L 41111-66 EWT(1) IJP(c) AT (N)

ACC NR: AT6020565 SOURCE CODE: UR/0000/65/000/000/0038/0059

56
B11

AUTHOR: Stepanov, K. N.

ORG: none

TITLE: High frequency heating of plasma

SOURCE: AN UkrSSR. Vysokochastotnyye svoystva plazmy (High frequency properties of plasma). Kiev, Naukovo dumka, 1965, 38-59

TOPIC TAGS: plasma heating, thermonuclear temperature, thermonuclear reaction, cyclotron resonance, magnetoactive plasma

21

ABSTRACT: A short review of high frequency collisionless methods for heating plasma to thermonuclear temperatures is given and a comparison with ohmic heating is made; an exhaustive bibliography of theoretical and experimental works is included. The methods reviewed in detail are: 1) Cherenkov heating of ions, 2) Cherenkov heating of electrons by magnetoacoustic waves, 3) cyclotron absorption of magnetoacoustic waves, 4) ion cyclotron resonance and Alfven's wave absorption. Heating rates for these processes are given and compared with the containment times needed to achieve sufficiently high temperature of the ions (50 kev) for the thermonuclear reactions to occur. It is shown that Cherenkov and cyclotron heating with weak fields is the same as ohmic heating if the distribution function for equilibrium is reached through collisions. Fur-

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L 41111-66

ACC NR: AT6020565

thermore, the heating periods are smaller than containment times for machines with positive energy balance. In cases where electric fields subcritical with respect to the run-away criterion are used, it is best to use higher densities since the critical field values are higher and the heating rates are greater. Orig. art. has: 57 formulas.

SUB CODE: 20/ SUBM DATE: 19Nov65/ ORIG REF: 038/ OTH REF: 011

Card 2/2 11b

L 04750-67 EWT(l) IJP(c) AT/WW
ACC NR: AT6020446 (N) SOURCE CODE: UR/0000/65/000/000/0155/0167

AUTHOR: Lominadze, D. G.; Stepanov, K. N.

63
6+1

ORG: none

TITLE: Excitation of longitudinal low frequency oscillations of a plasma by a charged particle beam with anisotropic distribution functions

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 155-167

TOPIC TAGS: plasma magnetic field, dispersion equation, longitudinal magnetic field, particle beam

ABSTRACT: The excitation of low-frequency electron-ion longitudinal waves in a plasma by a beam of oscillators (i. e., a beam consisting of particles with an identical gyroradius) in a longitudinal magnetic field is investigated. The plasma is assumed to have Maxwellian distribution while the beam has a similar distribution for its longitudinal velocity. The transverse velocity of the beam is taken to be a delta function. The dispersion relation for the longitudinal wave is used to investigate the damping coefficients of various waves. A detailed analysis of the "hot" beam and "cold" beam is made. The criteria specifying the point at which the beam satisfies the above designations are established. In the case of the hot beam, only a small fraction of the

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L 04750-67
ACC NR: AT6020446

beam particles contribute both to the excitation and absorption coefficients. The latter are explicitly derived. In the case of the cold beam, a similar analysis in which the problem was broken down into several subcases was made. At very low temperature, all particles were found to contribute to excitation; maximum increase in excitations occurred at particle resonance. Orig. art. has: 64 formulas.

SUB CODE: 20/ SUBM DATE: 11Nov65/ ORIG REF: 003/ OTH REF: 001

Card 2/2 fb

L 04836-67 EWT(1) IJP(c) AT/GD (N)
ACC NR: AT6020447 SOURCE CODE: UR/0000/65/000/000/0167/0177

AUTHOR: Lominadze, D. G.; Stepanov, K. N.

52
B+1

ORG: none

TITLE: Excitation of plasma oscillations by a beam of oscillators

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 167-177

TOPIC TAGS: plasma oscillation, Larmor radius, plasma wave, plasma density

ABSTRACT: Excitation of plasma waves moving normally to an external magnetic field by a beam of ions with identical Larmor radius (beam of oscillators) is investigated. The problem under consideration is limited to short wavelength excitations (much shorter than the Larmor radius). Growth rate and frequency of the wave are taken to be much greater than the gyrofrequency of the ions. This permits one to view the ions as moving effectively in a direction perpendicular to the external field. The contribution of the beam to the dielectric tensor of the plasma is described and the sums of each of the elements is rewritten in terms of suitable integrals. This leads to a simplified expression for the elements in terms of wavelengths, which in turn yields the dispersion relations. The latter are characterized by the presence of a resonance factor. The presence of ordinary and extraordinary waves is further derived and the special

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L 04835-67 EWT(1) [illegible] WW/AT/GD (N) SOURCE CODE: UR/0000/65/000/000/0177/0181
ACC NR: AT6020448

AUTHOR: Lominadze, D. G.; Stepanov, K. N.

58
B+1

ORG: none

TITLE: Excitation of magnetosonic waves in colliding plasma beams

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 177-181

TOPIC TAGS: MHD shock wave, plasma beam interaction, dispersion equation

ABSTRACT: The stability of two identical plasma streams moving along a static magnetic field in opposite directions is investigated in the region intersected by the streams. It is assumed that the streams are characterized by an electron temperature higher than that of the ions. The dispersion relation for the magnetosonic waves is written and immediately simplified by the elimination of small anti-hermitian factors, using, in effect, hydrodynamic approximation. The equations hold for low-frequency oscillations with the phase velocity of the waves being much smaller than the thermal electron velocity but greater than the thermal ion velocity. When beam velocity exceeds the Alfven velocity, transverse Alfven waves are excited; however, when acoustic velocity exceeds beam velocity, acoustic waves are generated. An expression relating these velocities is derived giving the region in which beam instability also develops. It is also shown

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L 04835-67
ACC NR: AT6020448

that more complete treatment of the problem predicts wave growth in the region where there is no instability. However, the rate of wave growth is slight. Orig. art. has: 5 formulas, 3 figures.

SUB CODE: .20/ SUBM DATE: 11Nov65/ ORIG REF: 003

Card 2/2 afs

MIKHAYLOVSKIY, A.B.; STEPANOV, K.N.

Soviet physicists visiting England. Atom. energ. 19 no.2:
211-212 Ag '65. (MIRA 18:9)

L 26977-65 EWT(l)/EPA(sp)-2/T/EEC(t)/EPA(w)-2/EWA(m)-2 Pz-6/Pc-4/Pab-10/Pi-4
IJP(c) AT
ACCESSION NR: AP5003250 S/0057/65/035/001/0148/0151

65
34
B

AUTHOR: Lominadze, D.G./ Stepanov, K.N.

TITLE: On the excitation of magnetoacoustic waves in colliding plasma streams 21

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.1, 1965, 148-151

TOPIC TAGS: plasma, plasma stability, plasma interaction, magnetic sound wave, dispersion relation, mathematical physics

ABSTRACT: The stability against low-frequency long-wavelength oscillations of two interpenetrating plasma streams moving in opposite directions parallel to a magnetic field is discussed theoretically. The temperatures of the two streams are assumed to be the same, and the electron temperature is assumed greatly to exceed the ion temperature. The dispersion equation is written for waves for which the frequency is low compared with the ion Larmor frequency, the wavelength is considerably greater than the electron and ion Larmor radii, and the component of the phase velocity parallel to the magnetic field is low compared with the electron and high compared with the ion thermal velocity. The antihermitian part of the dielectric tensor, describing Cerenkov absorption and radiation, is neglected. The roots of

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L 26977-65
ACCESSION NR: AP5003250

2

this dispersion equation are discussed and the region of stability was calculated numerically and is presented graphically in terms of coordinates representing essentially the relative velocity of the two streams and the strength of the magnetic field. The effect of Cerenkov absorption and radiation on the stability region is discussed briefly. Orig.art.has: 11 formulas and 2 figures.

ASSOCIATION: Institut fiziki AN Gruz.SSR,Tbilisi (Institute of Physics, AN Georgian SSR); Fiziko-tekhnicheskiy institut AN UkrSSR, Khar'kov (Physicotechnical Institute AN UkrSSR)

SUBMITTED: 12May64 ENCL: 00 SUB CODE: ME,EM

NR REF SOV: 003 OTHER: 000

Card 2/2

L 33167-65 EPA(w)-2/EWT(l)/EEC(t)/EPA(sp)-2/T/EWA(m)-2 Pi-4/Po-4/Pz-6/Pab-10
IJP(c) AT

ACCESSION NR: AP5005219 S/0057/65/035/002/0205/0211

AUTHOR: Lominadze, D.G.; Stepanov, K.N.

