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DEMIRKHANOV, R.A.

C-4

USSR/Nuclear Physics - Structure and Properties of Nuclei.

Abs Jour : Ref Zhur - Fizika, No 4, 1957, 8706

Author : Demirkhanov, R.A., Gutkin, T.I., Dorokhov, V.V., Rudenko, A.D.

Inst :

Title : Masses of Isotopes H, D, He^4 and C^{12}

Orig Pub : Atom. energiya, 1956, No 2, 21-27

Abstract : A new exact measurement of the masses of the atoms H, D, He^4 and C^{12} has been made. The measurements were carried out with a mass spectrograph developed by Ardenne with the participation of Eger and the authors of this work. The apparatus has double focusing by means of electric and magnetic fields, effected respectively by cylindrical capacitor and a sector magnet. The iron beam is created by a plasma source with single contraction of the discharge. Recording of the mass spectrum is photographic; "Schumann" plates are used. There

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Abs Jour : Ref Zhur - Fizika, No 4, 1957, 8706

is the possibility of visually observing the spectrum with the aid of an ion-optical converter.

The maximum resolution of the instrument is 100,000 -- 120,000, and the dispersion (roughly calculated) is not less than 2.34 cm percent of relative mass difference. The calibration of the scale of the masses of the instrument is made using photographs of certain basic lines, namely those of the groups

N^{14+} -- $N^{14}H^{+}$ -- $N^{14}H_2^{+}$ -- $N^{14}H_3^{+}$, $C_4^{12}H_3^{+}$ -- $C_4^{12}H_4^{+}$ -- $C_4^{12}H_5^{+}$

and O^{16+} -- $O^{16}H^{+}$ -- $O^{16}H_2^{+}$.

The masses of the atoms H, D, He^4 and C^{12} were found from photographs of the doublets H_2 -- D, D_2 -- H^4, D_3 -- 1/2 $C^{12}H_4$ -- O^{16}. The results are:

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USSR/Nuclear Physics - Structure and Properties of Nuclei. C-4

Abs Jour : Ref Zhur - Fizika, No 4, 1957, 8706

H -- 1.008142 $\pm 10^{-6}$, He_4 -- 4.003872 $\pm 4 \times 10^{-6}$,

D -- 2.014736 $\pm 2 \times 10^{-6}$, and C^{12} -- 12.003820 $\pm 5 \times 10^{-6}$.

The data obtained are in agreement with the values determined from the energy balance of the nuclear reactions.

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- DEMIRKHANOV, R.A.

USSR/Nuclear Physics - Structure and Properties of Nuclei. C-4

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 452

Author : Demirkhanov, R.A., Gutkin, I.I., Dorokhov, V.V.
Inst :
Title : Mass of the Isotope He^3.

Orig Pub : Atomn. energiya, 1957, 2, No 5, 469-470

Abstract : A mass-spectroscopic determination was made of the mass of the isotope He^3, in a mixture of helium isotopes enriched with He^3 to 99.5%, using a setup previously described (Referat Zhur Fizika, 1957, No 4, 8706). The mass was measured in the doublets H^3 -- He^3 and HD^3 -- He^3. The results of the measurements were checked against the HD -- H^3 doublet. The mass scale was calibrated against the spectrum $N^{14}H$ -- $N^{14}H_2$ -- $N^{14}H_3$. The value obtained for the mass of He^3 is 3.016970 ± 2 atomic units of mass. The data of this

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DEMIRKHANOV, R.A.

USSR / Nuclear Physics - Structure and Properties of Nuclei C-4

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 453

Author : Demirkhanov, R.A., Gutkin, I.N., Dorokhov, V.V.

Inst :

Title : Masses of the Isotopes C^{13}, N^{14}, and N^{15}.

Orig Pub : Atomn. energiya, 1957, 2, No 6, 544-551

Abstract : Results are reported on new mass-spectrographic measurements of the masses of C^{13}, N^{14}, and N^{15}. It is shown that there exists "an internal agreement" for the values of the masses of these isotopes, obtained from various systems of coublets. The measurements were performed under conditions that exclude the systematic errors. A procedure is given for a precision adjustment of the ion-optical system. For the masses of C^{13}, N^{14}, and N^{15}, the values obtained were $13.007491 \pm 3 \times 10^{-6}$, $14.007527 \pm 4 \times 10^{-6}$ and $15.004890 \pm 5 \times 10^{-6}$ atomic units of mass respectively, which is in good agreement with the values

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24(5)

AUTHORS: Demirkhanov, R. A., Gutkin, T. I., SOV/56-35-4-13/52
Dorokhov, V. V.

TITLE: Nuclear Bond Energy in the Region of the 82 Proton and 126 Neutron Magic Numbers (Energiya svyazi yader v oblasti magicheskikh chisel po protonam 82 i neytronam 126)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, V. 35 No. 4, pp 917 - 925 (USSR)

ABSTRACT: The authors of the present paper report on ich experimental material which is arranged in a clear manner in tables. By means of a mass spectrograph (resolving power 60000-80000, description in refererces 4,5) the masses of the following isotopes were measured:
Lead: Pb 204, 206, 207 and 208 (Table 2)
Mercury: Hg 198, 199, 200, 201, 202 and 204 (Table 3)
Thallium: Tl 203 and 205 (Table 4)
Bismuth: Bi 209.
Determination of masses was carried out by direct comparison with the masses of the corresponding

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Nuclear Bond Energy in the Region of the 82 Proton and 126 Neutron Magic Numbers

SOV/56-33-4-13/52

organic compounds, as e.g. for Pb 204 - $Cl_{16}H_{12}$, Pb 208 - $C_{14}H_8O_2$, Hg 199 - $C_{13}H_{11}O$, Hg 204 - $C_{16}H_{12}$, Tl 203 - $C_{16}H_{11}$, Tl 205 - $C_{16}H_{13}$, Bi 209 - $C_{14}H_{13}N_2$. The masses for the various isotopes are given up to 6 decimals, data given are accurate up to 3-4 decimals. From mass measurements the nucleon bond energies in the nucleus are calculated. The results obtained indicate a shell structure of the nucleus with a well-filled shell of 82 protons and 126 neutrons. The difference of the nuclear bond energy for an even and odd number of nucleons in the nucleus and its smoothing out as the shell is filled up can distinctly be seen. After the shell is filled up with Z= 82 and N= 126, the bond energy of the next neutron is higher than that of the next proton. The energy of two bound neutrons (which yields the Hg 204 nucleus) is greater than the energy of attachment of two protons in the formation of the Pb 204 nucleus. The authors

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thank Ye.Ye.Baroni, T.N.Lebsadze, K. A.

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Kovyrzina and V.M.Shoniya for placing the metallographic compounds and the heavy hydrogen at their disposal, and they also express their gratitude to P.S.Brostyuk, M.I. Dzkuya and G.A.Dorokhova for their practical help. There are 2 figures, 9 tables, and 10 references, 4 of which are Soviet.

SUBMITTED: May 17, 1958

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

20-118-6-14/43

AUTHORS: Demirkhanov, R. A., Gutkin, T. I., Dorokhov, V. V.

TITLE: Masses of Lead Isotopes (Massy izotopov svintsa)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 118, Nr 6, pp. 1103-1104 (USSR)

ABSTRACT: The present paper reports on the results of the measuring of the masses of load isotopes Pb^{204}, Pb^{206}, Pb^{207} and Pb^{209}. These measurements were carried out in connection with the determination of the binding energy of the nucleons in a nucleus in the range of the magic numbers 82 and 126 with respect to the protons and with respect to the neutrons, respectively. All this is connected with the necessary exact definition of the mass of the isotope Pb^{208} which is used as base value for the computation of the masses of heavy isotopes with

$$z \gtrless 82$$

from the data of the nuclear reactions. The measurements were carried out by means of a device described already earlier by the same authors (ref 1). The dissolving power

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of this device amounted in this region to 60,000 - 80,000. In order to increase the accuracy of the measurements the masses of the lead isotopes were determined by immediate comparison with the corresponding mass of hydrocarbons which contain the isotopes H^1, C^{12} and O^{16}. The values obtained here were controlled by the determination of the mass of the lead isotope from various doublets and by the production of lead ions from various compounds. Each value ΔM of the doublet was determined by treatment of 18-20 mass spectrograms (which were photographed on different plates). The results of the measurements are given in a table. Following is shown by the data of this table: Within the measuring error limits a satisfying "inner" connection exists between the mass values detected from various doublets. The results found here confirm the absence of systematic measuring faults and the reliability of the data obtained here. Finally the differences between the present measurements and the earlier ones are pointed out in short.

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21(7), 21(1)

AUTHORS: Demirkhanov, R. A., Gutkin, T. I., Dorokhov, V. V.

SOV/56-36-5-62/76

TITLE: The Mass of the Isotope Pu^{239} (Massa izotopa Pu^{239})

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1595-1596 (USSR)

ABSTRACT: Already in a number of previous papers the authors reported on the mass determinations of lead and uranium isotopes, and they also described the mass-spectrometric device used for these measurments (Refs 1, 3, 4). In the present "Letter to the Editor" they give a report on measurements carried out with Pu^{239} by means of this spectrometer, which has a resolving power of 60,000 - 80,000. For mass determination doublets of various organic compounds were used, which consisted of the already exactly known elements H, C^{12} and O^{16}, viz. alizarin ($C_{14}H_8O_4$, M = 240) and perilen ($C_{20}H_{12}$, M = 252). Ion formation occurred in an arc discharge in helium, the pairs Pu^{239} - organic compound

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were introduced into the discharge by evaporation from special crucibles. The mass differences ΔM of the doublet and the corresponding mass values of Pu^{239} are:

doublet	M[mME]	mass of Pu^{239} [ME]
$Pu^{239} - C_{14}H_7O_4$	18.448±0.082	239.128922±92
$C_{19}H_{11} - Pu^{239}$	33.447±0.067	239.128695±74

Mean value: 239.128784±165

The mass of Pu^{239} calculated from nuclear reactions gives 239.128025±155 if a correction of the more accurately known value of Pb^{208} is taken into account, and 239.126999±150 if this correction is not taken into account. It is found that the difference of the masses of Pu^{239} and U^{238} calculated according to the authors' data, when compared with the data obtained from nuclear reactions, amounts to only 0.166±0.250 mME, i. e. that it is still within the limits of errors. It is therefore assumed that the error of ~1 mME is due to an inaccurate Q-value.

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21(8)
AUTHORS: Demirkhanov, R. A., Gutkin, T. I., Dorokhov, V. V. SOV/20-124-2-16/71

TITLE: The Masses of the Isotopes Th^{232}, U^{234}, U^{235} and U^{238} (Massy izotopov Th^{232}, U^{234}, U^{235} i U^{238})

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 2, pp 301-303 (USSR)

ABSTRACT: Measurement of the masses of Th^{232}, U^{234}, U^{235} and U^{238} made it possible to determine the binding energy of nucleons in the nuclei not only of these isotopes but also of many radioactive isotopes connected with them by the naturally-radioactive series 4n, 4n + 2 and 4n + 3. The exact masses of these isotopes have hitherto not been determined by direct measurements. The authors determined the masses of these isotopes by means of an already previously (Ref 3) described mass-spectrographical device having a resolving power of the order of 60000 - 70000 . The masses of the isotopes were determined by direct comparison with the corresponding mass of organic compounds. These organic compounds contained H^1 , C^{12} and N^{14}, the masses of which are known.

