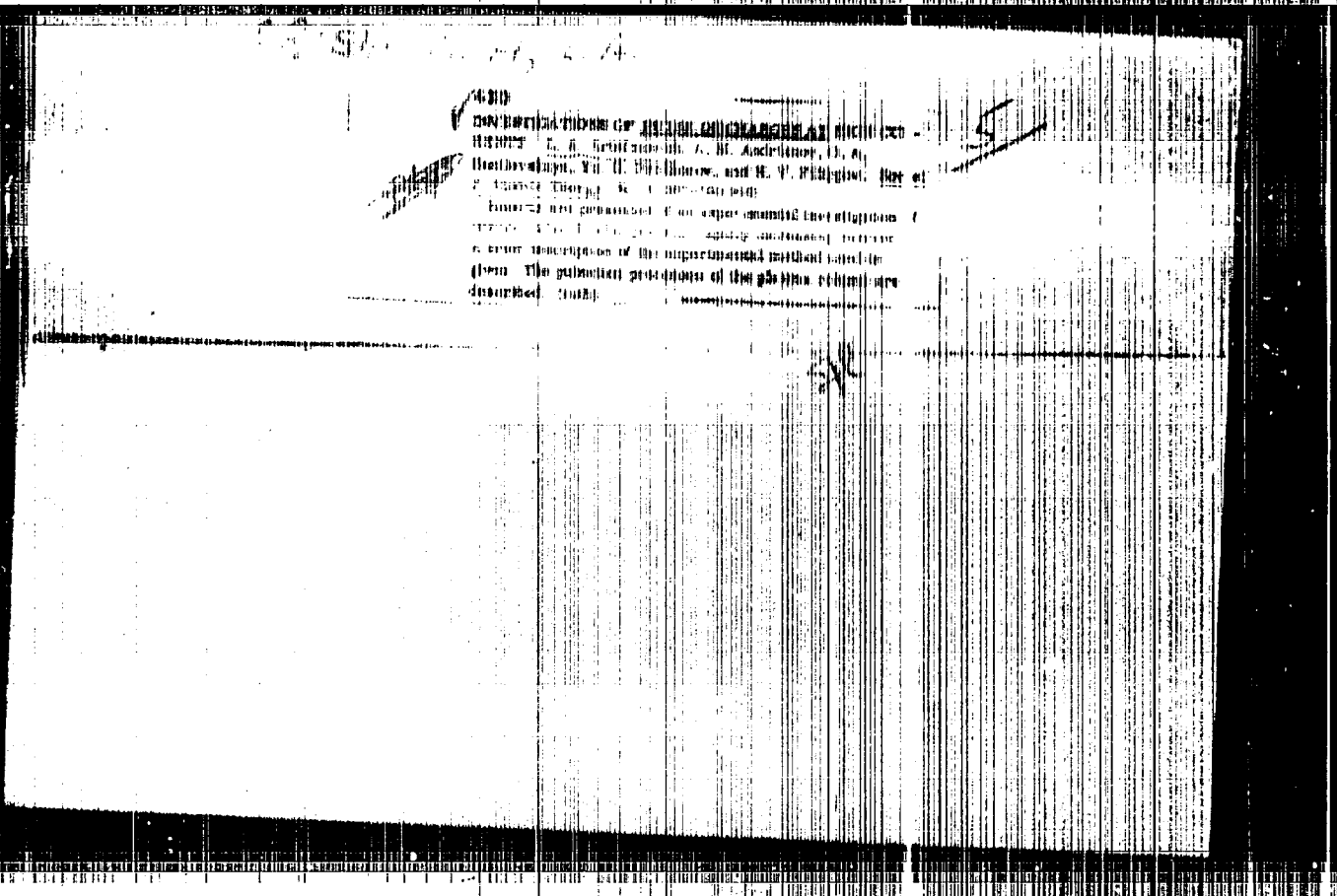
Title : Hard Radiation from Pulse Discharges.

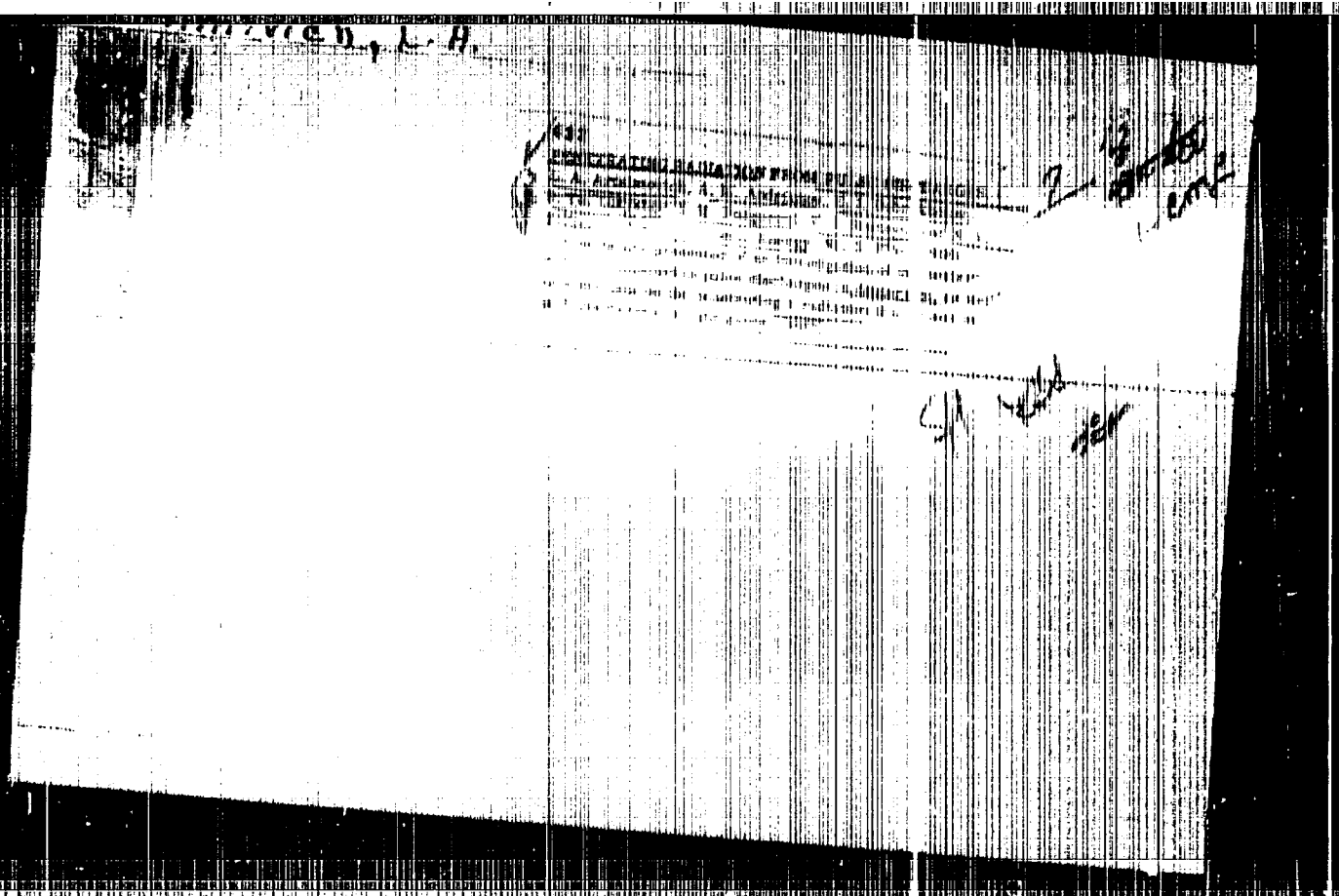
Orig Pub : Atom. energiya, 1956, No 3, 84-87