TITLE: On the stability of two colliding plasma streams in a magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.2, 1965, 205-211

TOPIC TAGS: plasma stability, plasma interaction, plasma heating, plasma beam instability, magnetic field

ABSTRACT: The authors discuss the stability of two plasma streamsof equal density and temperatures moving through each other in opposite directions parallel to an external magnetic field. The following cases are treated separately: 1) low-frequency longitudinal oscillations when the magnetic pressure is large compared with the kinetic, the electron thermal velocity is large compared with the stream velocity, and the ion thermal velocity is negligible; 2) high-frequency longitudinal oscillations when the thermal velocities of both the electrons and ions are small compared with the stream velocity; and 3) oscillations that occur when the ion temperature is high. In each case the requisite dispersion equation is either quoted from earlier work (A.B.Kitsenko and K.N.Stepanov, ZhTF 32,303,1962) or written

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L 33167-65
ACCESSION NR: AP5005219

3

without derivation or reference. The behavior of the dispersion equation is illustrated graphically in each case, the stability conditions are derived, and equations are derived for the growth constants (logarithmic increments) near the stability boundaries. The instability found in case 1) when the stream velocity is large compared with the velocity of sound could be employed to heat the ion component of a plasma, the electron component of which had been previously raised to a high temperature. The growth constant of the oscillations in case 3) is small, but these oscillations may still be important in interacting plasma streams because the ions carry the major portion of the stream energy. "In conclusion, the authors express their gratitude to A.I.Akhiyezer for discussing the results and for valuable advice." Orig.art.has: 21 formulas and 3 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR,Khar'kov(Physicotechnical Institute, AN UkrSSR);Institute fiziki AN GSSR Tiflis (Institute of Physics, AN GSSR)

SUBMITTED: 04May64 ENCL: 00 SUB CODE: ME,EM

NR REF SOV: 004 OTHER: 000

Card 2/2

L 40940-65 EPF(n)-2/EPA(w)-2/EWT(1)/EWG(m) Po-4/Pi-4/Pz-6/Pab-10 IJP(c) AT/WW

ACCESSION NR: AP5007288 S/0057/65/035/003/0441/0448

52
50
B

AUTHOR: Lominadze, D.G.; Stepanov, K.N. 21

TITLE: Excitation of oscillations in a plasma by a flux of oscillators

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.3, 1965 441-448

TOPIC TAGS: plasma beam interaction, plasma electromagnetic wave, plasma instability, ion stream, adiabatic trap

ABSTRACT: The authors discuss the excitation in a plasma of oscillations propagating nearly perpendicularly to an external magnetic field by a stream of ions, all of which have the same Larmor radius. These ions are the "oscillators" of the title. Those oscillations of the plasma are considered for which the wavelength is short compared with the Larmor radius of the exciting ions and the frequency is high compared with their Larmor frequency. The contribution of the ion beam to the dielectric tensor is taken from work of A.B.Kitsenko and K.N.Stepanov (Ukr.fiz.zhurn.6, 297,1961) in the form of an infinite series of Bessel functions whose arguments are the large ratio of the Larmor radius to the wavelength. The dielectric tensor is accordingly transformed to a form that converges more rapidly under the conditions

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L 4091)-65

ACCESSION NR: AP5007288

2

of the present problem, and the roots of the dispersion equation are discussed for ordinary, extraordinary and longitudinal waves. The dispersinn equation has roots not only at frequencies near harmonics of the electron Larmor frequency and the hybrid frequency, but also at a frequency close to the ratio of the ion beam velocity to the wavelength. The logarithmic increment of the longitudinal waves is much greater than that of the transverse waves; it is proportional to $(n'/n)^{2/5}$, where n' and n are the particle densities of the ion beam and the plasma, respectively. If the plasma contains no ions except those of the beam, it is unstable under all conditions. Instability of this type may be expected to arise in high density adiabatic magnetic mirror systems in which the ion velocity distribution is highly anisotropic. "In conclusion, the authors express their gratitude to V.F.Aleksin for valuable advice and discussions." Orig.art.has: 46 formulas.

ASSOCIATION: Institut fiziki AN Gruz. SSR,Tbilisi (Institute of Physics, AN Grus. SSR); Fiziko-tekhnicheskiy institut AN UkrSSR,Khar'kov (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 26Jun64 ENCL: 00 SUB CODE: ME

NR REF SOV: 005 OTHER: 001

Card 2/2

L 40941-65 EPF(n)-2/EPA(w)-2/EWT(1)/EWG(m) Pi-4/Po-4/Pz-6/Pab-10 IJP(c) AT/
WW

ACCESSION NR: AP5007289 S/0057/65/035/003/0449/0458

52
50
B 51

AUTHOR: Lominadze, D.G.; Stepanov, K.N.

TITLE: Excitation of low frequency longitudinal oscillations in a plasma by a stream of charged particles with an anisotropic distribution function

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.3, 1965, 449-458

TOPIC TAGS: plasma beam interaction, plasma stability, ion stream

ABSTRACT: The authors discuss the excitation of low frequency longitudinal oscillations of a plasma in the presence of an external magnetic field by a stream of charged particles having a delta-function distribution of velocity components perpendicular to the magnetic field and a Maxwellian distribution of the velocity component parallel to the field. The dispersion equation is written without derivation or reference, and its solutions are discussed at considerable length. Long wavelength oscillations occur with phase velocities much greater than the thermal velocities of the plasma particles and, in the case of a highly anisothermal plasma, with phase velocity intermediate between the ion and electron thermal velocities.

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L 40941-65
ACCESSION NR: AP5007289

2

Longitudinal ionic cyclotron waves with wavelength of the order of the plasma ion Larmor radius propagate nearly at right angles to the magnetic field. The excitation of longitudinal oscillations is discussed separately for the case of a hot beam (broad distribution of the velocity component parallel to the magnetic field), and for that of a cold beam. Formulas are derived for the logarithmic decrement (or increment) of the various waves, and the conditions for the stability of the system are discussed. Orig.art.has: 73 formulas.

ASSOCIATION: Institut fiziki AN Gruz.SSR,Tbilisi (Institute of Physics, AN Gruz. SSR); Fiziko-tekhnicheskiy Institut UkrSSR, Khar'kov(Physicotechnical Institute, UkrSSR)

SUBMITTED: 26Jun64 ENCL: 00 SUB CODE: ME

NR REF SOV: 003 OTHER: 001

Card 2/2 pb

L 49255-65 EWT(m)/EPA(w)-2/EWA(m)-2 Pab-10/Pt-7 IJP(c)

ACCESSION NR: AP5010798 UR/0057/65/035/004/0618/0622

AUTHOR: Makhnenko, L.A.; Pakhomov, V.I.; Stepanov, K.N. 32 B

TITLE: On high-frequency focusing in linear accelerators 19

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 4, 1965, 618-622

TOPIC TAGS: linear electron accelerator, traveling wave electron accelerator, high frequency field, reflected wave, stabilization

ABSTRACT: The authors calculate the focusing effect in a traveling wave linear accelerator of a reflected wave propagating in the opposite direction to the electron motion. The reflected wave is found to improve the focus both with respect to phase and with respect to radial motion. The improvement in phase stability is shown to be negligible in the relativistic case and to be significant in the nonrelativistic case only when the equilibrium phase is close to $\pi/2$. The radial focusing is improved at all energies. The radial focusing effect of the backward traveling wave is equivalent to that of a uniform longitudinal magnetic field of which the strength is of the order of the wave amplitude. The radial focusing effect was verified experimentally by directing a divergent beam (divergence angle

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L 43203-65

ACCESSION NR: AP5015798

0.001 rad) of 5 MeV electrons down a 3.6 m long septate wave guide. When a wave of amplitude 56 kV/cm was directed up the waveguide, the average current increased by a factor 1.8. There was no accelerating wave traveling down the waveguide in these experiments. Orig. art. has: 32 formulas.

ASSOCIATION: None

SUBMITTED: 26Jun64 ENCL: 00 SUB CODE: NP

NR REF SOV: 007 OTHER: 002

Card 2/2

L 54165-65 EWT(1)/EPF(n)-2/EWG(m)/EPA(w)-2 Pz-6/Po-4/Pab-10/Pi-4 IJP(c) WW/AT

ACCESSION NR: AP5015621 UR/0057/65/035/006/1002/1014

57
B

AUTHOR: Stepanov, K.N. 21

TITLE: On the influence of plasma resonance on the propagation of surface waves in a nonuniform plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.6, 1965, 1002-1014

TOPIC TAGS: plasma, surface wave, plasma wave propagation, surface layer

ABSTRACT: The author discusses the propagation of slow surface waves on the boundary between a plasma and the vacuum for the case in which the boundary is not sharp. The cases of a semi-infinite plasma, a thin plane plasma layer, and a plasma cylinder are treated separately but in a similar way. The plasma density is assumed to fall monotonically to zero in a surface layer that is thin compared with the wavelength, and the wave equation is solved by successive approximation in this region. The effect on the dispersion equation of first order

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L 54765-65
ACCESSION NR: AP5015621

terms in the ratio of the transition layer thickness to the wavelength is calculated. Only H-waves (the magnetic field in the surface and normal to the propagation direction) are treated because the E-wave equation does not admit surface wave solutions in the case of a diffuse boundary. Resonance between the wave frequency and the Langmuir frequency within the transition layer strongly affects the propagation of the surface waves and can lead to large damping constants. By measuring the frequency dependence of the damping constant one can derive information concerning the density distribution within the transition layer. In a final section the author discusses space dispersion due to the thermal motions of the electrons. A criterion for the negligibility of space dispersion is derived and the effects of space dispersion are calculated for the case when this criterion is not met. Space dispersion can contribute significantly to the damping when the electron collision frequency is low. Orig.art.has: 87 formulas.

