POLOVENKO, I.S., kand. ekon. nauk,; SHIMKO,N.I., agronom-ekonomist,; ARTYKOV, A., BORISOV, V.A., GONCHAROV, A.I., KLOTS,Ye.A., SPERANSKIY, V.Z., SHAPIRO, L.L.; KALASHNIKOVA, V.S.,red.; BALLOD, A.I., tekhn. red.

[Experience in introducing a new procedure in planning] Opyt vnedreniia novogo poriadka planirovaniia. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1958. 308 p. (MIRA 11:11)
(Agriculture)

POLOVENKO, I.S., kandidat sel'skokhozyaystvennykh nauk; SHIMKO, N.I., agronom-ekonomist; KALASHNIKOVA, V.S., redaktor; VESKOVA, Ye.I., tekhnicheskiy redaktor

[The new planning system in action] Novyi poriadok planirovaniia v deistvii. Moskva, Gos. izd-vo selkhoz. lit-ry, 1956. 331 p. (MLRA 9:11)
(Agricultural administration)

POLOVENKO, N.R.

Efficient slide valve distribution for steam hammers. Prom.energ. 12 no.8:9-12 Ag '57. (MIRA 10:10)
(Hammers)

POLOVENKO, N.R., inzh.

Adjusting Jungstrem turbine ejecters. Energetik 6 no.12:17-18 D '58.
(MIRA 11:12)

(Steam turbines)

POLOVENKO, N.R., tekhnik

Adjustment of the power supply of a three-phase testing system.
Energetik 11 no.8:24-25 Ag '63. (MIRA 16:10)

AUTHOR: Polovenko, N.R., Engineer SOV/91-58-12-9/20

TITLE: The Adjusting of the Operation of the Yungstrem Turbine Ejectors (Naladka raboty ezhektorov turbiny Yungstrem)

PERIODICAL: Energetik, 1958, Nr 12, pp 17-18 (USSR)

ABSTRACT: A thermoelectric power plant had 2 Yungstrem-type condensation turbines produced by the Swedish firm "Stal". The two DDK-30 turbines had capacities 1,500 dW each. Their steam parameters were: 35 a m and 435° C: rated vacuums were 0.081 atm at a temperature of cooling water 27° C. The vacuum was brought about by a steam ejector, divided into 2 steps. It has been stated that the thermal head of the condenser attached to turbine Nr 2 was normal (5 or 6° C) whereas at turbine Nr 1 it was 10 or 12° C. It was found that the reason for ejector's unsatisfactory work was the insufficient height of the hydraulic lock of step I. As soon as the hydrolock was lengthened 900 mm (the original length being 1.65 m) the ejector's operation became normal. There is 1 diagram.

Card 1/1

1. POLOVENKO, N. R., Eng.

2. USSR (600)

4. Steam Turbines

7. Tightening the diaphragm of a steam turbine, Rab. energ., 3, No. 4, 1953.

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

POLOVENKO, N.R., tekhnik

Concerning the use of a liquid rheostat in the rotor circuit of an asynchronous motor used to control the performance of draft and blowing machines. Energetik 10 no.4:9-13 Ap '62.
(MIRA 15:4)

(Fans, Electric)

Soyez

Planting

Kok-saghiz cultivation on peaty soil and on soil liable to flooding. S. POLOVNEV. *Agronomie Soviétique*, 1948, 6, No. 6, 43-50; *Chem. Zentr.*, 1949, 120 I, 251; *Rev. Gén. Caout.*, 1950, 27, 16. Peaty soil when drained yields 60 to 70 quintals of roots per hectare, if potassium and phosphorus fertilisers are added. 1228.52

1950

BUDAVEY, V.; POLOVENKO, S.

Important conditions for replacing and improving the utilization of machinery on collective farms. Vop.ekon. no.11:138-141 N '58. (Collective farms--Finance) (MIRA 11:11)

AREF'YEV, T.I., kand. ekon. nauk; BRASLAVETS, M.Ye., prof., doktor ekon. nauk; BROZGUL', M.M.; VLASOV, N.S., prof., doktor ekon. nauk; DUBROVA, P.F., doktor ekon. nauk; YESAULOV, P.A., kand. sel'khoz. nauk; ZAL'TSMAN, L.M., prof., doktor sel'-khoz. nauk; KAL'M, P.A., dotsent, kandidat sel'sko-khoz. nauk; KOSTSELETSKIY, N.A., kand. ekon. nauk; KRYLOV, V.S., kand. sel'khoz. nauk; LIBKIND, A.S., dots., kand. ekon. nauk; MAKAROV, N.P., prof., doktor ekon. nauk; OGLOBLIN, Ye.S., kand. sel'khoz. nauk; POLOVENKO, S.I., kand. ekon. nauk; POPOV, S.A., dots., kand. ekon.nauk; SAPIL'NIKOV, N.G., doktor ekon. nauk; TISHCHENKO, G.A., prof., kand. ekon. nauk; TYUTIN, V.A., prof., doktor ekon. nauk; YANYUSHKIN, M.F., kand. ekon. nauk; PYLAYEVA, A.P., red.; FREYDMAN, S.M., red.; SOKOLOVA, N.N., tekhn. red.

[Organization of socialist agricultural enterprises] Organizatsiia sotsialisticheskikh sel'skokhoziaistvennykh predpriiatii; kurs lektsii. Moskva, Sel'khozizdat, 1963. 662 p. (MIRA 16:8)

1. Zaveduyushchiy otdelom ekonomiki Vsesoyuznogo nauchno-issledovatel'skogo instituta sakharnoy svekly (for Aref'yev).
2. Odesskiy sel'skokhozyaystvennyy institut (for Braslavets).
(Continued on next card)

AREF'YEV, T.I.--- (continued). Card ..

3. Moskovskaya sel'skokhozyaystvennaya akademiya im. K.A.Timiryazeva (for Vlasov). 4. Zaveduyushchiy otdelom ekonomiki i organizatsii Nauchno-issledovatel'skogo instituta sadovodstva im. I.V.Michurina (for Dubrova). 5. Moskovskiy Gosudarstvennyy universitet im. M.V.Lomonosova (for Zal'tsman, Polovenko). 6. Zaveduyushchiy kafedroy organizatsii sel'skokhozyaystvennogo proizvodstva Leningradskogo sel'skokhozyaystvennogo instituta (for Kal'm). 7. Zaveduyushchiy otdelom ekonomiki Nauchno-issledovatel'skogo instituta ovoshchnogo khozyaystva (for Kostseletskiy). 8. Vsesoyuznyy nauchno-issledovatel'skiy institut ptitsevodstva (for Krylov). 9. Moskovskiy ekonomiko-statisticheskiy institut (for Libkind). 10. Vsesoyuznyy sel'skokhozyaystvenniy institut zaochnogo obrazovaniya (for Makarov). 11. Zaveduyushchiy otdelom ekonomiki Krasnodarskogo nauchno-issledovatel'skogo instituta sel'skogo khozyaystva (for Ogloblin). 12. Kafedra organizatsii sel'skokhozyaystvennogo proizvodstva Leningradskogo sel'skokhozyaystvennogo instituta (for Popov). 13. Zaveduyushchiy kafedroy Sovetskoy ekonomiki Vysshey partiynoy shkoly (for Sapil'nikov). 14. Voronezhskiy sel'skokhozyaystvennyy institut (for Tishchenko). 15. Leningradskiy sel'skokhozyaystvennyy institut (for Tyutin). 16. Direktor Severo-Kavkazskogo filiala Vsesoyuznogo nauchno-issledovatel'skogo instituta ekonomiki sel'skogo khozyaystva (for Yanyushkin).

(Agriculture--Economic aspects)

BULOCHNIKOVA, L.A., kandidat ekonomicheskikh nauk; KOROCHKIN, V.V., prepodavatel'; POLOVENKO, S.I., prepodavatel'.

Legitimate doubts ("Organization of socialist agriculture" by T.L. Basiuk. Reviewed by L.A. Bulochnikova, V.V. Korochkin, S.I. Polovenko). Nauka i pered. op. v sel'khoz. 7 no.5:69-71 My '57. (MLRA 10:6)

1. Kafedra ekonomiki sel'skogo khozyaystva ekonomicheskogo fakul'teta Moskovskogo gosudarstvennogo universiteta (for Korochkin and Polovenko).

(Farm management) (Basiuk, T.L.)

CA

30

The cultivation of kok-saghyz on peat and marshy soils.
Yu. S. Polovenko. *Sovet. Agron.* 6, No. 6, 43-50(1948);

Chem. Zentr. 1949, 602.—Fertilizing with K and P as well as with pyrite cinders increased the yield of kok-saghyz in field tests on such soils. M. G. Moore

KULIKOVA, I. K., inzh.; POLOVETS, A. L., inzh.

Coordination conference on the design of drainage and irrigation pumping stations. Gidr. i mel. 15 no.3:58-60 Mr '63. (MIRA 16:4)

1. Vsesoyuznyy gosudarstvennyy proyektno-izyskatel'skiy i nauchno-issledovatel'skiy institut Ministerstva sel'skogo khozyaystva SSSR.

(Pumping stations) (Drainage--Congresses)
(Irrigation--Congresses)

KULIKOVA, I. K., inzh.; POLOVETS, A. L., inzh.