Abstract : It was observed that high-power pulse discharges in light gases can be sources of hard radiation. In 1952 the authors detected neutron radiation accompanying pulse discharges in D<sub>2</sub>. The discharges were carried out in cylindrical tubes 20 -- 40 cm in diameter, 50 -- 100 cm long. The current reached several hundreds of kiloperes, and its rate of rise amounted to  $5 \times 10^{10}$  --  $1.5 \times 10^{11}$  amp/sec. Silver targets were placed in paraffin blocks and scintillation counters were used to count the neutrons. In discharge tubes with porcelain walls, neutron emission is observed if the initial pressure of D<sub>2</sub> ranges from 0.01 to 0.3 mm Hg, while in tubes with metal side-walls the emission is observed up to 10 mm. At a maximum

Card : 1/2

Card : 2/2





ESMEYANOV, A.N.; TOPCHIYEV, A.V.; KURCHATOV, I.V.; SHCHERBINA, D.;  
KAPITSA, P.B.; IOFFE, A.F.; VINOGRADOV, A.P.; MERNBERG, I.G.; TIKHONOV,  
N.S.; PADNIEV, A.A.; FRANK, I.M.; VEKSLER, V.I.; KORMNYCHUK, A.Ye.;  
POPOVA, N.V.; LEKHNEVA, Z.A.; VASILEVSKAYA, V.L.; PTEROVSKIY, I.G.;  
ALEKSANDROV, A.D.; ARTSIMOVICH, L.A.; MESHCHERYAKOV, M.G.

Irene Joliet-Curie; obituary. Vest.AN SSSR 26 no.4:73-72 Ap '56.  
(Joliet-Curie, Irene, 1897-1956) (MIRA 9:7)

AUTHORS:

Artsimovich, L. A., Shchepkin, G. Ya., Zhakov, V. V., 89-12-1/29  
Makov, B. N., Maksimov, S. P., Malov, A. P., Nikulichev, A. A.,  
Panin, B. V., Brezhnev, B. G.

TITLE:

Electromagnetic Isotope Separating Device for Heavy Elements of  
High Resolving Power. (Elektromagnitnaya ustanovka s vysokoy ra-  
zreshayushchey siloy dlya razdeleniya izotopov tyazhelykh elemen-  
tov)

PERIODICAL:

Atomnaya Energiya, 1957, Vol. 3, Nr 12, pp. 483-491 (USSR)

ABSTRACT:

The constructed apparatus, which shall be able to separate clear-ly isotopes even with a relative mass difference of 1/240, must have a high dispersion, a high resolving power and especially well stabilized magnetical and electrical fields. An axial-symmetrical field, the dispersion of which is proportional to the square of the focusing angle, was used as a magnetic field. The focusing angle is 225°. The measured dispersion of the apparatus amounts to 20 mm at a relative mass difference of the masses to be separated of 1%.

The stabilization of the magnetic field of the separating device has been brought to 0,005% by the aid of a valve scheme. The acceleration velocity for the source of ions (up to 40 kV) is stabilized by a double cascade scheme up to 0,01%. But also the current in the discharge source of ions is stabilized. The vacuum chamber is constructed from stainless steel, in a C-shape. The

Card 1/3

Electromagnetic Isotope Separating Device for Heavy Elements of High Resolving Power. 89-12-1/29

pump system has been arranged so that a working vacuum of 4-6.10<sup>-6</sup> mm Hg is always guaranteed. When separating toxic materials moving locks, valves and regulators from synthetic and rubber are applied. The high vacuum here is maintained by means of a surge chamber.

A normal gas discharge source of ions, in which the material to be separated can be heated up to 1000°C, is used as source of ions.

Boxes from copper or graphite are usually used as targets. The following results were obtained:

Concentration factor:

75 to 302	for Pb208	concentrated from the natural lead-isotope mixture
22 to 71	for Pb207	"
151 to 214	for U238	concentrated from natural uranium
985 to 1420	for U236	"
1000	for Pu239	concentrated from samples of different isotope compositions
190 to 300	for Pu240	"

Card 2/3

Electromagnetic Isotope Separating Device for Heavy Element of 89-12-1/29  
High Resolving Power.

160 to 360 for Pu241

concentrated from samples of  
different isotope compositions

SUBMITTED:

There are 4 tables, 8 figures and 3 Slavic references.

August 21, 1957

AVAILABLE:

Library of Congress

Card 3/3

ADTC

ARTSI MOVICH, L. A.

AUTHOR

ARTSIMOVICH, L.A.; LUKYANOV, S.Yu, POZDORNYI, I.M., CHUVATIN, S.A. 56-7-1/66

TITLE

Electrodynamical Acceleration of Plasma Bundle.

PERIODICAL

(Elektrodinamicheskoe uskoreniye sgustkov plazmy) Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 3, No 7, pp 3-3 (U. S.S.R.)

ABSTRACT

In a vacuum chamber two rail electrodes, which are not connected and are parallel to each other, are fitted; they are earthed over a condenser (75μF) and a sphere gap. If, between these two electrodes, a thin copper wire is smelted explosionlike, the plasma bundle produced will move with a certain velocity. This velocity is measured by means of a rapid-action camera (2.10<sup>6</sup> picture per second, time of exposure 0,2μS) or by means of 2 magnetic inductors. If a copper wire of 0,02 mm thickness is burned with 30 KV, the plasma bundle has a velocity of (1-2).10<sup>7</sup> cm/sec at a distance of 30 cm from the place of the explosion. Thus it was possible to show that a plasma bundle can be electro-dynamically accelerated.

(8 Slavic references)  
Institute for Atomic Energy (Institut atomnoy energii)

ASSOCIATION

PRESENTED BY

SUBMITTED

AVAILABLE

Card

19.6.1957

Library of Congress.

1/1



ARTSIMOVICH, L.A., akademik; LUK'YANOV, S.Yu., professor.

Thermonuclear reactions; search for a controlled thermonuclear  
reaction. Priroda 46 no.1:18-25 Ja '57. (NINA 10:2)  
(Nuclear reactions)

ARTSIMOVICH, L. A.

21(7)

PHASE I BOOK EXPLOITATION SOV/1242

Akademiya nauk SSSR. Institut atomnoy energii

Fizika plazmy i problema upravlyayemkh termoyadernykh reaktsiy, t. II. (Plasma Physics and the Problem of Controlled Thermonuclear Reactions, t. 2) [Moscow] Izd-vo AN SSSR, 1958. 355 p. 3,000 copies printed.

Resp. Ed.: Leontovich, M.A., Academician.

**PURPOSE:** This collection contains previously unpublished work of members of the Institut atomnoy energii (Institute of Atomic Energy) of the Academy of Sciences of the USSR. It is intended for scientists interested in this field.

**COVERAGE:** This book is the second of four volumes of previously unpublished work of members of the Institute of Atomic Energy during the period 1951-58. The exploitation cards on the other volumes in this series have been released under the numbers 1241, 1243, and 1244.

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Plasma Physics and the Problem (Cont.)

SOV/1242

TABLE OF CONTENTS:

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Braginskiy, S.I., and A.B. Migdal. Processes in a Plasma Column During Rapid Increase of a Current 20

Braginskiy, S.I., and V.D. Shafranov. Plasma Filament in the Presence of a Longitudinal Magnetic Field 26

Artsimovich, L.A. Passage of Large Currents Through Plasma in the Presence of a Longitudinal Magnetic Field 81

Artsimovich, L.A. Magnetic Flux in a Compressing Cylinder 87

Artsimovich, L.A. Analysis of the Equation of Compression of a Filament in the Presence of an External Magnetic Field 101

~~Card 2/3~~

ARTSIMOVICH, L. A.

"High Temperature Plasmas."

paper presented at Second All-Union Conference on Gaseous Electronics, Moscow,  
October 2- 6 1958.