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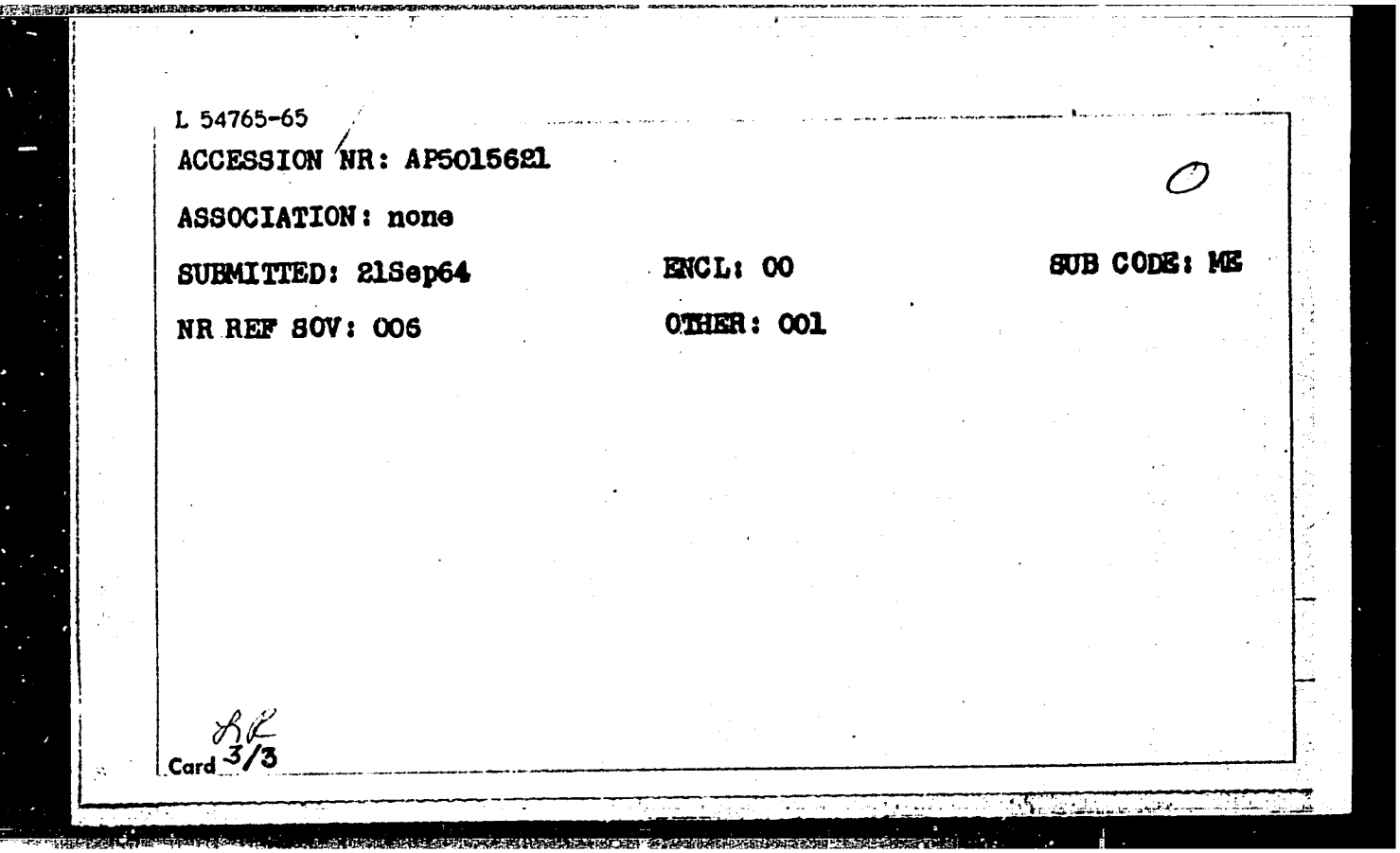

L 54765-65

ACCESSION NR: AP5015621

ASSOCIATION: none

SUBMITTED: 21Sep64 ENCL: 00 SUB CODE: ME

NR REF SOV: 006 OTHER: 001

Card 3/3

L 2468-66 EWT(1)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2 LJP(c) AT

ACCESSION NR: AP5020717 UR/0057/65/035/008/1349/1358

AUTHOR: Stepanov, K.N.

TITLE: On the propagation of surface waves in a magnetoactive plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 8, 1965, 1349-1358

TOPIC TAGS: plasma, magnetoactive plasma, plasma electromagnetic wave, plasma wave propagation, fluid surdace, surface geometry

ABSTRACT: The author discusses the propagation perpendicularly to an applied magnetic field along the smeared boundary between a plasma and the vacuum of the extraordinary electromagnetic wave. The plasma density is assumed to fall smoothly to zero within a finite distance, which is small compared with the wavelength. The equations for the field strengths in the wave are taken from earlier work of M.A. Gintsburg (ZhETF, 34, 1635, 1958), who discussed propagation along a sharp boundary. The dispersion equations are derived and discussed for the following geometrically different cases: 1) the infinite plane boundary of a semi-infinite plasma in a uniform magnetic field; 2) an infinite plane layer of plasma of finite but small thickness in a uniform magnetic field; and 3) a cylindrical plasma in an

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L 2468-66

ACCESSION NR: AP5020717

6

azimuthal magnetic field. It is found that the finite thickness of the transition region does not greatly affect the propagation of surface waves with frequencies lower than the electron Larmor frequency. When the wave frequency exceeds the Larmor frequency, however, the wave resonates with the Langmuir frequency at some point within the transition layer and the wave amplitude becomes large. In this case the effects of space dispersion are significant if the collision frequency is low. The dielectric tensor in the presence of space dispersion is quoted from earlier work (A.G.Sitenko and K.N.Stepanov, ZhETF, 31, 642, 1956) and is employed to calculate the wave amplitude in the resonance region. "In conclusion, the author expresses his deep gratitude to A.I.Akhiyezer and V.F.Aleksin for advice and a discussion of the work." Orig. art. has: 77 formulas and 1 figure.

ASSOCIATION: none

SUBMITTED: 28Dec64 ENCL: 00 SUB CODE: ME

NR REF SOV: 007 OTHER: 000

BVK

Card 2/2

L 12782-66 EWT(l)/EEC(k)-2/ETC(F)/EPF(n)-2/EWG(m)/T/EWP(k)/EWA(m)-2 IJP(c) WG/AT

ACC NR: AP5026613 SOURCE CODE: UR/0056/65/049/004/1197/1210

AUTHORS: Sizonenko, V. L.; Stepanov, K. N.

ORG: Physicotechnical Institute, Academy of Sciences UkrSSR (Fiziko-tekhnicheskiy institut Akademii nauk UkrSSR)

TITLE: Concerning quasilinear relaxation of longitudinal plasma oscillations

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 4, 1965, 1197-1210

TOPIC TAGS: plasma electron oscillation, relaxation process, distribution function, ion interaction, plasma resonance

ABSTRACT: It is shown on the basis of the equations of quasilinear theory that the time variation of the background velocity distribution function of plasma particles is such that the system reaches an equilibrium state at infinite time, manifest by the formation of a plateau on the distribution function of the resonant particles under the influence of three-dimensional longitudinal oscillations. The authors consider the relaxation of the distribution function of electrons moving relative to the ions under the influence of unstable ion-sound

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L 12782-66

ACC NR: AP5026613 9

oscillations. It is shown that if the electron velocity approaches a critical value, above which the oscillations are unstable, then the resonant electrons are decelerated during the initial stage of relaxation to velocities on the order of that of sound, after which a plateau is produced along the beam direction. The oscillation spectrum then becomes one-dimensional. Whether a one-dimensional or three-dimensional spectrum is produced depends on the volume occupied in velocity space by the electrons at the initial and final instants of time. The variation of the distribution function under the influence of longitudinal oscillations in a magnetic field is also considered. The equations derived are used to investigate the deformation of the distribution function in the case of narrow, one-dimensional wave packets. Authors thank A.I. Akhiyezer, A. A. Vedenov, and V. P. Silin for a discussion of the results and useful advice. Orig. art. has: 37 formulas.

SUB CODE: 20/ SUBM DATE: 24Apr65/ NR REF SOV: 008/ OTH REF: 002

Card 2/2

L 18536-66 EWT(l)/ETC(f)/EPF(n)-2/EWG(m) IJP(c) GG/AT

ACC NR: AP6002297 SOURCE CODE: UR/0141/65/008/006/1135/1147

AUTHOR: Aleksin, V. F.; Pakhomov, V. I.; Stepanov, K. N.

ORG: Physico-Technical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Some peculiarities in the radiation of electromagnetic waves in dispersing anisotropic media

SOURCE: IVUZ. Radiofizika, v. 8, no. 6, 1965, 1135-1147

TOPIC TAGS: electromagnetic radiation, anisotropic medium, magnetoactive plasma

ABSTRACT: The behavior of an electromagnetic field in the wave zone of a homogeneous dispersing anisotropic medium (magnetoactive plasma) is theoretically considered. Peculiarities of the radiation, in a cold plasma, of a point electric dipole directed along H_0 were studied by E. Arbel et al. (Proc. Symp. held in

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L 18536-66
ACC NR: AP600297

Copenhagen, June 1962) for $\chi \approx \chi_0$ and $\chi = \chi_0'$. The present article studies the radiation, in a cold plasma, of arbitrarily distributed external electric currents, with $\chi \approx \chi_{cr}$. In the cases of plasma resonance ($\chi \approx \chi_0'$) and electronic gyro-

UDC: 621.371.182

resonance, the spatial dispersion of plasma is allowed for. Also, with $\chi \approx \chi_{cr}$, the correlation of fluctuation electromagnetic fields is studied. Here, χ is the angle between the group velocity and the external magnetic field H_0. It is found that the radiation field is much stronger along some particular directions: the direction of magnetic field and the caustic surfaces (generatrix of the radiation cone). Orig. art. has: 3 figures and 105 formulas.