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The Masses of the Isotopes Th^{232}, U^{234}, U^{235} and U^{238}

SOV/20-124-2-16/71

The substances used for measurements are given; control was carried out by determining the mass of U^{238} from the doublets $C_{19}^{12}H_{10}-U^{238}$ and $C_{18}^{12}C^{13}H_9 - U^{238}$. Short reference is made to a second control method. Each doublet was determined by the evaluation of 18-20 mass spectrograms (which had been photographed on different plates). Results of measurements are given by a table. The masses of the isotope U^{238}, which were determined from 2 different doublets, agree well with one another within the limits of measuring errors. The "mean value" calculated by taking account of weight amounts to $M_{U^{238}}=238.127284 \pm 35.10^{-6}$ mass units. The mass values determined by the present paper are lower than the corresponding values determined by nuclear reactions. Also these differences remain within the limits of permissible deviations, an exception being formed only by uranium.

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The authors thank Ye. Ye. Baroni and K. A. Kovyrzina for placing heavy hydrogen at their disposal, and they also thank M. I. Dzkuya, G. A. Dorokhova and P. S. Brostyuk for their active help. There are 3 tables and 11 references, 6 of which are Soviet.

PRESENTED: September 26, 1958, by L. A. Artsimovich, Academician

SUBMITTED: August 29, 1958

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9.3150,24.2120

77342
SOV/57-30-3-8/15

AUTHORS: Demirkhanov, R. A., Gevorkov, A. K., Popov, A. F., Zverev, G. I.

TITLE: High-Frequency Oscillations In a Restricted Plasma (Work Completed in 1958)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 306-314 (USSR)

ABSTRACT: Oscillations observed in discharges are identified usually as plasma oscillations. However, Looney and Brown (see reference) observed some oscillations which occur only in presence of double layers on plasma boundaries. This is not in agreement with the theory of plasma oscillations. The authors here investigate the nature and excitation mechanism in plasma bounded by double layers and show that one obtains high-frequency oscillations due to oscillatory motion of secondary electrons in the potential well of the plasma. They used an apparatus similar to that of Looney and Brown (see Fig. 1).

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High-Frequency Oscillations in a Restricted Plasma

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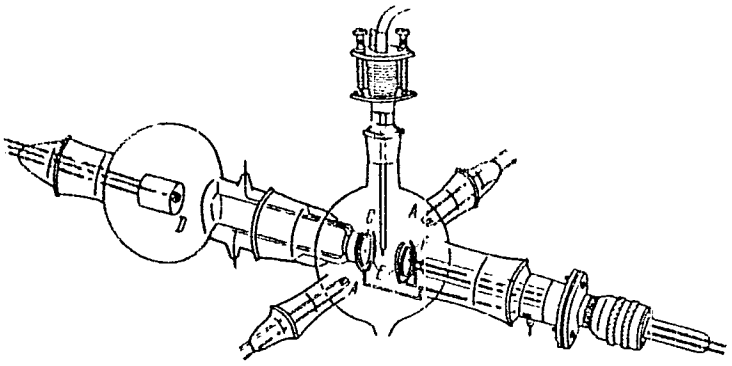

Fig. 1. Construction of discharge tube.

Plasma was produced between the oxide-coated cathodes A and anodes E. Electron beam, up to 3 kv of energy entered the region through C, and after crossing a distance L through the plasma, it would fall on F.

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connected electrically to C. The potential well for electrons was caused by ion layers between annular anodes E and electrodes F and C. Variable voltage 0-400 v enabled large variations of ion layer thickness. Distance L between F and C could be changed 10-30 mm. Working pressure was 10^{-2}-10^{-3} mm Hg, while the gases used were Ar, H_2, and N_2. A movable coaxial probe was collecting plasma parameters and oscillation frequencies, with the sensitivity of the registering device at 10^{-11} v. The authors first derive an expression for the frequency inside the potential well f_0 of electrons caused by secondary emission of electrons by primary beam on F:

$$f_0 = \frac{1}{4\frac{d}{\bar{v}} + \frac{2(L-2d)}{\sqrt{\frac{2eV_1}{m}}}}$$

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where d is thickness of ionic layer; $\bar{v}$ is average velocity of electrons in layer; V_1 is potential of plasma with respect to source of electrons. They found that these secondary electrons oscillating inside the potential well are responsible for the excitation of oscillations measured by the probe and listed in Table 1. Note that observed frequencies satisfy relation

$$f_n = nf_0 \quad (n = 1, 2, 3 \ldots).$$

Similar results were obtained for fixed potentials and variable L. A continuous flow of electrons oscillating inside the well could not produce an amplification of alternating fields unless a mechanism exists ensuring an orderly motion and enabling particles to give their energy to the alternating field. The authors show that such a mechanism of amplitude selection can exist provided there is an alternating field on the boundary of the plasma in addition to the constant field.

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High-Frequency Oscillations in a Restricted Plasma

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Table 1. V_{beam} = 300 v; P = $7 \cdot 10^{-3}$ mm Hg; L = 20 mm; f_o is frequency computed from the potential distribution; $f_n = nf_o$ (n = 1, 2, 3...) are experimentally observed frequency groups.

U bias, V	U_{plasma} V	d, mm	$f_1 \cdot 10^6$, cycles	$f_2 \cdot 10^6$, cycles	$f_3 \cdot 10^6$, cycles	$f_4 \cdot 10^6$, cycles	$f_5 \cdot 10^6$, cycles	$f_6 \cdot 10^6$, cycles
120	16	2.0	125	—	—	490	595—660	710—790
140	14	2.2	135	—	—	530—560	630—720	760—860
160	12	2.4	145	—	—	510—600	660—765	829—900
180	11	2.8	152	—	—	570—630	630—795	870—920
200	11	3.0	158	—	460—485	580—660	710—835	—
220	11	3.2	164	—	470—510	620—680	760—860	—
240	10	3.5	169	310—315	460—535	610—710	795—870	—
260	10	3.7	173	330—360	490—540	660—740	820—920	—

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This mechanism is applicable for frequencies lower than the plasma frequency since because of fast damping of such alternating fields inside the plasma they remain concentrated on the surface of the plasma. The authors also show that the mean free path l of the electrons is of fundamental importance and must be at least equal to 2L. When l was adjusted to approximately 6 cm, oscillation vanished at L = 3 cm. Also, the authors investigated influences of plasma densities and widths of the excited frequency groups. They found that phase focusing plays a substantial role at high amplitudes of oscillations. They observed sometimes in the plasma of the primary discharge, oscillations caused by electron oscillations in the potential well of the cathode potential drops. All oscillations were accompanied by electromagnetic radiations discernible by antennas placed outside the discharge tube. The authors believe that the oscillations observed by Looney and Brown and, most probably, by other authors are connected to the

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mechanism of amplitude selection. Ya. B. Faynberg evaluated many results of the present paper. There are 9 figures; 2 tables; and 11 references, 1 Soviet, 1 Dutch, 1 Irish, 1 U.K., 7 U.S. The 5 most recent U.K. and U.S. references are: D. Gabor, IRE Trans., AP-4, Nr 3, 526 (1956); T. K. Allen, R. A. Bayley, K. G. Emeleus, Brit. J. Appl. Phys., 6, 320 (1955); D. K. Looney, S. C. Brown, Phys. Rev., 93, 965 (1954); D. Bohm. E. P. Gross. Phys. Rev., 75, 1851, 1864 (1949); 79, 992 (1950).

SUBMITTED: November 2, 1959

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9.5 50,24.2120

SOV/57-30-3-9/15

AUTHORS: Demirkhanov, R. A., Gevorkov, A. K., Popov, A. F.

TITLE: Interaction With Plasma of a Charged Particle Beam (Reported at the IV International Conference on Ionization Phenomena in Gases, Upsala (Sweden), August 1959)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 315-319 (USSR)

ABSTRACT: Investigation of ultrahigh-frequency plasma oscillations excited by a beam of fast electrons is important for understanding kinetic stability of plasmas, establishment of Maxwellian velocity distributions, radio wave emission by sun and stars, etc. Despite many reports, investigations cannot be considered concluded since many of the published results disagree. Theoretical works by Bohm and Gross (Phys. Rev., 75, 1851, 1864, 1949; 79, 992, 1951), A. I. Akhiyezer, Ya. B. Faynberg (ZhTF, 21, 1262, 1951), and Berz (see references at end of abstract) showed that whenever a plasma

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contains beams of charged particles of fixed velocities higher than the average thermal velocity of the plasma electrons, the system becomes unstable, and oscillations of frequency close to that of the plasma build up in amplitude. The present work investigated oscillations caused by a continuous electron beam injected into the plasma. One of the experimental set-ups is shown on Fig 1. Oxide-coated cathode A and the anode B supplied the electron beam which is passing through a 2-4-mm circular opening through C into the basic plasma produced between the oxide-coated D and C. The current density of the beam was negligible compared with the density of the plasma. Oscillations were registered by antennas outside the tubes or by a probe inside the discharge region of another type of apparatus. The authors were able to register oscillations of 100-3,500 mc/s.

Experiments were performed at 10^{-2}-10^{-3} mm Hg of pressure with Ar, H_2, and N_2. They observed plasma

 oscillations every time the electron beam crossed the

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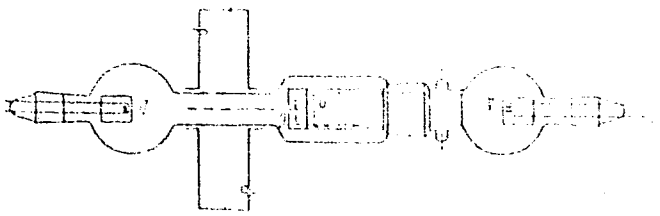

Fig. 1. Construction of the discharge tube.

plasma. The width of the excited spectrum was 500-600 mc with a maximum of intensity corresponding to the plasma frequency. The theoretical frequency is given by:

$$\omega_p^2 = \frac{4\pi Ne^2}{m},$$

where ω_p is frequency corresponding to the maximum of intensity; N is density of electrons of the plasma;

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e and m are charge and mass of the electron, respectively. It corresponds to curve 1 on Fig. 3.

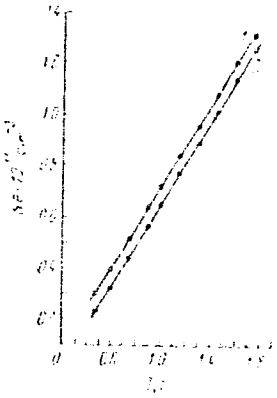

Fig. 3. Plasma density vs. discharge current: (1) plasma density computed using Equation ("A"); (2) density measured by the resonator method.