ARISIMOVICH, Lev Andreyevich

"Investigations on the controlled thermonuclear reactions in the USSR"  
(paper to be presented at 1958 UN "Atoms-for-Peace"  
Conference, Geneva).

AUTHOR: Arzamovich, L. A.

TITLE: Investigations of Controlled Thermonuclear Reactions in the USSR (Issledovaniya po upravlyayemyam termoyadernym reaktsiyam v SSSR)

SOV/89-5-51/27

PERIODICAL: *Atomnaya energiya*, 1958, Vol 5, Nr 5, PP 501-521 (USSR)

ABSTRACT: This is a rendering of the Geneva report 15/P/2298 ex 1958 in Russian.

The principal lines pursued in these investigations were:

- 1) The development of methods of heating matter up to very high temperatures in powerful pulsed electromagnetic processes of short duration.
- 2) The investigations of plasma heating methods in quasi-stationary high current electric discharges.
- 3) The investigation of plasma heating and containment methods in systems of a "magnetic trap" type.

In the paper the principal data obtained in experimental and theoretical investigations along the above-mentioned three lines are analyzed. The general criterion is presented of evaluating different

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Investigations of Controlled Thermonuclear Reactions in the USSR

SOY/89-5-5-4/27

systems which in principle may be used for the production of thermonuclear energy. The problem of choosing initial material for a thermonuclear generator is analyzed. Different types of magnetic traps in which the task of containing the heated plasma is performed entirely by external magnetic fields, are discussed. Typical versions of such systems can be divided into two categories:

- 1) Traps based on the adiabatic invariance principle
- 2) A trap with a varying magnetic field.

Different methods are presented of obtaining matter heated to a very high temperature in such systems (by the injection of ions, by the injection of plasma, by heating with a high-frequency magnetic field based on the cyclotron resonance etc.) There are 19 figures.

Card 2/2

*ARTSIMOVICH, L.A., akademik*  
ARTSIMOVICH, L.A., akademik

Siberian scientific center will be one of the most important  
scientific centers of the country. Tekh.mol. 26 no.3:3 '58.

(Siberia--Research)

(MIRA 11:2)



AUTHOR:

Artsimovich, L. A.

TITLE:

Investigations of Controllable Thermonuclear Reactions in the USSR (Issledovaniya po upravlyayemyh termoyadernym reaktsiyam v SSSR)

SOV/53-66-4-1/10

PERIODICAL:

Uspekhi fizicheskikh nauk, 1958, Vol 66, Nr 4 pp 545-569 (USSR)

ABSTRACT:

In his introduction, the author gives a short survey of the historical development of plasma research and the methods of confining hot plasma by strong magnetic fields. A magnetic field can be used for thermoinsulation and for plasma heating a) according to the method of plasma acceleration by electrodynamic forces. b) according to methods of obtaining equilibrium plasma configurations, i.e. states in which the pressure of the plasma is balanced by magnetic pressure. These two possibilities are discussed. Concerning b) two trends in research work are mentioned: Development of methods for the maintenance and the heating of plasma in systems with big closed discharge currents which are maintained by an exterior voltage and are stabilized by an external magnetic field; investigation of magnetic traps in which high-temperature plasma is produced by the accumulation

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of fast particles injected into the trap. In the following the author discusses some properties of the future thermonuclear reactors; thus, an equation for the magnetic system of a thermonuclear generator is given  $H^2 \tau > A(1 - \eta)$ ,  $H$  denotes the plasma-confining magnetic field,  $\tau$  the duration of the maintenance of high temperature in the plasma,  $\eta$  is that part of the thermal energy of the plasma which can be converted into electric energy, the constant  $A$  characterizes the nuclear fuel; ( $A \sim 10^{10}$  for pure D,  $A \sim 10^8$  for a D - T mixture). In the following section the author discusses the problem of the direct conversion of thermonuclear energy into electric energy and then into thermonuclear fuels, pure D and D - T mixture. The author is of the opinion that the use of a mixture consisting of equal parts of D-T offers considerable advantages. There now follows the report proper on the experimental and theoretical investigations in the USSR; in this connection new papers are especially considered. However, hardly any names or references are mentioned. Part I: Pulsed processes of short duration. An investigation of pulsed discharges with rapidly increasing current density ( $10^{10}$ - $10^{11}$  A/sec) shows that in the case of

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discharger in linear tubes as well as in toroidal chambers plasma acceleration by electrodynamic forces is the most important process. In the pulsed discharge the plasma is primarily pinched to the tube axis; this process introduces the rapid oscillation of the plasma column (stnar). Maximum density and temperature are obtained if the radius of the plasma column is shortest. The following holds for the determination of the lower limit of temperature during the first compression maximum:  $T = 4.6 \cdot 10^{12} I^2 / N$ ;  $I$  denotes the current density in kA at this moment,  $N$  the number of the particles with the same sign per unit of length of the plasma filament.  $T$  [keV] denotes the mean plasma temperature in the case of an ideal heat exchange between ions and electrons. Figure 1 shows the temperature distribution according to the radius of the plasma filament, figure 2 the distribution of the density of the material (maximum density at the moment of cumulation is by 30 to 40 times higher than the initial value). The experiments on intensive pulsed discharges aim at obtaining higher temperatures. Determination of the density of the plasma as well as of temperature is possible by

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means of spectroscopic measurements (by measuring the Doppler broadening of impurity lines). Further investigations concern the analysis of the particles produced in the discharge. The following institutes participated in this research program: Institut atomnoy energii AN SSSR (Institute of Atomic Energy, AS USSR), the fizicheskii fakul'tet Moskovskogo universiteta (Physics Dept. of Moscow University), the Ukrainskiy fiziko-tekhnicheskii institut (Ukrainian Physico-Technical Institute), and the Sukhumskiy institut elektronnoy fiziki (Sukhumi Institute of Electronics). PART III: Pulsed discharges with slowly increasing current in toroidal chambers. A distinction is made between "slow" and "fast" discharges; in the case of the first the plasma column oscillates several hundred times before the current reaches its peak value (in the case of the second, only once or twice). In slow discharges gas-kinetic pressure is in equilibrium with the electrodynamic forces, and the column temperature attains the Joule (Dzhoul) value if a) the column does not touch the walls of the chamber, and b) if this equilibrium is at the same time stable. The author supervised the investigations of equilibrium and stability at the

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Institut atomnoy energii AN SSSR (Institute of Atomic Energy, AS USSR). These investigations are then described. (Distinction between two different stability regimes; the magnetohydrodynamic conditions for perturbation damping are given for both regimes; for the second, where the stability of the plasma filaments is obtained by a strong longitudinal field, the formula  $H_z/H_\theta > L/2\pi a$  is given. ( $H_\theta$  denotes the current field,  $L$  the length of the filament);  $H = H_z$  - see figure 6; figure 7 shows a schematical representation of the nature of the occurring perturbations). In the following chapter the author discusses further experimental results of discharge investigations in chambers with insulating walls and in chambers with metallic walls (toroidal chambers); figures 9 and 10 show a photograph and a schematical drawing of such a metallic toroidal chamber at the Institute of Atomic Energy, AS USSR. The walls of this chamber consist of stainless steel of a thickness of 20 mm covered by a layer of copper having a thickness of 0.2 mm. The chamber is described more in detail and the main results of the investigation are given. It was found that even at conditions under which the plasma filament should no longer touch the

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Investigations of Controllable Thermonuclear  
Reactions in the USSR