SUB CODE: 20, 09 / SUBM DATE: 18Jan65 / ORIG REF: 010 / OTH REF: 002

Card 2/2
IC

L 45098-66 EWT(1)/T IJP(c) GG/AT
ACC NR: AP6024886 SOURCE CODE: UR/0056/66/051/001/0250/0257

AUTHOR: Bar'yakhtar, V. G.; Rudashevskiy, Ye. G.; Savchenko, M. A.; Stepanov, K. N.

ORG: Physico-technical Institute, Academy of Sciences, Ukrainian SSR (Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR) 10 B

TITLE: Interaction between electromagnetic, plasma and spin waves in antiferromagnetic semiconductors and metals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 1, 1966, 250-257

TOPIC TAGS: plasma wave, spin wave, antiferromagnetic material, magnetic susceptibility, electromagnetic wave

ABSTRACT: Coupled electromagnetic, plasma, and spin waves in antiferromagnetic semiconductors and metals are investigated. Since there are two spin waves in antiferromagnetics (unlike ferromagnetics, which have one), the spin and electromagnetic (plasma) wave interaction pattern in the former is more complex than in the latter. However, in antiferromagnetics the magnetic susceptibility is proportional to a small parameter χ_0 (static susceptibility), and the spin and electromagnetic oscillation coupling is therefore weak. In the region in which the frequencies of the noninteracting spin and electromagnetic (plasma) braches intersect, the frequency corrections due to wave coupling is of the order of $\sqrt{\chi_0}$, and far away from the intersection region they are of the order of χ_0. Orig. art. has: 32 formulas. [CS]

SUB CODE: 20/ SUBM DATE: 24Jan66/ ORIG REF: 005/ OTH REF: 004/

Card 1/1 blg

L 23096-66 EWT(1)/ETC(f)/EPF(n)-2/EWG(m) IJP(c) AT

ACC NR: AP6007079 UR/0057/66/036/002/0304/0312

AUTHOR: Dushin,L.A.; Kononenko,V.I.; Sizonenko,V.L.; Skibenko,A.I.; Stepanov,K.N.

ORG: None

TITLE: Determination of plasma density distribution by microwave refraction

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 2, 304-312

TOPIC TAGS: plasma diagnostics, plasma density, plasma decay, microwave, electromagnetic wave refraction

ABSTRACT: Fermat's principle is employed to calculate the path of a microwave beam in a cylindrical plasma in which the density decreases monotonically with increasing distance from the axis for the two cases in which the beam lies in a plane containing the axis of the plasma cylinder or in a plane perpendicular to the axis. For each case there is derived an equation that gives the plasma density as a function of the distance from the axis implicitely in terms of the position at which the microwave beam leaves the plasma as a function of the angle of incidence. It is proposed that these equations be used to determine plasma density distributions from microwave refraction measurements. The proposed techniques were tested by measuring density distributions in decaying hydrogen plasmas at. 5×10^{-2} mm Hg in a 2 m long 10 cm diameter quartz tube. The apparatus is described in more detail elsewhere by I.Adamov, L.Dushin, V.Kononenko,

Card 1/2 UDC: 533.9

L 23026-66
ACC NR: AP6007079

and O.Pavlichenko (Atomnaya energiya, 16, No. 2, 99, 1964). Microwaves of 8 mm wavelength were employed, and the radiating and receiving horns were provided with dielectric lenses that rendered the beam nearly parallel. For each run the antennas were held in fixed positions and the time after excitation of the plasma at which the refracted wave was received by the receiving antenna was recorded with an oscilloscope. Many such runs were made with the antennas in different positions and inclined at different angles, and from the accumulated data curves were constructed giving the position of the antenna as a function of the incidence angle for different times. From these curves the electron density of the plasma was calculated as a function of time and distance from the axis. Measurements were made both with the beam in a plane containing the axis of the plasma cylinder and with the beam in a plane perpendicular to the axis. Good agreement was obtained between the different measurements, and it is concluded that the proposed techniques are satisfactory. The techniques can be improved by employing narrower microwave beams and shorter wavelengths. It is also possible to vary the wavelength instead of the incidence angle. Orig. art. has: 14 formulas and 12 figures.

SUB CODE: 20/ SUBM DATE: 22Feb65/ ORIG REF: 001/ OTH REF: 002

Card 2/2 UVR

ACC NR: AP6018723 SOURCE CODE: UR/0057/66/036/006/1003/1007

57
56
B

AUTHOR: Dolgopolov,V.V.; Stepanov,K.N.

ORG: none

TITLE: Resonance absorption of energy from low frequency oscillations by a cold nonuniform plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 6, 1966, 1003-1007

TOPIC TAGS: plasma electromagnetic wave, plasma heating, plasma magnetic field, longitudinal magnetic field, plasma resonance, NONUNIFORM PLASMA, RESONANCE ABSORPTION

ABSTRACT: The authors discuss the propagation in the axial direction of low frequency electromagnetic waves in a cold radially nonuniform plasma cylinder in a longitudinal magnetic field, with particular reference to the resonance region where the square of the refractive index is approximately equal to the r-r component (in cylindrical coordinates r, θ, z) of the dielectric tensor. The plasma is assumed to be dense (the Langmuir frequency high compared with the Larmor frequency) and the wave frequency is assumed to be low compared with the ion Larmor frequency. The plasma is described by the usual expression for the dielectric tensor in terms of the ion and electron Langmuir, Larmor, and collision frequencies. Different approximation techniques are employed to solve Maxwell's equations inside and outside the resonance region, and expressions are derived for the energy lost to the plasma by interaction of the plasma

Card 1/2 UDC: 533.9

L 40999-66

ACC NR: AP6018723

with the radial, azimuthal, and longitudinal components of the electric field of the wave. The case when the radius of the plasma cylinder is of the order of the wavelength is discussed in some detail. Depending on the relative magnitudes of the ion and electron collision frequencies and the wave frequency, the absorbed energy can either heat both the electron and ion components of the plasma, or only the electron component. The plasma electrons are heated by the longitudinal component of the electric field, and the ions, by the radial component. The proportionality of the power absorbed by the plasma to the square of the current in the exciting windings found by V.V.Chechkin et al. (Vysokochastotnyye svoystva plazmy. Sb. Kiyev, 1965) in their experiments on ion cyclotron resonance in a cold plasma is explained, and it is noted that the theoretical results of M.P.Vasil'yev et al. (ZhTF, 34, 974, 1231, 1964) for the case of purely Coulomb collisions when the wave frequency is close to the ion Larmor frequency are correct only in order of magnitude because under those conditions a certain approximation employed both by those authors and in the present paper is not valid. Orig. art. has: 18 formulas.

SUB CODE: 20 / SUBM DATE: 22Jul65 / ORIG. REF: 005 /

Card 2/2

L 25933-66 EWT(l)/EEC(f)/EPF(n)-2/EWG(m) IJP(c) AT

ACC NR: AP6016666 SOURCE CODE: UR/0056/65/049/004/1197/1210

AUTHOR: Sizonenko, V. L.; Stepanov, K. N.

ORG: Physicotechnical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Quasi-linear relaxations of longitudinal plasma oscillations

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 4, 1965, 1197-1210

TOPIC TAGS: plasma oscillation, distribution function, magnetic field

ABSTRACT: Numerous researchers (see, e.g., the survey by B. B. KADOMTSEV, Voprosy teorii plazmy [Symp. Problems of Plasma Theory], 4, 188, 1964) using the quasi-linear theory have studied the relaxation of the "background" function of cases in which the oscillation spectrum represents a one-dimensional wave packet. They showed that the reverse influence of plasma oscillations on particles led to a distribution function plateau. The present paper investigates changes in the "background" distribution function for the case of a non-one-dimensional oscillation spectrum. On the basis of the quasi-linear theory equations it is shown that for $t \to \infty$ a "plateau" appears again in the distribution function of resonance particles under the action of three-dimensional longi-

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ACC NR: AP6016666

tudinal oscillations. Relaxation of the distribution function of electrons moving with respect to ions under the action of unstable ion-acoustic oscillations is also considered. It is shown that if the electron velocity is close to the critical value above which the oscillations are unstable, the resonance electrons will be slowed down during the first stage of relaxation to a velocity on the order of the velocity of sound. Subsequently, a "plateau" is formed along the direction of the beam, and the oscillation spectrum becomes one-dimensional. The paper concludes with a detailed discussion of the quasi-linear relaxation under the action of one-dimensional wave packets propagating at a given angle to the magnetic field. The authors thank A. I. Akhiyezer, A. A. Vedenov and V. P. Silin for their discussions of the results and their helpful suggestions. Orig. art. has: 37 formulas. [JPRS]

