APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, B.Ya., doktor tekhn.nauk, prof.; RABINOVICH, A.Sh., kand.tekhn.-nauk

"Investigating piston rings of tractor-type engines" by V. G. Goncharenko. Reviewed by B.IA.Gintsburg, A.Sh. Rabinovich. Vest.mashinostr. 42 no.9:84-87 S '62. (MIRA 15:9)
(Piston rings) (Goncharenko, V.G.)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

L 2166-66 EWT(m)/EPF(c)/EWP(j)/T/ETC(m) RM/WW

ACCESSION NR: AP5024508 UR/0191/65/000/010/0042/0044 31 B

AUTHOR: Gintsberg, E. G.; Chibisova, Ye. I.; Kovarskaya, B. M. 44,55 44,55 44,55

TITLE: Polarographic investigation of the products of thermo-oxidative destruction of polyester resins based on maleic and chlorendic anhydrides and ethylene glycol 15,44,55

SOURCE: Plasticheskiye massy, no. 10, 1965, 42-44

TOPIC TAGS: polyester plastic, polarographic analysis, oxidative degradation, chemical mechanics

ABSTRACT: The products obtained from thermal oxidation of a polyester resin were analysed polarographically to help establish the mechanics of the destructive process. The polyester investigated was based on diethylene glycol, maleic and chlorendic anhydrides (1.1:0.4:0.6 molar ratio), cured with benzoyl peroxide and diethanolamine in styrene (30% styrene in the initial solutions). It was heated at 240C for 1-4 hours under an initial oxygen pressure of 200 mm Hg. Formaldehyde, acetaldehyde, benzaldehyde and maleic acid were identified. No fumar-

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L 2166-66
ACCESSION NR: AP5024508

0

ic acid was present. Orig. art. has: 4 figures

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: OC, MT

NR REF SOV: 007 OTHER: 002

Card 2/2 *dg*

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

TRINCHER, K.S.; GINZSBURG, E.I.

Kinetics of the enzymatic destruction of the cell membrane of an erythrocyte. Biofizika, 7 no.2:244-247 '62. (MIRA 16:8)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(ERYTHROCYTES) (TRYPSIN)

GINTSBURG, G. I.

BC

Regenerative power in the tailless amphibian limbs. L. V. Polezhaev and G. I. Ginzburg (Compt. rend. Acad. Sci. U.R.S.S., 1939, 23, 733–737).—Autotransplantation of the leg of tadpoles does not stimulate regeneration in the early stages of leg development, but at a later stage regeneration is stimulated and, later still, inhibited. The region of transplantation affects regeneration. Histological changes are described. E. M. W.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

75
APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINZBURG, G. I.

"Concerning the Factors which Cause the Loss of Regenerative Capacities in Tissues among Anura Extremities."

Dok. An., 30, No 6, 1941.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

BC

a 4

[illegible] hindlimb in various Anuran species. [illegible] (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, 31, 961—964).—A description of the temporal limits for complete and partial regeneration of hindlimbs in *Rana temporaria*, *R. ridibunda*, *Pelobates fuscus*, and *Bombina bombina* and a discussion of the results.

J. D. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0

PROCESSES AND PROPERTIES INDEX

Bc

A-4

[illegible] L. V. Polezhaev
[illegible] U.R.S.S., 1944, 42,
[illegible] suggests that
[illegible] stage in which
[illegible] later stage with intense
[illegible] for successive days
[illegible] considered to be
[illegible] the dedifferentiating
[illegible] of the organ.
[illegible] phenomenon (cf. A.,
I. D. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINZBURG, G. I.

" Studies in Repeated Regeneration." Dok. AN., 45, No 6, 1944.

Mbr., Inst. Exptl. Biol., Kazakh Acad. Sci., -1939-41;

Mbr., Inst. Cytology, Histology & Embryology, Acad. Sci., -1941-:

Mbr., 2nd Moscow Med. Inst. imeni Stalin, -1941-.

GINTSBURG, G. I.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

Mbr., Institute of Cytology, Histology, and Embryology, Acad. Sci. (-1947-)

"The Participation of Regionally Different Skin in the Regeneration of the Extremities in the Tadpole, Ranca Temporaria," Dok. AN, 58, No. 2, 1947

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, G. I.

"Influence of Foreign Skin on Development and Regeneration of Extremities in Anuran Amphibians."

Dok. AN, No 5, 1948.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"
PA 43/43T63

USSR/Medicine - Regeneration
Medicine - Skin

Feb 1948

"Role of the Epithelium and Corium of Regionally Different Skin in the Regeneration of the Limbs of Anurous Amphibians," G. I. Gintsburg, Inst Cytology, Histology, and Embryol, Acad Med Sci USSR, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LIX, No 4

Describes experiments which led to conclusion that the corium of regionally different skin does not play active part in regeneration of a limb but evidently retards its dedifferentiation. Submitted by Academician I. I. Shmal'gauzen, 25 Nov 1947.

[redacted]

43T63

GINTSBURG, G. I.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

"Role of Skin in the Regeneration of Organs. Regional Participation of Dissimilar Skin in the Regeneration of Extremities in Tailless Amphibians." Sub 20 Dec 51, Moscow Oblast Pedagogical Inst.

Dissertations presented for science and engineering degrees in Moscow during 1951.

SO: Sum. No. 480, 9 May 55

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

OTRSPL, Vol. 5, No.1

Gintsburg, G.I. (A.N. Severtsov Institute of Animal Morphology U.S.S.R. Academy of Sciences), Reciprocal influence of the transplant and the host in different aged transplants of extremities in tailless amphibia, 153-6

Akademiya Nauk, S.S.S.R., Doklady, vol. 78, no.1, 1951

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, G. I.

Homoplastic transplantation of certain embryonic tissues and organs to adult mammals. Doklady Akad. nauk SSSR. 81 no. 3: 477-480 21 Nov 1951. (CLML 21:3)

1. Presented by Academician A. I. Abrikosov 15 September 1951.
2. Institute of Animal Morphology imeni A. N. Severtsov, Academy of Sciences USSR.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, G.I.

Conditions and significance of wound epithelization for regeneration of extremities in Amphibia. Doklady Akad. nauk SSSR 82 no.5:813-816 11 Feb 52. (CIML 21:5)

1. Presented by Academician K.I. Skryabin 27 December 1951.
2. Institute of Morphology of Animals imeni A.N. Severtsov, Academy of Sciences USSR.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

BARAKINA, N.F.:GINTSBURG, G.I.:KORCHAK, L.I.:POLEZHAYEV, L.V.:ROGAL', I.G.

Repair of cranial defects. Doklady Akad. nauk SSSR 87 no. 4:673-675 1 Dec 1952.
(CLML 23:5)

1. Presented by Academician A. I. Abrikosov 5 October 1952. 2. Institute of Animal Morphology imeni A. N. Severtsov of the Academy of Sciences USSR.

GINTSBURG, G. I.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

Replacement for skull defects in mature rats and dogs. Dokl. AN SSSR 87, No 5, 1952, pp 869-872.

When grafts consiting of bone of newly-born animals or of embryos are transplanted into the injured skull of adult animals, the tissue of the graft is resorbed and replaced by freshly formed bone. Unless a graft is made, only scar tissue is formed. Within the age limits studied (i.e., from embryos to newly-born animals), the effectiveness of the graft increases with the age of the donor animals. Presented by Acad. A. I. Abrikosov 6 Oct 1952.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, G.I.

Replacement of bone defects of the skull in mammals. Trudy Inst. morf.zhiv. no.11:158-174 '54. (MLRA 8:2)
(Skull--Surgery) (Bones--Transplantation)

GINTSBURG, G.I.

3614. GINTSBURG G.I. * Changes in the central nervous system during regeneration of limb muscles (Russian text) DOKLADY AKAD. NAUK SSSR 1955, 105/5 (1110-1113) Illus. 4

In young albino rats the entire skeletal musculature was removed from the left hind lower leg, but large nerves and blood vessels were left intact. In one group the excised muscles were cut up with scissors and the pulp replaced in the wound. Asepsis was not strict and infection occurred, particularly in animals with the reintroduced muscle tissue. Changes in the ventral horn cells of the spinal cord were seen in both types of preparations. In rats with 'empty' wounds, paleness of nerve cells could be detected after one day (the same on both sides of cord!), but in 20-30 days the cells regained their normal appearance. In rats with 'stuffed' wounds, even when there was no infection, the changes in the ventral horn cells were more marked and longer lasting, with proliferation of glia cells, while restorative changes were incomplete even 100 days after operation.