SOV/55-66-4-1/10

walls at all, substantial losses are still observed, so that the experimentally possible plasma temperature is considerably below the theoretical one. This might be due to impurity atoms. Part III: Magnetic traps. First, this term is explained in detail. In 1950 A. D. Sakharov and I. Ye. Tamm suggested the first concrete model of a magnetic thermonuclear reactor (ionized rarified D heated in a toroidal chamber). The magnetic traps may be divided into two groups: a) traps with magnetic plugs, b) traps with restricted drift. Especially the former are discussed in detail since in this connection investigations (theoretical and experimental) were carried out at the Institute of Atomic Energy. It was possible theoretically to predict the existence of such perturbations of the equilibrium state as cannot be stabilized by themselves. Some types of instability are closely connected with the geometry of the magnetic field in the traps. Thus, a very dangerous type may arise in systems in which the external boundary of the plasma has a negative curvature (Fig 13). Experimental investigations: investigation of the accumulation of fast ions, ion concentrations of  $\sim 10^{13}$  in arc discharges in a longitudinal field. Plasmas containing fast ions exist only

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Investigations of Controllable Thermonuclear  
Reactions in the USSR

SOV/53-66-4-1/10

for some milliseconds. In summer 1958 a large experimental system of plugs was completed at the Institute of Atomic Energy. It serves for the investigation of the external injection of particles into the central part of the trap ( $D^+$  are obtained by  $D_2^+$  dissociation) (Fig 17). Further investigations deal with the application of high-frequency electromagnetic fields for the confinement and the insulation of plasmas as well as for plasma heating. The paper concludes with a summary of the first Geneva Conference, of the achievements hitherto made, and of hopes for the future. There are 19 figures.

Card 7/7

KEL'MAN, V.M.; YAVOR, S.Ya.; ARTSEMOVICH, L.A., akademik, otv.red.;  
IM HEBETSIIY, Yu.K., red.isd-va; SMIRNOVA, A.V., tekhn.red.

[Electron optics] Elektronnaia optika. Moskva, Isd-vo Akad.  
nauk SSSR, 1959. 372 p. (MIRA 12:11)  
(Electron optics)



21(0)  
AUTHOR:

Artsimovich, L. A., Academician

BOV/30-99-1-2/57

TITLE:

Research Work in the USSR Concerning Controllable  
Thermonuclear Reactions (Issledovaniya po upravlyayemym  
termoyadernym reaktsiyam v SSSR)

PERIODICAL:

Vestnik Akademii nauk SSSR, 1959, Nr 1, pp 11-23 (USSR)

ABSTRACT:

Investigations are still at the stage of exploring different ways of approaching this problem. The author of the present article reports on the applicability of the magnetic field for thermal insulation and heating plasma. He considers further the question of direct transformation of thermonuclear energy into electric power, indicating the material concerning the problem of controllable thermonuclear reactions which has accumulated in the USSR during recent years. Figure 1 gives a schematic representation of radial distribution of temperature in the plasma column (shnur), figure 2 shows the dependence of temperature in the plasma column on the initial voltage of the discharge tube. Figure 3 shows a spectrogram of the pulsed discharge in hydrogen, depending on time. Further, the author deals with pulsed discharges with a slow increase of current in torus chambers (Fig 4),

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• Research Work in the USSR Concerning Controllable  
Thermonuclear Reactions

S07/30-59-1-2/57

as well as the question of magnetic traps which were examined by I. Ye. Tamm, A. D. Sakharov in 1950. A theoretical examination of these systems was started by G. I. Iudker in 1953. Figure 5 shows a schematic cross-section of the first experimental system for the investigation of condensation of fast ions; figure 6 is the outside view of such a plant at the Institut atomnoy energii (Institute of Atomic Energy). A plant for the condensation of  $D^+$  ions was erected at the Institute of Atomic Energy (Fig 7), as well as a system with "crimped" magnetic field for the formation of traps with limited drift (Fig 8). Finally, the author states that the maintenance and further development of international scientific collaboration is the most important condition of a successful development of research concerning controllable thermonuclear reactions. There are 8 figures.

Card 2/2

198151001230001-2

845180  
ADDRESS:

Gromovskiy, V.L., Luk'yanov, S.N., Spivak, G.V. and  
Sivitskiy, I.G.  
TITLES:

Reports on the Second All-Union Conference on Gas  
Electrode  
PERIODICAL:  
Radioelektronika i Elektromekhanika, 1959, Vol 9, Nr 8,  
pp 1355 - 1358 (USSR)

ABSTRACT:

The conference was organized by the Academy of Sciences of the USSR, the Ministry of Higher Education and Moscow State University. It was opened by the chairman of the organizing committee, Prof. I.G. Sivitskiy, Academician of the USSR Academy of Sciences. A number of reports were delivered during the conference. A survey of the literature on the theory of the discharge in the glow region of the discharge was given in the papers by V.L. Gromovskiy and S.N. Luk'yanov. A survey of the high-frequency methods of the investigation of stationary and non-stationary plasma (see p 1355) is given in the paper by G.V. Spivak and I.G. Sivitskiy.

A survey of the literature on the theory of the discharge in the glow region of the discharge was given in the papers by V.L. Gromovskiy and S.N. Luk'yanov. A survey of the high-frequency methods of the investigation of stationary and non-stationary plasma (see p 1355) is given in the paper by G.V. Spivak and I.G. Sivitskiy.

Card/15  
Sivitskiy, I.G. and Spivak, G.V. "The Role of the Discharge in the Glow Region of the Discharge".

Abstracts of the papers presented at the conference are given in the following table. The papers are arranged in the order of their presentation at the conference.

1. Sivitskiy, I.G. and Spivak, G.V. "The Role of the Discharge in the Glow Region of the Discharge".

2. Gromovskiy, V.L. and Luk'yanov, S.N. "The Role of the Discharge in the Glow Region of the Discharge".

3. Spivak, G.V. and Sivitskiy, I.G. "The Role of the Discharge in the Glow Region of the Discharge".

4. Sivitskiy, I.G. and Spivak, G.V. "The Role of the Discharge in the Glow Region of the Discharge".

5. Gromovskiy, V.L. and Luk'yanov, S.N. "The Role of the Discharge in the Glow Region of the Discharge".

6. Spivak, G.V. and Sivitskiy, I.G. "The Role of the Discharge in the Glow Region of the Discharge".

7. Sivitskiy, I.G. and Spivak, G.V. "The Role of the Discharge in the Glow Region of the Discharge".

8. Gromovskiy, V.L. and Luk'yanov, S.N. "The Role of the Discharge in the Glow Region of the Discharge".

9. Spivak, G.V. and Sivitskiy, I.G. "The Role of the Discharge in the Glow Region of the Discharge".

10. Sivitskiy, I.G. and Spivak, G.V. "The Role of the Discharge in the Glow Region of the Discharge".

11. Gromovskiy, V.L. and Luk'yanov, S.N. "The Role of the Discharge in the Glow Region of the Discharge".

12. Spivak, G.V. and Sivitskiy, I.G. "The Role of the Discharge in the Glow Region of the Discharge".

13. Sivitskiy, I.G. and Spivak, G.V. "The Role of the Discharge in the Glow Region of the Discharge".

14. Gromovskiy, V.L. and Luk'yanov, S.N. "The Role of the Discharge in the Glow Region of the Discharge".

15. Spivak, G.V. and Sivitskiy, I.G. "The Role of the Discharge in the Glow Region of the Discharge".



ARCIMOVICS, L.A. [Artsimovich, L.A.]; DOLINSZKY, Tamas [translator]

Controlled thermonuclear research in the Soviet Union. Atom taj 2  
no.4:98-142 '59.

1. "Atomechnikai Tajekostato szerkesztoje.

ARTSIMOVICH, L. A.

EAST GERMANY/Nuclear Physics - Physical Base of Nuclear and  
Thermonuclear Technology

C

Abs Jour : Ref Zhur Fizika, No 2, 1960, 3125

Author : Artsimovich, L.A.

Inst : -

Title : Research on Controllable Thermonuclear Reactions in the  
USSR

Orig Pub : Fortschr. Phys., 1959, 7, No 7, 422-449

Abstract : Translated from the Journal "Uspekhi Fiz. Nauk" 1958, 65,  
545-569 (Referat Zhur Fizika, 1959, No 7, 14997).