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It differs from the experimental curve 2 probably because of a nonuniform distribution of plasma density over the discharge tube, leading to a lower resonator coontent. The authors obtained a set of oscillation intensity versus density curves (Fig. 4) which agree well with theoretical predictions by Bohm and by Sumi (J. Phys. Soc. Japan, 13, 1470, 1958) The power of these longitudinal oscillations was of the order of a microwatt for a 1-2 ma beam current. Oscillations may be observed over the whole volume of the plasma, but the amplitude decreases very fast with the distance from the beam. The authors conclude that whenever a beam is injected having velocities V_1 larger than the thermal electron velocities V_T inside the plasma, the beam excites waves and the beam energy is converted into oscillation energy which may alter the relaxation time, change the diffusion, and produce emission of radio waves. Ya. B. Faynberg evaluated some results of

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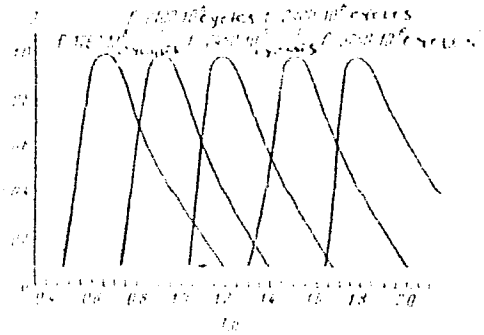
Fig. 4. Intensity variations for a given frequency vs. plasma density. Ordinate represents intensity for each curve, in relative units.



this work, and G. I. Zverev explained the methods for measuring ultrahigh frequencies. There are 4 figures; and 14 references, 2 Soviet, 1 Dutch, 1 Irish, 1 Japanese, 2 U.K., 7 U.S. The 5 most recent U.K. and U.S. references are: G. P. Boyd,

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Interaction With Plasma of a
Charged Particle Beam

L. M. Field, R. W. Gould, Phys Rev., 109, 1393 (1958); F. Berz, Proc. Phys. Soc., 69, Nr 441B, 939 (1956); T. K. Allen, R. A. Bailey, K. C. Emeleus, Brit. J. Appl. Phys., 6, 320 (1955); D. K. Looney, S. C. Brown, Phys. Rev. 93, 965 (1954); D. Bohm, E. P. Gross, Phys. Rev., 79, 992 (1950).

SUBMITTED: November 2, 1959

Card 7/7

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87371
21.5300(2916,1033,1138) S/120/60/000/004/010/028
E032/E414

AUTHORS: Shyuttse, V., Demirkhanov, R.A., Gutkin, T.I., Samadashvili, O.A. and Karpenko, I.K.

TITLE: A Double Focusing Mass-Spectrograph for the Measurement of the Masses of Isotopes

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No.4, pp.92-98

TEXT: A description is given of a double-focusing mass spectrograph in which the double focusing condition is obeyed for all mass numbers. The principal ion optical parameters are as follows: ion deflection angle in the electric field 31°50'; ion deflection angle in the magnetic field 90°, radius of curvature in the electric field 51 cm. Owing to large linear dimensions, high stability of deflecting fields and accurate adjustment, a resolution of 120000 was achieved. The corresponding line widths were 1.5 to 2 μ. The dispersion per 1% of mass was between 0.25 and 2.25 mm. A permanent magnet is employed so that the same degree of stability is achieved over the whole mass range. The spectrometer is essentially of the Mattauch type, as indicated by Fig.1, where 1 is the ion source, 2 is a cylindrical condenser, 3 is the magnet, 4 is a vacuum

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3

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A Double Focusing Mass-Spectrograph for the Measurement of the Masses of Isotopes

valve, 5 is the input slit, 6 is a vacuum-tight screen which also serves as the ion current receiver, 7 are slits, 8 is a Faraday cylinder, 9 is a magnetic slit, 10 is an ion-optical (image) converter with a quartz light guide, 11 is the photographic plate holder, 12 are diffusion pumps and 13 is the concrete foundation. The length of the photographic plate is 400 mm. The input slit is at a distance of 360 mm from the boundary of the electric field and the distance between the electric and the magnetic fields is 560 mm. The ion source is in the form of a water-cooled gas discharge tube. With an anode voltage of 50 kV and anode-cathode potential difference of 25 kV, the discharge current was 4 to 5 mA. The accelerating electrode is earthed and the general arrangement of the electrodes is indicated in Fig.3. The anode is in the form of a copper cylinder with a closed end and a circular aperture drilled through it. The cathode is in the form of a steel disc, having a channel of 0.5 mm in diameter and 8 mm long. The flux of slow ions

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E032/E414

A Double Focusing Mass-Spectrograph for the Measurement of the Masses of Isotopes

leaving this channel is accelerated by a third electrode in the form of a truncated cone and having a 1 mm diameter aperture. The position of the anode can be varied relative to the cathode. The magnet is such that fields up to 11000 Oe can be produced in a 4 mm gap; it is a permanent magnet with Armco-iron poles. The use of a permanent magnet ensures a high degree of uniformity ($\Delta H/H \sim 10^{-7}$). In order to reduce the effect of the fringe field, a special magnetic slit made of high permeability material is used (9). Acknowledgments are expressed to E.Gotman who took part in the development of the design and to V.F.Moskovskiy and P.S.Brostyuk for practical assistance. There are 7 figures and 17 references: 1 Soviet and 16 non-Soviet.

SUBMITTED: May 16, 1959

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R A

Reports presented at the 5th Intl. Conference on Ionization Phenomena in Gases. Munich, 28 August - 1 September 1961.

a. G A Basilevskaya, A M Andrianov, V F Demichev and V I Vasilyev
"Investigation of a Pulse Discharge in a Hollow Cylindrical Gas Sheath"

b. D G Brezhnev Yu S Maksimov
"Energy Measurements of Fast Electrons Formed During a Powerful Pulse Discharge" Chamber

c. A B Berezin, A N Zaydel, and G M Malyshev
"On a Method of Spectralisopic Investigation of the Hydrogen Discharge Chamber Walls Interactions"

d. V F Kitayeva N N Sobolev
"On the Hydrogen Lines Broadening Under the Carbon Arc and Detonation Wave Conditions"

e. S G Alikhanov R A Demirkhanov, A V Komin, G G Podlesnyy, G L Zhotevnov
" An Investigation of Plasma Diffusion in the Magnetic Field"

f. V S Komelkov, Yu V Skvortsov V N Tereshchenko S S Tserevitinov
"Dynamical Current Cord"

g. N N Sobolev
"A Spectroscopically Studied State of Gases Following the Detonation Wave"

h. R N Ilin, Ye S Solovyev N V Fedorenko
"Molecular Hydrogen Ionization by Gas Hydrogen Atoms"

i. I P Flaks, G N Ogurtsov
"Ionization of Gases Induced by Multi-charged Ions"

j. P M Morozov, L N Filippov
"The Source for Molecular Hydrogen Ions Formation at the Ogra Device"

k. A L Besbatchenko V V Kuznetsov N P Malakhov N N Semashko
"Injection of an Ionic Beam into the Ogra Magnetic Trap"

l. V Ye Yurasova
"On Directed Emission of Particles from a Copper Single Crystal Sputtered by Bombardment with Ions"

33

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89257

24.6510

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B029/B063

AUTHORS: Demirkhanov, R. A., Gutkin, T. I., Dorokhov, V. V.

TITLE: Masses of heavy atoms and binding energies of nuclei in the range of $174 \leq M \leq 239$

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 1, 1961, 124-129

TEXT: The results of mass-spectrographic measurements of nuclear masses in the range of $174 \leq M \leq 239$, carried out for a large number of isotopes with an accuracy of 10^{-7} to $5 \cdot 10^{-7}$, are presented. The mass spectrograph with double focusing used for the purpose had a resolution of 50,000-80,000. The masses of heavy nuclei were measured by the doublet method and with the use of the organic compounds C_nH_m, $C_nC^{13}H_m$, $C_nH_mH_k$, and $C_nO_mN_kH_p$ as standard masses. The question as to whether there is a fine structure in the curve of binding energy in the mass range with $A \sim 200$ can only be answered if the accuracy of measurement is improved by one

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order of magnitude, i.e., to $\Delta M/M \sim 3 \cdot 10^{-7}$, and a discontinuity of ~3 Mev in the binding energy can be established with an accuracy of ~20% if $\Delta M/M \sim 3 \cdot 10^{-6}$. The high degree of accuracy with which the dispersion coefficient can now be measured, and the method developed by the authors make it possible to increase the accuracy of measurement in the respective mass range by a factor of 10-50. In many cases, the mass of the isotope was determined from various doublets, i.e., the "inner agreement" was taken into account. Table 1 contains the masses of the Re, W, Ta, and Hf isotopes and, for comparison, the masses obtained by the mass-spectroscopic method and nuclear reactions. The masses of Re^{185}, Hf^{179}, Hf^{177}, and Hf^{174} were measured for the first time. The mass values of the majority of isotopes measured by the authors are higher than those obtained in Refs. 8 and 9. This is obviously due to the fact that a defective standard mass had been used. A comparison of the present data with similar values obtained by other methods is of particular interest. The results of the present paper are compared in Table 2 with those of other papers. They agree with those published by W. H. Johnson and V. B. Bhahot

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(Ref. 17) within the limits of error, but differ from the results obtained from nuclear reactions by about the double error. According to what has been said above, the Q values for the reactions $Hf^{177}(\gamma,n)Hf^{176}$ and $Hf^{179}(\gamma,n)Hf^{178}$ are probably erroneous, or the limits of error in the determination of the Q values of these reactions must be increased two or three times. The nuclear masses of 42 stable isotopes measured by the authors were then used to determine E/A as a function of A (per nucleon) within the range $174 \leqslant M \leqslant 210$ (cf. Fig.). In addition, the binding energies of 66 radioactive nuclei were calculated. Table 3 contains the binding energies B_n of the last neutron and B_p of the last proton, and also the pairing energies P_n and P_p of the neutrons and protons, respectively, for the Hf, Ta, W, and Re isotopes. On the strength of these measurements it is possible to establish some rules concerning nuclear energies. The nucleus has a shell structure, and the shell is completely filled at Z = 82 and N = 126. In the case of nuclei with odd A, the binding energy is always lower than in the case of nuclei with even A. At equal values of Z, the shell structure may be derived also

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Masses of heavy atoms and binding ... S/048/61/025/001/023/031
B029/B063

from the mutual behavior of the (Z+1)th proton and the (N+1)th neutron (Z = 82, N = 126). The binding energy of the last neutron or proton satisfies the law of conservation of parity. The authors thank Ye. Ye. Baroni and his co-workers K. A. Kovyrsina and V. M. Soyfer for several preparations, as well as M. I. Dzkuya and G. A. Dorokhova for assistance. This is the reproduction of a lecture read at the Tenth All-Union Conference on Nuclear Spectroscopy, Moscow, January 19-27, 1960. There are 1 figure, 3 tables, and 21 references: 8 Soviet-bloc and 13 non-Soviet-bloc.

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APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R.A.; GUTKIN, T.I.; SAMADASHVILI, O.A.; KARPENKO, I.K.