Kleitman - Chicago, Ill.

Inst. Animal Morphology im. A.N. Severtsov AS USSR

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, G.I.

Some data on the role of the micronucleus in the accumulation of nucleic acids in Paramecium caudatum. Zhur. ob. biol. 22 no.6: 452-458 N-D '61. (MIRA 14:11)

1. Institute of Animal Morphology, U.S.S.R. Academy of Sciences, Moscow.

(CELL NUCLEI) (NUCLEIC ACIDS) (INFUSORIA)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, G.I.

Autoradiographic study on thymidine-H^3-inclusion in the process of oogenesis. Zhur. ob. biol. 24 no.1:71-73 Ja-F'63. (MIRA 16:11)

1. Institut morfologii zhivotnykh imeni A.N.Severtsova AN SSSR, Moskva.

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTS[illegible] I. A. Charact[illegible]ristics of tumour c[illegible]lls in the [illegible] in c[illegible]s of mali[illegible]nant tumour Vop. N[illegible]irokhir. 1949, 13/(([illegible]) II no. 4

Polymorphism of the cells, polynuclear cells - especial[illegible]y those with 3 nuclei - big nuclei and their polymorphism, the presence of con[illegible]lomera[illegible] [illegible]nd the structure of the tissue in the form of epithelial layers or glandular forms, are the cha[illegible]cteristic features.

Herman - Lo[illegible]

So: N[illegible] & [illegible], Section VIII Vol 4 No 1-[illegible]

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, I. B., inzhener.

The construction of apartment houses with small apartments. Biul. tekh.inform. 3 no.6:4-8 Je '57. (MIRA 10:10)

(Leningrad--Apartment houses)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

[illegible], I.B., inzh.

Testing reinforced concrete autoclaves. Biul.tekh.inform. 5 no.2:7-9 F '59. (MIRA 12:4)

(Autoclaves--Testing) (Precast concrete construction)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, I.B., inzh.

Using assembly-line method in building apartment houses along the Lanskoye Highway. Biul. tekh. inform. po stroi. 5 no.7:11-14 Jl '59. (MIRA 12:10)

(Leningrad--Apartment houses) (Assembly-line methods)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L., doktor yurid.nauk

Vacations for workers and employees. Sots.trud 4 no.12:41-43 D '59.

(Vacations, Employee) (MIRA 13:6)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GIL[illegible], [illegible] I.

[illegible] Problems of a [illegible] workday. [illegible] 1.

([illegible]) [illegible]

GINTSBURG, L.L.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

Engineering method of calculating automobile brakes. Avt.trakt. prom. no.10:17-20 O '54. (MLRA 7:10)

1. ATE-1
(Automobiles--Brakes)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"
GINTSBURG, L.L., aspirant

Stability of hydraulic power steering gear. Izv.vys.ucheb. zav.; mashinostr. no.7/8:134-144 '58. (MIRA 12:8)

1. Moskovskiy vecherniy mashinostroitel'nyy institut.
(Automobiles--Steering gear)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

AUTHOR: Gintsburg, L.L.

SOV/[illegible]

TITLE: The Choice of a Booster System for Steering Mechanism (Vybor komponovki usilitelya mekhanizma rulevogo upravleniya)

PERIODICAL: Avtomobil'naya promyshlennost', 19[illegible], Nr [illegible], pp [illegible] (USSR)

ABSTRACT: The author describes hydraulic and pneumatic booster systems for the steering mechanisms of motor vehicles as designed by American, English, and French firms. He also gives the set-up diagram (Fig [illegible]) of the pneumatic booster system in YAAZ-214 automobile and its brief description. The distributor in this system is mounted on the steering-wheel column and is connected by rod with the pneumatic booster mounted on the right longeron of the frame. There are [illegible] diagrams, [illegible] photos, and [illegible] Soviet references

ASSOCIATION: NAMI

Card 1/1

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

[illegible], [illegible], Cand Tech Sci (diss) -- "Investigation of the operation of a hydraulic amplifier for automobile steering". Moscow, [illegible]. [illegible] pp (Min Higher and Inter Spec Educ RSFSR, Moscow Automotive Mech Inst), 120 copies (KL, No 14, 1960, 132)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L.

Calculating and selecting parameters of the hydraulic servo system for power steering. Avt.prom. no.1:29-32 Ja '60. (MIRA 13:5)

1. Gosudarstvennyy soyuznyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.

(Motor vehicles--Steering gear)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L.

Comparative testing of hydraulic and pneumatic sevomechanisms for power steering. Avt.prom. no.2:3-5 F '60. (MIRA 13:5)

1. Gosudarstvennyy soyuznyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.
(Automobiles--Steering gear)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L.

Investigating vibrations of steering wheels of automobiles caused by the hydraulic booster of the steering gear. Avt.prom. no.7: 9-14 Jl '60. (MIRA 13:7)

1. Gosudarstvennyy soyuznyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.

(Automobiles--Steering gear--Vibration)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L., kand.tekhn.nauk; VENDEL', V.Ye.

Using the electric measurement method for the study of steering gear. Avt. prom. 27 no. 5:24-27 My '61. (MIRA 14:5)

1. Gosudarstvennyy soyuznyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.
(Automobiles--Steering gear) (Electric measurements)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L., kand. tekhn. nauk

Shimmy of front wheels of motor vehicles. Avt. prom. 28 no.7:8-12 Jl '62. (MIRA 16:6)

1. Gosudarstvennyy soyuznyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.

(Motor vehicles—Wheels—Vibration)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L., kand. tekhn. nauk; SYRKIN, G.A.

Hydraulic pumps of power steering boosters. Avt. prom. 29 no.7:27-30 Jl '63. (MIRA 16:8)

1. Gosudarstvennyy soyuznyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut i Moskovskiy avtozavod imeni Likhacheva.

(Automobiles—Steering gear)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L., kand. tekhn. nauk; FITTERMAN, B.M., kand. tekhn. nauk

Some problems of the maneuverability of motor vehicles. Avt. prom. 30 no.8:28-32 Ag '64. (MIRA 17:11)

1. TSentral'nyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, L.L., kand. tekhn. nauk; FITTERMAN, B.M., kand. tekhn. nauk

Maneuvrability of motor vehicles. Avt. prom. 30 no.11:24-29
N '64 (MIRA 18:2)

1. TSentral'nyy ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy avtomobil'nyy i avtomotornyy institut.

APPROVED FOR RELEASE: Thursday, September 26, 2002 "CIA-RDP86-00513R000515120007-0"

ACC NR: AP7004800 (A) SOURCE CODE: UR/0413/67/000/001/0140/0141

INVENTOR: Gintsburg, L. L.; Trikoz, A. A.