Card 1/1

ARTSIMOVICH L.A.

ARCIMOVICS, L.A. [Artsimovich L.A.]; POCS, Lajos [translator]

Investigation of controlled thermonuclear reactions in the Soviet Union. Fis szemle 9 no.2:44-51 P '59.

MESEYANOV, A.N., akademik; TOPCHIYEV, A.V., akademik; ARTSIMOVICH, L.A.,  
akademik

Congratulations to Academician Vasilii Grigor'evich Pessenkov  
(on the occasion of his 70th birthday). Astron. zhur. 36 no.1:3  
Ja-F '59. (MIRA 12:4)

1. Prezident AN SSSR (for Messeyanov). 2. Glavnyy uchenyy  
sekretar' Prezidiuma AN SSSR (for Topchiyev). 3. Ispolnyayemyy  
shohiy obyazannosti akademika-sekretarya Otdeleniya fiz.-mat.  
nauk AN SSSR (for Artsimovich).  
(Pessenkov, Vasilii Grigor'evich, 1889-)



S/089/60,008/06/14/021  
B006/B063

AUTHOR: Artsimovich, L. A., Academician

TITLE: To the Editor of the Periodical "Atomnaya energiya"  
(On the Abstract "Entropic Trapping of Plasma by a  
Magnetic Field With Anti-plug Configuration")

PERIODICAL: Atomnaya energiya, 1960, Vol. 8, No. 6, p. 562

TEXT: The abstract of an article by Zh. Tak (J. or G. Tuck) was published in Atomnaya energiya, 1960, Vol. 8, No. 3. The abstracter writes that Tuck suggested a new method of plasma injection into the magnetic trap, but the author of the present article points out that this method has already been described by S. Yu. Luk'yanov and I. M. Podgorny (Ref. 1). Moreover, it is noted that the Institut atomnoy energii (Institute of Atomic Energy) has made experiments for years to work out this method. Eight months before Tuck published the first of his articles, Luk'yanov and Podgorny published the results of an investigation on the possibility of plasma trapping by a magnetic field

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To the Editor of the Periodical "Atomnaya  
energiya" (On the Abstract "Entropic Trapping  
of Plasma by a Magnetic Field With Anti-plug  
Configuration")

S/089/CO,008/06/14/021  
B006/BC6:

having a structure which was called "anti-plug configurat.on" by G. B.  
At the Second Geneva Conference on the Peaceful Uses of Atomic Energy  
(1958), Soviet physicists spoke about investigations carried out in the  
Soviet Union in this field. There are 3 Soviet references.

SUBMITTED: April 15, 1960



Card 2/2

PHASE I BOOK EXPLOITATION SOV/5806

Artsimovich, Lev Andreyevich

Upravlyayemye termoyadernyye reaktsii (Controlled Thermonuclear Reactions) Moscow, Fizmatgiz, 1961. 467 p. 10,000 copies printed.

Eds.: V. A. Leshkovtsev and B. L. Livshits; Tech. Ed.: K. P. Brudno.

**PURPOSE :** This book is intended for physicists and scientific and technical personnel who are interested in the progress made in the field of controlled nuclear reactions.

**COVERAGE:** The book describes a small part of what has been done up to the present time in the field of controlled thermonuclear reactions and in the study of the properties of high-temperature plasma, and includes some discussion of the difficulties to be overcome before a controlled reaction becomes a reality. Attention is given to basic

Card ~~2~~

### Controlled Thermonuclear Reactions

SOV/5806

theoretical concepts of the processes taking place in plasma, methods for heating plasma, thermal insulation, existing experimental installations for high-temperature plasma research, the results of this research, and the main trends in thermonuclear-synthesis research. The theoretical treatment has been kept to the strict minimum necessary for a general orientation in high-temperature plasma physics, and cumbersome derivations of formulas have been omitted. For the most part the material for the book has been gathered from pre-1961 publications and studies. The ODS system of units has been used in all computations. The author thanks his colleagues of the Otdel plazmennykh issledovaniy Instituta atomnoy energii imeni I. V. Kurchatova AN SSSR (Department of Plasma Research of the Institute of Atomic Energy imeni I. V. Kurchatov AS USSR) and the following: R. Z. Sagdeyev, who composed most of section 4.7 and the greater part of section 7.7; V. M. Dlagolev, for his analysis of the principal methods for the high-frequency containment of plasma discussed in sections 8.17 and 8.18; and Ye. V. Artyushkov, for plotting a great number of the graphs.

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S/030/61/COO/004/002/015  
B105/B206

AUTHOR: Artsimovich, L. A., Academician-Secretary, Academician  
(see Association)

TITLE: Department of Physical and Mathematical Sciences

PERIODICAL: Vestnik Akademii nauk SSSR, no.4, 1961, 27-30

TEXT: The general meeting of the Otdeleniye fiziko-matematicheskikh nauk (Department of Physical and Mathematical Sciences) was opened by Academician L. A. Artsimovich, Academician-Secretary of the Department. He mentioned the following most significant scientific results of the last year: utilization of the molecular field of ferromagnetic substances for the polarization of nuclei, realized at the Institut atomnoy energii im. I. V. Kurchatova (Institute of Atomic Energy imeni I. V. Kurchatov); starting of a microtron with high stability of particles and high intensity, at the Institut fizicheskikh problem im. S. I. Vavilova (Institute of Problems of Physics imeni S. I. Vavilov); production of high pressures at high temperatures at the Institut fiziki vysokikh davleniy (Institute

Carc. 1/4

Department of Physical...

S/030/61/000/004/002/015  
B105/B206

of Physics of High Pressures). According to L. A. Artsimovich, the training of cadets is unsatisfactory. He also mentioned problems of foreign contacts of Soviet scientists, as well as the collaboration with the academies of the People's Republics in various fields, which he considers to be of great importance. Finally, he mentioned problems connected with extending the network of scientific institutions. Academician S. L. Sobolev opened the discussion by dealing with problems of strengthening research institutions and schools of higher learning by cadets, and improving their working conditions and raising scientific qualifications. The same problem was also dealt with by Academicians P. S. Aleksandrov and A. N. Kolmogorov. The Academicians I. Ye. Tamm and A. A. Dorodnitsyn, as well as D. I. Blokhintsev, Corresponding Member AS USSR, considered it necessary to strengthen the links with the scientific centers of the People's Democracies. I. A. Kibel', Corresponding Member AS USSR, reported on meteorological forecasts. Academician V. I. Veksler recommended unofficial discussions of topical problems under participation of outstanding scientists and leaders of institutions. The Academicians B. P. Konstantinov, P. L. Kapitsa, A. P. Aleksandrov,

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Department of Physical...

S/O30/61/000/004/002/015  
B105/B206

V. P. Linnik, I. K. Kikoin, as well as the Corresponding Members AS USSR M. A. Sadovskiy, S. V. Vonsovskiy, and K. I. Shchelkin participated in the discussions. The following scientific reports were delivered: Academician L. S. Potryagin and V. G. Boltanskiy, R. V. Gamkrelidze, Ye P. Mishchenko, Doctors of Physical and Mathematical Sciences, reported on the theory of optimum processes. They conducted research work in this field at the Matematicheskii institut im. V. A. Steklova (Institute of Mathematics imeni V. A. Steklov) for many years. I. Ya. Pomeranchuk, Corresponding Member AS USSR, reported on some asymptotic properties of elastic scattering of strongly interaction particles at great energies. I. Ya. Pomeranchuk and V. B. Berestetskiy studied the simplest nonelastic processes of conversion near the pole of two particles into three and of two particles into four. V. A. Krat, Doctor of Physical and Mathematical Sciences, described the studies of the movement in the solar atmosphere, made at the Pulkovskaya observatoriya (Pulkovo Observatory) from 1951 to 1960. V. V. Vitkevich, Candidate of Physical and Mathematical Sciences, reported on latest research of the sun and the space close to it, and pointed out that the method of radioscopy was elaborated at the laboratoriya radio-

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Department of Physical..