SUB CODE: 20 / SUBM DATE: 24Apr65 / ORIG REF: 008 / OTH REF: 002

L 22253-66 EPF(n)-2/EWT(1)/EWT(m)/ETC(f)/EWG(m)/EWA(d)/EWP(t) IJP(c) MT/JD

ACC NR: AP6010978 SOURCE CODE: UR/0056/66/050/003/0576/0588

AUTHOR: Bar'yakhtar, V. G.; Savchenko, M. A.; Stepanov, K. N. 80 B

ORG: Physicotechnical Institute, Academy of Sciences, Ukrainian SSR (Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR)

TITLE: Interaction of plasma and spin waves in ferromagnetic semiconductors and metals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 3, 1966, 576-588

TOPIC TAGS: spin wave, ferromagnetism, magnetic permeability, Larmor radius, magnon, plasma physics, ferromagnetic material, semiconducting material, metal, magnetic anisotropy

ABSTRACT: Bound plasma, and electromagnetic and spin waves in ferromagnetic semiconductors and metals with magnetic anisotropy of the "easy axis" and "easy plane" type are considered. The region of wave vectors κ is investigated in which space dispersion of the magnetic permeability tensor may be significant, but space dispersion of the dielectric permittivity is weak (the wavelength is much greater than the Larmor electron radius and the phase velocity of the waves is much greater than the thermal of Fermi velocity of the electrons). The

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L 22253-66

ACC NR: AP6010978 O

indices of refraction waves and the transparency regions are determined. It is shown that bound waves in the plasma in the absence of space dispersion of the ε tensor possess normal dispersion). The spectra of bound cyclotron and spin waves moving perpendicular to the magnetic field are also determined in the case when the wavelength is of the order of the Larmor electron radius. [CS]

SUB CODE: 20/ SUBM DATE: 07Oct65/ ORIG REF: 006/ OTH REF: 002/

Card 2/2 nst

L 25041-66 EWT(l) IJP(c) WW/AT

ACC NR: AP6014040 SOURCE CODE: UR/0056/66/050/004/0994/1004

91
89
B

AUTHOR: Roulands, Dzh.; Sizonenko, V. L.; Stepanov, K. N.

ORG: Physicotechnical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut AN USSR)

TITLE: Quasilinear theory of attenuation of electromagnetic waves in a magnetoactive plasma

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 4, 1966, 994-1004

TOPIC TAGS: magnetoactive plasma, linear approximation, cyclotron resonance, magnetic field, wave attenuation, electromagnetic wave

ABSTRACT: A quasilinear approximation has been studied for Cherenkov and cyclotron attenuation of electromagnetic waves in a homogeneous magnetoactive plasma by taking into account collisions between resonance particles responsible for the absorption of waves and the remaining plasma particles. The velocity of resonance particles along the magnetic field may be of the order of or less than the thermal velocity. For three-dimensional wave packets in the absence of collisions, the system finally reaches a steady state in which either the oscillation energy vanishes or the distribution function has a plateau. In the case of Cherenkov resonance, diffusion of particles on the waves in the velocity space occurs only along the magnetic field, whereas in the case of the cyclotron resonance diffusion takes place along and

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L 36388-66
ACC NR: AP6014040

across the magnetic field. The distribution function is determined in the quasistationary state when particle diffusion on waves is counterbalanced by collisions. The nonlinear decay decrement is determined. The authors thank A. I. Akhiyezer for his attention and useful comments. Author Dzh. Roulands thanks GKIAE and FTI, AN UkrSSR for their hospitality. Orig. art. has: 4 formulas. [Based on author's abstract] [NT]

SUB CODE: 20/ SUBM DATE: 19Oct65/ ORIG REF: 008

Card 2/2

L 05013-67 EWT(1) GG

ACC NR: AP6024484 SOURCE CODE: UR/0181/66/008/007/2168/2172

AUTHOR: Bar'yakhtar, V. G.; Savchenko, M. A.; Stepanov, K. N. 55

ORG: none B

TITLE: Interaction of electromagnetic and spin waves in helicoidal magnetic structures

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2168-2172

TOPIC TAGS: spin wave, electromagnetic wave, magnetic structure, antiferromagnetism, refractive index

ABSTRACT: The authors consider coupled spin and electromagnetic waves and their propagation in antiferromagnets with helicoidal magnetic structure and derive analytic expressions for the frequencies of the interacting waves. The different modes of oscillations that can exist in the antiferromagnet are illustrated as functions of the frequency dependence of the refractive index. It is shown that near the points of intersection of the spin and electromagnetic branches, the coupling parameter has an order of magnitude $\sqrt{\zeta}$, while far from this point it is proportional to ζ ($\zeta = g\mu^2 S/Ia^3 \sim 10^{-3}$, where g is the Lande factor, μ is the Bohr magneton, S the spin of the atom, I the exchange integral, and a the lattice constant). Orig. art. has: 2 figures and 15 formulas

SUB CODE: 20/ SUBM DATE: 29Dec65/ ORIG REF: 005/ OTH REF: 002

Card 1/1 egb

L 05226-67 EWT(l) EJP(c) GG/AT

ACC NR: AP6032479 SOURCE CODE: UR/0056/66/051/003/0858/0867

AUTHOR: Sizonenko, V. L.; Stepanov, K. N.

ORG: Physicotechnical Institute, Academy of Sciences Ukrainian SSR (Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR)

TITLE: Cerenkov quasilinear theory and cyclotron attenuation of electromagnetic waves in a plasma

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 3, 1966, 858-867

TOPIC TAGS: electromagnetic wave, cyclotron, plasma density, linear approximation, electron, external magnetic field, ion distribution, Cerenkov theory, magnetoacoustic wave

ABSTRACT: The Cerenkov absorption of Alfven and fast magnetoacoustic waves in a plasma with a high gas-kinetic pressure ($4\pi n_0 T / H_0^2 \gtrsim 1$) is investigated in a quasilinear approximation. The cyclotronic absorption of fast magnetoacoustic waves is also investigated in a quasilinear approximation by ions and by ordinary and extraordinary waves of electrons in a plasma with a low gas-kinetic pressure

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ACC NR: AP6032479

$(4\pi n_0 T / H_0^2 \ll 1)$, where n_0 is the plasma density, T is temperature, and H_0 is the external magnetic-field strength. It is shown that the various components of the field amplitude of Alfven waves and fast magnetoacoustic waves, propagating almost parallel to the external magnetic field, possess different damping decrements. The decrement difference is of the order of the inverse ion-diffusion time on waves in a velocity space. It is also shown that the appearance of a "plateau" in the ion distribution function may lead to a strong increase of the Cerenkov absorption of Alfven waves (in comparison with the linear theory). In a plasma with a low gas-kinetic pressure, the appearance of a "plateau" would always result in a decrease of the damping constant. The cyclotron decrements of a fast magnetoacoustic wave and of the ordinary and extraordinary waves may also increase with increased field amplitude due to the "plateau" formation. The authors thank A. I. Akhiezer for his attention to the work and valuable remarks. Orig. art. has: 33 formulas. [Based on authors' abstract]

SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 008/ OTH REF: 002/

Card 2/2 egh

L 07410-67 EWT(1) IJP(c) GD/AT

ACC NR: AT6020572 (N) SOURCE CODE: UR/0000/65/000/000/0109/0117

46

AUTHOR: Sizonenko, V. L.; Stepanov, K. N.

B+/

ORG: none

TITLE: Determination of density distribution and temperature of plasma using refraction and attenuation of the beam

SOURCE: AN UkrSSR. Vysokochastotnyye svoystva plazmy (High frequency properties of plasma). Kiev, Naukovo dumka, 1965, 109-117

TOPIC TAGS: plasma density, plasma temperature, plasma beam interaction, plasma diagnostics

ABSTRACT: Propagation of a microwave beam through a nonhomogeneous plasma is considered as a diagnostic method for determination of the density distribution and electron temperature in the plasma. Fermat's principle is employed to obtain a general expression for the trajectory of the beam in a refracting medium as a function of frequency and angle of incidence. Detailed computation for the case of semi-infinite plasma is considered and the distance between points of beam entry and exit is found, as well as the inverse relationship for the density coordinates. This approach is extended to a laboratory plasma of cylindrical geometry. The temperature of the plasma electrons is shown to be obtainable by observing the beam attenuation. The coefficient of attenua-

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L 07410-67

ACC NR: AT6020572

tion as a function of radius is derived for the plasma with electron-ion and electron--neutral collision frequencies lower than beam frequency. Orig. art. has: 2 figures, 25 formulas.

