SOURCE CODE: UR/0000/65/000/000/0115/0130 ACC NRI AT6020442

AUTHOR: Tsytovich, V. N.; Shapiro, V. D.

ORG: none

TITLE: Nonlinear stabilization of plasma beam instabilities

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 115-130

TOPIC TAGS: plasma beam interaction, plasma instability, nonlinear plasma, plasmon

ABSTRACT: The study of plasma and interacting beam parameters shows that the stabilization of beams by nonlinear means is possible. The mechanism investigated in this connection is the pumping of excited oscillations into a nonresonant spectral region. It is assumed that the characteristic time of pumping is shorter than the instability development time, thus keeping the energy of the waves low. The spectral density time behavior is obtained by deriving the cross section for dispersion of Langmuir waves on the plasma particles. This is done both by use of the theory of growing amplitude excitations as well as by the quantum-mechanical approach (plasmons). The effects of nonlinearities are obtained from the dynamics of beam instabilities. It is shown that the beam can be accelerated by the excitation of internal electric fields. The analy-

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ACC NR. AP6030921 SOURCE CODE: UR/0207/66/000/004/0048/0055	
AUTHOR: Tsytovich, V. N. (Moscow); Shapiro, V. D. (Khar'kov)	
ORG: none	
TITLE: Nonlinear theory for the passage of pulses of electromagnetic waves	
through a plasma boundary	
SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 4, 1966, 48-55	
TOPIC TAGS: wave pulse, electromagnetic wave, transverse wave, longitudinal wave, plasma, plasma boundary, boundary effect	***
ABSTRACT: The role of boundary effects is investigated for the passage of pulses of electromagnetic waves through a plasma boundary. Cases of narrow and wide spectra are analyzed. Stochastic phases of transverse waves and generated	***
longitudinal waves are assumed. The boundary effects may be used to generate	
longitudinal waves needed for the effective acceleration of particles in the plasma	-
as well as for the modulation and changing of the spectrum of initial transverse waves. The application of boundary effects in diagnostics of turbulent plasma is	
pointed out. The authors thank Ya. B. Faynberg, M. S. Rabinovich, I. S. Danilkin,	
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ACC NR: AP6022072

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No. 12 or Conference of the State of the State of State o

AUTHOR: Liperovskiy, V. A.; Tsytovich, V. N.

ORG: Institute of Physics im. P. N. Lebedev, AN SSSR (Fizicheskiy institut AN SSSR)

TITLE: Nonlinear interaction of waves in plasma in the presence of strong transverse

waves

SOURCE: IVUZ. Radiofizika, v. 9, no. 3, 1966, 469-478

TOPIC TAGS: plasma wave, plasmon, plasma research

ABSTRACT: The effects are considered of the induced dispersion of longitudinal waves in plasma, in the presence of strong transverse waves. It is proven that the spectrum of longitudinal waves shifts toward higher wave numbers k (lower  $v_r^1$ ) also. in the

case of transverse waves in a homogeneous isotropic plasma. It is found that, in the process of 4-plasmon interaction, strong compensating effects (similar to those occurring in wave dispersion by particles) are possible. The interaction of Langmuir-type waves is used as an illustrating example. Orig. art. has: 2 figures and 52 formulas.

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UDC: 533.951

ACC NR. AP6037069

SOURCE: CODE: UR/0056/66/051/005/1385/1388

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AUTHOR: Tsytovich, V. N.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Monlinear instability of optical frequencies in a partially ionized plasma

SOURCE: Zhurnal eksperimental'noy i teoraticheskoy fiziki, v. 51, no. 5, 1966, 1385-1388

TOPIC TAGS: nonlinear optics, plasma oscillation, astrophysics

ABSTRACT: A theoretical study was made of the nonlinear interaction of plasma beams and optical beams, whose frequencies are near the frequency (w<sub>12</sub>) of transition between inversely populated levels. Only the initial stage of development of a nonlinear instability was considered, and an invariant level population was assumed. It is indicted that rapidly excited plasma oscillations can provide a mechanism for the luminescence of the system, which then leads to an increase in the generation power. Such an increase for a powerful pulsed pinch discharge in a plasma was observed experimentally by S. G. Kulagin et al. (ZhETF, PvR, v. 3, no. 1, 1966, 12). The generation of frequencies differing from w<sub>12</sub> by the plasma frequency was observed experimentally by N. G. Basov and O. V. Bogdankevich (DAN SSSR, 168, 1966, 6) in an electron-beam-pumped semiconductor plasma. The anomalously

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ACC NR: AT6033041

SOURCE CODE: UR/2504/66/032/000/0112/0129

AUTHOR: Danilkin, I. S.; Kovrizhnykh, L. M.; Rayzer, M. D.; Tsytovich, V. N.