ORG: None

TITLE: A hydraulic power steering drive with hydraulic feedback for transportation vehicles. Class 63, No. 190224

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1967, 140-141

TOPIC TAGS: hydraulic equipment, mechanical power transmission device, drive train

ABSTRACT: This Author's Certificate introduces: 1. A hydraulic power steering drive with hydraulic feedback for transportation vehicles. The installation contains a double-action master cylinder with two pistons connected by a rod and forming a central and two terminal working cavities. The rod connecting the pistons is power-driven from the steering wheel. The unit also incorporates a hydraulic pump, a reservoir for the working fluid, a power cylinder with rod connected to the turning mechanism, and a distributor with a cylindrical slide valve. The terminal cavities of the distributor are connected to the working cavities of the master cylinder. The remaining distributor cavities are connected by pipelines to the working cavities of the power cylinder, to the hydraulic pump and through a filter to the reservoir. The device

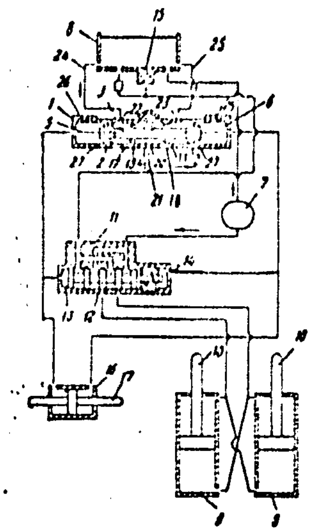
 UDC: 629.113.014.514-522.2

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

also contains a hydraulic feedback cylinder with rod connected to the turning mechanism and working cavities connected to the terminal cavities of the distributor. To achieve correspondence between the positions of the steering wheel and the positions of the turning mechanism, the central cavity of the master cylinder is equipped with annular projections on the inside encircling the rod with sealing rings on the sides facing the inner surfaces of the piston. An opening between these annular projections connects the central cavity to the overflow line. On the other side of each projection at a distance greater than the length of the piston is an opening connecting the central cavity to lines passing through choke valves to the reservoir. The working cavities of the master cylinder are made with bypass channels which connect these cavities to the central cavity when the pistons are at their extreme positions. 2. A modification of this drive in which unilateral ring-shaped sealing sleeves are used on the pistons in the master cylinder for compensating fluid leakage.

ACC NR: AP7001690

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"



1--master cylinder; 2--piston; 3--rod; 4--central cavity of the master cylinder; 5 and 6--terminal cavities of the master cylinder; 7--hydraulic pump; 8--reservoir; 9--overflow cylinder; 10--rod; 11--distributor; 12--slide valve; 13 and 14--terminal cavities of the distributor; 15--filter; 16--feedback cylinder; 17--rod; 18--projection; 19--sealing ring; 20--opening; 21--overflow line; 22 and 23--openings; 24 and 25--pipeline; 26--bypass channel; 27--ring-shaped sealing sleeve.

SUB CODE: 13/ SUBM DATE: 23Jul65

Card 3/3

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, Leonid Yakovlevich; PASHERSTNIK, A.Ye., professor, otvetstvennyy redaktor; KHAVINA, E.K., redaktor izdatel'stva; GUSEVA, I.N., tekhnicheskiy redaktor

[Leave for industrial workers and salaried employees] Trudovye otpuska rabochikh i sluzhashchikh. Moskva, Izd-vo Akad.nauk SSSR, 1957. 129 p. (MIRA 10:7)

(Vacations, Employee)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, M.

Increasing the life of brake shoes and clutch disks. Za rul. no.6:17 Je '57. (MIRA 10:7)
(Motorcycles--Maintenance and repair)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, M.

Easying automobile engine starting in winter. Za rul. 16 no.12:12d D '58. (MIRA 12:1)
(Automobiles--Cold weather operation)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

AKIMOVA, I., inzh.; GINTSBURG, M., izobretatel'.

Heat the engine but not the radiator. Tekh.mol. 29 no.3:11 '61. (MIRA 14:3)

(Automobile drivers)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, M.

Let us talk about starting. Za rul. 21 no.8:18 Ag '63.
(MIRA 16:11)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GINTSBURG, M.

Selecting a lubricating oil. Za rul. 21 no.6:27 Je '63. (MIRA 16:11)

GINSBURG
APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

H. Gintsburg

The Investigations of The Ionosphere by the New Radio-Location Method

The Progress of Physical Science, Moscow
Vol. 45, No. 1, September 1951, pp. 147

From: Monthly list of Russian Accessions
December 1951, Vol. 4, No. 9, p. 38

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

GIN[illegible], [illegible]

Dissertation: "The propagation of electromagnetic waves in [illegible] anisotropic media." [illegible], Moscow Order of Lenin Power Engineering Institute imeni V. M. Molotov, [illegible] (Vechernyaya Moskva, [illegible])

[illegible]

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

USSR/ Physics - Waves in gyrotropic media

Card 1/1 Pub. 43 - 3/11

Authors : Gintsburg, M. A.

Title : About waves in "gyrotropic media" (media in which the circular plane of polarization can be observed)

Periodical : Izv. AN SSSR ser. fiz. 18/4, 444-455, Jul - Aug 1954

Abstract : Analytical studies of electromagnetic waves and propagation in "gyrotropic media" are presented. The propagation of a flat electromagnetic wave is analyzed. The physical meaning of the results obtained is explained. An analogy between the time-space components of electromagnetic waves (Maxwell's equation) and those of an oscillatory coupled system with small oscillations (pendulums) is established. Further, the propagation of a non-homogeneous electromagnetic wave in a wave guide filled with a "gyrotropic medium" is studied. A more generalized form for Maxwell's equations is derived (for a gyrotropic medium). Then, gyrotropic wave-guide excitation is analyzed. Finally the propagation of an electromagnetic wave in a wave-guide with a "gyrotropic medium" (ferrite) in a transverse magnetic field is considered. Fifteen references: 7-USSR; 8-English (1885-1954).

Institution : ...

Submitted : April 24, 1954

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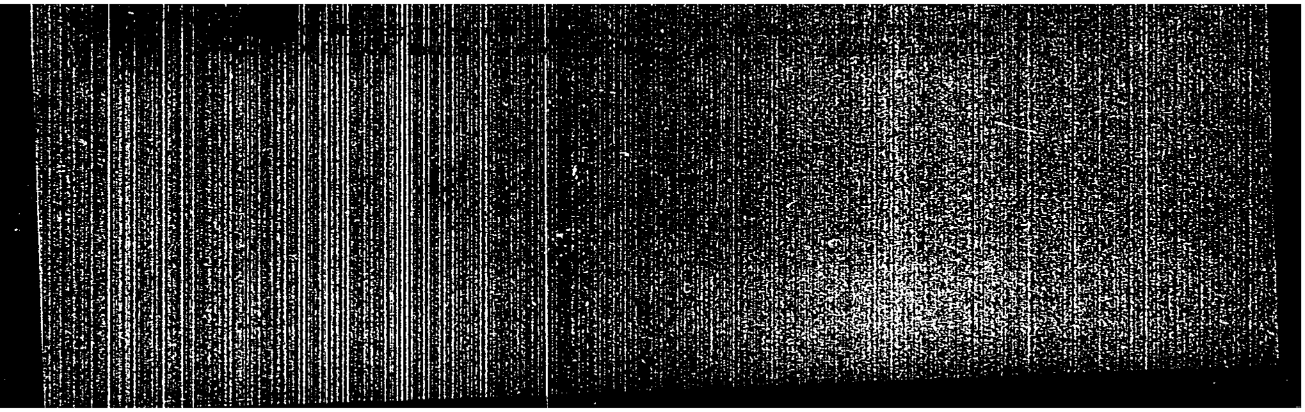

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515120007-0"

FD-3052

USSR/Physics - Waveguides

Card 1/1 Pub. 153 - 21/23

Author : Gintsburg, M. A.

Title : Letter to the editor. Anisotropic waveguide

Periodical : Zhur. tekh. fiz., 25, February 1955, 358-363

Abstract : The writer considers a waveguide filled with an anisotropic medium, the Maxwell equations for the normal waves of such a waveguide reducing to equations of the 4th order for one unknown function, which is the component E or H. He treats here the special case of a medium with symmetric tensors e_{ik} and m_{ik} and obtains from the Maxwell equations a 4th-order equation in the E_z component of E. He obtains the exact solution for the rectangular anisotropic waveguide, and notes that for a different contour of the cross section one can employ variational methods, keeping in mind that the above mentioned equation for the normal wave $E_z \cdot \exp[i(kz-wt)]$ is the Euler-Ostrogradskiy equation for a certain functional F given. Two references: B. A. Vvedenskiy and A. G. Arenberg, Radiovolnovody [Radio waveguides], 1946; L. A. Vaynshteyn, Zhur. tekh. fiz., 23, 646, 1953.

Institution : -

Submitted : April 29, 1954

GINTSBURG, M. A.