Mass measurements of tin and antimony isotopes. Izv. AN SSSR. Ser. fiz. 25 no.7:871-873 Jl '61. (MIRA 14:7)
(Mass spectrometry) (Tin--Isotopes)
(Antimony--Isotopes)

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S/057/62/032/002/007/022
B104/B102

AUTHORS: Demirkhanov, R. A., Leont'yev, N. I., and Kosyy, I. A.

TITLE: Concentration measurement of charged particles in a strong high-frequency pulse discharge in a magnetic traveling field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 180-184

TEXT: The authors compare the results of measurements of the charged particle concentration made with strong h-f pulse discharges using data obtained by the microwave method. The measurements were made with a cylindrical quartz gas discharge chamber (800 mm long, diameter: 36 mm). The plasma was excited by h-f electromagnetic traveling waves. The particle concentration was determined with the aid of a double Mo-wire (1 mm in diameter) probe. The voltage drop due to the probe current at a resistor is fed into an ЭНО-1 (ENO-1) oscilloscope (Fig. 1). The results of the measurements made at $1 \cdot 10^{-1}$ and $6 \cdot 10^{-2}$ mm Hg are in good agreement with those obtained by the microwave method. Measurements of the distribution of the electric field made it possible to determine the surplus charge of the ions caused by the different rates of diffusion of ions and

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electrons to the chamber wall. The concentration of the surplus ions is low compared with that of the ions. With r = 0.65 cm $n_{i\ surplus} = 3.6 \cdot 10^{8}$ cm^{-3}, $n_i = 4.5 \cdot 10^{13}$ cm^{-3}. The authors thank T. M. Filatov for his assistance in the probe measurements, N. I. Malykh for microwave measurements, and I. R. Yampol'skiy for discussion of the probe measuring method. There are 4 figures, 1 table, and 7 references: 5 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: B. Wharton, a. M. S. Donald. J. Appl. Phys., 31, 2, 428, 1960; D. Bohm. The characteristics of the electrical discharge in magnetic fields, Ed. by A. Guthrie a. R. K. Wakerling, New York-Toronto-London, 1949.

SUBMITTED: November 24, 1960 (initially), April 3, 1961 (after revision)

Fig. 1: probe measuring circuit;
Legend: (1) probe; (2) to the oscilloscope; (3) battery

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35361

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B108/B104

76.2371

AUTHORS: Demirkhanov, R. A., Khodyrev, Yu. S., Romashko, N. D., and Nadykto, B. T.

TITLE: Discharge induced by electromagnetic travelling wave

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 3, 1962, 313-321

TEXT: The authors studied the parameters of an electrodeless pinched discharge induced by standing and travelling electromagnetic waves in a toroidal 10 cm wide discharge tube. The experimental arrangement is shown in Fig. 1. The power of the h. f. tube generator could be varied continuously from 0 to 10 kw, its frequency from 0.8 to 4 Mcps. Charged particle concentration, electron temperature and space potential were measured with probes. Pinched discharges were observed in Xe, Kr, Ar, He, O_2, N_2, and H_2. The particle concentration from the center of the pinch discharge to the wall decreases more rapidly than would follow from diffusion theory of the positive column. It was found that the minimum diameter of the pinch for all powers of the discharge is reached at a

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Discharge induced by electromagnetic ...

0.02 mm mercury head. The pinch broadens with increasing pressure at powers greater than 200 w and also with increasing power at pressures above 0.03 mm Hg. Up to a certain pressure, electron concentration rises, but it decreases again when pressure is further increased. A monotonous increase of the electron concentration with power was established.

Electron temperature was between $3 \cdot 10^4$ and $6 \cdot 10^4$ °K. The pinching of the discharge plasma is determined essentially by the r-component of the electric field of the wave which, through the non-diffusional departure of electrons from the plasma to the wall, increases the negative potential (with respect to the plasma) of the wall. V. P. Volkov is thanked for assistance. There are 13 figures and 14 references: 6 Soviet and 7 non-Soviet. The four most recent references to English-language publications read as follows: E. R. Harrison. J. of Electr. a. control, 5, 4, 5, 1958; T. H. Y. Young, J. Soyers. Proc. Phys. Soc., 70, no. 45113, 663, 1957; H. A. H. Boot a. R. B. R. Shersby-Harvie. Nature, 18, 1187, 1957; H. A. H. Boot et al. J. of Electr. Control, 4, no. 5, 434, 1958.

SUBMITTED: December 17, 1960

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R.A.; DORCKHOV, V.V.

Mass of the isotope Pu^{240}. Zhur. eksp. i teor. fiz. 40 no.4:1033-1034 Ap '61. (MIRA 14:7)

(Plutonium--Mass)

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R.A.; DOROKHOV, V.V.; DZKUYA, M.I.

Isotope masses and binding energies of nuclei in the region from strontium to ruthenium. Zhur. eksp. i teor. fiz. 40 no.6:1572-1582 Je '61. (MIRA 14:8)

(Nuclei, Atomic)
(Isotopes—Mass)

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34632

S/056/62/042/002/004/055
B102/B138

9.4930 (1532)
24.6714

AUTHORS: Demirkhanov, R. A., Leont'yev, N. I., Kosyy, I. A., Filatova, T. M.

TITLE: Plasma instability in a toroidal discharge excited by a traveling electromagnetic field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42 no. 2, 1962, 338 - 343

TEXT: The oscillation frequency of a plasma produced by traveling electromagnetic H-waves in a toroidal glass chamber was studied experimentally in dependence on the discharge parameters. The traveling field was produced by a delay-line spiral with R_{wave} = 16.5 ohms, fed by 900-kc pulses of 250 kw, duration τ = 4msec. H_{max} at the inner chamber walls was 150 oe. The phase velocity of the wave along the delay line was $5.6 \cdot 10^7$ cm/sec. The toroidal chamber was 160 mm in diameter, tube diameter 40 mm, initial pressure 10^{-6} mm Hg, pressure during operation $4 \cdot 10^{-3}$ - $1 \cdot 10^{-4}$ mm Hg. In

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Plasma instability ...

spectroscopic measurements of a hydrogen discharge only the Balmer series was found. The radial distributions of the field components were measured with and without plasma. Some of the experiments were made in a uniform traveling field with closed delay-line spiral. At two points, where the phase shift was 90° and 8 waves were traveling along the line, with both generators operated at 1Mw and 1.5 Mc, H_{max} at the inner wall was 1100 oe without, and ~550 oe with, plasma. The charged particle concentration was measured with two electric probes, azimuthal currents with a Rogovskiy band and discharge brightness with a photocell. An (ФР-1 (SFR-1) camera was used for the high-speed photography. The instabilities observed were oscillations in charged particle concentration, azimuthal current, brightness and h-f magnetic field amplitude. The oscillations were non-sinusoidal but with an error of 15%, so that, with some approximation the envelope of the probe signals could be expanded into a Fourier series. Their frequency increased with H_z. At the maximum azimuthal current J_z = 530 a. these oscillations were observed in the whole range of operational pressures. The results show that the SE instabilities can only be due to interactions between J_z and the plasma. The oscillation frequency observed is of the

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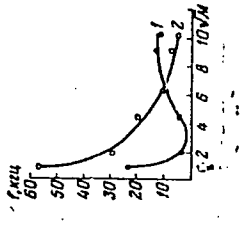
same order of magnitude as that of the ionic "sound", observed by A. V. Nedospasov (Paper No 217, Salzburg Conference on Plasma Physics and Controlled Thermonuclear Reactions, 1961). S. S. Germayeva, E. M. Barkhudarov are thanked for help, S. N. Lozovskiy and I. R. Yampol'skiy for discussions. V. P. Velikhov (Preprint IAE AN SSSR, 1960) and G. V. Gordeyev (ZhETF, 27, 19, 1954) are mentioned. There are 7 figures, 2 tables, and 7 references: 6 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: P. C. Thonemann et al. Nature, 169, 34, 1952.

SUBMITTED: July 6, 1961

Fig. 7. Plasma oscillation frequency (kc) as a function of M atomic weight of the gas. (1) experimental curve, (2) magnetoacoustic frequency.



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S/020/62/146/001/008/016
B108/B102

AUTHORS: Demirkhanov, R. A., Dorokhov, V. V., Dzkuya, M. I.

TITLE: The isotope masses of lutecium, ytterbium and thulium

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 1, 1962, 72 - 74

TEXT: The isotope masses were measured with a double-focusing mass spectrograph. For reference, doublets formed by ions of the element to be measured and by organic compounds consisting of H^1, C^{12}, C^{13}, N^{14}, O^{16} were used. The spectrograph was able to resolve the masses of C^{12} and C^{13}. The mass of each isotope was calculated from the mass of the doublet. Results show good agreement with those by V. B. Shanot et al. (Phys. Rev., 120, no. 1, 235, 1960). There are 1 figure and 1 table.

PRESENTED: May 3, 1962 by L. A. Artsimovich, Academician

SUBMITTED: March 26, 1962

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

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B104/B102

The isotope masses of ...

Table 1.
Legend: m. u. = mass units. (1) Doublet, (2) mass of isotope, (3) average mass (for O^{16}, M = 16); the error refers to the last figures.

№	(1)	(2)	(3)
169	$C_{13}H_{11}N$ — Tu^{169}	154,972±0,061	168,987936±62
	Hg^{200} — $Tu^{169}Cl^{35}$	70,416±0,008	168,987911±100
168	$C_{13}H_{10}N$ — Ib^{169}	147,055±0,103	167,987707±103	167,987692±30
	Ib^{169} — Ib^{168}	2001,543±0,200	167,987635±202	
170	$C_{13}H_{12}N$ — Ib^{171}	161,882±0,043	169,989171±43	
	$C_{12}H_{12}ON$ — Ib^{170}	125,406±0,150	169,989250±150	169,989178±30
	$C_{11}C^{13}H_{12}N$ — Jb^{170}	157,374±0,210	169,989207±210	
171	$C_{13}H_{13}ON_2$ — Ib^{171}	119,676±0,270	170,990476±270	
	$C_{12}C^{13}H_{13}N$ — Ib^{171}	151,195±0,050	170,990633±50	170,990[illegible]
	Ib^{171} — Ib^{170}	1051,533±0,060	170,990711±65	
172	$C_{14}H_{14}O_2N$ — Ib^{173}	103,591±0,060	171,990960±60	
	Ib^{173} — Ib^{171}	1931,265±0,226	171,990902±236	171,990[illegible]±70
	Ib^{172} — Ib^{171}	1052,293±0,118	171,990617±127	
173	$C_{13}H_9$ — Ib^{172}	101,062±0,067	172,990376±67	
	$C_{14}H_{13}O_2N$ — Ib^{174}	103,812±0,063	172,990448±63	172,990340±50
	Ib^{174} — Ib^{173}	1001,022±0,050	172,990222±51	
174	$C_{14}H_9$ — Ib^{174}	103,342±0,038	173,990342±38	
	Ib^{174} — Ib^{173}	2001,631±0,050	173,990356±100	173,990344±50
176	$C_{14}H_5$ — Ib^{176}	120,018±0,046	175,988557±46	
	$C_{13}H_4N$ — Ib^{176}	107,223±0,100	175,988772±103	175,988[illegible] ±50
175	$C_{14}H_7$ — Lu^{175}	114,157±0,037	174,..06272±37	
	$C_{13}C^{13}H_6$ — Lu^{175}	103,795±0,035	174,996159±36	174,996211±40
176	$C_{14}H_6$ — Lu^{176}	120,030±0,049	175,995575±50	
	Lu^{176} — Lu^{175}	1002,301±0,069	175,996515±70	175,99[illegible]±50

Card 2/2

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

L 13813-63 EWG(k)/BDS/EWT(1)/EEC(b)-2/ES(w)-2 AFFTC/AFWL/ASD/ESD-3/SSD Pz-4/Pab-4/Pi-4/Po-4 IJP(C)/AT

ACCESSION NR: AP3004386 S/0109/63/008/003/1489/1490

AUTHOR: Demirkhanov, R. A.; Gevorkov, A. K.; Popov, A. F.; Khorasanov, G. L.