ORG: none

TITIE: Nonlinear effect in a plasma without collisions and possible prospects for their use

SOURCE: AN SSSR. Fizicheskiy institut. Trudy, v. 32, 1966. Fizika plazmy (Plasma physics), 112-129

TOPIC TAGS: nonlinear effect, plasma dynamics, plasma electromagnetic wave

ABSTRACT: The present article is of the review type (35 literature references) and the authors state that it is primarily based on the theoretical results of a series of previously published articles. After an extended mathematical introduction, the authors consider the subject of the induced dissipation of transverse waves and their transformation into longitudinal waves. The next two subsections deal with processes of disintegration and merging of waves in a plasma, and processes of three-plasma dissipation. The next main heading is the nonlinear transformation of transverse electromagnetic waves into longitudinal plasma waves. Following this is a treatment of the acceleration of clusters in a plasma using electromagnetic waves. The final section of the article concerns the possibility of the generation of transverse

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SOURCE CODE: UR/2504/66/032/000/0130/0164

AUTHOR: Tsytovich, V. N.

ORG: none

TITIE: Statistical acceleration of particles in a plasma

SOURCE: AN SSSR. Fizicheskiy institut. Trudy, v. 32, 1966. Fizika plazmy (Flasma

physics), 130-164

TOPIC TAGS: particle acceleration, plasma flow, statistic analysis

ABSTRACT: This is a long article of the review type (34 pages, 111 literature references). It starts with a mathematical treatment of the problem of the statistical change of state of the particles in a plasma. Next is a treatment based on Cherenkov acceleration, followed by a consideration of acceleration by means of longitudinal oscillations of the plasma. A long section is devoted to nonlinear effects and the limits of application of induced acceleration. The next main heading is the statistical characteristics of the accelerated particles. A highly is the statistical characteristics of the accelerated particles. A highly is the attention in a weakly turbulent neutrons. The author next treats the mechanism of acceleration in a weakly turbulent plasma placed in external electric and magnetic fields. The article concludes with a discussion of the application of the method to the heating and acceleration of

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particles under laboratory conditions, and in astrophysics. "The author expresses his deep indebtedness to Ya. B. Faynberg and V. D. Snapiro for discussion of the experimental work on acceleration of particles in a plasma; to V. L. Ginzburg, S. I. Syrovatskiy, S. B. Pikel'ner, I. S. Shklovskiy, and N. S. Kardashev for discussion of strophysical applications. The author is sincerely grateful to V. I. Veksler, M. S. Rabinovich, and R. Z. Sardeyev for stimulating discussions of pertinent questions." Orig. art. has: 106 formulas and 6 figures.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 108/ OTH REF: 015

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ACC NRI AT6033043

SOURCE CODE: UR/2504/66/032/000/0165/0172

AUTHOR: Danilkin, I. S.; Rayzer, M. D.; Tsytovich, V. N.

ORG: none

TITIE: Acceleration of particles with interaction between high frequency fields and a plasma

SOURCE: AN SSSR. Fizicheskiy institut. Trudy, v. 32, 1966. Fizika plazmy (Plasma physics), 165-172

TOPIC TAGS: particle acceleration, plasma magnetic field, traveling wave interaction

ABSTRACT: The present article analyzes several mechanisms for the acceleration of the individual particles of a plasma acted upon by a high frequency field. It considers the conditions under which data can be taken on the mechanism of acceleration, and offers an evaluation of the mean values of the energy which can be collected by the ions and the electrons. The article starts with a mathematical development of the problem of acceleration brought about by waves with a fixed phase in a weak high frequency field, and then goes on to a consideration of the same problem with waves of random phase in weak high frequency fields. It concludes with the derivation of mathematical expressions for the acceleration of particles in a strong high frequency field. "In conclusion the authors thank M. S. Rabinovich for discussion of the problem." Orig. art. has: 25 formulas.