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B105/B206

astronomii (Radioastronomical Laboratory) of the Fizicheskii institut im. P. N. Lebedeva (Physics Institute imeni P. N. Lebedev) and spread during the last years. The supercorona of the sun which reaches from 5 to 30 R<sub>0</sub> and more, mainly consists of radial heterogeneities. It is concluded therefrom that a radial magnetic field predominantly exists in the space close to the sun. The new tasks of optical astronomy consist in observing the spaces of the supercorona distant from the sun, in determining the average electronic concentration and degree of heterogeneities, causing the dispersion of radio waves.

ASSOCIATION: Otdeleniye khimicheskikh nauk (Department of Chemical Sciences) [Abstracter's note: Name of association was taken from first page of journal.]

Card 4/4



S/029/61/000/009/003/006  
D037/D113

AUTHOR: Artsimovich, L.A., Academician and Secretary of the  
Department (see Association)

TITLE: To-day's physics is to-morrow's engineering

PERIODICAL: Tekhnika molodezhi, no. 9, 1961, 9

TEXT: The author describes two problems of physics under discussion: (1) controlled thermonuclear fusion and (2) nuclear radiostations. The solution of the first problem would create a basis for harnessing the inexhaustible nuclear energy contained in ordinary water. The main difficulty in solving this problem is that an ultrastellar temperature of some hundred million degrees has to be maintained continuously in the substance to initiate the static thermonuclear reaction. The idea of nuclear radiostations was developed in the Soviet Union by the young physicists Frokhorov and Basov. These radiostations will make it possible to produce extremely

Card 1/2

To-day's physics ....

S/029/61/000/009/003/006  
DO37/D113

powerful acicular beams of electromagnetic waves and light rays by which signals can be transmitted many billions of kilometers beyond the solar system. Nuclear radiostations will allegedly come into operation within the next 5 to 10 years. No striking advances in controlling thermonuclear fusion are cited.

ASSOCIATION: Otdeleniye fiziko-matematicheskikh nauk AN SSSR (Department of Physics and Mathematics of the AS USSR) ↙

Card 2/2

SISAKYAN, N.M., akademik; MINTIS, I.I., akademik; SATPAYEV, I.I., akademik;  
FRUMKIN, A.N., akademik; SHEMYAKIN, M.M., akademik; SOBOLEV, S.I.,  
akademik; SHULEYKIN, V.V., akademik; BITSADZE, A.V.; MEL'NIKOV, N.V.;  
KHOVSTOV, V.M.; ROMASHKIN, P.S.; ABDULLAYEV, Kh.M.; DANYKIN, V.P.,  
doktor biol.nauk; BOLENTSEV, R.D., doktor khim.nauk; PONOMAREV,  
B.M.; BLAGONRAVOV, A.A., akademik; ARTSIMOVICH, L.A., akademik;  
KOSTENKO, M.P., akademik; NALIVKIN, D.V., akademik

Discussion of the report. Vest.AN SSSR 31 no.3:27-47 Mr '61.  
(MIRA 14:3)

1. AN Kazakhskoy SSSR (for Satpayev). 2. Chleny-korrespondenty  
AN SSSR (for Bitsadze, Mel'nikov, Khvostov, Romashkin, Abdullayev,  
Ponomarev).

(Research)

ARTSIMOVICH, L.A., akademik; FAYNBOYM, I.B., red.; NAZAROVA, A.S., tekhn.  
red.

[The attack of thermonuclear synthesis; discussions with  
Academician L.A.Artsimovich] Shturm termoiadernogo sinteza;  
besedy s Akademikom L.A.Artsimovichem. Zapiski Viktora Trostnikova.  
Moskva, Izd-vo "Znanie," 1962. 47 p. (Novoe v zhizni, nauka,  
tekhnika. IX Seriya: Fizika i khimiya, no.1) (NIIIA 15:5)  
(Thermonuclear reactions)

S/O30/62/000,001/001/011  
B104/B102

AUTHOR: Artsimovich, L. A., Academician

TITLE: The problem of controlled thermonuclear synthesis

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 1, 1962, 7 - 15

TEXT: This paper was written on the basis of a report held by the author at the International Conference on the Peaceful Uses of Atomic Energy, Salzburg, Austria, 1961. In the first stages of the study of controlled thermonuclear reactions, high-temperature plasmas were produced by powerful linear pulse discharges of very short duration. Now systems for plasma compression by means of an increasing external field have been studied. The theta-pinch instability allows to reach a maximum concentration of magnetic energy in small volumes. It is improbable that high-speed plasma compression by a radially increasing field should be of any practical importance in thermonuclear synthesis; nevertheless investigations will be continued in this direction. Devices for investigating quasi-steady or slow discharges in toroidal chambers, built in USA, Great Britain, and USSR ("Альфа"- "А1'фа"), are described. The study of the  
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The problem of controlled ...

S/030/62/000/001/001/011  
B104/B102

ohmic plasma heating in a strong magnetic field is still in the developmental stage. The abnormal diffusion of particles out of plasma shortens its lifetime to some hundred microseconds. In the last few years, the stability of plasma in magnetic mirror traps has been studied at the Institut atomnoy energii im. I. V. Kurchatova Akademii nauk SSSR (Institute of Atomic Energy imeni I. V. Kurchatov of the Academy of Sciences USSR).

A plasma with fast-ion concentrations of up to  $10^9 - 10^{10} \text{ cm}^{-3}$ , contained in the chamber of an ion magnetron, shows a characteristic channel instability which limits the duration of particle containment in the magnetic field to some hundred microseconds. The study of stability of plasmas produced in American magnetic traps with dynamic fields has not yet been completed. Plasma in magnetic traps with hyperbolic lines of force must be magneto-hydrodynamically stable. The confinement of plasma in such traps has been studied in the last few years. The lifetime of particles is prolonged in a magnetic field resulting from the superposition of the magnetic field of electric conductors on the field of a magnetic mirror. The metal conductors are placed along the lines of force of the magnetic mirror. This result was obtained at the Institute of Atomic Energy imeni

Card 2/3

The problem of controlled ...

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B104/B102

I. V. Kurchatov. The abnormal diffusion of particles out of the plasma trap is considered to be characteristic of magnetic traps and depends on their manipulation. There are 2 figures.



Card 3/3

ARTIMOVICI, L.A. [Artsimovich, L.A.]

The 22d Congress of the CPSU and tasks of Soviet physics,  
mathematics, and astronomy. Analele mat 16 no.4:3-11  
O-D '62.



ARTSIMOVICH, L.A.

The 22d Congress of the CPSU and tasks facing Soviet physics,  
mathematics, and astronomy. *Usp.mat.nauk* 17 no.2:3-11 Nov-62.  
(Research) (MIRA 15:12)

ARTSIMOVICH, L.A.

~~ARTSIMOVICH, L.A.~~ [Artsimovich, L.A.], akademikus (USSR)

Soviet research in nuclear fusion. Klet tad 17 no.44:1384-1386  
4 N 162.