24-10-17/26

AUTHOR: Gintsburg, M. A. (Moscow)

TITLE: Fracturing rocks by means of high frequency electromagnetic fields. (Razrusheniye gornykh porod vysokochastotnymi elektromagnitnymi polyami)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.10, pp.93-95 (USSR)

ABSTRACT: The main results described in this paper were presented at a seminary of the Institute of Mining, Ac.Sc., U.S.S.R. (Institut Gornogo Dela AN SSSR), May 23, 1955. In this paper a new method is described of breaking up rocks and other solid bodies by means of non-uniform heating inside a high frequency magnetic field. The experiments were carried out on iron ore specimens (iron quartzites) from the Kursk Magnetic Anomaly. Their mineralogical composition was: quartz, magnetite, hematite, amphiboles and carbonates. The experiments comprised tests with a uniform magnetic field of H = 100 Oe, 240 c.p.s., using quartzite specimens weighing between 5 and 20 kg; the time until appearance of the first fracture was 1 to 2 mins. The tests were stopped when cracks went right through and sub-divided the specimen into several parts (after 4 to 8 mins). The average temperature of the heated rock was

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Fracturing rocks by means of high frequency electromagnetic fields.

300 to 450°C and, as a result of the heating, the rocks became extremely brittle. Furthermore, experiments were carried out with the field of a circular turn so that the magnetic field was concentrated inside the turn and only a small volume of the specimen was heated, whereby the parameters were as follows: H = 100 to 200 Oe, f = 240 c.p.s., turn diameter d = 9 cm. The first fractures appeared after about 35 secs. The duration of crack formation does not depend on the specimen size, since the coefficient of heat conductivity of rocks is very small; however, cracks which start in the heated volume propagate throughout the entire body of the rock and lead to splitting up of large rock blocks (0.5 to 1 ton) with a small expenditure of energy since the heated volume is small. For splitting up a specimen of 500 kg the calculated power requirement is about 7 kW and for a breaking up time of 12 mins this corresponds to an energy requirement of 1.5 kWh. Thereby, the power taken up by the generator from the supply system is about 50 kW and, therefore, it is necessary to design a special generator for supplying current for breaking up ferromagnetic rocks.

Card 2/3 The magnetic method of breaking up rocks is also suitable

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SOV/162-58-3-6/26

9(9)

AUTHOR: Gintsburg, M.A.

TITLE: Surface Waves at the Boundary of a Gyrotropic Medium (Poverkhnostnyye volny na granitse girotropnoy sredy)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Radiotekhnika i elektronika, 1958, Nr 3, pp 38-47 (USSR)

ABSTRACT: The author discusses surface waves at the boundaries of gyrotropic and isotropic media. The Maxwell equations show that the waves are propagated only in one direction (valve effect) when both media have certain magnitudes of ε and μ (electrical and magnetic permeability). The conditions are presented for the propagation of direct and inverse waves along the boundary of the division. The results of the investigation are used for analyzing gyrotropic plates, a more complicated independent system. The results of this paper may be used as a first approximation for solving surface wave problems in the ferrite plate of a wave guide. The magnitudes μ, and γ, obtained from the equation

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Surface Waves at the Boundary of a Gyrotropic Medium

$$\mu_0(u^2 - \varepsilon_1\mu_1)^{\frac{1}{2}} + \mu_1 (u^2 - \varepsilon_0\mu_0)^{\frac{1}{2}} = \mu_0 \Gamma u$$

may be placed (if the plate is not too close to the walls of the wave guide) as a first approximation $h=h^{(o)}+\Delta h, \gamma=\gamma^{(o)}+\Delta\gamma$, into the transcendental equation of a wave guide with a thick ferrite plate, and using Newton's method, corrections $\Delta h, \Delta\gamma$ to be introduced into the walls, may be found. (The magnitude u has the physical meaning of a factor for the delay of the waves by the boundary of the division, showing how many times the phase speed of a surface wave is slower than the speed of a plane wave of the same frequency in a vacuum). Instead of the walls of a wave guide, one may assume a second ferrite plate with a field in the opposite phase, as suggested by B.Z. Katsenelenbaum. For satisfying the boundary conditions at both metal walls, two infinite rows of such plates are required. The author expresses

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Surface Waves at the Boundary of a Gyrotropic Medium

his gratitude to B.Z. Katsenelenbaum for considering the results of this paper. There are 6 graphs, and 7 references, 3 of which are English and 4 Soviet.

PRESENTED: Presented at a seminary on radio-spectroscopy at the Fizicheskiy institut AN SSR imeni Lebedeva (Institute of Physics imeni Lebedev, AS USSR)

SUBMITTED: February 13, 1958

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GINZBURG, M.A.

Surface waves on the boundary of gyrotropic media. (MIRA 11:9)
Zhur.eksp. i teor.fiz. 34 no.6:1635-1637 Je '58.
(Electromagnetic theory)

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SOV/56-35-4-41/52

24(3)

AUTHOR: Gintsburg, M. A.

TITLE: The Exchange-Effects in Ferromagnetic Resonance (Obmennyye effekty pri ferromagnitnom rezonanse)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 1047-1049 (USSR)

ABSTRACT: The present paper elaborates a uniform law for the dispersion of transversal electromagnetic and spin waves, which takes both the relativistic and exchange-interaction into account. With a shortening of the wavelength (on the condition ω = const) the relative significance of the displacement currents is reduced more and more, but the amount of the exchange forces increases. Instead of transversal electromagnetic waves, spin waves are in this case obtained. The author proceeds from the usual equations of motion of magnetization: $dM/dt = \gamma \left\{(H_{ex}a^2/M_s)\left[M \Delta H\right] + \left[MH\right]\right\}$. Here H_{ex} denotes the effective field of the exchange forces, a - the lattice constant, M_s - the saturation magnetization, H - the magnetic field

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strength of the sample, γ - the ratio between the magnetic moment of the electron and its spin moment; γ = 2.8 megacycles/ Oersted. The author puts $\vec{M} = \vec{M}_s + \vec{m}$, $\vec{H} = \vec{H}_i + \vec{h}$. Here $\vec{H}_i$ denotes the internal statistical field in the sample, $\vec{h}$ and $\vec{m}$ the high-frequency components of the magnetic field and of magnetization respectively. Expressions are derived for the components of the tensor of magnetic permeability and for the dispersion law (i.e. for the correlation between ω and k). This dispersion equation has 3 radicals corresponding to the three branches of dispersion. The aforementioned dispersion equation goes over (if displacement currents are neglected) into the equation of statistical approximation (i.e. into the dispersion law of the spin waves). The character of the dispersion curves can be investigated in the best manner for the special cases $\Theta = 0$ and $\Theta = \pi/2$. For $\Theta = 0$ the dispersion equation has three positive solutions. For $\Theta = \pi/2$ 2 waves are possible: one of the type E and one of the type H. There are 4 references, 2 of which are Soviet.

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GINTSBURG, M.A. [·nslator]

Theory of e.ectromagnetic wave propagation in gyromagnetic media [from "Rev. Mod. Phys." 28,3, 1956]. P. Epstein. Usp. fiz. nauk 65 no.2:283-311 Je '58. (MIRA 11:9)
(Ferrates) (Radio waves) (Epstein, P.)

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GINTSBURG, M.A.

Radar measurements of the thickness of ice layers. Izv. AN SSSR.Ser.geofiz. no.6:872-874 Je '60. (MIRA 13:6)
(Glaciological research) (Radar)

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30936
3.2320 (1049,1502)
11.1530

S/570/60/000/017/006/012
E032/E114

AUTHOR: Gintsburg, M.A.

TITLE: Electric double layer at the surface of a satellite

SOURCE: Akademiya nauk SSSR. Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln. Trudy, no.17(27), Moscow, 1960. Rasprostraneniye radiovoln i ionosfera, 187-202.