Coordination conference on the design of drainage and irrigation pumping stations. Gidr. i mel. 15 no.3:58-60 Mr '63. (MIRA 16:4)

1. Vsesoyuznyy gosudarstvennyy proyektno-izyskatel'skiy i nauchno-issledovatel'skiy institut Ministerstva sel'skogo khozyaystva SSSR.

(Pumping stations) (Drainage--Congresses)
(Irrigation--Congresses)

POLOVETSKAYA, A.A.; LYUBCHENKO, S.D.; GRUDZINO, S.F.

Observations on the development and vitality of the eggs and larvae of Necator under the conditions in the various regions of the Georgian S.S.R. Med.paraz.i paraz.bol. no.1:91-95 '62. (MIRA 15:5)

1. Iz Nauchno-issledovatel'skogo instituta meditsinskoy parazitologii i tropicheskoy meditsiny imeni S.S. Virsaladze Ministerstva zdravookhraneniya Gruzinskoy SSR (dir. instituta I.I. Topuriya, rukovoditel' gel'mintologicheskogo otdeleniya - prof. G.N. Gordadze).

(GEORGIA--HOOKWORMS)

POLOVETSKAYA, A. A., Cand of Med Sci -- (diss) "Means of eliminating ancylostomiasis in sovkhozes of subtropical crops of Georgian SSR." Tbilisi, 1957, 29 pp (Tbilisi State Medical Institute), 200 copies (KL, 32-57, 98)

POLOVETSKAYA, A. A.

Polovetskaya, A. A. - "Calcium in the blood in ancylostomiatic diseases", Byulleten' (Nauch.-issled. in-t malyarii i med. parazitologii im. Virsaladze), No. 2, 1948, p. 51-55, (In Georgian, resume in Russian), - Bibliog: 7 items.

SO: U-4329, 19 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 21, 1949).

MARUASHVILI, G.M.; GORDADZE, G.N.; GVINIASHVILI, Sh.P.; POLOVETSKAYA, A.A.; ZENAISHVILI, O.P.; GABUNIYA, L.V.

Experience with eradicating ascariasis in Telavi District [with summary in English]. Med.paraz. i paraz.bol. 27 no.5: 555-561 S-O '58. (MIRA 12:1)

1. Iz Instituta malyarii i meditsinskoy parazitologii imeni S.S. Virsaladze Ministerstva zdravookhraneniya Gruzinskoy SSR (dir. instituta - prof. G.M. Maruashvili) i iz Telavskoy rayonnoy sanitarno-epidemiologicheskoy stantsii (glavnyy vrach L.A. Sakvarelidze).
(ASCARIASIS, prev. & control,
(Rus))

[illegible], A.I., starshiy inzh.; GOLOV, V.I., elektromekhanik; GOLOVATSKIY, A.V., elektromekhanik

Device for dismantling code transmitters. Avtom. telem. i svyaz' 5 no.9:41-42 S '61. (MIRA 14:10)

1. Kontrol'no-ispytatel'skiy punkt Kirovskoy distantsii signalizatsii i svyazi Donetskoy dorogi (for Golovatskiy).
(Railroads--Signaling)

POLOVIK, G.; LYSENKO, P.

How to select the most advantageous firing sites. Voen. znan. 25 no.4:6-7 Ap '49. (MIRA 12:12)
(Shooting, Military)

POLOVIK, G.S.; ZAGORUYKO, A.V.

Improvement of public services and amenities in residential areas. Gor.khoz.Mosk. 36 no.7:23-24 Jl '62. (MIRA 16:1)

1. Nachal'nik zhilishchno-ekspluatatsionnoy kontory No.15 Krasnopresnenskogo rayonnogo zhilishchnogo upravleniya, Moskva (for Polovik). 2. Zaveduyushchiy tekhnicheskim kabinetom kontory No.15 Krasnopresnenskogo rayonnogo zhilishchnogo upravleniya, Moskva (for Zagoruyko).
(Moscow--Street-cleaning machinery)

L 63786-65 EWT(m)/EWP(j)/T RM

ACCESSION NR: AP5019628 UR/0183/65/000/004/0002/0006
677.494.742.2.004.12

AUTHOR: Zverev, M. P.; Kostina, T. F.; Polovikhina, L. A.

TITLE: Strengthening of fibers made from crystalline polypropylene

SOURCE: Khimicheskiye volokna, no. 4, 1965, 2-6

TOPIC TAGS: polypropylene plastic, material deformation, synthetic fiber, crystalline polymer

ABSTRACT: The article presents experimental data on the effect which temperature and drawing rate have on the process of drawing fibers from crystalline polypropylene and on the properties of the strengthened fiber. The drawing process was studied with the use of a special device which made it possible to determine with great accuracy the relationships between stress in the fiber, temperature, elongation factor, and drawing rate. The data showed that in order to obtain a fiber with a high degree of orientation, the drawing should be done near the melting point of the polymer when the drawing rates are high. The physical and mechanical properties of fibers oriented at various temperatures and deformation rates were measured. It is

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L 63786-65
ACCESSION NR: AP5019628

concluded that the process of drawing of fiber from polypropylene involves not only a reorientation of the molecular structure in the direction of the applied stresses, but also a change in this structure. The stresses arising in an infinite polypropylene thread during drawing decrease with rising temperature and falling drawing rate, while the elongation factor increases. This decrease in stresses makes it possible to obtain a polymer having a high density and cross-sectional strength because of improvement of the intermolecular orientation in the direction of the applied stresses. Orig. art. has: 6 figures and 3 tables.

ASSOCIATION: VNIIV

SUBMITTED: 03Sep64 ENCL: 00 SUB CODE: MM, IE

NO REF SOV: 005 OTHER: 002

Card 2/2

ZVEREV, M.P.; KOSTINA, T.F.; POLOVINKINA, L.A.

Strengthening of fibers made from crystalline polypropylene. Khim. volok. no.4:2-6 '65. (MIRA 18:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volkona.

ZHELONKINA, L.; ZHEYENBAYEV, Zh.; KARIKH, F.G.; POLOVIKOV, A.I.; ENGEL'SHT, V.S.

Simultaneous quantitative determination of silicon, carbon, sulfur, phosphorus, manganese, and chromium in grey cast iron using an ST-7 stylometer. Izv. AN Kir. SSR. Ser. est. i tekh. nauk 5 no.6:99-104 '63. (MIRA 17:5)

POLOVIKOV, F.I.

Electret amplification of the photoluminescence of anthracene.
Opt. i spektr. 18 no.2:321-322 F '65.
(MIRA 18:4

POLOVIKOV, F.I.

Constant polarization of ebonite. Fiz.tver.tela 1 no.11: 1720-1726 N '59. (MIRA 13:4)

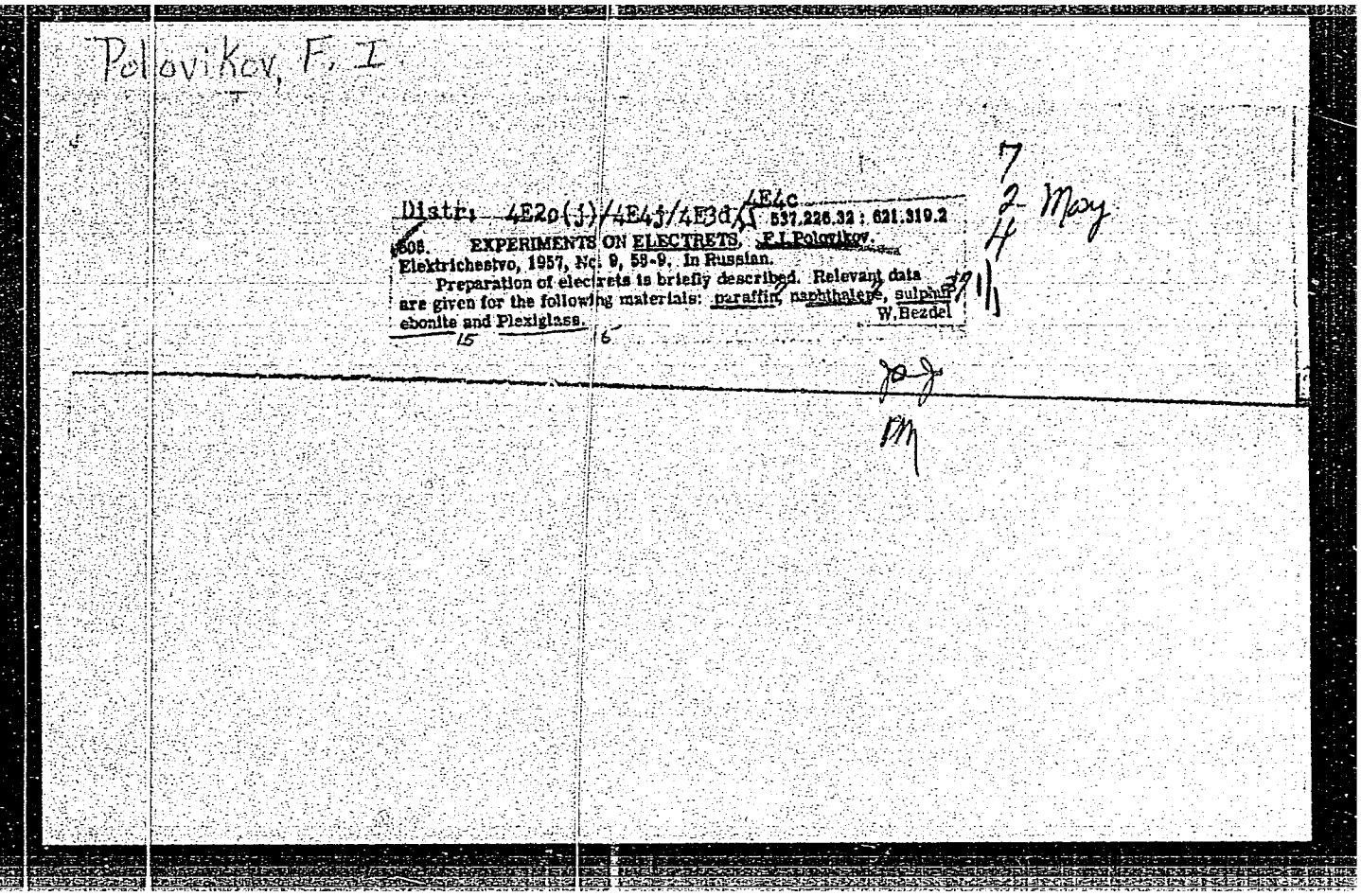
1. Kirgizskiy zhenskiy pedagogicheskiy institut im. V.V.Mayakovskogo. (Rubber--Electric properties)