KELDYSH, M.V., akademik; FEDOROV, Ye.K., akademik; ARTSIMOVICH, L.A., akademik;  
 SISAKYAN, S.F., akademik; GORSKIY, I.I.; KAFETSIA, P.L.; POK, V.A.;  
 LANDAU, L.D.; LIFSHITS, Ye.M.; SHAI'NIKOV, A.K.; PHELATHILOV, I.M.;  
 ALEI SEYEVSKIY, N.Ye.; VAYNSHTEYN, L.A.; FALLAGIN, A.V., akademik;  
 SATPAYEV, S.I., akademik; AMBARTSUMYAN, V.A., akademik; LUPREVICH,  
 V.F.; MUSHKELISHVILI, N.I., akademik; KARAMEYEV, P.K.; MUSTEL', E.R.;  
 MASEVICH, G.G., doktor fiz.-matem.nauk; EFKON, K.M.; MARTYNOV, D.Ya.,  
 prof.; GABDOR'YEV, A.A., akademik; MAROV, K.K., prof.; COLOVAJVA,  
 A.G., prof.; FILATOVA, L.G., prof.; FEYVE, Ya.V.; SEMIKHATOV, B.N.,  
 prof.; TITOV, A.C.; KYCHAGOV, G.I.; BARSKAYA, V.F.; VLASOVA, A.A.;  
 BARANOVA, Ye.F.; KIBARDINA, L.A.; ISACHENKO, A.F.; IL'INA, Yu.P.;  
 DANILOV, A.I., prof.; FIALDE, K.K.; NECHAYEVA, T.N., prof.; CHEFER,  
 L., doktor; SZANTO, Ladislav, akademik; BELACHIK, Iozef; FAN KLOK  
 V'YEN; JOHNSON, M.S., prof. (L'vov); STARKOV, N.; ABRAMOVICH, Yu.;  
 VOSKRESHINSKIY, V.; KNOPACHEV, A.; REZVOY, D., prof. (L'vov);  
 KONDRAT'YEV, V.N., akademik; LEBEDINSKIY, V.I., kard.geol.-mineral.-  
 nauk; YANSHIN, A.L., akademik

"Priroda" is 50 years old. Priroda 51 no.1:3-16 Ja '62.

(NIRA 15:1)

1. Prezident AN SSSR (for Keldysh).
2. Glavnyy uchenyy sekretar' Prezidiuma AN SSSR (for Fedorov).
3. Akademik-sekretar' Otdeleniya fiziko-matem.nauk AN SSSR (for Artsimovich).
4. Akademik-sekretar' Otdeleniya biologicheskikh nauk AN SSSR (for Sisakyan).
5. Chlen-korrespondent AN SSSR, zamestitel' akademika-sekretarya Otdeleniya

(Continued on next card)

ARTSIMOVICH, L.A.

The 22d Congress of the CPSU and problems in Soviet physics,  
mathematics, and astronomy. Usp. fis. nauk 76 no.1:3-10 Ja  
'62. (MIRA 15:2)

(Research)

S/053/62/076/001/001/004  
B117/B101

AUTHOR: Artsimovich, L. A.

TITLE: State of research of controlled thermonuclear reactions

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 1, 1962, 11 - 20

TEXT: The present paper which summarizes the results achieved during recent years in the field of controlled thermonuclear reactions and published in 250 experimental and theoretical papers was the subject of a lecture held at the end of the International Conference on Peaceful Uses of Atomic Energy in Salzburg, Austria, in September 1961. As compared with the 1958 Geneva conference where the ideas advanced were hardly backed by experimental data, the author achieved considerable progress almost in every branch of the general thermonuclear program. Valuable results and accurate experimental studies provide a secure basis for pushing forward further research work, particularly as to the creation and stabilization of high-temperature plasma. Since the problem of dangers resulting from various forms of plasma instability is still far from being solved, further prospects cannot be foreseen. It can therefore hardly be

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✓

State of research of controlled ...

S/053/62/076/CO1/CO1/004  
B117/B101

said that the practical final goal has been achieved by solving the present problems, since new problems may arise in the course of further research work. Finally, the author thanked the mayor of Salzburg on behalf of the Soviet delegation for his hospitality and appreciated the way in which the secretary's office of the International Atomic Energy Agency had organized the Conference. Among others, the author mentioned work carried out at the Institut atomnoy energii imeni I. V. Kurchatova (Atomic Energy Institute imeni I. V. Kurchatov). ✓

Card 2/2

ARTSIMOVICH, L.A., akademik; KARTASHEV, K.B.

Effect of transverse magnetic field on a toroidal discharge.  
Dokl. AN SSSR 146 no.6:1305-1308 0 '62. (MIRA 15:10)  
(Electric discharges through gases)  
(Magnetic fields)

KEL'MAN, Veniamin Moiseyevich; YAVOR, Stella Yakovlevna; AR'SIMOVICH,  
L.A., akademik, otv. red.; GOL'SHTEYN, G.A., red. Izd-vo  
AREP'YEVA, G.P., tekhn. red.

[Electron optics] Elektronnaia optika. Izd.2., perer. i dop.  
Moskva, Izd-vo Akad. nauk SSSR, 1963. 362 p. (MIR 16:6)  
(Electron optics)



ARTSIHOVICH, Lev Andreyevich; ALYAB'YEV, A.F., red.; VLASOVA,  
T.A., tekhn. red.

[Elementary plasma physics] Elementarnaya fizika plazmy.  
Moskva, Gosatomizdat, 1963. 19. p. (MIRA 16:12)  
(Plasma (Ionized gases))

ARTSIMOVICH, Lev Andreyevich; KOSTIYENKO, A.I., red.; SHREINCO, K.P.,  
tekh. red.

[Controlled thermomuclear reactions] Upravlyaniye termoo-  
iadernye reaktzii. Izd.2., perer. Moskva, Fizmatgiz,  
1963. 496 p.  
(MIRA 17:3)

AM4029013

BOOK EXPLOITATION

S/

Artsimovich, Lev Andreyevich

Elementary plasma physics (Elementarnaya fizika plazmy\*). Moscow, Gosatomizdat, 63. 0109 p. illus. 40,000 copies printed.

Series note; Nauchno-populyarnaya biblioteka Gosatomizdata

TOPIC TAGS: plasma research, plasma magnetic field interaction, plasma radiation, magnetohydrodynamics, plasma conductivity, plasma physics, thermonuclear control.

PURPOSE AND COVERAGE: The book develops the fundamentals of plasma physics in a method understandable to persons with only secondary education. It presents results of an analysis of different plasma processes, as well as means of interpreting these results. The purpose of the book is to simplify the explanation of plasma physics.

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- Ch. II. Motion of particles under the influence of electric and magnetic fields - - 17
- Ch. III. Motion of charged particles in a plasma - - 56
- Ch. IV. Radiation of plasma - - 36
- Ch. V. Directed streams of particles and of energy in a plasma: electric current, diffusion, thermal conductivity - - 95
- Ch. VI. Measurement methods - - 120
- Ch. VII. Plasma and magnetic field - - 182
- Ch. VIII. Prospects of technical application - - 168
- Appendix - - 190

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OTHER: 000

DATE ACQ: 23Mar64

Card 2/2

KELDYSH, M.V., akademik; DORODNITSYN, A.A., akademik; SOBOLIV, S.L., akademik;  
TRAPEZNIKOV, V.A., akademik; STAROVSKIY, V.N.; KOEN, I., prof. psikhologii;  
BERNAL, D. (Angliya); PAUCELL, S.; ARTSIMOVICH, L.A., akademik;  
NEKUCHINOV, V.S., akademik

Science in the borderland of fantasy. Tekh.mo. 31 no.1:2 of cover, 2,7,  
163.  
(MIRA 16:3)

1. President AN SSSR (for Keldysh).
2. Chlen-korrespondent AN SSSR (for Starovskiy).
3. Manchesterkiy universitet, Angliya (for Koen).
4. President Vsemirnoy federatsii nauchnykh rabotnikov (for Pauell).  
(Science)

ARTSIMOVICH, L.A., akademik; DOLLEZHAL', N.A., akademik; KIRILLIN, V.A., akad.;  
MILLIONSHCHIKOV, M.D., akademik; POPKOV, V.I.; FRUMKIN, A.N.,  
akademik

[Power engineering of the future; the second discussion]  
Energetika budushchego; beseda vtoraiia. [By] L.A.  
Artsimovich i dr. Moskva, Izd-vo "Znanie," 1962. 54 p.  
(no. 06 v shizni, nauke, tekhnike. Seria IX: Fizika, ma-  
tematika, astronomia, no.11) (MIRA 17:6)

1. Chlen-korrespondent AN SSSR (for Popkov).

ARTSIMOVICH, L. A.