TITLE: On the use of a decaying plasma for detection of an shf signal

SOURCE: Radiotekhnika i elektronika, v. 8, no. 8, 1963, 1489-1490

TOPIC TAGS: shf signal demodulation, plasma pulse discharge, decaying plasma, plasma afterglow quenching, plasma decay

ABSTRACT: Some results of a study on the use of decaying plasma as an shf detector are presented. Experiments were carried out with plasma produced by a pulse discharge in helium for the case of a three-particle recombination, which was assumed to be the most probable process. The plasma was produced in glass tube (1) (see Fig. 1 of Enclosure), inserted in selenoid (4) by means of shf pulses of 1 to 3 sec from a magnetron. An shf probing signal from a sweep generator with a frequency deviation of 3200 to 3380 Mc was applied during the period between two magnetron pulses to cavity (2) for plasma firing. The quenching effect on an afterglow by the probing signal was recorded by means of a photoelectron multiplier, whose output pulse was applied to one channel of a dual-trace oscilloscope. The other channel of the oscilloscope was fed by a

Card 1/2

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

demodulated and amplified probing signal. The plasma density was determined by cavity detuning. The whole system was synchronized by a special circuit controlled by a master oscillator with a pulse repetition frequency of 60 cps. The discharge tube was filled by spectrally pure helium up to a pressure of 10^{-1} to 10^{-3} mm Hg. Fig. 2 represents a typical oscillogram of the glow intensity variations of a plasma at a wavelength of 3888 Å in the presence of the probing signal. The selected wavelength corresponds to the transition of an electron to the metastable helium level as a result of a triple collision: $He^+ + e^- + e^- \rightarrow He^* + e^-$. The oscillogram illustrates a case of cyclotron resonance. In a number of cases, a complete plasma light beam was recorded within the spectral sensitivity of a multiplier (see Fig. 2b). The minimum power of the probing signal which leads to marked quenching of afterglow (signal-to-noise ratio at the output of the multiplier, approximately 2) is approximately 10^{-6} to 5×10^{-7} w. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 19Nov63 DATE ACQ: 20Aug63 ENCL: 02

SUB CODE: SD NO REF SOV: 001 OTHER: 005

Card 2/2

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R.A.; DOROKHOV, V.V.; DZKUYA, M.I.

Isotope masses and nucleon binding energies in the rare-earths region ($150 \leq A \leq 176$, $63 \leq A \leq 71$). Izv. AN SSSR. Ser. fiz. 27 no.10:1338-1356 O '63. (MIRA 16:10)

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

L 10814-63 EWT(1)/EWG(k)/BDS/FEC(b)-2/ES(w)-2--AFFTC/ASD/ESD-3/AFWL/
SSD--Pz-4/Pab-4/Pi-4/Po-4--AT/IJP(C)

ACCESSION NR: AP3000007 S/0057/63/033/005/0544/0549

83
91

AUTHOR: Demirkhanov, R. A.; Gutkin, T. I.; Soldatenkov, T. R.

TITLE: Containment of particles in a fluted system with current

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 33, no. 5, 1963, 544-549

TOPIC TAGS: plasma containment, fluted magnetic field, toroidal drift instability

ABSTRACT: Drift equations are used to describe the motion of a particle in a fluted magnetic field, with longitudinal current taken into account. A cylindrical rather than a toroidal coordinate system is used, permitting simplification of the analysis, as drift angle can be considered the same in both toroidal and cylindrical systems. It is shown that under certain conditions of current, magnetic field modulation, and periodicity, resonance particles which lead to increased losses can be eliminated in a closed system with a fluted magnetic field by a longitudinal current along the axis; charge separation and toroidal drift of particles to the walls are thereby prevented.

Card 1/2

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L 10814-63

ACCESSION NR: AP3000007

2

Both high- and low-velocity particles are affected, and the containing properties of the system are considerably increased. "In conclusion the authors express their thanks to A. G. Kirov for his repeated and useful discussions." Orig. art. has: 29 equations.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Gruzinskoy SSR Sukhumi (Physico-technical Institute AN Gruzinskoy SSR)

SUBMITTED: 21Jun62	DATE ACQ: 12Jun63	ENCL: 00
SUB CODE: PH,SD	NO REF SOV: 003	OTHER: 000

mce/ur
Card 2/2

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R.A.; KURSANOV, Yu.V.; BARATOV, D.G.; KHARIN, G.V.

Motion of electrons in a space-periodical helical magnetic field. Zhur. tekh. fiz. 33 no.9:1098-1103 S '63.
(MIRA 16:11)

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4018358 S/0120/64/000/001/0030/0033

AUTHOR: Demirkhanov, R. A.; Kursanov, Yu. V.; Blagoveshchenskiy, V. M.

TITLE: Source of high-intensity protons

SOURCE: Pribory* i tekhnika eksperimenta, no. 1, 1964, 30-33

TOPIC TAGS: ion source, high intensity proton, high intensity proton source, electron fore injector, 10 Gev proton synchrotron, duoplasmatron

ABSTRACT: An ion source is described which is capable of developing a proton emission of 1.5 amp and was used in 1956 as a fore-injector in the 10-Gev proton-synchrotron at the Joint Nuclear Research Institute. The design of the source with magnetically contracted discharge is shown in Fig 1, its electric-supply scheme in Fig 2, Enclosure 1. Emission characteristics of the source were investigated under rather long (100 microsec) pulse conditions; the effect of the arc current, magnetic field, and gas pressure upon the ion current are reported. The basic parameters of the ion source are:

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ACCESSION NR: AP4018358

Accelerating voltage	30 kv
Ion emission current	1.5 amp
Arc current	20 amp
Arc voltage	110-120 v
Gas pressure	$(5-7) \times 10^{-3}$ torr
Magnetic field	1,000 gauss
Emission port diameter	6 mm
Proton component	85%

Orig. art. has: 6 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut (Physico-Technical Institute)

SUBMITTED: 04Apr63 DATE ACQ: 18Mar64 ENCL: 01

SUB CODE: NS NO REF SOV: 002 OTHER: 002

Card 2/2

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4033098 S/0120/64/000/002/0019/0021

AUTHOR: Demirkhanov, R. A.; Poroshin, O. F.; Belensov, P. Ye.; Mkheidze, G. P.

TITLE: Heavy-current injector of hydrogen ions

SOURCE: Pribory* i tekhnika eksperimenta, no. 2, 1964, 19-21

TOPIC TAGS: injection, ion injection, hydrogen ion injection, heavy current ion injection

ABSTRACT: A new hydrogen-ion injector (whose development is claimed to have been completed in 1959) operates continuously at a drawing voltage 50 kv or lower. The system uses a magnetic-type arc plasma source with oscillating electrons. The following operating data is reported: ion-beam current, 275 ma at 45 kv (drawing); beam diameter at 250 cm from the source, 5 cm; aperture of the converging beam, 2.5×10^{-2}; beam directivity, 7 acm^{-2}; current of the h-v

Card 1/2

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4033098

source, 500 ma; gas pressure in the source in the cathode region, 3×10^{-2} torr; same, in the "intermediate-electrode-anode" region, 6×10^{-3} torr; arc voltage, 220 v; arc current, 12 amp; magnetic field of the source, 600 oerst; magnetic field of the principal focusing lens, 1,500 oerst; magnetic field of the auxiliary lens, 220 oerst. "The authors thank Yu. V. Kursanov, T. I. Gutkin, N. I. Leont'yev, and G. I. Bolislavskaya for their participation in the initial phase of the project; I. A. Chukhin for design work; and A. M. Abzianidze, A. A. Kolodub, and S. I. Filatov for their practical help with the project." Orig. art. has: 4 figures and 1 formula.

ASSOCIATION: Fiziko-tekhnicheskiy institut GKAE SSSR (Physico-Technical Institute, GKAE SSSR)

SUBMITTED: 28Apr63 DATE ACQ: 11May64 ENCL: 00

SUB CODE: NS NO REF SOV: 003 OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

AP4009921 S/0057/64/034/001/0060/0065

AUTHOR: Demirkhanov,R.A.; Kursanov,Yu.V.; Baratov,D.O.; Kharin,O.V.

TITLE: Resonance imprisonment of electrons in a magnetic mirror device with a spatially periodic helical magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.1, 1964, 60-65

TOPIC TAGS: helical magnetic field, magnetic mirror, magnetic mirror trap, charged particle capture, particle imprisonment, helical magnetic field resonance, helical magnetic field trap

ABSTRACT: The equations of motion of an electron in combined longitudinal uniform and transverse helical magnetic fields are solved approximately for paraxial trajectories. It is found that at certain resonant values of the longitudinal electron velocity there is an interchange of longitudinal and transverse (Larmor) kinetic energy of the electron. The resonant velocities are those at which the apparent frequency of the magnetic field as seen from the moving electron is equal to the Larmor frequency, or to its second or third harmonic. Depending on the phase of the electron motion, either the transverse kinetic energy or the longitudinal

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AP4009921

kinetic energy may increase at the expense of the other. It is suggested that the resonant loss of longitudinal kinetic energy may make it possible for a particle to be imprisoned between two magnetic mirrors after having penetrated one of them. The theoretical conclusions were tested experimentally. A longitudinal magnetic field of 300 Oe or less was produced in a 9-cm diameter copper vacuum chamber by a solenoid 115 cm long. Magnetic mirrors with mirror ratios of up to 10 were located 150 cm apart. The transverse helical field was provided by three pairs of conductors carrying currents up to 700 amp. Each of these conductors was wound about the vacuum chamber in the form of a helix of 16-cm pitch. A 2-mm diameter 100-microamp beam of 0.75-keV electrons was injected at one end. The resonant loss of longitudinal kinetic energy was observed with the aid of a retarding field collector. The resonances at the fundamental and the second harmonic of the Larmor frequency were quite marked, about 40% of the electron energy being converted to transverse motion in a typical case. The energy conversion is more efficient when the electron beam is not too close to the axis, but the resonance conditions then become complex. This fact is illustrated with an experimental curve. To detect the capture of electrons between the magnetic mirrors, electron pulses of 3.5 microsec duration were injected and the decay of the current in the apparatus was observed with an oscilloscope. Two distinct half lives were usually observed: 1.5 microsec, including some 20% of

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the injected electrons, and 5 microsec, including 45% of the electrons. The current was still perceptible as long as 18 microsec after beam cut off. This portion of the current was due to electrons that had completed about 150 oscillations between the magnetic mirrors. Orig.art.has: 10 formulas and 7 figures.