POLOVIKOV, F. I. Cand. Physicomath Sci.

Dissertation: "Intensity of Fluoreseenee of the Solutions of Anthracene and its Derivatives."

19/6/50
Moscow State Pedagogical Inst. imeni.
V. I. Lenin

SO Vecheryaya Moskva
Sum 71



Polovikov, F. I.

Distr: 4E2o(j)/4E4j/4E3d/4E4c

537.226.32 : 621.319.2

7
2 May
4

6608. EXPERIMENTS ON ELECTRETS. F.I.Polovikov.
Elektrichestvo, 1957, No. 9, 58-9. In Russian.
Preparation of electrets is briefly described. Relevant data are given for the following materials: paraffin, naphthalene, sulphur, ebonite and Plexiglass. W.Hezdel

15 6

POLOVIKOV, F. I.

PA 165T86

USSR/Physics - Fluorescence 21 Mar 50
Anthracene

"Absolute Yield of Fluorescence in Anthracene and Some of Its Derivatives," F. I. Polovikov, Moscow State Pedagogical Inst imeni Lenin

"Dok Ak Nauk SSSR" Vol LXXI, No 3, pp 453-456

Supplements earlier (1948) optical investigations of polycyclic aromatic hydrocarbons. Carries out measurements by method of photoelectric comparison of energy of radiation with energy of exciting radiation, using mercury-quartz SVDSh-250 lamp and dark "E" Zeiss filter. Studies 18 compounds to obtain their k-ratio (the ratio $k = Ef/E_a$ [illegible]

165T86

USSR/Physics - Fluorescence (Contd) 21 Mar 50

where Ef is energy of fluorescence light and E_a is absorption energy). For ethanol and benzol solutions, k varies from 0.100 (9-bromo-anthracene - 10 - carboxylic acid in ethanol) to 0.843 (9, 10-diisobutylanthracene, also in ethanol; its value in benzol being 0.815). These correspond to wave lengths around 420 millimicrons. Submitted 20 Jan 50 by Acad S. I. Vavilov.

[illegible]

165T86

POLOVIKOV, F.I.; VOLCHANSKAYA, V.V.

Susceptibility of electrets. Fiz. tver. tela 5 no.11:3195-3198 N '63. (MIRA 16:12)

1. Kachinskoye vyssheye aviatsionnoye uchilishche letchikov imeni A.F.Myasnikova, Volgograd.

POLOVIKOV, F.I.

Some observations of the solar eclipse on February 25, 1952. Trudy Fiz-mat.fak.Kir.un. no.2:129-135 '53. (MLRA 10:5)
(Eclipses, Solar--1952)

POLOVIKOV, F.I.

Effect of an alternating electric field on the formation of electrets.
Fiz.tver.tela 1 no.5:783-788 My '59. (MIRA 12:4)
(Electrets) (Electric fields)

POLOVIKOV, F.I.

Effect of infrared radiation on the electret state in naphthalene. Fiz. tver. tela 5 no.7:1830-1832 Jl '63. (MIRA 16:9)
(Naphthalene crystals) (Electrets)

6822-65 EWT(l)/EPA(s)-2/EWG(k)/EWT(m)/EPF(c)/EPR/EWP(j)/T/ESC(b)-2 Pz-6/Pc-4/
T-4/Pe-4/Pt-10 IJP(c)/ASD(a)-5/AFWL/BSD/ASD(m)-3/AS(mp)-2/APGC(b)/ESD(gs)/ESD(t)/
ACCESSION NR: AP4044965 RAEM(t) AT/RM S/0181/64/006/009/2854/2856

AUTHOR: Polovikov, F. I.

94

TITLE: On photodepolarization of naphthalene thermoelectrets

SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2854-2856

TOPIC TAGS: naphthalene, photopolarization, depolarization, photoelectret, absorption spectrum

ABSTRACT: Results are reported on experiments on photodepolarization of naphthalene thermoelectrets in connection with the introduction of some changes in their production and illumination conditions. The preparation of the photoelectrets is briefly described. The electrets were illuminated with a PRK-4 mercury-quartz lamp either directly, or with filters separating spectral regions with maxima near 313 and 365 nm. The illumination was started 15 minutes after the first measurements of the charge and usually continued for one

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ACCESSION NR: AP4044965

hour. The results indicate that exposure to light in the vicinity of the absorption spectrum naphthalene causes depolarization of the electrets. The density of the heterocharge decreases exponentially during the first hour of illumination. When the duration of the electret polarization is increased from 80 to 150 minutes, the rate of depolarization does not change appreciably, but is strongly dependent on the intensity of the polarizing field. If the electrets are prepared under identical polarization conditions, the depolarization rate is completely determined on the illumination conditions. The net result of the experiments is that photodepolarization of the naphthalene thermoelectrets has different rates and depends on the conditions under which the electret state is produced in the naphthalene, as well as on the spectral composition of the depolarizing radiation. If it is assumed that the heterocharge in the naphthalene is produced by localized electrons, then the differences in depolarization rate, observed in the experiments, are apparently connected with the fact that the electrons become localized during the preparation of the electret on defects of various nature, in-

L 6822-65

ACCESSION NR: AP4044965

cluding macroscopic inhomogeneities. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: None

SUBMITTED: 02Jan64 ENCL: 00

SUB CODE: EM, OP NR REF SOV: 004 OTHER: 000

Card 3/3

~~24(6)~~ 24.8700 66278

AUTHOR: Polovikov, F. I. SOV/181-1-11-13/27

TITLE: Permanent Polarization of Ebonite

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 11, pp 1720 - 1726 (USSR)

ABSTRACT: The polarization current was measured in a dismountable condenser, in which a 1 mm thick ebonite disk (type GOST-2788-44) was clamped between the brass electrodes (principal circuit diagram see Fig 1). The heating of the ebonite was carried out as follows: a) the condenser with the sample was kept in a thermostat at the desired temperature during 30 minutes. Subsequently the thermostat over was switched off and the polarization field was applied. b) The sample was heated by high frequency (300 w generator, 6 megacycles). The polarization occurred at a field strength of 0.2 - 15.0 kv/cm. The following was measured: dependence : initial homo - charge - polarization field strength (Fig 2); dependence:maximum charge - polarization temperature (Fig 3); dependence:polarization current - time at 56, 70, 80, and 85°C (Fig 4); dependence:depolarization current - time at 70, 77 and 80°C (Fig 5). Course of polarization and depolarization current in samples which were

Card 1/2

Permanent Polarization of Ebonite

heated by an alternating field to 56, 70, 72 and 73°C (Fig 6). The measuring results permit the following conclusions: 1) the charge in a polarized ebonite at even polarization temperature depends only on the polarization field strength and on the polarization period. 2) At even polarization field strengths the size and the sign of the polarization charge is determined only by the temperature conditions prevailing during polarization. Below 70°C a hetero-charge was observed in ebonite, and a homo-charge at higher temperatures. 3) If a high frequency field is used for the heating, this will shorten the polarization period and cause larger charge quantities. There are 7 figures, 1 table, and 9 references, 4 of which are Soviet.

ASSOCIATION: Kirgizskiy zhenskiy pedagogicheskiy institut im. V. V. Mayakovskogo (Kirgizian Pedagogic Institute For Women, imeni V. V. Mayakovskiy)

SUBMITTED: February 5, 1958

4

S/058/61/000/012/039/083
A058/A101

AUTHOR: Polovikov, F. I.