"Research on high temperature plasma physics and controlled thermonuclear fusion in the USSR."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.





L 58365-55

ACCESSION NR: AT9010445

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the charge particles is compared with the value expected in the presence of Bohm or classical diffusion. The prospects of using the chaotic method of plasma heating in a confinement are discussed. The authors thank G. H. Dalgarno-Savel'ev and V. I. Golovinskiy for their assistance with the experimental results and procedures, G. I. Gorbunov for his assistance with the optical measurements, and the technical crew." Orig. art. num: 27 Figures, 11 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 00

HR REF SOV: 009

ENCL: 00

OTHER: 005

HR REF SOV: 00

L 11364-65 EWT(1)/ENG(k)/EWT(m)/EPA(sp)-2/EPA(sp)-2/HEC(t)/HEC(t)-2/EWA(a)-0  
Pz-6/Pon-2/Pab-10/Pi-4 IJF(c)/ESD(gg)/LSD(p)-3/ADR/ABDC(b)/SIR(b)  
ACCESSION NR: AP045327 8/0089/61/017/101/0170/0176

AUTHOR: Artemovach, L. A.; Mirnov, S. V.; Strelkov, V. M.

TITLE: Investigation of plasma ohmic heating on a "Tokamak-3" toroidal machine

SOURCE: Atomnaya energiya, v. 17, no. 3, 1964, 170-176

TOPIC TAGS: plasma heating, plasma pinch, plasma conductivity, plasma pinch instability, Tokamak 3 machine, controlled fusion reaction, controlled thermonuclear reaction

ABSTRACT: Experiments were performed on a "Tokamak-3" machine to investigate the heating of plasma by means of a current passing through it in the presence of a strong longitudinal magnetic field. In order to prevent the most dangerous forms of magnetohydrodynamic instability of the plasma pinch. It was found that the correction of the magnetic field substantially changes the discharge characteristics. Measurements of the main discharge characteristics show that even the very small transverse components of the stabilizing magnetic field, appearing as a result of a non-ideal magnetic field, strongly affect the

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behavior of the plasma pinch in the toroidal chamber. The compensation of the stationary component of the transverse field on the "Tokamak-3" considerably improves the discharge characteristics and particularly increases the conductivity of the plasma pinch. When the stabilizing field is very strong and the equilibrium position of the plasma pinch is such that the axial line of the pinch passes through the center of the opening of the limiting diaphragm, then the average electric conductivity over the plasma cross section reaches  $(1-2) \times 10^{16}$  CGS units. During the process the plasma pinch is gradually displaced in the direction of the chamber outer wall. If the longitudinal magnetic field is not too strong and the initial gas pressure in the chamber is not too low, then at some moments the movement towards the outer wall is interrupted, and the plasma pinch returns to the inner wall. Discontinuities on the potential oscillograms correspond to this intermittent motion, and sharp peaks correspond to it on current oscillograms. Orig. art. has 6 figures and 1 formula.

ASSOCIATION: none

Con. 2/3

L 14332-65 EWT(l)/EWG(k)/EWT(m)/NPA(sp)-2/EPA(w)-2/EHC(t)/EHC(u)-2/EWA(v)-2/  
Pz-6/Pe-4/Pab-10/P1-4 IJP(c)/ASD(d)-2/SSD(b)/APW1/SSD/ASD(u)-2/EHC(b)/ASD(p)-3/  
APETN/RAEM(a)/ESL(qs)/ESD(t) AT  
ACCESSION AR: AP4047414 S/0089/64/017, 004/0269/0213

AUTHOR: Artsimovich, L. A.

TITLE: Investigation of controlled nuclear fusion and high-temperature plasma physics

SOURCE: Atomnaya energiya, v. 17, no. 4, 1964, 269-278

TOPIC TAGS: nuclear fusion, plasma, plasma physics, fusion, nuclear physics, nuclear reaction

ABSTRACT: The present paper is a review of Soviet experimental research on nuclear fusion and high-temperature plasma physics presented at the Third International Conference on Peaceful Uses of Atomic Energy held in Geneva in 1964 (Paper No. 257). The article traces the developments of the last few years in investigation of properties of plasma in open magnetic mirrors, ohmic heating of plasma in toroidal systems in the presence of an intense stabilizing field, and the behavior of plasma in intense, high-frequency, electromagnetic fields (heating and containment of plasma). The main results

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ACCESSION NR: AP4047414

attained with various trapping devices are given, and the organiza-  
tions involved in the research are listed. Orig. art. has: 9 figures

ASSOCIATION: none

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OTHER: 000

ATO FRES: 3135

Card 2/2



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limit containment to a few microseconds and have created great difficulties for experimentalists. A review of present experimental facilities with high temperature plasma containment indicates that although efforts are being made in England, in the USA, and in the USSR in this direction, since the early 1960s the state-of-the-art in this area is very low. Various types of magnetic geometries are in use, but the most common are the tokamak, the figure-eight and the mirror machines, which require the containment to date have been 1 million to 100 million degrees Kelvin at pressures of a few atmospheres for a few microseconds only. Another problem is the lack of efficient plasma heating. It is hoped that the development of more efficient heating methods will in time render these heating techniques energy conversion practical.

ASSOCIATION: none

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ENCLOS: 00

DATE CONTAINED: 1965

NO REF SOV: 000

OTHER: 000

Card 2/2

AETSIMOVICH, L.A., akademik; KELDYSH, M.V., akademik; KAPITSA, P.L., akademik;  
VUL, B.M.; VERESHCHAGIN, L.F.; PISTOL'KORS, A.A.; SPCH'KIN, A.N.,  
akademik; SKOBEI'TSYN, D.V., akademik; ALEKSANDROV, A.P., akademik;  
AMBARTSUMYAN, V.A., akademik; ZEL'DOVICH, Ya.B.; SENENOV, N.N.,  
akademik; KOTEL'NIKOV, V.A., akademik; LIFSHITS, I.M.; VEKSLER, V.I.,  
akademik; GINZBURG, V.L.; MILLIONSHCHIKOV, M.D., akademik

Some problems in the development of modern physics; discussion of  
the work of the Department of General and Applied Physics. Vest.  
AN SSSR 35 no.2:3-46 F '65. (MIRA 18:3)

1. Chleny-korrespondenty AN SSSR (for Vul, Vereshchagin, Pistol'kors,  
Lifshits, Ginzburg).



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Approved for release by NSA on 05-08-2014 pursuant to E.O. 13526  
AP 169  
(CIA 1215)

ANZIMCVIC, L.A. and ALICHAOV, A.I.

"The Partial Absorption of X-Ray Quanta," Zeitschrift für Physik,  
Vol. 69, pp. 853,856, 1931.

ARTSIMOVICH, L.L.; MEDOSPASOV, A.V.

Radial distribution of a positive column of plasma in a magnetic field. Dokl.AN SSSR 145 no.5:1022-1024 '62. (MIRA 15:8)

1. Predstavleno akademikom M.A.Leontevichem.  
(Plasma (Ionized gases)) (Magnetic fields)

TEMBBAUM, M.M., kand.tekhn.nauk; ARTSIMOVICH, Y.N.

Protecting reducing gear parts on coal-mining machinery from abrasive wear. Ugol' 34 no.2143-45 P '59. (MIRA 12:4)

(Coal mining machinery--lubrication)  
(Mechanical wear)