TEXT: A satellite moving through the ionosphere becomes charged and an electric double layer is formed at its surface. A knowledge of the properties of this layer is important to the theory of the interaction of a satellite with the ionosphere, since the double layer determines the boundary conditions and has an effect on the physical processes which occur in the immediate neighbourhood of the satellite. Three equations are available in the literature for the description of the electric field in the double layer. These equations, however, are different and predict different potential distributions. The aim of the present review is to examine these differences. The review was completed in January 1959. The first approach is to use the classical double-

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layer theory as used in electrochemistry and the chemistry of colloids, where charged particles (ions) in the double layer are in a state of thermodynamic equilibrium and are therefore described by the Maxwell-Boltzmann distribution

$$F(u, x) = C e^{-\frac{mu^2}{2kT} - \frac{e\varphi}{kT}} \quad (1)$$

where: u is the velocity, φ the potential, e and m the charge and mass of the particles, and t the temperature. The present author discusses the one-dimensional case only, i.e. the case where the potential φ is a function of a single coordinate only. Knowing the distribution function for the ions and the electrons, one can calculate the field in the double layer by solving the one-dimensional Poisson equation:

$$\frac{d^2\varphi}{dx^2} = + 4\pi n_0 \varepsilon \left(e^{\frac{\varepsilon\varphi}{kT_e}} - e^{\frac{-\varepsilon\varphi}{kT_1}} \right) \quad (4)$$

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It is shown that the solution of the Poisson equation for the case where the distribution given by Eq.(1) holds, is

$$\varphi = \frac{kT}{\varepsilon} \; 2 \ln \frac{e^{z/2}(1 + e^{-\xi}) + (1 + e^{-\xi})}{e^{z/2}(1 - e^{-\xi}) + (1 + e^{-\xi})} \qquad (9)$$

where: $\xi = x\sqrt{2}/R_d$, R_d is the Debye radius, $z = \varepsilon\varphi_c/kT$, φ_c is the potential of the satellite, and ε is the numerical value of the electronic charge. The double layer may be divided into two regions: in the first region $\varepsilon|\varphi|/kT > 1$, i.e. the potential energy of an electron or an ion within the layer is greater than the thermal energy, while in the second layer $\varepsilon|\varphi|/kT \ll 1$ and the potential energy may be looked upon as a small correction to the thermal energy. In the thermal region the space-charge consists largely of ions and the electron concentration falls off exponentially, while in the second region the space-charge is made up of ions and electrons, both concentrations being small. As an example it is estimated that at 300-400 km from the earth's surface the maximum thickness of a

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double layer is of the order of 1 cm. On this theory the field strength at the wall of a satellite increases exponentially (in absolute magnitude) with the potential φ_c, reaching 47 kV/cm at $\varphi_c = -3$ V. It is this property which, together with the dependence of the capacitance of the double layer on φ_c, may be used to compare the theory with experiment and to select the correct model for the double layer by independent measurements of E and φ_c. The second approach is to use the Langmuir-Bohm equation (Ref.6: I. Langmuir, Phys. Rev., v 34 876, 1929; Ref.7: D. Bohm, The characteristics of electrical discharges in magnetic fields, ed. by A. Guthrie and R. Wakerling. McGraw Hill, N.Y., 1949, chap.3). Here, as before, the electron distribution is assumed to be of the Boltzmann type but the ion distribution is not. On this approach the Poisson equation assumes the form:

$$\frac{d^2\varphi}{dx^2} = -4\pi e n_0 \left[\sqrt{\frac{\varphi_c}{\varphi}} - e^{\frac{e(\varphi - \varphi_c)}{kT}} \right] \qquad (12)$$

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This equation cannot be integrated and must be solved numerically. The advantage of Eq.(12) is that in deriving it, it is not necessary to assume either a perfectly reflecting wall or thermodynamic equilibrium. However, this equation does not take into account the thermal motion of ions which is, in fact, neglected. The third approach is due to R. Jastrow and C. Pearse (Ref.2: J. Geophys., Res., v.62, 413, 1957). Here the Poisson equation is of the form:

$$\frac{d^2\varphi}{dx^2} = 4\pi n_0 \varepsilon \left(e^{\varepsilon\varphi/kT} - 1\right) \tag{16}$$

and again, the potential distribution can only be evaluated by numerical methods. The paper is concluded with a general discussion of the effect of the magnetic field on the above phenomena. Acknowledgments are expressed to the workers of IZMIRAN, G.M. Sosnovskaya and Yu.G. Ishchuk, for assistance. There are 19 figures and 11 references: 5 Soviet-bloc and 6 non-Soviet-bloc. The four most recent English language references read as follows:

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Electric double layer at the surface... E032/E114

Ref.2: R. Jastrow, C. Pearse. J. Geophys. Res., v.62, 413, 1957.
Ref.3: E. Verwey, J. Overbeck. Theory of stability of lyophobic colloids, N.Y. - Amsterdam, 1948.
Ref.5: R. Smith-Rose, Proc. IRE, November 1958.
Ref.7: D. Bohm. The characteristics of electrical discharges in magnetic fields. ed. by A. Guthrie and R. Wakerling. McGraw-Hill, N.Y., 1949, chap. 3

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30938
S/570/60/000/017/008/012
E032/E114

3,2310 (1049, 1502)

AUTHOR: Gintsburg, M.A.

TITLE: Surface waves on the boundary of a plasma in a magnetic field

SOURCE: Akademiya nauk SSSR. Institut zemnogo magnetizma, ionosfery i rasprostraneniye radiovoln. Trudy, no.17(27). Moscow, 1960. Rasprostraneniye radiovoln i ionosfera. 208-215.

TEXT: This paper was first read at a seminar of the Otdel dlinnykh radiovoln (Division of Long Radio Waves) of IZMIRAN in December 1958.
The problem is formulated as follows. Consider two semi-infinite media separated by the plane $y = 0$ (Fig.7). The z-axis is in the direction of the magnetic field, the half-space $y > 0$ is occupied by air ($\varepsilon_0 = \mu_0 = 1$) and the half-space $y < 0$ is occupied by plasma. The properties of the plasma are characterised by the tensor

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$$\begin{vmatrix} \varepsilon_1 & -i\varepsilon_2 & 0 \\ i\varepsilon_2 & \varepsilon_2 & 0 \\ 0 & 0 & \varepsilon_3 \end{vmatrix} \qquad (1)$$

When the waves are propagated in the direction perpendicular to the magnetic field there are two possible types of normal waves, namely type H ($E_z \neq 0$, $H_x \neq 0$, $H_y \neq 0$, $E_x = E_y = H_z = 0$) and waves of the type E ($H_z \neq 0$, $E_x \neq 0$, $E_y \neq 0$, $H_x = H_y = E_z = 0$). Of these, only the E waves can propagate along the boundary of the plasma. It is shown that in the plasma

$$E_x = \frac{1}{ik_o\varepsilon_\perp}\left[\frac{\partial H_z}{\partial y} - i\Gamma\frac{\partial H_z}{\partial x}\right] = \frac{\gamma_2 - \Gamma h}{ik_o\varepsilon_\perp} H_z \qquad (3)$$

where: $k_o = \omega/c$ is the wave number in vacuum, $\Gamma = \varepsilon_2/\varepsilon_1$, and

$$\varepsilon_\perp = (\varepsilon_1^2 - \varepsilon_2^2)/\varepsilon_1.$$

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For $y > 0$,

$$E_x = \frac{1}{ik_o}\frac{\partial H_z}{\partial y} = -\frac{\gamma_1}{ik_o} H_z \qquad (4)$$

Using the condition that E_x and H_z must be continuous across the boundary, one can find the characteristic equation for the phase velocity of the surface waves. It is shown that

$$\varepsilon_\perp \sqrt{u^2 - 1} + \sqrt{u^2 - \varepsilon_\perp} = \Gamma u \qquad (7)$$

where $u = h/k_o$ and is the ratio of the phase velocity in vacuum to the phase velocity in the medium. Four cases then arise:

1) $\varepsilon_\perp > 0$, $\Gamma > 0$, $\varepsilon_\perp > 1$. The condition for the propagation is then:

$$\varepsilon_\perp + 1 > \Gamma > \left[\varepsilon_\perp (\varepsilon_\perp - 1)\right]^{1/2} \qquad (10)$$

2) $\varepsilon_\perp > 0$ but < 1, $\Gamma > 0$. Here the condition for the propagation of the direct wave is:

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$$\varepsilon_{\perp} + 1 > \Gamma > (1 - \varepsilon_{\perp})^{1/2} \qquad (11)$$