TITLE: Concerning the heterocharge of naphthalene electrets

PERIODICAL: Referativnyy zhurnal, Fizika, no. 12, 1960, 326, abstract 12E196 ("Uch. zap. Kirg. zhensk. ped. in-t", 1959, no. 4, 51-58)

TEXT: There is examined the external-field dependence of heterocharge in polarized naphthalene. It is shown that heterocharge arises in naphthalene only at certain values of the applied-field strength. The obtained results can be explained on the assumption that in addition to electron polarization, some molecular processes take part in forming heterocharge so that at certain field strengths an additional dipole moment arises parallel to the induced dipoles. The curve of the external-field dependence of heterocharge evinces a whole series of maxima. A connection between the formation of heterocharge maxima and molecular vibration spectra is suggested, and a possible mechanism is sketched. There is a good agreement between the relative values of field strength that pertain to heterocharge maxima and the relative values of the square roots of the vibration frequencies of the naphthalene infrared spectrum.
[Abstracter's note: Complete translation] S. Dovorin

Card 1/1

AUTHOR Polovikov F.I., Dotsent

TITLE Test of Electrets. (Opyty nad elektretami - Russian)

105-9-15/32

PERIODICAL Elektrichestvo, 1957, Nr 9, pp 58 - 59 (U.S.S.R.)

ABSTRACT

Electrets are nonconductors which maintain the polarized state for a longer period of time. They are characterized by their polarization-direction, their steadiness and with respect to time their magnitude of polarization. There is proof that these parameters depend on the chemical composition of the basic material as well as on the formation- process of the conditions accompanying the electrets. In this case the production method was changed by substituting it with the treatment of the nonconductor in the electric alternating field. Every sample prepared was first exposed to the influence of the alternating field and only then subjected to the direct-current field of polarization. In most cases an alternating field with a frequency of 6×10^8 c and a direct-current field with a voltage of 3,5; 6,6; 13 kV/cm was used. The samples produced this way were steadier and in a number of cases contained a higher polarization charge. The effectiveness of the alternating field showed already with samples which were produced at from 20 to 35°C. The influence of the alternating field increases with the rise of temperature during the polarization period. This becomes especially evident with samples of plexiglass. A characteristic property of the influence of the alternating field

Card 1/2

Test of Electrets.

105-9-15/32

on the process of the formation of the polarized state is the characteristic that it can cause a reversal of polarization charge.
There is 1 table and 2 Slavic references.

ASSOCIATION Osh State Pedagogical Institute .
(Oshskiy gosudarstvennyy pedagogicheskiy institut).
SUBMITTED April 6, 1957
AVAILABLE Library of Congress.
Card 2/2

L 18027-63 EPF(c)/EWT(l)/EWT(m)/BDS AFFTC/ASD Pr-4
RM/WW

ACCESSION NR: AP3003877 S/0181/63/005/007/1830/1832

AUTHOR: Polovikov, F. I. 60

TITLE: Effect of infrared radiation on the electretic state in naphthalene 21

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1830-1832

TOPIC TAGS: electret, infrared, radiation, naphthalene, charge, electrical field, polarization

ABSTRACT: Experiments were made on samples of purified naphthalene in the form of disks (50 mm in diameter and 3 mm thick) made by congealing naphthalene in a portable plane-parallel capacitor free of electrical field. The samples were then polarized, and the value and stability of the charge was investigated at 14 different values of field potential in the interval 2.0-12.5 kv/cm and with radiation by infrared light in continuous spectrum with maximum in the neighborhood of 3 μ. The experiments showed that all the electrets obtained with variable radiation, regardless of the voltage across the polarizing field, exhibited heterogeneity of charges. If it is taken into account that electrets obtained in fields of 4.2, 9.8, 11.7, and 12.5 kv/cm without accompanying radiation exhibit

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L 18027-63
ACCESSION NR: AP3003877

only homogeneous charges, it may then be assumed that the presence of charge heterogeneity is associated with the radiation. It is concluded that the radiation causes an insignificant increase in initial charge in the electrets exhibiting charge heterogeneity immediately after polarization without radiation. When radiation accompanies polarization, a very small increase in the value of charge heterogeneity is observed over the value when the radiation and polarization are effected in sequence. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 31Jan63 DATE ACQ: 15Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 002 OTHER: 001

Card 2/2

-POLOVIKOV, F.I.

Heterocharge in electrets from naphthalene. Uch. zap. Kir. zhen. ped. inst. no. 4:51-58 '59. (MIRA 14:1)
(Electrets)

POLOVIKOV, F.I.; KORUNKO, T.Ye.

Conducting vocational practice for students in an industrial establishment. Uch. zap. Kir. zhen. ped. inst. no. 4:87-98 '59. (MIRA 14:1)

(Technical education)

L 25291-65 EWT(l)/EPA(s)-2/EWT(m)/EPF(c)/EWP(j)/T/EEC(b)-2 Pc-4/Pr-4/Pt-10
IJP(c) RM

ACCESSION NR: AP5005047 S/0051/65/018/002/0321/0322

38
B

AUTHOR: Polovikov, F. I.

TITLE: Intensified photoluminescence in anthracene electrets

SOURCE: Optika i spektroskopiya, v. 18, no. 2, 1965, 321-322

TOPIC TAGS: electret, electret luminescence, electret photoluminescence, electret stimulated luminescence, anthracene naphthalene electret

ABSTRACT: Photoluminescence intensity in anthracene-naphthalene thermoelectrets with an internal field of approximately 4 to 5 kv/cm was measured. Disk-shaped specimens 15 mm in diameter and 5 mm thick melted in pairs from an anthracene-naphthalene mixture of a given concentration were used. One specimen of each pair was polarized in a flat condenser between aluminum electrodes for two hours at 2.4 kv. The effect of the polarizing field began when the temperature of the specimen reached 75C and ended when it reached room temperature. Heating and cooling of nonpolarized (control) specimens was carried out at the same rate. The comparison of electret specimens with nonelectrets showed that all electrets possess a higher intensity of luminescence. The electret phenomenon has the following features: 1) Peculiar quenching due to concentration of stimulated luminescence

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L 25291-65

ACCESSION NR: AP5005047

caused by electreting. The highest relative intensification (35%) was in electrets with an anthracene concentration of 10^{-3} g/g, and the lowest (13%) at a concentration of 4×10^{-3} g/g . 2) The luminescence intensity of electrets changes with time. The time it takes for the intensity to reach its maximum is inversely dependent on the anthracene concentration in the electret specimen. 3) The increase of intensity is directly associated with the decrease of the charge in the electret. 4) An hour's uninterrupted irradiation of specimens with a concentration of 1×10^{-3} g/g with a light at $\lambda = 365$ mμ 15 or 25 days after polarization produces no marked changes in the intensity of luminescence. Orig. art. has: 1 figure. [JA]

ASSOCIATION: none

SUBMITTED: 21Jan64 ENCL: 00 SUB CODE: EM, OP

NO REF SOV: 002 OTHER: 000 ATD PRESS: 3184

Card 2/2

L 02255-67 EWT(m)/T/EWP(j) IJP(c) WW/TCH/RM

ACC NR: AP6015481 SOURCE CODE: UR/0181/66/008/005/1562/1568

42
B

AUTHOR: Novikov, Yu. N.; Polovikov, F. I.

ORG: Kachinsk Higher Military Aviation School im. A. F. Myasnikov (Kachinskoye vyssheye voyennoye aviatsionnoye uchilishche)

TITLE: Electrical charges originating in polymethylmethacrylate subjected to compression deformation

SOURCE: Fizika tverdogo tela, v. 8, no. 5, 1966, 1562-1568

TOPIC TAGS: compression deformation, methylmethacrylate, electron charge, electric polarization

ABSTRACT: The authors assume that polarization during deformation depends on the magnitude and the means of application on a polymer of a mechanical field in conjunction with various temperature conditions. In order to verify this assumption, the authors investigate the polarization in polymethylmethacrylate (PMMA) under different modes of deformation. Square and round cross section specimens (averaging 10 mm thick), prepared from commercial sheet of "grade A" PMMA, were studied. Relaxation of internal stresses, arising in the material as a result of shaping the specimens, was achieved by prolonged annealing at 130C. Conclusions are

Card 1/2

reached on the basis of the experimental data obtained. The polarized state in PMMA is related to the process of orientation of the molecules and of individual links, containing polar groups. The orientation of the molecules as a whole determines the polarization at deformations up to 75%; the electrical charge originating in this case has low stability. The primary mechanism in the formation of a long-term polarized state is the process in which, during the flow of the material in the radial direction, not only the "straightening" of the globule-molecules occurs, but also the rotation of the polar groups. In this case, polarization increases with an increase in the degree of polarization up to the state of mechanical destruction of the polymer. The magnitude of the polarized charge depends on the rate of deformation and is only slightly sensitive to temperature variations, if the temperature during deformation differ little from the vitrification temperature. Orig. art. has: 5 figures and 2 tables.

SUB CODE: 11,20/ SUBM DATE: 09Aug65/ ORIG REF: 004

ACCESSION NR: AT4036055 S/2781/63/000/003/0169/0179

AUTHOR: Polovin, R. V.

TITLE: Evolutionality conditions in ordinary hydrodynamics and in magnetohydrodynamics

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upravlyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3. Kiev, Izd-vo AN UkrSSR, 1963, 169-179

TOPIC TAGS: hydrodynamics, magnetohydrodynamics, plasma stability, plasma physics, shock wave propagation, thermodynamic characteristic

ABSTRACT: The relation between the stability of various plasma configurations and the conditions for the existence of solutions of the corresponding equations are reviewed, and cases when stability

Cc

Card 1/3

ACCESSION NR: AT4036055

SUBMITTED: 00 DATE ACQ: 21May64 ENCL: 00

SUB CODE: ME NR REF SOV: 014 OTHER: 002

Card 3/3

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001341820020-0"

ACCESSION NR: AT4036056 S/2781/63/000/003/0179/0183

AUTHORS: Polovin, R. V.; Cherkasova, K. P.