ASSOCIATION: none

SUBMITTED: 03Nov62 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: PH NR REF SOV: 002 OTHER: 003

Card 3/3

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4013412 S/0057/64/034/002/0266/0268

AUTHOR: Demirkhanov, R.A.; Gutkin, T.I.; Soldatenkov, T.R.

TITLE: On the equilibrium of a plasma in a spatially periodic magnetic field

SOURCE: Zhurnal tekhn.fiz.,v.34, no.2, 1964, 266-268

TOPIC TAGS: plasma, magnetic field, periodic magnetic field, plasma equilibrium, magnetohydrodynamics, pinch, linear pinch, resonance particles

ABSTRACT: A solution of the magnetohydrodynamic equations is obtained which describes an equilibrium state of a plasma filament in a spatially periodic magnetic field. Such a solution is considered to be of interest because it has recently been shown that the resonance particles that occur in these systems can be removed by means of a longitudinal current (R.A.Demirkhanov, T.I.Gutkin, T.R.Soldatenkov,ZhTF, 33,544,1963). The solution was obtained with the aid of an equation derived by R. Lüst and A.Schlüter (Zs.Astrophys.38,190,1955) and under the assumption that both the current and the pressure gradient are proportional to the magnetic flux. For a certain value of the longitudinal current, the periodicity of the magnetic field in the solution obtained disappears, and the solution reduces to that for a linear

Card 1/2

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4013412

pinch. When the longitudinal current vanishes, the solution reduces to one given by Lust and Schluter (loc.cit.). Orig.art.has: 14 formulas.

ASSOCIATION; none

SUBMITTED: 31Jan63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: PH NR REF SOV: 003 OTHER: 001

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APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4031133 S/0056/64/046/004/1169/1177

AUTHORS: Demirkhanov, R. A.; Kady*sh, I. Ya.; Khody*rev, Yu. S.

TITLE: Skin effect in a high frequency annular discharge

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 4, 1964, 1169-1177

TOPIC TAGS: skin effect, plasma, discharge plasma, gas discharge, toroidal discharge, electron collision

ABSTRACT: The penetration of a longitudinal high-frequency magnetic field into a plasma was investigated at frequencies 0.9, 4.6, and 5.6 Mc, with particular attention to the study of the dependence of the thickness of the skin layer on the plasma density, which was varied continuously over a wide range. To eliminate edge effects in the plasma and in the magnetic field, a toroidal discharge in a quartz glass was used (diameter 18 cm, 2 diameter 5 cm). The tests were made for different limiting ratios of the field and electron-

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4031133

collision frequencies, and of the ratios of the skin layer to the mean free path of the electron ($\omega/\nu_{eff} \ll 1$, $\omega/\nu_{eff} \gg 1$, and $\delta/\ell \gg \gg 1$, $\delta/\ell \ll 1$). It is shown that the character of penetration of the field in the plasma changes on going from one case to another. A penetration anomaly, manifest in an increase in the field amplitude as it propagates inside the plasma, is observed in the region near the discharge axis, and the conditions under which such an anomaly exists are determined. This anomaly cannot be explained by elementary theory and it is most likely the manifestation of the spatial-dispersion properties of the plasma. It is shown that such an anomaly can exist also if the plasma susceptance is assumed to be capacitive near the axis. "In conclusion the authors are grateful to Yu. G. Bobrov and V. P. Volkov for help with the experiment." Orig. art. has: 9 figures and 7 formulas.

ASSOCIATION: None

Card 2/3

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ACCESSION NR: AP4031133

SUBMITTED: 12Jul63 DATE ACQ: 07May64 ENCL: 00

SUB CODE: NP, ME NR REF SOV: 008 OTHER: 004

Card 3/3

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMTRKHANOV, R.[illegible], [illegible]V, V.V.; SOLOV'YEV, V.G.

An [illegible] binding energy of the last two neutrons in the region N = 86 + 92. Izv. fiz. 2 no.1:10-13 Ja '65. (MIRA 18:8)

1. Ob"yedinennyy institut yadernykh issledovaniy.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIRKHANOV, R.A.; DOROKHOV, V.V.; DZKUYA, M.I.

Masses of stable isotopes of neodymium, praseodymium, cerium, and lanthanum. Izv. AN SSSR.Ser. fiz. 29 no.5:857-861 My '65. (MIRA 18:5)

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

L 27596-65 EWT(1)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EWA(m)-2 Pz-6/Po-4/Pab-10/Pi-4
IJP(c) AT

ACCESSION NR: AP5003234 S/0057/65/035/001/0043/0046 66
43B

AUTHOR: Demirkhanov,R.A./ Kossyy,I.A./ Leont'yev,N.I./ Lozovskiy,S.N./ Udovichenko, Yu.K./ Filatova,T.M.

TITLE: Interaction of a traveling electromagnetic wave with a plasma 21

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.1, 1965, 43-46

TOPIC TAGS: plasma, plasma confinement, plasma heating, plasma wave absorption, traveling wave

ABSTRACT: An experimental investigation was undertaken to test the possibility of confining a plasma by means of a traveling electromagnetic wave as proposed by S.M. Osovets (Fizika plazmy i problemy upravlyayemykh termoyadernykh reaktsiy /Plasma physics and problems of controlled thermonuclear reactions/ Vol.4,p.3,Izd.AN SSSR, 1958). A toroidal pulsed machine was employed, similar to that described elsewhere by R.A.Demirkhanov et al.(ZhTF 32 248,1962). Hydrogen plasma was investigated at a pressure of 0.06 mm Hg. One megacycle/sec traveling waves were produced with a delay line terminated in its surge impedance. The phase velocity was 5.6×10^7 cm/sec

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and the maximum amplitude of the magnetic field was 230 Oe. The electron density and temperature and the longitudinal component of the high frequency magnetic field were measured at various distances from the axis to the discharge tube by means of probes. The electron temperature was approximately constant at 60 000 ^{o}K and the electron density was of the order of 10^{14} cm^{-3}. From the measured data the gradients of the plasma pressure and the magnetic pressure were calculated. The plasma pressure gradient everywhere exceeded the magnetic; confinement of the plasma was accordingly not achieved. Some calculations are presented concerning the behavior of a plasma in a high frequency magnetic field. To achieve confinement it is not sufficient simply to increase the magnetic field strength, for the high frequency field tends to heat the plasma. It is concluded that confinement can be achieved only in an incompletely ionized plasma witha large electron density, in which energy can be transferred from the electrons to the walls of the chamber via the ions and the neutral particle. "The authors express their gratitude to S.V.Kuril'nikov and N.V.Aleksandrov for constructing the power supply for the high-frequency discharge." Orig.art.has: 13 formulas and 2 figures.

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L 27596-65

ACCESSION NR: AP5003234 0

ASSOCIATION: none

SUBMITTED: 16Feb64 ENCL: 00 SUB CODE: ME

NR REF SOV: 006 OTHER: 001

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

L 27850-65 EWT(1)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EWA(m)-2 Pz-6/Pc-4/Pab-10/
Pi-4 IJP(c) AT

ACCESSION NR: AP5005220 S/0057/65/035/002/0212/0222

AUTHOR: Demirkhanov, R.A.; Kadysh, I.Ya.; Fursa, I.S.; Khodyrev, Yu.S.

TITLE: Investigation of the drag of plasma electrons by a traveling magnetic wave

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.2, 1965, 212-222

TOPIC TAGS: plasma, plasma confinement, traveling wave, electron flux

ABSTRACT: The drag of electrons by traveling waves was investigated under steady state conditions in Xe, Kr, Ar, Ne, He, and H_2 plasmas at pressures from 3×10^{-4} to 8×10^{-2} mm Hg. This phenomenon is of interest in connection with plasma confinement and has other possible applications. The plasmas were contained in a 4.2 cm inner diameter, 18 cm mean principal diameter fused quartz torus and were excited by the traveling waves themselves. The traveling waves were produced by a loaded helical delay line wound on the toroidal plasma chamber and fed with an 8 KW oscillator at from 1 to 4 Mc/sec. The phase velocity of the waves ranged from 4×10^7 to 4×10^8 cm/sec. The magnitude of the electron current in the plasma was determined by measuring the magnetic field on the principal axis of the torus with a saturated Permalloy frequency doubling probe. The electron density and temperature and the

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

L 27850-65

ACCESSION NR: AP5005230

high-frequency power absorbed by the plasma were also measured. Electron currents as great as 500 A were obtained for short intervals with the apparatus overloaded. As a function of pressure the electron current reached a maximum at a pressure that was independent of the absorbed power. The velocity of the electrons was nearly equal to the phase velocity of the waves under conditions of maximum current. A simple theory of the phenomenon is developed and the experimental results are compared with it. Reasonable agreement is found for pressures greater than that for which the current is maximum, but the theory does not account for the current peak observed. This inadequacy of the theory is ascribed to the neglect of the effects of thermal motion and the walls of the chamber. Orig.art.has: 14 formulas, 12 figures, and 2 tables. [02]

ASSOCIATION: none

SUBMITTED: 08Apr64 ENCL: 00 SUB CODE: ME,EM

NR REF SOV: 004 OTHER: 005 ATD PRESS: 3193

2/2

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

L 60327-65 EWT(1)/EPA(w)-2/EWA(m)-2 Pz-6/Pl-4 IJP(c) AT
ACCESSION NR: AP5018304 UR/0057/65/035/007/1250/1254 45 44 B
533.9

AUTHOR: Demirkhanov, R. A.; Kursanov, Yu. V.; Muratov, D. G.; Kharin, G. V.

TITLE: Investigation of the escape of electrons from a trap with a spatially periodic helical magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 7, 1965, 1250-1254

TOPIC TAGS: magnetic mirror, helical magnetic field, pulsed magnetic field, electron beam

ABSTRACT: The authors have investigated the influence of a pulsed magnetic field on the escape of electrons from a magnetic mirror system with a superimposed helical magnetic field. The magnetic mirror system was established in a 8 cm diameter, 2 m long glass cylinder evacuated to 2×10^{-4} N/m^2. The magnetic field strength in the uniform field region was between 2×10^3 and 2×10^4 A/m and the mirror ratio was between 5 and 7. The mirrors were 1.5 m apart. The helical field was produced by a 12 cm diameter, 16-cm pitch helical winding carrying 600 A. The pulsed field was produced by discharging a capacitor through a one-layer solenoid. This field was in the same direction as the

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

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ACCESSION NR: AP5018304

magnetic mirror field; its amplitude was 3 x 10^3 A/m, its rise time was less than 2 microsec, and its decay time was varied from 10 to 500 microsec. A 1 mm diameter 50 microampere beam of 750 eV electrons was injected for 3.5 microsec parallel to the axis of the system and 1 cm from the axis. The delay between injection of the electrons and pulsing of the field was controlled. The electrons escaping from the magnetic mirror system at the end opposite the injector were collected and analyzed with a two-grid collector probe. Without the pulsed field the electrons escaped from the magnetic mirror system after a few tens of reflections. This rapid escape is ascribed to the reversibility of the resonance interaction of the particles with the helical field. The pulsed magnetic field increased the entrapment time to 2½ microsec, corresponding to about 250 reflections. The escape of the electrons when the pulsed field was present appeared to be due to collisions with residual gas molecules. "The authors express their gratitude to I.P.Yamol'skiy for assistance in organizing the measurements." Orig. art. has: 3 formulas and 8 figures.