3) $\varepsilon_{\perp} < 0$ but $|\varepsilon_{\perp}| < 1$, $\Gamma > 0$. As before, only the direct wave is propagated here and the condition is:

$$(1 - \varepsilon_{\perp})^{1/2} > \Gamma > \varepsilon_{\perp} + 1 \qquad (12)$$

4) $\varepsilon_{\perp} < 0$; $|\varepsilon_{\perp}| > 1$, $\Gamma > 0$. The condition for the propagation of a direct wave is:

$$(1 - \varepsilon_{\perp})^{1/2} > \Gamma \qquad (13)$$

and the condition for the reverse wave is:

$$|\varepsilon_{\perp} + 1| > \Gamma \qquad (14)$$

Thus, for sufficiently small Γ both waves can propagate but their phase velocities and the field distribution will be different. The second case considered is that where the

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boundary $y = 0$ separates two gyrotropic media (two plasma layers with different electron concentrations). Medium 1 is described by the tensor ε_{ik} and medium 2 by $\tilde{\varepsilon}_{ik}$. The equation corresponding to Eq.(7) now becomes:

$$\varepsilon_{\perp}\sqrt{u^2 - \tilde{\varepsilon}_{\perp}} + \tilde{\varepsilon}_{\perp}\sqrt{u^2 - \varepsilon_{\perp}} = u(\varepsilon_{\perp}\tilde{\Gamma} - \tilde{\varepsilon}_{\perp}\Gamma) \qquad (15)$$

and the propagation conditions are as follows:

1) $\varepsilon_{\perp} > 0$, $\tilde{\varepsilon}_{\perp} > 0$;

$$\left[\varepsilon_{\perp}(\varepsilon_{\perp} - \tilde{\varepsilon}_{\perp})\right]^{1/2} < \left|\varepsilon_{\perp}\tilde{\Gamma} - \tilde{\varepsilon}_{\perp}\Gamma\right| < \varepsilon_{\perp} + \tilde{\varepsilon}_{\perp} \qquad (17)$$

2) $\varepsilon_{\perp} > 0$, $\tilde{\varepsilon}_{\perp} < 0$, $\varepsilon_{\perp} + \tilde{\varepsilon}_{\perp} > 0$:

$$\left[\varepsilon_{\perp}(\varepsilon_{\perp} - \tilde{\varepsilon}_{\perp})\right]^{1/2} > \left|\varepsilon_{\perp}\tilde{\Gamma} - \tilde{\varepsilon}_{\perp}\Gamma\right| > \varepsilon_{\perp} + \tilde{\varepsilon}_{\perp} \qquad (18)$$

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3) $\varepsilon_\perp > 0$, $\tilde{\varepsilon}_\perp < 0$, $\varepsilon_\perp + \tilde{\varepsilon}_\perp < 0$, $\varepsilon_\perp \tilde{\Gamma} + \Gamma \tilde{\varepsilon}_\perp > 0$,

$$\left[|\varepsilon_\perp| \quad (\varepsilon_\perp - \tilde{\varepsilon}_\perp)\right]^{1/2} > \varepsilon_\perp \tilde{\Gamma} - \tilde{\varepsilon}_\perp \Gamma, \quad \text{(direct wave)} \qquad (19)$$

and

$$|\varepsilon_\perp + \tilde{\varepsilon}_\perp| > \Gamma \quad \text{(reverse wave).} \qquad (20)$$

4) $\varepsilon_\perp < 0$, $\tilde{\varepsilon}_\perp < 0$;

$$|\varepsilon_\perp + \tilde{\varepsilon}_\perp| < |\Gamma| \qquad (21)$$

where for $\Gamma > 0$ the reverse wave is propagated while for $\Gamma < 0$ the direct wave is propagated. The analysis can be extended to a set of parallel layers. Acknowledgments are expressed to Ya.L. Al'pert for discussing the results.
There are 4 figures and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc, (including 1 Russian translation fron non-Soviet publication. The English language references read as follows:

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Surface waves on the boundary of ...

Ref.4: W. Pfister, J. Ulwick. J. Geophys. Res., v.63, N 2, 301, 1958.
Ref.5: J Jackson, J. Seddon. J. Geophys. Res., v.63, N 1, 197, 1958.

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Gintsburg, M. A.

S/181/60/002/05/24/041
B020/B056

AUTHOR: Gintsburg, M. A.

TITLE: The Theory of Spin Waves

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 5, pp. 913 - 921

TEXT: The present paper was read at the Seminar of the Theoretical Department of FIAN on January 7, 1959. The basic relation in the theory of spin waves is, as known, the dispersion law - the dependence of the wavelength λ on frequency. Hitherto, the theory of spin waves had been based upon a dispersion law (Refs. 1-3) which is mathematically expressed by equation (1). On the basis of the statements made in the paper, the question arises as to the manner in which transition from spin waves to electromagnetic waves takes place, as to the nature of the waves in the transition zone, and as to the part played by absorption. This question is briefly dealt with by the present paper. In case A a loss-free ferromagnetic is studied. At θ = 0 the dispersion law (equation (2)) takes the form of (4). With an increase of frequency in (4), this equation continuously goes over into equation (1) (see Fig.1).

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In Fig. 1 the solid curves represent the dispersion law (4) and the analogous relation for $\Theta = \pi/2$, whereas the broken curves illustrate the dispersion law (1). The next paragraph deals with the case of real ferromagnetics. Fig. 2 shows the curves $k_1(\omega)$ and $k_2(\omega)$ for both branches of equations (8) and (9) (solid curves), whereas the broken curves illustrate the dispersion law (1), where k_1 is the wave number, and the imaginary part k_2 is the damping coefficient (k in equation (9) is complex: $k = k_1 - ik_2$). A further paragraph deals with the dispersion law of spin waves for an arbitrary direction of their propagation. The position of the branches of the dispersion curves for this case is given in Fig. 3. There are 3 figures and 15 references: 3 Soviet, 2 German, and 10 British.

ASSOCIATION: Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln AN SSSR (Institute for Terrestrial Magnetism, the Ionosphere, and the Propagation of Radio Waves of the AS USSR)

SUBMITTED: January 10, 1959

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S/141/60/003/006/006/025
E133/E361

9.9841 (also 1036, 1041, 1126)

AUTHOR: Gintsburg, M.A.

TITLE: On the Possibility of Exciting Radio Waves by Solar Corpuscular Streams

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 6, pp. 963 - 986

TEXT: A stream of particles moving in a plasma in the direction of an external magnetic field can radiate transverse electromagnetic waves. This can be applied to the case of ions and electrons from the Sun moving in the ionized atmosphere of the Earth. A Maxwellian velocity distribution is assumed in the stream (with a small correction due to the presence of a field). (All terms in the equations are used to a first-order approximation.) An expression is then derived for the effective electrical conductivity . The problem is restricted to trying to find a value for the wave number which will correspond to instability of the solar corpuscular stream in the Earth's exosphere - this being the condition for radio waves to be emitted. In practice this means that one looks

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for a value of ω and k for which the imaginary part of the equation:

$$\varepsilon = \varepsilon_{xx} \mp i\varepsilon_{xy} = 1 + \frac{i\sqrt{\pi}}{\omega_1^2 k} \sum_{l=1}^{4} \frac{\omega_{0,l}^2}{S_l} (\omega_1 - u_l k) W(z_l), \qquad (1)$$

is negative. The extraordinary wave is considered first and it is shown that this condition is fulfilled if:

$$u_2 = v_\varphi (1 + \Omega_H/\omega) \qquad (5)$$

holds (where u_2 is the ion velocity,
v_φ is the phase velocity of the waves, and
Ω_H is the Larmor frequency of the ions).