TITLE: Thermodynamic characteristics in a plasma

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upraylyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3, Kiev, Izd-vo AN UkrSSR. 1963, 179-183

TOPIC TAGS: thermodynamic characteristic, entropy, plasma heating, thermal conductivity, Maxwell equation, equation of state, charged particle, plasma physics

ABSTRACT: The behavior of a plasma consisting of several species of charged and neutral particles is described by means of the hydrodynamic equations of motion of each of the components to which are add-

Card 1/2

ACCESSION NR: AT4036052 S/2781/63/000/003/0151/0161

AUTHORS: Akhiyezer, A. I.; Lyubarskiy, G. Ya.; Polovin, R. V.

TITLE: On the kinetic instability of a plasma

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upravlyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3, Kiev, Izd-vo AN UkrSSR, 1963, 151-161

TOPIC TAGS: plasma research, plasma instability, kinetic gas theory, distribution statistics, plasma stability, plasma magnetic field interaction, Laplace transformation

ABSTRACT: The article deals with the stability of the distribution function of particles in a plasma with respect to plasma oscillations. The general conditions for the stability of the electron distribution

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ACCESSION NR: AT4036052

function are derived by investigating the behavior of individual spatial Fourier components of the potential and the deviations of the electron distribution function from the initial distribution function. The first part of the analysis is devoted to a free plasma without external fields. The singular points of the Laplace transformations of the potential and of the distribution function (which determine the behavior of these functions in the steady state) are then determined. Stability criteria based on the locations of these roots in the complex plane are then established. It is shown that a distribution function which has only one maximum is stable; this confirms deductions made by others. Furthermore, an arbitrary spherically symmetrical distribution function which does not vanish anywhere is also stable, regardless of the number of maxima. The second part of the analysis is devoted to a plasma in a constant and homogeneous magnetic field, the stability being investigated only with respect to plasma waves for which the electric field is potential. The necessary and sufficient stability criteria are estab-

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ACCESSION NR: AT4036052

lished and it is shown that an even distribution function with a single maximum is stable and that any anisotropic distribution function is stable. The stability conditions for a fixed value of the plasma frequency are also established. The stability condition of the distribution function in a plasma in a constant and homogeneous weak electric field is then determined and it is shown that a weak electric field does not change the stability conditions. "The authors are grateful to K. N. Stepanov and A. B. Kitsenko for valuable advice, and to L. B. Landau and M. A. Leontovich for a useful discussion." Orig. art. has: 29 formulas.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 21May64 ENCL: 00

SUB CODE: ME NR REF SOV: 013 OTHER: 014

Card 3/3

POLOVIN, R.V.

Kinetic instability in a magnetic field. Zhur. tekh.fiz. 34 no. 2:259-261 F '64. (MIRA 17:6)

POLOVIN, R. V.

PA 236T101

USSR/Physics - Plasma Oscillations Nov 52

"Oscillation of Plasma in Crossed Electrical and Magnetic Fields," A. I. Akhiyezer and R. V. Polovin

"Zhur Tekh Fiz" Vol 22, No 11, pp 1794-1802

Authors consider the interaction of a compensated beam of electrons with slow waves in crossed-over electrical and magnetic fields. Clarify the conditions that govern the instability of the beam. Cite related works of V. M. Lopukhin and S. D. Gvozdover.

236T101

POLOVIN, R.

USSR/Nuclear Physics - Quantum Electrodynamics Review Sep 53

"Elimination of Divergences in Quantum Electrodynamics," A. Akhiyezer and R. Polovin

Usp Fiz Nauk, Vol 51, No 1, pp 3-40

Reviews the recently developed relativistically invariant form of perturbation theory. This theory facilitates the progress of quantum electrodynamics by pointing to the existence of only 3 basic types of divergences, which are connected with self-energies of electron and photon. These divergences, which are connected with self-energies of electron and photon. These divergences may be eliminated by new rules based on new renormalization of mass and charge of electron.

263T97

263T97

POLOVIN, R. [V.]

259T77

USSR/Nuclear Physics - Electron Scattering 1 May 53

"Radiative Corrections to the Scattering of an Electron by an Electron," A. Akhiyezer and R. Polovin

DAN SSSR, Vol 90, No 1, pp 55-57

Interaction of electron with zero oscillation of electromagnetic field and polarization of electron-positron vacuum lead to additional electron scattering in a specified external electromagnetic field. This should be considered in electron-electron scattering. Corrections are computed and represented graphically. Presented by Acad L. D. Landau 10 Mar 53.

(PA 56 no. 672: 8223 '53)

259T77

POLOVIN, R. V.

Dissertation: "Radiation Correction for Electron Scattering on an Electron." Cand Phys-Math Sci, Khar'kov State U, Khar'kov, 1954. (Referativnyy Zhurnal-Fizika, Moscow, Jun 54)

SO: SUM 318, 23 Dec 1954

Polovin, R. [V.]

USSR/Physics

Card 1/1 Pub. 22 - 17/54

Authors : Akhiyezen, A., and Polovin, R.

Title : About the relativistic oscillations of plasma

Periodical : Dok. AN SSSR 102/5, 919-920, June 11, 1955

Abstract : Questions connected with the relativistic oscillations of plasma are analysed. The analysis is accomplished in view of the Maxwell electromagnetic equations for the electric (E) and magnetic (H) fields. Only the longitudinal oscillations of the plasma are considered. One USSR reference (1951).

Institution : .....

Presented by : Academician L. D. Landau, February 26, 1955

ROSOWSKY, R.U.

Distr: 4E4b

Akhiezer, A. I.; and Polovin, R. V., Theory of wave motion of an electron plasma. Soviet Physics. JETP 3 (1956), 696-705.

The properties of wave motion in an infinitely extended plasma are studied with a model in which the positive charges form a homogeneous background, the density fluctuations arising from the electrons alone. The electron gas is described in a hydrodynamic sense, all electromagnetic variables, as well as the electron momentum, being functions of a single set of space and time variables. The field equations are used in complete form, so that the treatment is not restricted by the limitations imposed in magnetohydrodynamic theory, but is a kind of extension of the usual theory of the optical properties of matter. Solutions are assumed in the form of plane waves and their velocity and polarization properties are studied under various conditions, for both longitudinal and transverse waves. (The reader should be on his guard for mathematical errors. Equations (10) and (12) should have $\mathbf{i}\cdot\mathbf{H}$ instead of $\mathbf{i}\cdot\mathbf{H}_0$ on the right hand side.

3
1-F\W

Akhiezer, A. I. + Polovin, R. V.

This error, which appears in the original article [Z. Eksper. Teoret. Fiz. 30 (1956), 915–928] seems to be fundamental since with this correction Eq. (10) is not completely soluble for **H**, while in the form given the right hand side of (12) should vanish identically and the equation be integrable for **p**. Equation (13) is incorrectly transcribed from the original article, but the reviewer has not been able to verify the form given there. The reviewer has not attempted to determine the extent to which these slips may invalidate the conclusions of the paper.}

E. L. Hill (Minneapolis, Minn.).

POLOVIN, R.V.

H

USSR / Electronics

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9816

Author : Akhiyezer, A.I., Polovin, R.V.
Inst : Kharkov State University, Khar'kov
Title : Contribution to the Theory of Wave Motions of Electron Plasma.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 5, 915-928

Abstract : A theoretical investigation is made of the nonlinear wave motions in an infinite electron plasma for all electron velocities. With this, the temperature effects are not taken into account and the state of the plasma is characterized not by the distribution function, but by the electron density. The fundamental equations determine the fields E and H, the density, the velocity, and the momentum of the electrons in the plasma. General non-linear solutions are obtained forlongitudinal and transverse wave motions of the

Card : 1/2

Polovin, R.V.

USSR/Electronics - Gas Discharge and Gas Discharge Instruments H-7

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12352

Author : Polovin, R.V.

Inst : Physical Technical Institute, Academy of Sciences, Ukrainian SSR, Khar'kov.

Title : Contribution to the Nonlinear Theory of Longitudinal Plasma Oscillations.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 31, No 2, 354-355

Abstract : Using the Lagrangian form of the equations of motion and Maxwell's equations, the author obtains results concerning the plasma oscillations in the nonrelativistic and relativistic cases, previously examined by other methods.

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Abs Jour : Ref Zhur - Fizika, No 5, 1957, No 10874

of small momenta of virtual particles are eliminated by introducing the photon mass λ, which enters into the elastic-scattering cross section. When adding the cross sections of the purely-elastic and the inelastic scattering (with emission of a long-wave photon, whose energy does not exceed Δ E), the quantity λ cancels out; the final result does not contain λ. The author considers the limiting case of ultra-relativistic electron energies, in which the formulas for the radiation corrections become substantially simplified.
A rule is proposed that facilitates the calculation of the traces of the matrixes, and also the multiplication of two matrix traces.

POLOVIN, R. V.

5397
NONLINEAR THEORY OF LONGITUDINAL PLASMA OSCILLATIONS. R. V. Polovin (Academy of Sciences, Ukrainian SSR). Soviet Phys. JETP 4, 290(1957) March.