SUB CODE: 20/ SUBM DATE: 19Nov65/ ORIG REF: 003/ OTH REF: 002

Card 2/2

L 07402-67 EWT(1) IJP(c) GD/AT
ACC NR: AT6020582 (N) SOURCE CODE: UR/0000/65/000/000/0186/0189

AUTHOR: Dolgopolov, V. V.; Pakhomov, V. I.; Stepanov, K. N. 73

ORG: none B+1

TITLE: On electron radiation in a plasma-magnetic field boundary layer

SOURCE: AN UkrSSR. Vysokochastotnyye svoystva plazmy (High frequency properties of plasma). Kiev, Naukovo dumka, 1965, 186-189

TOPIC TAGS: thermonuclear power, plasma magnetic field, electron radiation, boundary layer plasma, cyclotron frequency

ABSTRACT: The energy radiated by electrons in the region of a plasma near the plasma-magnetic field is calculated. The calculation is made for a low density plasma contained by a strong magnetic field such as in a thermonuclear reactor. The computation includes the effect of the anomalous skin thickness which differs from the case of dense plasma. When cyclotron radiation wavelength corresponds to stabilizing oscillation of the plasma and Doppler broadening (of the order of cyclotron frequency) is included, the intensity of the cyclotron radiation emitted by the plasma is given by the equation

$$I \sim I(\omega)\omega_B \sim \frac{\omega_B^3 v_e T}{4\pi^2 c^3} \sim \frac{e^3 n_0^{1/2} T^3}{c^6 m^{1/2}}.$$

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ACC NR: AT6020582

When the plasma polarization is accounted for, the intensity [illegible] decreases by the ratio of electron rest mass energy to plasma temperature. It is shown that cyclotron radiation is smaller (by the same ratio) than the bremsstrahlung radiation. These relations hold provided no generation of plasma waves occurs. Orig. art. has: 8 formulas.

SUB CODE: 20/ SUBM DATE: 19Nov65/ ORIG REF: 003/ OTH REF: 001

Card 2/2 pla

ACC NR: AP7005845 SOURCE CODE: UR/0181/66/008/012/3574/3577

AUTHOR: Savchenko, M. A.; Stepanov, K. N.

ORG: Physicotechnical Institute AN UkrSSR, Khar'kov (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Contribution to the theory of coupled electromagnetic and spin waves in helicoidal magnetic structures

SOURCE: Fizika tverdogo tela, v. 8, no. 12, 1966, 3574-3577

TOPIC TAGS: spin wave theory, electromagnetic interaction, ferromagnetic resonance, dispersion equation, plasma wave, refractive index

ABSTRACT: This is a continuation of earlier work (FTT v. 8, 2163, 1966) where coupled electromagnetic and spin waves in helical and magnetic structures were investigated in the absence of an external magnetic field at frequencies much higher than the ferromagnetic resonance frequency. In the present article these waves are studied at low frequencies, in the region of the ferromagnetic-resonance frequency. It is shown by analysis of the dispersion equation for this case that the plasma waves and one of the electromagnetic waves do not interact with the spin wave. For the electromagnetic wave interacting with the spin wave, and for the spin wave itself, the correction to the frequency far from the point of intersection is of the order $\zeta = gu^2/Sa^3\sqrt{KK'}$ (g - Lande factor, u - Bohr magneton, S - spin of atom, a - lattice constant, K and K' - anisotropy constants of the crystal; for most known substances

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ACC NR: AP7005845

$\zeta \sim 10^{-2}$). Near the point of intersection, the correction is of the order of $\sqrt{\zeta}$. Expressions are also obtained for frequencies of the interacting waves in the strong-coupling region, when $\zeta \gtrsim 1$. Plots of the frequency dependences of the refractive index and of the wave vector are presented. Orig. art. has: 4 figures and 14 formulas.

SUB CODE: 20/ SUBM DATE: 22May66/ ORIG REF: 002

Card 2/2

ACC NR: AP7005125 SOURCE CODE: UR/0126/66/022/004/0498/0505

AUTHOR: Savchenko, M. A.; Stepanov, K. N.

ORG: none

TITLE: Bound spin, electromagnetic and plasma waves in ferrites

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 4, 1966, 498-505

TOPIC TAGS: ferrite, spin wave, electromagnetic wave, plasma wave

ABSTRACT: In ferrites, as in ferromagnetics, there exist two spin-wave branches, by contrast with ferromagnetics, which have only one branch. Hence it is to be expected that the picture of the interaction between spin waves and electromagnetic and plasma waves in ferrites must be more complex than in ferromagnetics. In this connection, the article investigates the propagation of bound spin, electromagnetic and plasma waves in conducting ferrites with a sufficiently large number of conduction electrons. If its frequency greatly exceeds the gyrofrequency of electrons, the spin wave feebly interacts with electromagnetic waves: in the neighborhood of the point of intersection between noninteracting spin and electromagnetic waves the interaction parameter is of the order of $1/\sqrt{\delta}$, while at a distance from this point

 UDC: 537.311.33:[538 + 537]

ACC NR: AP7005125

it is of the order of $1/\delta$, where $\delta \sim 10^3$ is the exchange constant. The spin wave of a frequency of the order of electron gyrofrequency, on the other hand, strongly interacts with plasma and electromagnetic waves (the coupling parameter is greater than or of the order of unity) so that separation of the waves into spin and electromagnetic (or plasma) waves is possible only in limiting cases."In conclusion, the authors are deeply indebted to V. G. Bar'yakhtar for discussion of this project and valuable suggestions."Orig. art. has: 39 formulas.

SUB CODE: 20, 11/ SUBM DATE: 25Jan66/ ORIG REF: 006/ OTH REF: 002

Card 2/2

[illegible]

Dissertation: "The Investigation of an Electric-Arc Furnace for Melting Calcium Carbide and a Selection of the Most Efficient Method of Its Operation." Cand Tech Sci, Moscow Order of Lenin Power Engineering Institute imeni V. M. Molotov, 25 Jun 54. (Vechernyaya Moskva, Moscow, 14 Jun 54)

SO: Sum 243, 29 Dec 54

VELLI, Yu.Ya., kand. tekhn. nauk; DOKUCHAYEV, V.V., kand. tekhn. nauk; FEDOROV, N.F., doktor tekhn. nauk; Prinimali uchastiye: DYUKOV, A.B., inzh.; STEPANOV, K.V., inzh.; NOVITSKIY, M.I., inzh.; AGA, M.M., kand. tekhn. nauk; SAKHAROV, I.V.; VOLKOV, V.N., inzh.; ZABORSHCHIKOV, O.V., inzh.; RYBAKOVA, V.G.; ZOLOTAR', I.A., kand. tekhn.nauk, nauchn. red.; KOSTANDOV, A.I., red.izd-va; CHERKASSKAYA, F.T., tekhn. red.

[Buildings and structures in the Far North] Zdaniia i sooruzheniia na Krainem Severe; spravochnoe posobie. Leningrad, Gosstroiizdat, 1963. 490 p. (MIRA 17:2)

STEPANOV, A.I., kand. tekhn. nauk, dotsent

Effect of voltage and current parameters on the operation of ore-smelting electric arc furnaces. Izv. vys. ucheb. zav.; energ. 7 no.9:22-27 S '64. (MIRA 17:11)

1. Kuybyshevskiy politekhnicheskiy institut imeni V.V. Kuybysheva. Predstavlena kafedroy teoreticheskoy i obshchey elektrotekhniki.

MANUSADZHYANTS, Zh., inzh.; STEPANOV, L., inzh.

Reducing the contamination of atmospheric air with exhaust gases. Avt. transp. 41 no.5:19-21 My '63. (MIRA 16:10)

1. Nauchno-issledovatel'skiy institut avtomobil'nogo transporta.
(Automobile exhaust gas--Safety measures)

YAGOFAROV, E.Kh.; STEPANOV, L.A.

Granulometric characteristics of lower Carboniferous terrigenous sediments in the northeastern Tatar A.S.S.R. Izv. Kazan. fil. AN SSSR. Ser. geol. nauk no. 7:455-466 '59. (MIRA 14:4)
(Tatar A.S.S.R.—Rocks—Analysis)

STEPANOV, L.A.

Distribution of Ostracoda in the Akchaghyl marine deposits of the Volga and Kama regions. Dokl.AN SSSR 144 no.3:630-632 My '62. (MIRA 15:5)

1. Geologicheskiy institut Kazanskogo filiala AN SSSR.
Predstavleno akademikom D.V.Nalivkinym.
(Volga Valley--Crustacea, Fossil) (Kama Valley--Crustacea, Fossil)

STEPANOV, L.A.

Correlation of Pliocene sediments in the northeastern part of the trans-Volga part of Saratov Province. Dokl. AN SSSR 150 no.1: 155-157 My '63. (MIRA 16:6)

1. Geologicheskiy institut Kazanskogo filiala AN SSSR. Predstavleno akademikom D.V.Nalivkinym.
(Saratov Province--Geology, Stratigraphic)

YANKO, P.I., inzh.; STEPANOV, L.A., inzh.; BOYKO, A.P., inzh.

Washing of regenerative air heaters of boilers operating on sulfur containing mazut. Energetik 12 no.3:12-13 Mr '64. (MIRA 17:4)

L 9582-66 EWT(l)/EWT(m)/ETC/EPF(n)-2/EWG(m)/T/EWP(t)/EWP(b) IJP(c) JD/WW/
ACC NR: AP6000564 JG/AT SOURCE CODE: UR/0109/65/010/012/2200/2204

AUTHOR: Dyubua, B. Ch.; Stepanov, L. A.