The extraordinary wave is excited by the ions and not by the

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electrons. Fig. 1 shows the dependence of $v_{\perp}$ (Curve A) and u'_2 (Curve B) on frequency. $v_{\perp}$ has a maximum at $1/2|\omega_H|$ (where ω_H is the Larmor frequency for the electrons). u_2 has a minimum value at $\omega \approx 2.7\Omega_H$, at which point it is equal to 2.6 $v_{\perp}$ (where $v_{\perp}$ is the phase velocity of hydromagnetic waves). Ion streams with velocities greater than $u_{2,min}$ therefore excite an extraordinary wave in the plasma. The electron stream excites waves of opposite polarization. The dispersion of these, however, is determined by the ions. In order to excite the waves it is necessary that the increment (the imaginary part of the angular frequency) due to the corpuscular stream should be greater than the decrement (that is, the damping due to collisions and cyclotron resonance absorption). The author next considers typical conditions in the Earth's exosphere, at a distance of 28 x 10^3 km from the centre of the Earth (Ref. 4). It is

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shown that the velocity of solar corpuscular streams is fast enough to excite waves. For a stream velocity of 8.5×10^8 cm sec^{-1}, three ranges of frequency are excited: $\sim$ 5 c.p.s., 850 c.p.s. and 7 600 c.p.s. The low-frequency range is probably connected with micro-pulsations of the Earth's magnetic field. Assuming an average stream velocity of 2×10^8 $cmsec^{-1}$, the requirements for instability are satisfied in the ionosphere (h < 700 km) and in the outer radiation belt ($h \gtrsim 2.5 \times 10^4$ km). Observations of low-frequency radio waves from corpuscular streams by R. Gallet, R. Helliwell and G. Ellis (Refs. 6-8) agree well with the predictions of this paper. Eq. (5) also demonstrates the predicted correlation between the radio waves and magnetic activity. The author estimates the amplitude of the excited geomagnetic pulsations to be about 10 - 100 γ.

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On the Possibility of ....

There are 1 figure and 11 references: 5 Soviet and 6 non-Soviet.

ASSOCIATION: Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln AN SSSR (Institute of Earth Magnetism, Ionosphere and Propagation of Radio Waves of the AS USSR)

SUBMITTED: February 1, 1960

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20433

S/109/60/005/012/031/035
E032/E514

24.2120 (1049, 1482, 1502, 1532)

AUTHOR: Gintsburg, M.A.

TITLE: The Dielectric Constant Tensor for a Plasma and a Beam

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.12, pp.2060-2062

TEXT: Shafranov's formula (Refs.1 and 2) is used to calculate the components of the dielectric constant of a plasma-beam system under the following assumptions:
1) the plasma obeys the Maxwellian velocity distribution;
2) a charged particle beam (ions and electrons) is passing through the plasma. The beam is assumed to be infinite and the velocity distribution in it is also Maxwellian and given by

$$f_{o,n}(V) = C \exp\left\{-\frac{\left[(v_z - u)^2 + v_x^2 + v_y^2\right]}{s^2}\right\},$$

where u is the velocity of the beam and $s = \sqrt{2\varkappa T/m}$ is the thermal velocity of the ions (electrons) in the beam. The external magnetic field H_o is assumed to be uniform and such that

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The Dielectric Constant Tensor for a Plasma and a Beam

$H_o \parallel Oz, u \parallel H_o$. The following notation is employed: $\omega_{H,\ell} = \frac{eH_o}{m_\ell c}$ is the Larmor frequency, ω_1 is the complex frequency of the wave ($\omega = \omega_1 + i\gamma$), N_ℓ is the concentration of particles of the ℓ-th type, T_ℓ is their kinetic temperature, u_ℓ is the velocity of the directed motion and k is the wave vector ($E,H \sim e^{i(\vec{k}\vec{r} - \omega t)}$, $\vec{k}\{k_x, 0, k_z\}$). The subscripts $\ell = 1$ and $\ell = 2$ refer to electrons and ions in the beam and the subscripts $\ell = 3$ and $\ell = 4$ refer to electrons and ions in the plasma. The plasma frequency is denoted by

$$\omega_{o,\ell} = \sqrt{\frac{4\pi e^2 N_\ell}{m_\ell}}, \quad \lambda = \frac{k_x s_\ell}{\omega_{H,\ell}},$$

and $W(z) = e^{-z^2}\left(1 + \frac{2i}{\sqrt{\pi}} \int_0^z e^{t^2}\, dt\right)$ is the probability integral.

The functions $F_n(\lambda)$, $\Phi_n(\lambda)$ and $\Psi_n(\lambda)$ are defined by Eq.(1) and

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using the expansion $e^{-i\alpha \sin\psi} = \sum_{n=-\infty}^{+\infty} J_n(\alpha) e^{-in\psi}$ in conjunction with Eq.(5) of Ref.2), the dielectric constant components are found to be given by

$$\varepsilon_{xx} = 1 + i\sqrt{\pi}\,\frac{\omega_0^2}{\omega^2}\,\frac{\omega - uk_z}{sk_z}\sum_n \frac{F_n^*(\lambda)}{\lambda^2} W(z_n) n^2, \quad (2)$$

$$\varepsilon_{xy} = -\varepsilon_{yx} = \sqrt{\pi}\,\frac{\omega_0^2}{\omega^2}\,\frac{\omega - uk_z}{sk_z}\sum \frac{\Phi_n(\lambda)}{\lambda} W(z_n) n, \quad (3)$$

$$\varepsilon_{xz} = \frac{\omega_0^2}{\omega^2}\,\frac{\omega}{sk_z}\sum \frac{n}{\lambda} F_n(\lambda)\left[1 + i\sqrt{\pi}\,\frac{\omega - uk_z}{\omega sk_z}(\omega - n\omega_H) W(z_n)\right], \quad (4)$$

$$\varepsilon_{yy} = 1 + i\sqrt{\pi}\,\frac{\omega_0^2}{\omega^2}\,\frac{\omega - uk_z}{sk_z}\sum \Psi_n^*(\lambda) W(z_n), \quad (5)$$

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$$\varepsilon_{xx} = i\frac{\omega_0^2}{\omega^2}\frac{\omega - uk_z}{sk_z}\sum\frac{n}{\lambda}F_n(\lambda)\left[1 + i\sqrt{\pi}\,\frac{\omega - n\omega_H}{sk_z}W(z_n)\right], \quad (6)$$

$$i\varepsilon_{xy} = -\frac{\omega_0^2}{\omega^2}\frac{\omega - uk_z}{sk_z}\sum\Phi_n(\lambda)\left[1 + i\sqrt{\pi}\,\frac{\omega - n\omega_H}{sk_z}W(z_n)\right], \quad (7)$$

$$\varepsilon_{yz} = i\frac{\omega_0^2}{\omega^2}\frac{\omega}{sk_z}\sum\Phi_n(\lambda)\left[1 + i\sqrt{\pi}\,\frac{\omega - uk_z}{\omega sk_z}(\omega - n\omega_H)W(z_n)\right], \quad (8)$$

$$\varepsilon_{zz} = 1 + \frac{\omega_0^2}{\omega^2}\frac{\omega}{sk_z}\sum F_n(\lambda)\left\{\frac{\omega - n\omega_H\left(\frac{\omega - uk_z}{\omega}\right)}{sk^2} + i\sqrt{\pi}\,\frac{(\omega - n\omega_H)^2}{(sk_z)^2}\frac{(\omega - uk_z)}{\omega}W(z_n)\right\}; \quad (9)$$

In these formulae the summation over n is carried out between $-\infty$ and $+\infty$ and the summation sign over ℓ is $\left(\sum_{\ell=1}^{\ell=4}\right)$

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The Dielectric Constant Tensor for a Plasma and a Beam

omitted. These formulae hold for a plasma with any number of beams (all parallel to H_0) and can be used to solve various problems in radio engineering, including numerical calculations on plasma amplifiers, calculation of the absorption of waves in the plasma near the gyromagnetic resonance, calculation of the excitation of waves in the ionosphere by an ion jet and other problems in which the elementary theory is insufficient and the thermal motion of the plasma particles must be taken into account. When $T \to 0$, these formulae become identical with the formulae of the elementary theory ($\varepsilon_{yz}, \varepsilon_{zy}, \varepsilon_{xz}, \varepsilon_{zx} \to 0, \varepsilon_{yy} \to \varepsilon_{xx}$), while when $u \to 0$ the formulae become identical with those obtained by Stepanov and Sitenko (Ref.4). These are 4 Soviet references.