POLOVIN R.V.

12786

RADIATIVE CORRECTIONS TO THE SCATTERING OF ELECTRONS BY ELECTRONS AND POSITRONS. R. V. Polovin (Academy of Sciences, Ukrainian SSR). Soviet Phys. JETP 4, 385-92(1957) Apr.

The radiative corrections to the scattering of electrons and positrons are calculated with accuracy up to α^2. Consideration is given to the general case and the limiting case of large energies. (auth)

POLOVIN, R. V.

57-27-7-9/40

AUTHORS: Polovin, R. V., Tsintsadze, N. L.

TITLE: Small Oscillations of an Electron Beam (O malykh kolebaniyakh elektronnogo puchka)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1957, Vol. 27, Nr 7, pp. 1466 - 1473 (USSR)

ABSTRACT: The problem of the stability of an electron beam is here solved according to the qualitative method based on the self-coupling of differential operators. It is assumed that the beam possesses an axial symmetry and that it is enclosed in a cylindrical wave guide with walls of ideal conductance. The ions are assumed as sufficiently heavy. It is also assumed that they do not participate in the high-frequency oscillations. The electrons and ions possess different temperatures constant in the entire space. The problem is solved by means of hydrodynamic approximation. The variable components of the fields, the density and the speed of the electrons are assumed to be small and the equations are linearized. At first equilibrium equations of a non-compensated system which was for the first time obtained by Bennettare derived in a simpler manner than by Bennett (Phys. Rev. 45, 1934, 1984, 1935). The small oscillations of the electron beam are investigated and the equations for

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-. Electron
3. Operators (Mathematics)-

Polovin, R.V.

AUTHORS: Polovin, R.V., Tsintsadze, N.L. 57-11-23/33

TITLE: Longitudinal Vibrations of Electron-Ion Beams. (Prodol'nyye kolebaniya elektronno-ionnykh puchkov)

PERIODICAL: Zhurnal Tekhn.Fiz., 1957,Vol. 27, Nr 11, pp. 2615-2623 (USSR)

ABSTRACT: The problem of the stability of the electron-ion beam is here solved according to the qualitative method which is based on self-conjugate differential operators, without the necessity to solve the differential equations. By the aid of the "quality method" also the intervals in which the phase velocity of the electromangetic waves is situated are found and final conclusions on the topography of the electro-magnetic field are made. It is assumed that the beam is confined in a cylindrical wave-guide with perfectly conducting walls. In order to be able to pay attention to the interaction between the beam and the slow electromagnetic waves the problem is idealized and the concrete structure serving for the deceleration is replaced by a certain medium with an effective dielectricity constant ε that is higher than one. The figh frequency energy can be transferred from the electrons to the ions and this can lead to the instability of the beam. Here only the longitudinal oscillations are investigated. that means it is assumed that the electrons and ions can only be displaced along the axis of the beam, which can be obtained by applying a sufficiently strong magnetic longitudinal field. There are 11 figures and 1 Slavic reference.

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Khar'kov Physico-tech Inst.

AKHIYEZER, A.I. [Akhiiezer, O.I.]; LYUBARSKIY, G.Ya.[Liubars'kyi, H.IA.]; POLOVIN, R.V.

Simple waves in magnetohydrodynamics [with summary in English]. Ukr.fiz.zhur. 3 no.4:433-438 Jl-Ag '58. (MIRA 11:12)

1. Fiziko-tekhnicheskiy institut AN USSR i Khar'kovskiy gosudarstvennyy institut.
(Magnetohydrodynamics)

LYUBARSKIY, G.Ya. [Liubars'kyi, H.IA.]; POLOVIN, R.V.

Simple magnetoacoustic waves. Ukr.fiz.zhur. 3 no.5:567-570 S-O '58. (MIRA 12:2)

1. Fiziko-tekhnicheskiy institut AN USSR i Khar'kovskiy gosudarstvennyy universitet.
(Magnetohydrodynamics)

POLOVIN, R.V.; LYUBARSKIY, G.Ya. [Liubars'kyi, H.IA.]

Impossibility of rarefaction shock waves in magnetohydrodynamics. Ukr.fiz.zhur. 3 no.5:571-574 S-O '58. (MIRA 12:2)

1. Khar'kovskiy gosudarstvennyy universitet i Fiziko-tekhnicheskiy institut AN USSR.
(Magnetohydrodynamics) (Shock waves)

SOV/56-34-3-15/55

AUTHORS: Polovin, R. V., Tsintsadze, N. L.

TITLE: Circular Waves in an Electron-Ion Beam (Tsirkulyarnyye volny v elektronno-ionnom puchke)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 637-642 (USSR)

ABSTRACT: This work examines the oscillations in a non-compensated electron-ion beam which is enclosed in a cylindrical wave guide of radius R. The authors here investigate circular oscillations i. e. they assume that the electromagnetic field and the densities and velocities of the electrons and of the ions do not depend on z. The dependences of these quantities on the coordinates r, φ, and on the time t have the form $F(r, \varphi, t) = f(r)e^{i(\omega t - \mu\varphi)}$. The here obtained conclusions can also be transferred on perturbations of the more general form $F(r, \varphi, z, t) = f(r)e^{i(\omega t - \mu\varphi - \gamma z)}$ if only the condition $\gamma R \ll 1$ is satisfied. The amplitude of the oscillations is regarded to be small and the equations are linearized. The problem here is solved by hydrodynamic approxima-

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tion. The electrons and the ions have different, in space and time constant temperatures. The magnetic field, produced by the current of the beam is assumed to be strong. Subsequently some further assumptions are given. First, terms for the densities of the electrons and of the ions and for the electric and magnetic field strength are given. Certain components of the electric and of the magnetic field strength equal zero. Then the Maxwell equations, the equations of motion, and the continuity equations for this problem are given. Then these equations are linearized and repeatedly transformed. After some steps of computation a differential equation for the determination of E_φ. with the boundary conditions belonging to it is obtained. The frequency ω of the oscillations is an eigenvalue of the corresponding differential operator. The function $E_\varphi(r)$ must be finite in the interval $0 \leqslant r \leqslant R$ and besides other quantities in this interval must also be finite. The authors solve the above mentioned differential equation by qualitative methods. First it is shown that all values of ω are real. Besides the frequencies ω do not exceed the value $\mu c/R$. In the point $r = \mu c/\omega$ H_z remains infinite in the non-linear theory as well. In the case of the consideration of the collisions this infiniteness is also re=

tained. Finally the topography of the field is briefly discussed.
There are 2 figures, and 7 references, 5 of which are Soviet.

SUBMITTED: July 31, 1957.

24 (1), 24 (3)

AUTHORS: Lyubarskiy, G. Ya., Polovin, R. V. SOV/56-35-2-30/60

TITLE: On Simple Magneto-Sound Waves (Prostyye magnitozvukovyye volny)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2 (8), pp 509-509 (USSR)

ABSTRACT: The following law was demonstrated in ordinary hydrodynamics: In a simple wave, the points with a high density move faster than the points with a low density if the inequation $(\partial^2(1/\rho)/\partial p^2) > 0$ is satisfied. In magneto hydrodynamics there are 3 types of simple waves: fast and slow magneto-sonic waves and Alfvén (Al'fven) (magneto-hydrodynamic) waves. The Al'fven waves are characterized by a constant density and by a constant velocity. In the slow and fast magneto-sonic waves the points with higher velocity move faster if the above-given condition is satisfied. This implies in particular the fact that automodel waves are always expansion waves. The dependence of phase velocity on density leads (as also in ordinary hydrodynamics) to the following conclusion: In the

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regions of contraction the liquid continues to contract as long as no shock wave is generated. The authors thank A. I. Akhiyezer and A. S. Kompaneyets for their useful advice. There are 2 references, 2 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (Physico-Technical Institute, AS Ukrainskaya SSR)

SUBMITTED: April 4, 1958

10 (4), 24 (3)

AUTHORS: Polovin, R. V., Lyubarskiy, G. Ya. SOV/56-35-2-3'/60

TITLE: The Impossibility of Expansion Shock Waves in Magneto-Hydrodynamics (Nevozmozhnost' udarnykh voln razrezheniya v magnitnoy gidrodinamike)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2 (8), pp 510-510 (USSR)

ABSTRACT: The law of Tsemplen remains valid also in magnetic hydrodynamics for any intensity of the explosion and for any direction of the magnetic field if the conditions $(\partial^2(1/\varrho)/\partial p^2)_s > 0$ and $(\partial p/\partial T)_\varrho > 0$ are satisfied. An increase of the pressure in the shock wave causes an increase of density. A formula is given for the calculation of the change of the magnetic field $H_\perp$ when a shock wave passes by. Weak magnetic fields are intensified, but strong magnetic fields become weaker. This is an argument in favor of a certain equalizing influence of the shock waves. The authors thank A. I. Akhiyezer and A. S. Kompaneyets for useful advice. There are 4 references, 4 of which are Soviet.

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The Impossibility of Expansion Shock Waves in Magneto-Hydrodynamics SOV/56-35-2-31/60

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (Physico-Technical Institute, AS Ukrainskaya SSR)

SUBMITTED: April 4, 1958

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24(3), 10(4) SOV/56-35-3-25/61

AUTHORS: Akhiyezer, A. I., Lyubarskiy, G. Ya., Polovin, R. V.