Card 2/3

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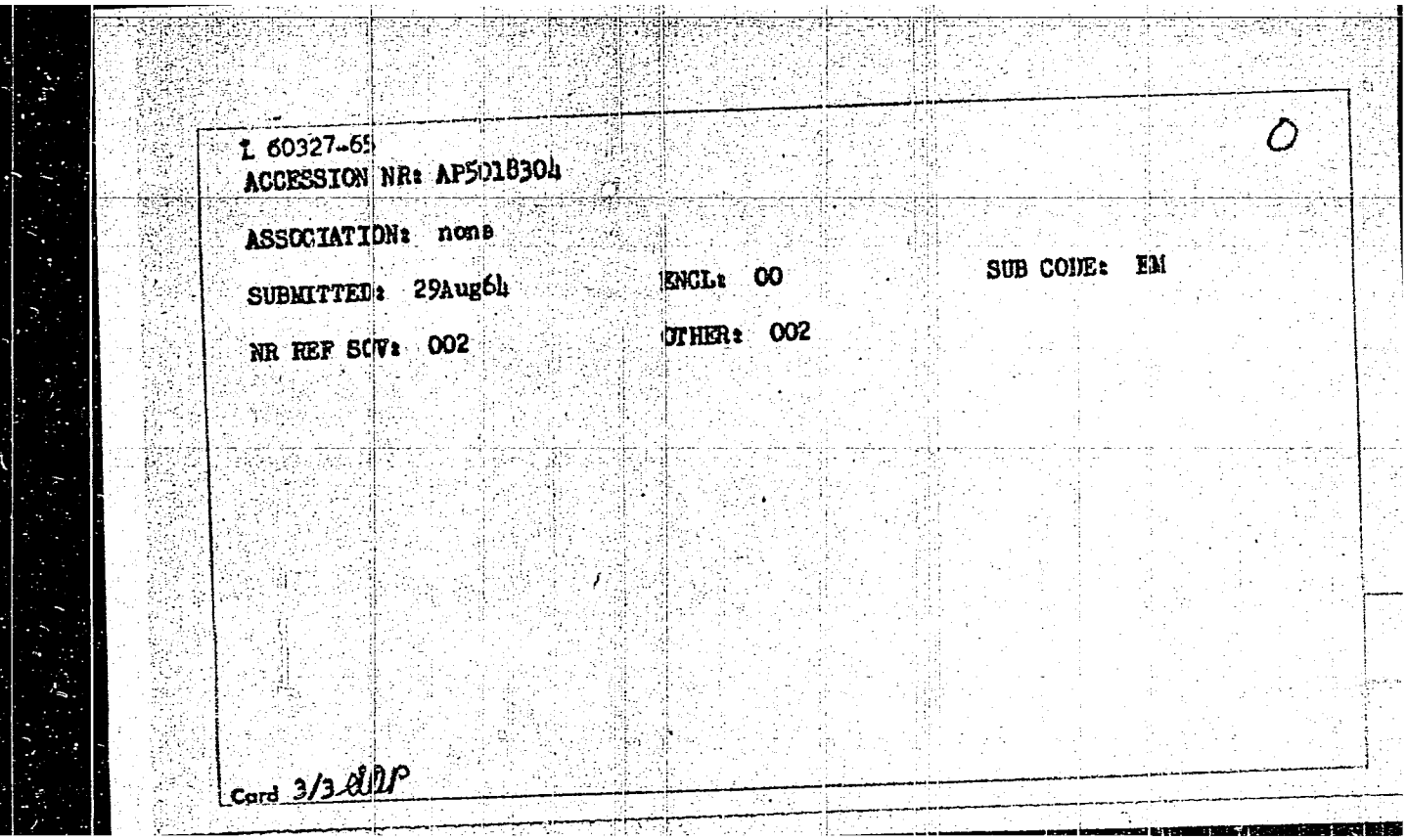

L 60327-65
ACCESSION NR: AP5018304

ASSOCIATION: none

SUBMITTED: 29Aug64 ENCL: 00 SUB CODE: EM

NR REF SOV: 002 OTHER: 002

Card 3/3 dmp

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIROV, G.

On bone tumors according to material of the clinic of orthopedics and traumatology of the "I. P. Pavlov" Medical Institute in Plovdiv during the period of 1956-1959. Khirurgiia, Sofia 14 no.2/3:310-311 '61.

1. Klinika po ortopediia i travmatologiia pri Visshiia meditsinski institut "I. P. Pavlov", Plovdiv.

(BONE AND BONES neopl)

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

ADZHEMYAN, V., inzh.; DEMIRYAN, A., inzh.

Power test and the determination of efficiency of a screw-cutting lathe. Prom.Arm. 6 no.10:59-62 O '63. (MIRA 17:1)

1. Eksperimental'nyy nauchno-issledovatel'skiy institut metallorezhushchikh stankov.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIS, O.

"Problems of Wage Policy in the Building Industry. (To be contd.)" p. 36
"Deficiencies in Building Industry Terminology. (To be contd.) p. 37.
(Stavebni Pruzvsl, Vol.3, No.2, Jan. 1953, Praha.)

SO: Monthly List of East European Accessions, Vol.2, No.9, Library of Congress, September 1953, Uncl.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIS, C.

"Questions Connected with the Wage Policy in the Building Industry." p. 51 (Stavebni Prumysl, Vol. 3, no. 3, Feb. 1953, Praha)

SO: Monthly List of East European Accessions, Vol. 3, no. 2, Library of Congress, Feb. 1954, Uncl.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMIS, O.

For further development of socialist competition in the building industry. p. 217. POZEMNI STAVBY. (Ministerstvo stavebnictvi, Praha. Vol. 3, no. 6, June 1955.

SOURCE: East European Accessions List (EEAL), Library of Congress, Vol. 4, No. 12, December 1955.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMISENKO, G. F.

DEMISENKO, G. F. -- "Study of the Process of Filtration of Dusty Air in Filters Made of Porous Metal." Min Higher Education USSR, Moscow Inst of Chemical Machine-Building, Moscow, 1955 *(Dissertation for the Degree of Candidate in Sciences)

SO: Knizhnaya letopis', No. 37, 3 September 1955

*For the Degree of Candidate in Technical Sciences

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EM
ACCESSION NR: AR5002383 S/0271/64/000/010/A014/A014
621.398.694.4-531.7

SOURCE: Ref. zh. Avtomat., telemekh. i vychisl. tekhn. Sv. t., Abs. 10A110

AUTHOR: Le-Mikhal', D.

TITLE: Some problems in measuring temperature stresses

CITED SOURCE: Sb. Vysokotemperat. tenzodatchiki. M., Mashgiz, 1963, 103-111

TOPIC TAGS: tensometer, high temperature tensometer

TRANSLATION: Peculiarities of measuring strains at high temperature and methods of compensating resistance variation are considered. The problem of measuring alternating stresses at various points of a structure is investigated in detail. Requirements of the tensometer materials and cements used for affixing them are specified. Both the self-compensated tensometers and the various circuit devices are used for compensating the temperature increment of resistance. It is noted that the existing methods permit reliable use of tensometers at temperatures up to 815C; the necessity of measurements at temperatures up to 1370C is noted. Five illustrations.

SUB CODE: PD, IE ENCL: 00
Card 1/1 dm

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166T15

DEMISHEV, G. K.

USSR/Electricity - Semiconductors Jul 50

"Methods for Measuring the Resistivity of Semiconductors Made of Soft Materials," G. M. Bartenev, G. K. Demishev, Sci Res Inst of Rubber Ind

"Zavod Lab" Vol XVI, No 7, pp 807-813

Develops simple methods for measuring specific electric resistance of semiconductors made of soft materials, such as rubber and plastics: method of superposed contacts, substitution method, and average point method. Compares methods with Miller method, discusses advantages and shortcomings, and indicates limits of application, between 10^{-2} and 10^{7} ohm cm.

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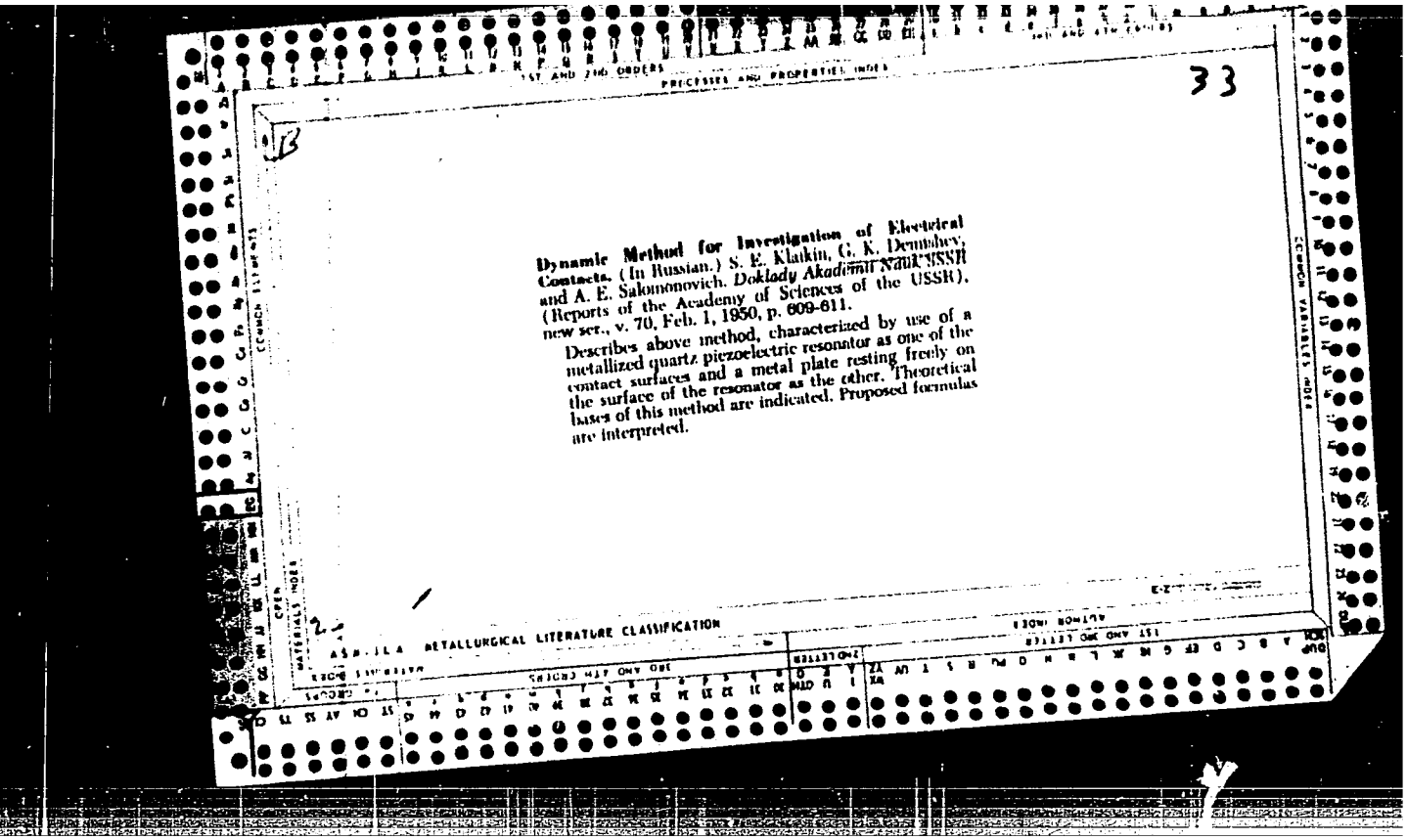

Dynamic Method for Investigation of Electrical Contacts. (In Russian.) S. E. Klaikin, G. K. Demidov, and A. E. Sakomonovich. *Doklady Akademii Nauk* USSR (Reports of the Academy of Sciences of the USSR), new ser., v. 70, Feb. 1, 1950, p. 609-611.