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87246

9.9845
3.1720 (1041, 1126, 1127)

S/033/60/037/006/005/022
E032/E514

AUTHOR: Gintsburg, M. A.

TITLE: Generation of Plasma Waves by Solar Corpuscular Streams

PERIODICAL: Astronomicheskiy zhurnal, 1960, Vol.37, No.6, pp.979-982

TEXT: It is shown that solar corpuscular streams should excite plasma waves in the exosphere and the Earth's ionosphere. A numerical solution is obtained for the dispersion equation for a solar corpuscular stream in the Earth's exosphere. It was shown in Refs. 2 and 3 that the kinetic equation describing a beam-plasma system can be written in the form:

$$\sum_{\ell=1}^{4} - \frac{1}{a_\ell^2 k^2}\left[1 + i\sqrt{\pi}\, Z_\ell W(Z_\ell)\right] = 1 \tag{1}$$

where

$$Z_\ell = X_\ell + iY_\ell = \frac{\omega + i\gamma - kU_\ell + i\nu_\ell}{kS_\ell}$$

and

$$W(Z) = e^{-Z^2}\left(1 + \frac{2i}{\sqrt{\pi}} \int_0^Z e^{t^2} dt\right)$$

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and the remaining symbols are as follows: N_ℓ - concentration of particles of the ℓ-th type, T_ℓ - their temperature, ε - their charge, s_ℓ - thermal velocity, U_ℓ - velocity of the directed motion, a_ℓ - Debye radius, ν_ℓ - effective number of collisions, k - wave number of excited plasma wave and ℓ = 1, 2, 3, 4, where these numbers refer to the electrons and ions in the solar corpuscular stream and electrons and ions in the plasma through which the stream is passing, respectively. These equations are solved numerically for the following numerical parameters:

A: Solar corpuscular stream:

$T = 30000°K$, $U_2 = 10^8$ cm/sec, $N_2 = 10$ cm^{-3} $U_1 = 0$

B: Exosphere (h = 2000 km from the Earth's surface)

$T = 3000°K$, $N = 1000$ cm^{-3}

The numerical results obtained as are follows.

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Generation of Plasma Waves by Solar Corpuscular Streams

$(\omega/k)_1 = 0.9645 \cdot 10^8$ cm/sec; $(\omega/k)_2 = 0.9986 \cdot 10^8$ cm/sec;

$f_1 = 315$ kc/s; $f_2 = 110$ kc/s,

$\lambda_1 = 3$ m; $\lambda_2 = 9$ m (λ - wavelength)

Thus, the protons of the solar corpuscular stream can excite electron plasma waves in the exosphere, the frequency being close to the proper frequency for electrons in the plasma $f_o \sim 300$ kc/s. Measurement of the frequencies of these waves would provide information on the parameters and nature of corpuscular streams. Plasma waves will be propagated only at frequencies close to f_o. Since f_o is proportional to the concentration N and the latter increases towards the Earth's surface, it follows that plasma waves which originate at large altitudes cannot penetrate towards the Earth's surface. However, plasma waves (without a magnetic field) can become transformed into electromagnetic waves on scattering and can reach the Earth's surface in this form. It follows that, in addition to polar auroras and magnetic variations,

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Generation of Plasma Waves by Solar Corpuscular Streams

solar corpuscular streams should produce radio noise in the frequency range 10^5 - 10^6 cps on the Earth's surface. Dowden (Ref. 9) has reported radio noise of exospheric origin on 230 kc/s and the present author identifies this with the above waves. Owing to the screening effect of the ionosphere, this noise is best observed from a rocket or a satellite. Plasma waves can also be excited by beams under laboratory conditions. In recent years considerable effort has been devoted to possibilities of ion jet propulsion. The ion beams producedin these experiments may also generate plasma waves. A graphical method is described which can be used to estimate the stability of the ion beam under these conditions. Acknowledgments are made to N. N. Mayman for valuable advice.
There are 2 figures and 9 references: 6 Soviet and 3 non-Soviet.

ASSOCIATION: Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln Akademii nauk SSSR (Institute of Terrestrial Magnetism, Ionosphere and the Propagation of Radio Waves AS, USSR)

SUBMITTED: January 28, 1960

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30283

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D239/D303

3.9110 (1442, 1121)

AUTHOR: Gintsburg, M.A.

TITLE: On a new mechanism for the excitation of micropulsations in the earth's magnetic field

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 11, 1961, 1979-1691

TEXT: The radiation from a single ion in the solar corpuscular stream (SCS) interacting with the earth's magnetic field is considered. Apart from radio frequencies, solutions are found for low-frequency mhd-waves in the range 0.1 to 0.001 c/s and it is suggested that these are components of the earth's short-period variation field. It is shown in the course of the theory that the ion must be travelling at super-critical speed (i.e. with a velocity greater than that of radiation in the plasma) in order to radiate in this mode. The cases are divided into two, according as u, the velocity of the ion, is greater or less than the velocity v_A of radiation in the plasma. For the subcritical case, the ex-

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pression for the Larmor frequency as received by an observer fixed w.r.t. the plasma, ω', is

$$\omega' = \frac{\Omega}{1 - \frac{u}{c} N \cos \theta} \qquad (1)$$

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where Ω is the Larmor frequency of the ion, N is the refractive index of the plasma and θ is the angle between $\underline{u}$ and the wave vector. For the super-critical case the mechanism of radiation may be of either the cyclotron or Cherenkov type. For the cyclotron type the equation corresponding to (1) is

$$\omega' = \frac{\Omega}{\frac{u}{c} N \cdot \cos \theta - 1} \qquad (2)$$

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of the anomalous Doppler effect. For each case of interest now, the procedure is to write the expression for N and by some manipulation to obtain a relation between η and u/v_A where η is defined by ω/Ω, ω being the symbol for 2π times the frequency observed. In the simplest case where the ion is travelling down a line of force and considering the wave of magnetosonic type this relation is as follows:

$$\frac{u}{v_A} = \left(1 + \frac{1}{\eta}\right)\sqrt{(1+\eta)(1-\alpha\eta)} \qquad (5)$$

The equation which has three roots given approximately by $\eta_1 = v_A/u$, $\eta_2 = (u/v_A)^2$ and $\eta_3 = 1/\alpha - (u/v_A)^2$ where $\alpha = m/M = 1/1836$, is graphed for various cases. Inserting typical values the η_1 root corresponds to a frequency of 0.46 c/s. The cases where 0 is finite and of Cherenkov radiation are also treated in detail. The case of radiation from protons in the inner radiation belt requires the

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substitution for (2) of the relativistic Doppler equation

$$\omega = \frac{\Omega_i \sqrt{1 - \beta^2}}{\frac{u}{c} N \cos \theta - 1} \quad (14)$$

Alfven waves are now considered. The equation for η is

$$\eta = \frac{v_A}{c} Q \left[(2 + T/Mc^2) T/Mc^2\right]^{-1/2} \quad (16)$$

where $Q = M_p/M_s$ = ratio of masses of plasma ions (O^+_{16}) to SCS ions (H^+) and T is the kinetic energy of the ion. Likely values of F are given in a table, e.g. for T = 750 MeV, v_A = 2.10^7 cm/sec and at h = 500 Km, F = 0.17 c/s. In a geophysical appendix the importance is

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discussed of the focussing effect of the field which brings the group-velocity vector closer to the field-line direction than the wave-vector. The attenuation and polarization of the low-frequency waves are also discussed. It is concluded that a single ion with subcritical velocity travelling along the field cannot radiate, (i.e. there is no incoherent radiation with $u < v_A$). Coherent radiation also disappears. However, the position is radically different for ions travelling with super-critical velocities, where both coherent and incoherent radiation at very low frequencies in an mhd-mode are possible for all directions of the ion relative to the field. There is a mathematical appendix. There are 1 figure, 1 table and 23 references: 15 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: M. Sugiura, Phys. Rev. Letters, 6, 255, 1961; R. Santirocco, Proc. IRE, 48, 1650, 1960; W. Murcray, J. Pope, Proc. IRE, 49, 811, 1961; J. Pope, W. Campbell, J. Geophys., 65, 1960.

ASSOCIATION: Akademiya nauk SSSR, Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln (Academy of