SUB CODE: 20/ SUEM DATE: none/ ORIG REF: 012/ OTH REF: 002

L 08807-67 EWT(1) IJP(c) AT/GD SOURCE CODE: UR/0000/65/000/000/0111/0115

AUTHOR: Tsytovich, V. H.; Shapiro, V. D.

58

ORG: none

TITLE: The interaction of an electron beam with an optically active medium

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 111-115

TOPIC TAGS: electron beam, plasma resonance, plasma interaction, plasma density

ABSTRACT: The generation of oscillations in the visible and UV ranges is considered theoretically in the interacting system of a beam and an optically active plasma. The electron beam is of smaller density than the plasma and has a large thermal component. The plasma frequency is much smaller than that of the most rapidly growing harmonic, which is about equal to the characteristic frequency of the plasma. The spectrum of oscillations excited in the plasma is obtained from the quasilinear theory. At resonance, nearly all the energy of the beam goes into the kinetic energy of oscillators (i. e., atoms or ions of the plasma) exceeding the collisional transfer of energy to a large degree. A numerical example is given to show that very strong generation of large degree. A numerical example is given to show that a beam with a density of 10<sup>14</sup> cm and a particle velocity of 3·10<sup>19</sup> cm/sec injected into a plasma with a density of 10<sup>19</sup> and a particle velocity of 3·10<sup>19</sup> cm/sec injected into a plasma with a density of 10<sup>19</sup>

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AUTHOR: Tsytovich, V.N.; Shvartsburg, A.B.

ORG: Physics Institute im. P.N.Lebedev, Moscow (Pizicheskiy institut im. P.N. Lebedova)

TITLE: Nonlinear interaction of waves in a plasma in a strong external magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 11, 1966, 1915-1942

TOPIC TAGS: nonlinear plasma, turbulent plasma, magnetoactive plasma, plasma

ABSTRACT: The scope of this 27 page treatise on nonlinear interactions of waves in magnetized plasmas is indicated by the following section and subsection headings:

1) Nonlinear interaction; 2) Nonlinear scattering; 3) Induced scattering of high frequency waves on ions, a) Scattering through virtual plasma waves of plasma waves and extraordinary waves at the zeroth harmonic;
4) Scattering through plasma waves at the first harmonics; 5) Induced nonlinear. scattering of waves on ions through virtual quasitransverse waves; 6) Induced scattering of low frequency plasma waves on ions; 7) Induced scattering of high frequency waves on electrons; 8) Decay processes, a) Decay of plasma waves into low frequency waves, b) Decay of plasma waves into transverse waves and vice versa, d) Decay of transverse waves into transverse waves are based on a modification for the case of weakly damped waves in a magnetized plasma under conditions of weak Card 1/2

#### ACC NRI AP6036026

space dispersion of the general method developed in a series of papers by A. Gaylitis and V.N.Tsytovich (ZhETF, 46, 1726,1964; 47,1468,1964) and by the present authors (ZhETF, 49,795,1965). Three types of waves are discussed: plasma waves, ordinary waves, and extraordinary waves. Under certain conditions the cross section for scattering on ions can exceed that for scattering on electrons. The interaction of waves propagating nearly perpendicularly to the magnetic field can somewhat exceed that of waves propagating parallel to the field. Nonlinear scattering involving wirtual waves of different types is discussed and it is shown that induced scattering at the first harmonics of the ion Larmor frequency can exceed that at the zeroth harmonic. The possibility of nonlinear amplification of plasma oscillations at frequencies near the electron cyclotron resonance is discussed. Scattering on ions through virtual quasitransverse waves can exceed that through quasilongitudinal waves; the conditions that this be the case are found, and the induced nonlinear scattering on ions of low frequency plasma waves is discussed. The scattering of waves on the plasma electrons is also discussed. Probabilities are given for a number of decay processes, and equations are presented in an appendix with which probabilities of other decay processes can be calculated. Orig. art. has: 133 formulas, and 5 figures.