TITLE: On the Stability of Shock Waves in Magnetohydrodynamics (Ob ustoychivosti udarnykh voln v magnitnoy gidrodinamike)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 3, pp 731-737 (USSR)

ABSTRACT: The present paper aims at investigating the stability of plane magnetohydrodynamic shock waves against minor disturbances in dependence on the distance to the explosion front and on time. It is shown that magnetohydrodynamic shock waves become instable and may be split up into several shock waves if the number of magnetohydrodynamic, magnetosound-, and entropy waves leaving the explosion front is different from six. The method of investigation is then described. By basing on the system of equations (1) $\sum_{k=1}^{n}\left\{X_{ik}(u)\frac{\partial u_k}{\partial x}+T_{ik}(u)\frac{\partial u_k}{\partial t}\right\}=0;\quad i=1,2,\ldots n,$ where u_k is the total of hydrodynamic quantities (velocity v, magnetic field H, density ϱ, entropy s); $X_{ik}(u)$ and $T_{ik}(u)$ are

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On the Stability of Shock Waves in Magnetohydrodynamics

functions of $u_1, u_2, \ldots u_n$; x is the distance to the explosion front, and t denotes the time. (1) is, in the following, linearized for u_{1k} and u_{2k}, and the system of equations (2) thus obtained is solved. Investigation of stability of shock waves is based on Syrovatskiy's (Ref 2) assumption that in magnetohydrodynamics there are seven types of onedimensional plane waves: 1) magnetohydrodynamic waves with the phase velocities $v_x - V_x$, $v_x + V_x$, where $V_x = H_x/\sqrt{4\pi\rho}$; 2) magnetic sound waves with the phase velocities $v_x - u_-$, $v_x + u_-$, $v_x - u_+$ and $v_x + u_+$, where $u_\pm^2 = \frac{1}{2}\left[V^2 + c^2 \pm \sqrt{(V^2 + c^2)^2 - 4c^2V_x^2}\right]$, $\vec{V} = \vec{H}/\sqrt{4\pi\rho}$ (c = velocity of sound); 3) entropy waves the phase velocity of which coincides with the velocity of the liquid v_x. It holds that (8): $u_- \leq V_x \leq u_+$. In the following it is shown what waves show convergence and divergence respectively at what phase velocities. Stability is obtained only in the following 3 cases:

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$$\begin{array}{lll} \text{A)} & u_{-1} < v_{1x} < V_{1x}, & v_{2x} < u_{2-} \\ \text{B)} & V_{1x} < v_{1x} < u_{1+}, & u_{2-} < v_{2x} < V_{2x} \\ \text{C)} & u_{1+} < v_{1x} & V_{2x} < v_{2x} < u_{2+} \end{array} \qquad (9)$$

(cf. Fig 1).

The authors further investigate such cases in which the magnetic field develops parallel to the wave front and in which it is vertical to it; the respective conditions for stability are given (equations 10-13). In conclusion the case of an Al'fven rotary shock wave is investigated and the conditions of stability according to scheme (9) are discussed for various cases.

The authors thank L. D. Landau, A. S. Kompaneyets, and G. I. Barenblatt for discussions and advice. There are 6 figures and 2 references, — which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (Physico-Technical Institute of the Academy of Sciences, Ukrainskaya SSR)

SOV/56-35-5-39/56

24(3), 21(7)

AUTHORS: Lyubarskiy, G. Ya., Polovin, R. V.

TITLE: The Splitting-Up of a Small Explosion in Magnetohydrodynamics (Rasshchepleniye malogo razryva v magnitnoy gidrodinamike)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 5, pp 1291-1293 (USSR)

ABSTRACT: N. E. Kotchine (Kochin) (Refs 1, 2) in 1926 investigated the problem of the decay of any hydrodynamic plane explosion, basing mainly on the fact that on each side of the primary explosion, either a shock wave or an automodel-like rarefaction wave may be propagated. In magnetic hydrodynamics decay is, as a rule, much more complicated: On each side of the primary explosion up to 3 waves (shock waves or automodel-like waves) can be propagated. In magnetohydrodynamics there are three different types of steady shock waves (fast and slow magnetosonic waves and magnetohydrodynamic waves) as well as two types of automodel-like waves (fast and slow magnetosonic waves). Because of the difference in propagation velocity, up to 3 waves of the aforementioned types can propagate in each direction starting from the point of the primary explosion.

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SOV/56-35-5-32/56

The Splitting-Up of a Small Explosion in Magnetohydrodynamics

The initial explosion is characterized by 7 parameters. As each wave is characterized by a parameter, the initial explosion is split up into 7 waves: three of them move towards the left, three to the right, and one remains immobile. It is necessary that in each direction waves of three different types develop: first, a fast magnetosonic wave (shock wave or automodel-like wave), followed by an Alfvén (Al'fven) shock wave, and behind the latter a slow magnetosonic wave (shock wave or automodel-like wave). The problem consists in the suitable selection of the amplitudes of these 7 waves, so that transition from the state on the left of the primary explosion to the state to the right of it can be performed. For reasons of greater simplicity, the authors confine their investigation to a very small primary explosion, in which case all secondary discontinuities are small as well. The relations between the discontinuities of the magnetohydrodynamic quantities in the automodel-like and shock waves are the same as between the amplitudes of the corresponding linearized wave . These relations are given for the following waves: Magnetosonic waves, Alfven shock waves. contact-discontinuity. The sum of the discontinuities of each magnetohydrodynamic quantity on the 7

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The Splitting-Up of a Small Explosion in Magnetohydrodynamics

waves formed is equal to the primary discontinuity. In this way 7 equations with 7 unknowns are obtained, by solving of which it is possible to calculate all discontinuities. The authors thank Professor A. I. Akhiyezer for valuable advice. There are 5 references, 4 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (Physico-Technical Institute of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: June 30, 1958

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems in Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 343 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; I.M. Kirko, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Veldre, Candidate of Physics and Mathematics; V.G. Vitol, Candidate of Physics and Mathematics; Yu.M. Kruzin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magnetohydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 35 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and A.I. Gubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

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Polovin, R. V.

Voprosy Magnitnoy Gidrodinamiki i Dinamiki Plazmy. Trudy Konferentsii Po Magnitnoy Gidrodinamike, Riga, 2-10 Iyulya 1958 g. (Problems of Magnetohydrodynamics and Plasma Dynamics. Works of the Conference On Magnetohydrodynamics, Riga, 2-10 July 1958), Riga, 1959, 339 pp

The majority of the texts of the 55 conference reports and discussions of reports are presented in the source in abridged form. Previously published reports are included there as brief abstracts only. The material published there for the first time (abridged and unabridged) are as follows:

"The Role of Magnetohydrodynamics and Plasma Dynamics in Certain Problems of Astrophysics," by D. A. Frank-Kamenetskiy, Moscow, pp 7-11

"Magnetohydrodynamics and the Study of Variations of Cosmic Rays," by L. I. Dorman, Moscow, pp 13-44

"Cosmic Ray Spectra and Their Role in Cosmic Gas Dynamics," by S. I. Syrovatskiy, Moscow, pp 45-48

"The Influence of a Magnetic Field on the Stability of Flow of a Conducting Fluid," by Ye. P. Velikhov, Moscow, pp 49-58

"Some Problems of the Motion of a Rarefied Plasma in a Magnetic Field," by Ya. P. Terletskiy, Moscow, pp 59-62

"On Nonlinear Steady-State Motions of a Rarefied Plasma in a Magnetic Field," by R. Z. Sagdeyev, Moscow, pp 63-65

"On One Criterion of Applicability of the Equations of Magnetohydrodynamics to a Plasma," by S. I. Braginskiy, Moscow, pp 67-71 (Discussion of the report by R. V. Polovin, Khar'kov, pp 71-72)

"On the Possibility of Accelerating Charged Particles by Means of Shock Waves in a Magnetized Plasma," by L. I. Dorman and G. I. Freydman, Moscow and Gor'kiy, pp 77-81

"On the Acceleration of Charged Particles During Powerful Impulse Discharges and During the Collision of Magnetized Clouds," by L. I. Dorman, Moscow, pp 83-88

~~"The Influence of a Longitudinal Magnetic Field on the Temperature of the Electrons in a Plasma," by [illegible], pp 89-92~~

"Investigation of Certain Characteristics of a Plasma of Xenon and Argon Behind a Powerful Shock Wave," by S. R. Kholev, Moscow, pp 93-105

"Observation of Electrodynamic Contraction of an Arc With the Aid of an Electron-Optical Converter," by V. L. Granovskiy, [illegible], V. I. Savoskin, and G. G. Timofeyeva, Moscow, pp 107-115

"On the Interaction of Weak Perturbations With Discontinuities and the Stability of Shock Waves in Magnetohydrodynamics," by V. M. Kontorovich, Khar'kov, pp 117-125

"On the Stability of Shock Waves in Magnetohydrodynamics," by S. I. Syrovatskiy, Moscow, pp 127-131

"On the Scattering of Hydromagnetic Waves on Turbulent Fluctuations," by A. G. Sitenko and Yu. A. Kirochkin, Khar'kov, pp 143-146

"On the Damping of Magnetohydrodynamic Waves in a Plasma," by R. Z. Sagdeyev, Moscow, pp 147-149

"Simple Waves in Magnetohydrodynamics," by A. I. Akhiyezer, G. Ya. Lyubarskiy, and R. V. Polovin, Khar'kov, pp 151-157

"Two-Dimensional Problems of Magnetohydrodynamics," by G. S. Golitsyn, Moscow, pp 161-165

"On Wave-Induced Flows in Magnetohydrodynamics," by A. I. Ivanovskiy, Moscow, pp 167-171

"Oscillations of an Infinite Gas Cylinder With Its Own Gravitation in a Magnetic Field," by I. M. Yavorskaya, Moscow, pp 175-183

"On Magnetic Boundary Layers and Electric Current Discharges in Moving Media," by V. N. Zhigulev, Moscow, pp 185-190

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C111/C333

AUTHORS: Akhiyezer, A. J., Lyubarskiy, G. Ya., Polovin, R. B.