Describes above method, characterized by use of a metallized quartz piezoelectric resonator as one of the contact surfaces and a metal plate resting freely on the surface of the resonator as the other. Theoretical bases of this method are indicated. Proposed formulas are interpreted.

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USSR/Physics - Sound May 52

"Method of Determining Mechanical Parameters of Rubber-Like Materials at Sound Frequencies," G. K. Demishev, Inst of Rubber Ind, Min of Chem Ind

"Zhur Eksper i Teoret Fiz" Vol XXII, No 5, pp 617-623

Devises a method of measuring the mech parameters of rubber-like materials which allows one to measure modulus of shearing and tangent of angle of mech losses within the range of medium and higher sound frequencies at various temps. As an example, gives data on soft rubber obtained at room temp. They

215T96

show an increase of shearing modulus and a weak rise of tangent at higher frequencies. Received 26 Jan 51 and re-edited 14 Sep 51.

215T96

DEMISHEV, G.K.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

DEMISHEV, G. K. FD-604

USSR/Physics - High polymers testing

Card 1/1 : Pub 153-16/22

Author : Demishev, G. K.

Title : Apparatus for frequency testing of high polymers

Periodical : Zhur. tekh. fiz. 24, 299-307, Feb 1954

Abstract : Applying the design of an electro-mechanical converter, the author devises a simple and compact apparatus for measuring the shearing modulus and the tangent of angle of mechanical losses at frequencies of 20-500 cycles/sec and at temperatures of -180 to -200°C within the range of controllable deformation. The apparatus may be used to test rubber or its mixtures and eventually other high polymers. Indebted to L. Ya. Gutin and I. I. Klyutin. 6 references, including one foreign.

Submitted : February 24, 1953

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

AUTHORS: Demishev, G. K., Kolbasnikova, A. I. 72-58-3-7/15

TITLE: Supersonic Glass Grinding (Shlifovka stekla s pomoshch'yu ul'trazvuka)

PERIODICAL: Steklo i Keramika, 1958, Nr 3, pp. 25-29 (USSR)

ABSTRACT: Works on the application of supersonic oscillations for boring, drilling, and cutting of glass, ceramics, germanium and other hard materials are available by N. Klark, D. P. Aloizio, L.B. Pirozhnikov, I.S. Vaynshtok, I.V. Metelkin (reference 1). Following a suggestion by N. P. Krasnikov and V.S. Pod"yel'skiy (reference 2) M. A. Bezborodov, A. A. Gezburg and N. P. Krasnikov (reference 1) utilized this manufacturing method for the grinding of plane glass surfaces. Investigations on this method of grinding where also carried out by G. M. Bartenev, A. I. Kolbasnikova, I. S. Vaynshtok and G. K. Demishev in the Institute for Glass. The plant, in the acquisition and mounting of which participated I.S. Vaynshtok and V. M. Antonov (reference 3), comprises the generator ZG-2A, the amplifier TU-600, the

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frequency-meter ICh -6, the rectifier VG -2, the autotransformer LATR -1 and others. The design of vibrator corresponds to that described by Klark in his work. The total view of the grinding wheel is given in figure 1. The grinding-tool represented in figure 2, proved to be the most suitable one. Moreover, the grinding operation is described. The quality of the surface was exaimend by means of a double microscope of the type MIS -11. As may be seen from table 1, the ground quality of the surface does not depend on the period of grinding, whereby grinding with the narrow face of the grinding tool- under equal conditions - results always in a coarser surface than grinding with the wide lateral face. The mechanism of the grinding operation was described in the monograph by N. N.Kachalov (reference 1). The grinding results with various specific pressures of grinding are given in tabel 2. As may be seen from this, it has no effect on the quality or the surface, just like the grinding with various amplitudes of vibration (figure 3). Approximately the same quality of surface is achieved with supersonic grinding as with the ordinary grinding-method.

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Supersonic Glass Grinding 72-58-3-7/15

There are 2 figures, 3 tables, and 7 references, 6 of which are Soviet.

ASSOCIATION: Institut stekla (Institute for Glass)

1. Glass--Machining 2. Ultrasonic radiation--Applications

Card 3/3

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SOV/72-59-4-8/21

24(0)
AUTHOR: Demishev, G. K.

TITLE: Device for Measuring the Resistance of Semiconductor Films on Glass and Ceramics (Pribor dlya izmereniya soprotivleniya poluprovodnikovykh plenok na stekle i keramike)

PERIODICAL: Steklo i keramika, 1959, Nr 4, pp 29 - 31 (USSR)

ABSTRACT: The most simple method of measuring the film resistance consists in applying to the surface of the product two parallel or concentric current-supply electrodes which are connected with a Wheatstone bridge or an ohmmeter. In these cases a resistance is measured which is composed of the mean resistance of the film and the transition resistance of the metallic semiconductor. In order to eliminate the influence exercised by the transition resistance on the results of measurement the author of this article developed a device which is represented in figure 1 and then described in detail. In figure 2 the scheme of the contact press is shown. For the check of films on curved surfaces a device is recommended as may be seen from figure 3. By means of

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this device the accuracy of measurement may be up to 98-99%. There are 3 figures.

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15(2) SOV/72-59-5-10/23

AUTHOR: Demishev, G. K.

TITLE: Device for the Determination of the Elastic Constants of Glass and Ceramics (Pribor dlya opredeleniya uprugikh postoyannykh stekla i keramiki)

PERIODICAL: Steklo i keramika, 1959, Nr 5, pp 31 - 34 (USSR)

ABSTRACT: The elastic constants - the modulus of elasticity, the modulus of elasticity in shear and the Poisson constant are necessary for the calculation of various products which work under a load. These constants can also be used in the quality control of finished products. Moreover, an ultrasonic device is described by means of which the elastic constants of plane-parallely polished samples of a strength of 0.5 to 30 mm with a minimum diameter of the cross section of 10 to 15 mm can be determined. The device has an instrument for measuring the ultrasonic resonance intensity of the type V4-8R (Fig 1) which was designed by the VIAM; moreover, it has a detachable part the diagram of which is shown in figure 2 and subsequently described. Moreover, formulas for the computation of the three elastic constants are given on the basis of the monograph by L. Bergman (Ref 1). The frequency values

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measured and computed are compared in figure 3. Finally, it is stated that a device can be mounted on the basis of the instrument for measuring the ultrasonic resonance intensity designed by the VIAM and produced by the Soviet industry which can be used for determining the elastic parameters and the wall strengths of glass- and ceramic products. There are 3 figures and 1 Soviet reference.

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

15(2) SOV/72-59-10-7/14

AUTHOR: Demishev, G. K.

TITLE: Intensification of Grinding at Vibration of the Abrasive

PERIODICAL: Steklo i keramika, 1959, Nr 10, pp 27 - 31 (USSR)

ABSTRACT: The research results of the influence exerted by ultrasonic and low-frequency vibration of the abrasive on the amount of abraded glass, the quality of the ground surface, and the coefficient of friction between abrasive and glass are explained in the paper under review. The oscillations of the ultrasonic abrasives were perpendicular, and those of the low-frequency abrasives parallel to the treated surface. The ultrasonic abrasive was composed of a magnetostriction pack of the NEL-4 type. The amplitude of oscillation was measured by means of the instrument MIS-11. An installation with an ultrasonic abrasive is described and then shown in figure 1. The dependence of the amount of abraded glass on the specific pressure of the abrasive for the usual grinding method (Curve 1) and for an additional ultrasonic vibration (Curve 2) at various tensions of the glass sample are shown in figures 2,3,4, and 5. The measurement results of the friction torque for the usual

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grinding method (Curve 1) and for low-frequency vibration (Curve 2) are shown in figures 6 and 7. The results of the grinding of samples on napped cloth by means of the electrocorundum M-28, are shown in figures 8 and 9 with identical nomenclature. Conclusions: Ultrasonic abrasives can be used for the treatment of hard metals, minerals, and ceramics if only acceleration of material abrasion is required. Low-frequency abrasives should be used for intensifying the grinding process of sheet glass and other products, which are polished afterwards. The motor power of grinding machines can be reduced, and lighter and more compact machines can be built by reducing the frictional force for vibrating abrasives. There are 9 figures.

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S/081/62/000/023/065/120
B180/B144

AUTHORS: Demishev, G. K., Butovich, L. N., Kolbasnikova, A. I., Galdina, N. M.

TITLE: Co^{60} gamma ray detection of internal defects in certain electrically fused refractories during manufacture

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 23, 1962, 489, abstract 23K375 (Steklo. Byul. Gos. n.-i. in-ta stekla, no. 4 (113), 1961, 15-24)

TEXT: The article describes a method for the systematic quality control of electrically produced refractories. Flaws and other cavities are detected by means of hard gamma-radiation from the isotope Co^{60}, using a wide beam and X-ray photography. Experimental work indicates the possibility of using this "gamma-ray" flaw detection on refractories of the "bakor-33" type. [Abstracter's note: Complete translation.]

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"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

S/277/63/000/001/012/017
A052/A126

AUTHOR: Demishev, G. K.

TITLE: A device for determining elastic parameters of hard materials

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk, 48. Mashinostroitel'nyye materialy, konstruktsii i raschet detaley mashin, no. 1, 1963, 28, abstract 1.48.201 (In collection: "Primeneniye ul'traakust. k. issled. veshchestva", M., no. 15, 1961, 195 - 200)

TEXT: An ultrasonic device for quick measuring of elastic parameters (modulus of elasticity, modulus of shearing and Poisson's ratio) of metals, glass and ceramics is described.

[Abstracter's note: Complete translation]

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APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"

"APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7

YANOVSKII, YU.G., VINOGRADOV, G.M., KRASHENNIKOV, S.K., SHIFMAN, V.S.
DEMISHEV, G.K., ZELENOV, YU.V.

Apparatus for testing polymers with audio-frequencies.

Report presented at the 13th Conference on High-molecular compounds
Moscow, 8-11 Oct 62

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000310110008-7"