ORG: none

TITLE: Thermionic emission of some metal-like compounds in barium vapor

SOURCE: Radiotekhnika i elektronika, v. 10, no. 12, 1965, 2200-2204

TOPIC TAGS: thermionic emission, electron tube cathode, barium, metal compound

ABSTRACT: Results are reported of an experimental investigation of thermionic emission and adsorption, in a barium flow, of the following metals and their compounds: Ti, Zr, Mo, C, $TiSi_2$, $ZrSi_2$, $MoSi_2$, TiC, ZrC, Mo_2C, TiB_2, ZrB_2, Mo_2B_5. A special 6-cathode, Mo-anode, 10^{-7}-torr electron tube was used for testing the above materials; the anode had ports through which Ba, supplied by a special source, flowed to the cathodes. Curves of emission-current density vs. temperature are presented. It was found that the carbides, borides, and silicides of the above metals have a lower emission than Mo but higher than Ti and Zr. Although carbides have a higher melt point than borides, the latter are more chemically stable. Carbides (melt point 3140—3530C), borides (2980—3040C), and silicides (1540—1700C) have low emission in the Ba flow and, therefore, can be recommended as anti-emission coatings. "The authors wish to thank G. V. Samsonov for his interest in the work and practical help." Orig. art. has: 4 figures.

[03]

Card 1/2

UDC: 537.583:546.431

L 9582-66
ACC NR: AP6000564 O.

SUB CODE: 20,11/ SUBM DATE: 05Aug64/ ORIG REF: 009/ OTH REF: 006/ ATD PRESS: 4162

Card 2/2

LIKHACHEV, V.G.; STEPANOV, L.A.

Third session of the Conference of Ministers of the Railroad Cooperation Organization. Zhel.dor.transp. 40 no.11:88-91 N '58. (MIRA 11:12)

(Railroads)

AKIMOV, M.I.; VOLKOV, S.P.; KONOVALOVA, N.A.; OSINOVSKAYA, R.I.; PLISKO, Yu.Yu.; SEVEROV, M.N.; STEPANOV, L.A.; SHCHUKIN, V.Ya.; VORONICHEV, M.P., red.; TSARENKO, A.P., red.; VERINA, G.P., tekhn.red.

[International railroad transportation] Mezhdunarodnye zheleznodorozhnye soobshcheniia. Pod red. M.P.Voronicheva. Moskva, Gos. transp.zhel-dor.izd-vo, 1959. 242 p. (MIRA 13:2)
(Railroads)

LIKHACHEV, V.G.; STEPANOV, L.A.

Fourth session of the Conference of Ministers of the Railroads Cooperation Organization. Zhel.dor.transp. 41 no.8: 87-89 Ag '59. (MIRA 12:12)
(Railroads--International cooperation)

KRUK, M.I., inzh.; YANKO, I.I., inzh.; STRYANOV, L.S., inzh.

Special features in starting and operating the TGM-84 boiler on sulfur bearing mazut. Elek. sta. 35 no.5:2-7 My '64. (MIRA 17:8)

STEPANOV, L.G.

Problems in preparation and increase of qualifications of gynecological and obstetric personnel. Akush. gin., Moskva no.5:8-14 Sept-Oct 1952. (CLML 23:2)

1. Director of the Institute of Obstetrics and Gynecology of the Ministry of Public Health USSR.

STEPANOV, L

Ocherki Akusherskoy Patohogii I Operativnoye Akusherstvo (Outline of Obsterical Pathology and Operative Obsterics) Pod Red. L.G. Stepanov. Moskva, Medgiz, 1953.
589 p. Illus., Diagrs.
Bibliographies Throughout.

STEPANOV, L.G.

DYATLOV, S.A.; STEPANOV, L.G., direktor; BELOSHAPKO, P.A., professor, nauchnyy rukovoditel'.

Sucking capacity of the newborn and an apparatus for its determination. Pediatriia no.2:33-36 Mr-Ap '53. (MLRA 6:5)

1. Nauchno-issledovatel'skiy institut akusherstva i ginekologii Ministerstva zdravookhraneniya SSSR. (Infants (Newborn))

STEPANOV, L.G.

KALGANOVA, R.I., kandidat meditsinskikh nauk; STEPANOV, L.G., direktor.

Clinical considerations on the narrow pelvis. Akush. i gin. no.3:33-37 My-Je '53. (MLRA 6:7)

1. Institut akusherstva i ginekologii Ministerstva zdravookhraneniya SSSR.
(Pelvis--Abnormities and deformities)

STEPANOV, L.G.

TOLMACHEVSKAYA, O.A.; STEPANOV, L.G., direktor.

Treatment of cracked nipples with penicillin aerosols. Akush. i gin. no.3: 42-45 My-Je '53. (MLRA 6:7)

1. Institut akusherstva i ginekologii Ministerstva zdravookhraneniya SSSR. (Breast) (Penicillin)

STEPANOV, L.G.

BULYGINA, Ye.A., kandidat meditsinskikh nauk; GUREVICH, I.B., kandidat meditsinskikh nauk; STEPANOV, L.G., direktor.

Analysis of the work of joint institutions in 1950-51. Akush. i gin. no.3: 57-63 My-Je '53. (MLRA 6:7)

1. Institut akusherstva i ginekologii Ministerstva zdravookhraneniya SSSR. (Hospitals)

STEPANOV, L.G.

POBEDINSKIY, M.N., professor; STEPANOV, L.G., kandidat meditsinskikh nauk [authors]; POKROVSKIY, V.A., professor [reviewer].

"Hygiene for women." M.N.Pobedinskii, L.G.Stepanov. Reviewed by V.A. Pokrovskii. Akush. i gin. no.3:90-91 My-Je '53. (MLRA 6:7)
(Women--Health and hygiene) (Pobedinskii, M.N.) (Stepanov, L.G.)

PERSYANINOV, L.S., professor

"Outlines of obstetric pathology and surgery; handbook for physicians." K.N.Zhmakin, L.G.Stepanov, ed. Reviewed by L.S.Persianinov. Akush. i gin. no.5:92-94 S-O '54. (MLRA 7:12)
(PREGNANCY, COMPLICATIONS OF)
(OBSTETRICS--SURGERY)

STEPANOV, L.G.; GRANT, N.Ye.

"Rural feldsher-midwife station." G.F.Konstantinov, I.IA.Bychkov. Reviewed by L.G.Stepanov, N.E.Granat. Akush. i gin. no.6:87-89 N-D '54. (MLRA 8:2)
(MEDICINE, RURAL) (MIDWIVES) (KONSTANTINOV, G.F.)

STEPANOV, L.G.

Work of midwives in rural areas. Akush.i gin. no.2:9-15 Mr-Ap '55. (MLRA 8:7)
(RURAL CONDITIONS,
midwifery in Russia)
(MIDWIVES,
rural, in Russia)

STEPANOV, L.G. (Moskva)

The work of midwives in a village. Fel'd. i akush. no.3:3-8 Mr '55. (MLRA 8:5)
(MIDWIVES,
in Russia, in rural area)
(RURAL CONDITIONS,
in Russia, work of midwives)

GRANAT, N.Ye.; STEPANOV, L.G., (Moskva)

Work of a rural midwife. E. Klenitskaia, L. Mel'nikova. Reviewed by N.E.Granat, L.G. Stepanov. Fel'd. i akush. no.8:57-60 Ag '55. (MIDWIVES) (KLENITSKAIA, E.) (MLRA 8:10)

STEPANOV, L.G.

Toxoplasmosis in obstetrics. Akush. i gin. 32 no.1:64-66 Ja-F '56
(MLRA 9:6)

(PREGNANCY, compl.
toxoplasmosis, diag.)
(TOXOPLASMOSIS, in pregn.
diag.)

KAPLAN, Abram L'vovich, red.; STEPANOV, L.G., red.

[Obstetric hospital clinic; a manual for physicians and students] Akusherskaia gospital'naia klinika; posobie dlia vrachei i studentov. Moskva, Medgiz, 1959. 501 p. (MIRA 13:6)
(OBSTETRICS)

STEPANOV, L.G. (Moskva)

Organizational aspects of the problem of contraception. Akush. i gin. 35 no.6:6-8 N-D '59. (MIRA 13:4)

1. Iz Instituta akusherstva i ginekologii Ministerstva zdravookhraneniya RSFSR.
(CONTRACEPTION)

STEPANOV, L.G., dots. (Moskva)

Trichomoniasis in obstetrics and gynecology. Akush. i gin. 33 no.5:107-110 S-O '57. (MIRA 12:5)
(TRICHOMONIASIS, prev. and control)
(VAGINITIS, TRICHOMONAS, prev. and control)

BARTEL'S, A.V.; GRANAT, N.Ye.; NOGINA, O.P.; SALGANNIK, G.M. [deceased]; SMIRNOV, G.I.; STEPANOV, L.G.; KHANOVA, T.M., red.; YANKELEVICH, Ye.I., red.; GABERLAND, M.I., tekhn.red.

[Lecture course for pregnant women] Kurs lektsii dlia beremennykh zhenshchin. Pod red. L.G.Stepanova. Izd.3. Moskva, Medgiz, 1959. 231 p. (MIRA 12:8)

1. Nauchno-issledovatel'skiy institut akusherstva i ginekologii Ministerstva zdravookhraneniya RSFSR (for all except Khanova, Yankelevich, Gaberland). 2. Direktor Nauchno-issledovatel'skogo instituta akusherstva i ginekologii Ministerstva zdravookhraneniya RSFSR (for Stepanov).
(PRENATAL CARE)

STEPANOV, Leonid Grigor'yevich; SOKOL'SKAYA, E.V., red.; LYUDKOVSKAYA, N.I., tekhn. red.