TITLE: Simple waves in magnetic hydrodynamics

PERIODICAL: Referativnyy zhurnal, Matematika, no. 8, 1961, 56, abstract 8B244.("Vopr. magnitn. gidrodinamiki i dinamiki plazmy" Riga, AN Latv SSR, 1959, 151-157)

TEXT: The authors describe a method for finding out simple plane waves with a finite amplitude of oscillation in magnetic hydrodynamics. The basic system of equations of magnetic hydrodynamics is schematically represented in the unidimensional case in the form

$$\sum_{k=1}^{n} X_{ik}(u) \frac{\partial u_k}{\partial x} + T_{ik}(u) \frac{\partial u_k}{\partial t} = 0; \; i = 1,2,\ldots, n, \quad (1)$$

where u_k is the totality of the hydrodynamic parameters, X_{ik} and T_{ik} -- certain functions of u_k. The authors interprete all the functions u_k as functions of one of them: $u_k = u_k(u_1(x,t))$, substitute this into

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AUTHORS: Akhiyezer, A.I., Lyubarskiy, G.Ya., Polovin, R.V.

TITLE: On the theory of plain and shock magnetohydrodynamical waves

PERIODICAL: Referativnyy zhurnal.Mekhanika, no. 8, 1961, 3-4, abstract 8B17 ("Tr. 2-y Mezhdunar. konferentsii po mirn. ispol'zovaniyu atomn. energii, 1958, T.1. Yadern. fiz.", Moscow, Atomizdat, 1959, 213-220)

TEXT: The authors point at the existence of plane non-stationary plain magnetohydrodynamical waves, each of which propagates in an immovable gas with one of the velocities of small disturbance propagation. It is shown that phase velocity within the wave increases with increasing density, if the following relation is fulfilled:

$$\left(\frac{\partial^2}{\partial p^2}\frac{1}{\rho}\right)_S > 0$$

where p is pressure, ρ is density, S is entropy. The interaction of magnetohydrodynamical shock waves with plane waves of small disturbances is considered. It is concluded that the necessary condition for the stability of a wave is as

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POLOVIN, R.V.; TSINTSADZE, N.L.

Magnetohydrodynamic equations [with summary in English]. Ukr. fiz. zhur. 4 no.1:30-38 Ja-F '59. (MIRA 12:6)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Magnetohydrodynamics)

SOV/56-36-3-64/71

21(7), 24(5)

AUTHOR: Polovin, R. V.

TITLE: The Tsemplen Theorem in Relativistic Hydrodynamics (Teorema Tsemplena v relyativistskoy gidrodinamike)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 3, p 956 (USSR)

ABSTRACT: As I. M. Khalatnikov (Ref 1) showed, the tsemplen-theorem and the condition for mechanical stability $v_1 > c_1, v_2 < c_2$ hold for a weak relativistic shock wave if the inequation (1): $\left(\frac{\partial^2(w/n)}{\partial p^2}\right)_S > 0$ is satisfied (w= thermal function, s - entropy, n - particle density, p - pressure). This holds also for relativistic shock waves of arbitrary intensity. In the present paper ("Letter to the Editor") the author shows that, if the shock adiabatic is in the (p,w/n)-plane, it is possible to proceed in accordance with § 84 of the book by Landau and Lifshits (Ref 2), and how certain formulae of this book may be made to go over into such as possess validity also for

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The Tsemplen Theorem in Relativistic Hydrodynamics SOV/56-36-3-64/71

relativistic shock waves of any intensity. It follows herefrom that in shock waves not only pressure and density but also the quantity n/w increase. For the nonrelativistic case $(\partial^2(1/n)/\partial p^2)_s > 0$ and for a relativistic perfect gas (1) is

$$\left(\frac{\partial^2 (w/n)}{\partial p^2}\right)_S = \frac{2(2-\gamma)}{\gamma(\gamma-1)} \frac{1}{pn^2} \quad ; \quad 1 < \gamma \leq 5/3.$$

For an ultrarelativistic gas $\gamma = 3/4$. The author finally thanks A. I. Akhiyezer and G. Ya. Lyubarskiy for discussions. There are 3 references, 2 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (Physico-Technical Institute of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: December 12, 1958

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24(7)

AUTHORS: Lyubarskiy, G. Ya., Polovin, R. V. SOV/56-36-4-45/70

TITLE: On the Disintegration of Unstable Shock Waves in Magnetohydrodynamics (O rasshcheplenii neustoychivykh udarnykh voln v magnitnoy gidrodinamike)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1272-1278 (USSR)

ABSTRACT: In the present paper the authors investigate the fate of an unstable magnetohydrodynamic shock wave on the basis of the simple example of a plane steady shock wave in a perfect gas; the magnetic field is assumed, along both sides of the wave plane, to form only small angles to the vertical on this plane. The authors show that such a wave must necessarily disintegrate into several (theoretically seven) waves; among them there are fast and slow plane magnetoacoustic shock waves and similarity waves; Alfven discontinuities, and a contact discontinuity. This paper consists of 4 parts. The first discusses the problem and gives a qualitative analysis of the disintegration of such an unstable shock wave. In the 2. part the problem of the method of successive approximation in zero-th approximation for a negligible tangential magnetic field is

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investigated. An unstable shock wave which is split up into two discontinuities serves as a basis. In this approximation the distance between the discontinuities formed does, however, not change with time. In order to be able to explain the possibility of such splitting-up it is, therefore, necessary to investigate also the following approximation. Part 3 deals with the problem of taking the tangential magnetic field in first approximation into account. In this approximation the primary shock wave is disintegrated into 4 discontinuities. In part 4, finally, it is shown that if the tangential magnetic field is taken into account, the distance between the discontinuities formed grows. The process of the disintegration of shock waves is thus connected with an increase of entropy. In a stable shock wave there is no such disintegration. The authors finally thank A. I. Akhiyezer, A. S. Kompaneyets, L. D. Landau, and I. M. Lifshits for discussions and advice. There are 1 figure and 12 Soviet references.

21(7)
AUTHORS: Akhiyezer, I. A., Polovin, R. V. SOV/56-36-6-31/66

TITLE: On the Theory of Relativistic Magnetohydrodynamic Waves (K teorii relyativistskikh magnitogidrodinamicheskikh voln)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1845-1852 (USSR)

ABSTRACT: In the introduction the authors discuss the paper by Hoffmann and Teller (Ref 1) in which the equation of the non-relativistic shock-adiabatic was derived. However, neither the problem of the stability of relativistic magnetohydrodynamic shock waves was investigated, nor was the Tsemplen theorem verified, and, besides, the problem of the direction of the variation of the magnetic field in the shock wave was investigated only for special cases. Also the questions relating to the classification and the particular features of relativistic magnetohydrodynamic discontinuities (contact-, tangential-, Alfven-, fast and slow shock waves) were not investigated. To deal with all these problems was the aim of the present paper. Like in the case of ordinary hydrodynamics, the shock wave also in magnetohydrodynamics develops from a simple wave, in that every point of the liquid with a greater

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density also moves with higher velocity. The authors first investigate these simple plane waves; each of their values may be represented as a function of the coordinates x and t (Khalatnikov and Stanyukovich already investigated these waves in relativistic magnetohydrodynamics). The authors base their investigations on the system of the relativistic magnetohydrodynamic equations in the case of vanishing viscosity and infinite electric conductivity, and give a mathematical description of the Alfven wave, the magnetosonic waves, as well as of the fast and slow magnetosonic waves. In the following chapter the discontinuities are investigated, viz 1) discontinuities which, relatively to the liquid, are at rest (contact- and tangential discontinuities) and 2) such as are in motion relatively to the liquid (Alfven and shock waves). In the last part of the paper the Tsemplen theorem is proved for shock waves of arbitrary intensity (in nonrelativistic magnetohydrodynamics this has already been proved by Iordanskiy, Polovin, and Lyubarskiy (Refs 16-18)). The theorem states that in the shock wave pressure and density increase if $(\partial s/\partial p)_{w/n} > 0$. The authors finally thank

On the Theory of Relativistic Magnetohydrodynamic Waves SOV/56-36-6-31/66

A. I. Akhiyezer and G. Ya. Lyubarskiy for valuable discussions. There are 23 references, 17 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (Physico-technical Institute of the Academy of Sciences of the Ukrainskaya SSR)

SUBMITTED: December 27, 1958

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