[Guard a woman's health; contraceptive methods] Beregite zdorov'e zhenshchiny; o sredstvakh preduprezhdaiushchikh beremennost'. Moskva, Gos. izd-vo med. lit-ry Medgiz, 1960. 9 p. (MIRA 14:9)
(CONCEPTION—PREVENTION)

STEPANOV, L.G., red.; KAKUSHKINA, Ye.A., red.; ALEKSANDROV, N.I., red.; RAFAL'KES, S.B., red.; ZUYEVA, N.K., tekhn.red.

[Hormonal research in gynecology; collection of works of the Endocrinology Laboratory at the Research Institute for Midwifery and Gynecology of the Ministry of Public Health of the R.S.F.S.R.] Gormonal'nye issledovaniia v ginekologii; sbornik rabot laboratorii endokrinologii Nauchno-issledovatel'skogo instituta akusherstva i ginekologii Ministerstva zdravookhraneniia RSFSR. Moskva, Gos. izd-vo med.lit-ry Medgiz, 1960. 201 p. (MIRA 14:7)
(GYNECOLOGICAL RESEARCH) (HORMONES, SEX)

BULAVINTSEVA, A.I., kand. med. nauk; KAZANSKAYA, N.I., kand.med. nauk; KASHINSKIY, A.V., kand. med. nauk; LIPMANOVICH, S.G., kand. med. nauk; MARBUT, Ye.I., kand. med. nauk; POKROVSKIY, V.A., zasluzhennyy deyatel' nauki RSFSR, prof.; ROMANOVSKIY, R.M., kand. med. nauk; TUMANOVA, Ye.S., prof.; YAKOVLEV, I.I., zasluzhennyy deyatel' nauki RSFSR, prof.; LANKOVITS, A.V., prof., nauchnyy red.; PERSIANINOV, L.S., prof., otv. red.; BEKKER, S.M., prof., red.; BELOSHAPKO, P.A., prof., red. [deceased]; ZHMAKIN, K.N., prof., red.; ZHORDANIA, I.F., prof., red.; LEBEDEV, A.A., prof., red.; MANENKOV, P.V., prof., red.; STEPANOV, L.G., kand. med. nauk, red.; SYROVATKO, F.A., prof., red.; FIGURNOV, K.M., prof., red.; PORAY-KOSHITS, K.V., red.; LANKOVITS, A.V., red.; SENCHILO, K.K., tekhn. red.

[Multivolume manual on obstetrics and gynecology] Mnogotomnoe rukovodstvo po akusherstvu i ginekologii. Moskva, Gos.izd-vo med. lit-ry. Vol.6. 1961. 679 p. (MIRA 15:4)

1. Chlen-korrespondent Akademii meditsinskikh nauk SSSR (for Persianinov, Beloshapko, Figurnov).
(OBSTETRICS--SURGERY) (GYNECOLOGY, OPERATIVE)

STEPANOV, L.G.

Toxoplasmosis and its significance in medical practice. Kaz. med. zhur. no. 2:89-91 Mr-Ap '61. (MIRA 14:4)

1. Institut akusherstva i ginekologii Ministerstva zdravookhraneniya RSFSR (direktor - prof. O.V. Makeyeva).
(TOXOPLASMOSIS)

STEPANOV, L.G., dotsent

Organizational problems in pediatric gynecology. Akush.i gin. 37 no.1:23-25 '61. (MIRA 14:6)

1. Iz Nauchno-issledovatel'skogo instituta kusherstva i ginekologii (dir. - prof. O.V. Makeyeva) Ministerstva zdravookhraneniya RSFSR.

(GYNECOLOGY) (PEDIATRICS)

STEPANOV, L.L.; KSENOFONTOV, A.N.

Removing chips by pin conveyers. Stan.i instr. 29 no.6:38-39 Je '58. (MIRA 11:7)
(Conveying machinery)

STEPANOV, L.M., kand.tekhn.nauk

Big fires and factors determining their spreading. Inform.zbor. TSNIIPO no.3:29-33 '59. (MIRA 14:3)
(Fire prevention--Research)

[illegible], L. I.

Dissertation: "Behavior of Construction Materials and Structures Under Conditions of High Temperatures." Cand Tech Sci, Moscow Order of Labor Red Banner Engineering Construction Inst imeni V. V. Kuybyshev, 8 Jun 54. Vechernyaya Moskva, Moscow, 28 May 54.

SO: JUM 284, 26 Nov 1954

STEPANOV, L.N.

Machine tool for grinding shaped drawplates. Biul.TSNIICHM no.17:47 (325) '57. (MIRA 11:4)

1.Leningradskiy staleprokatnyy i provolochno-kanatnyy zavod.
(Grinding machines)

STEPANOV, L. N.

"The Action of Drainage on Frozen Soils." Cand Tech Sci, Northern Sci-Res Inst of Hydraulic Engineering and Soil Improvement, Leningrad, 1953. (RZhBiol, No 2, Sep 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (10)

So: Sum. No. 481, 5 May 55

IOFFE, A.F., akademik, redaktor; SAMPYLOV, I.I., akademik redaktor; VERSHININ, P.V., redaktor; KOLYASEV, F.Ye., redaktor; CHUDNOVSKIY, A.F., redaktor; REVUT, I.B., redaktor; STEPANOV, L.N., redaktor

[Problems in agricultural physics] Voprosy agronomicheskoi fiziki. Pod obshchei red. A.F.Ioffe i I.I.Samoilova. Red. kollegiia P.V.Vershinin i dr. Leningrad, 1957. 327 p. (MLRA 10:6)

1. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk imeni V.I.Lenina.
(Agricultural physics)

REVUT, I.B.; STEPANOV, L.N.

Meeting on coordination and research methods in soil physics.
Zemledelie 6 no.9:91-93 S '58. (MIRA 11:9)
(Soil physics--Congresses)

STEPANOV, L.N., kand.tekhn.nauk

Academician Abram Fedorovich Ioffe. Zemledelie 8 no.10:76-78 O '60. (MIRA 13:10)

(Ioffe, Abram Fedorovich, 1880-)

STEPANOV, L.N., kand. tekhn. nauk (Leningrad)

Agrophysics of our days. Priroda 51 [i.e. 52] no.5:68-72 '63. (MIRA 16:6)

(Agricultural physics)

NERPIN, S.V., red.; MEL'NIKOVA, M.K., red., CHUDNOVSKIY, A.F., red.; REVUT, I.B., red.; STEPANOV, L.N., red.; POYASOV, N.P., red.

[Collection of papers on study methods in the field of soil physics] Sbornik rabot po metodike issledovanii v oblasti fiziki pochv. Leningrad, Agrofizicheskii nauchno-issl. in-t, 1964. 320 p. (MIRA 17:12)

1. Soveshchaniye po koordinatsii i metodike nauchno-issledovatel'skikh rabot v oblasti fiziki pochv, Leningrad. 2. Agrofizicheskiy nauchno-issledovatel'skiy institut, Leningrad (for all except Nerpin).

ACC NR: AP6012254 (A) SOURCE CODE: UR/0349/65/000/012/0079/0081

AUTHOR: Stepanov, L. N. (Candidate of technical sciences)

ORG: none

TITLE: Cybernetics in plant growth

SOURCE: Zemledeliye, no. 12, 1965, 79-81

TOPIC TAGS: plant growth, cybernetics, biologic conference, biologic personnel

ABSTRACT: Cybernetics applied to plant growth is directed toward creating optimal growth conditions based on most effective use of land and resources and creating optimal environmental conditions. Results of initial studies on the application of cybernetics to plant growth were reported at an All Union Conference held at the Agrophysical Scientific Research Institute in Leningrad (date not given). Thirty-seven papers were presented on the following four basic subjects: 1) general approach to the solution of problems and to the principles of applying cybernetics to plant growth; 2) methods of obtaining data on plant conditions; 3) electrophysiological problems of plants related to processes of plant excitability and autonomic processes; and, 4) mathematical models in the study of plant physiological processes. Title of the papers and authors and a few brief comments are given. Orig. art. has: none.

SUB CODE: 06, 02/ SUBM DATE: none

UDC: 519.95:631.5

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STEPANOV, L.O.

New regulating valve. Neftianik 6 no.3:22 Mr '61. (MIRA 14:10)

1. Krasnokamskiy neftepererabatyuvayushchiy zavod.
(Cracking process)

STEPANOV, L.O.

Off-center device for repairing, checking, and distributing manometers. Neftianik 6 no.7:23-24 Jl '61. (MIRA 14:7)

1. TSekh normativno-izmeritel'nykh priborov Krasnokamskogo neftepererabatyvayushchego zavoda.
(Manometer)

STEPANOV, L.P., inzh.

Determining the technological parameters of vibrating grizzlies.
Trudy VNIIStroidormash. 32:32-50 '63. (MIRA 17:6)

ZHUKOV, V.I.; STEPANOV, L.P.; CHASOVNIKOV, A.A.

Automatic measuring tank designed by the All-Union Scientific Research Institute of Metrology. Trudy VNIIM no.19:76-83 '52. (MLRA 11:6)
(Flowmeters)

STEPANOV, L.P.

Micromanometer with end length-gauge. Trudy VNIIM no.22:108-112 '54. (MIRA 10:12)

(Manometer)