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ACC NR: AP6033428

SOURCE CODE: UR/0057/66/036/010/1896/1900

AUTHOR: Tsytovich, Y. N.; Shvartsburg, A.B.

ORG: none

TITLE: On the theory of the excitation and propagation of electromagnetic waves in a weakly turbulent plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.36, no. 10, 1966, 1896-1900

TOPIC TAGS: turbulent plasma, plasma diagnostics, plasma stability, double refraction, hydrodynamic theory, perturbation method

ABSTRACT: The authors employ the hydrodynamic equations for the plasma electrons to discuss high frequency perturbations of a weakly turbulent cold plasma. An expression containing terms up to the third degree in the electric field strength is obtained for the current in the plasma. It is assumed that the random electric field due to the turbulence is large compared with the perturbation field, and only terms linear in the latter are retained. A formula is given for the dielectric tensor of a plasma containing both longitudinal and transverse turbulence. The imaginary parts of the dielectric tensor lead to the known decay instabilities. The expression obtained for the increment for quasilongitudinal waves in the presence of transverse turbulence agrees with that obtained in the random phase approximation by V.A.Liperovskiy and V.N.Tsytovich (Preprint FIAN, A-120, 1965) but is valid beyond the limits of appli-

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cability of that approximation. New types of instabilities are found, which cannot be described in the random phase approximation. Conditions for the appearance of these instabilities in a plasma containing anisotropic longitudinal or transverse turbulence are found and expressions for their increments are derived. The double refraction of high frequency waves in a plasma containing anisotropic longitudinal turbulence is discussed. The double refraction in a turbulent plasma may prove useful in plasma diagnostics. Orig. art. has: 24 formulas.

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SOURCE CODE: UR/0053/66/090/003/0435/0489

AUTHOR: Tsytovich, V. N.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR (Fizicheskiy institut AN SSSR)

TITLE: Nonlinear effects in a plasma

SOURCE: Uspekhi fizicheskikh nauk, v. 90, no. 3, 1966, 435-489

TOPIC TAGS: plasma interaction, plasma wave, nonlinear plasma, ionized plasma, plasma decay, plasma oscillation

ABSTRACT: This is a review article with emphasis on the nonlinear interaction between waves having random phases in a plasma. The nonlinearity is assumed weak, and the energy of the interacting waves is assumed to be much larger than the energy of the equilibrium fluctuations in the plasma. The sections headings are as follows: Introduction (a. Object of investigation, b. Nonlinear effects and plasma physics, c. Problems in the procedure of calculating nonlinear effects). I. General theory of interaction of waves in spatially dispersive media (1. Concept of the number of waves (Connection between the spontaneous and induced processes. 2. Processes of radiation, scattering, and decay. 3. Kinetic equation for waves. 4. Nonlinear plasma current and probability of decay processes. 5. Nonlinear and Compton scattering and their interference). II. Nonlinear interaction of waves in an isotropic plasma (6. Stimu-

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EPF(n)=2/EMI(1)/ETC(f)/EMG(m)IJP(c) AT ACC NR UR/0057/66/036/004/0575/058 AP6013110 SOURCE CODE: AUTHOR: Liperovskiy, V.A.; Tsytovich, V.N. Physics Institute im. P.N.Lebedev, Moscow (Fizicheskiy institut) B TITLE: On the oscillation spectra of a weakly turbulent plasma SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 4, 1966, 575-587 TOPIC TAGS: turbulent plasma, unstable plasma, plasma oscillation, plasma stability, dispersion equation, nonlinear plasma, nonlinear theory ٠...... ABSTRACT: In an unstable plasma, there can arise a quasi-equilibrium state of weak turbulence with a self-consistent distribution of particles and waves. Such quasistationary states have been previously discussed for different types of waves (instabilities) by the authors (ZhTF, 35, 773, 1965; PMTF, No.5, 15, 1965). Here they discuss the stability of quasistationary states of different types with respect to excitation of slow plasma oscillations (which are called "second sound") and derive the spectra of the second sound waves. The calculations are based on equations given by L.M. Kovrizhnykh and V.N. Tsytovich (ZhETF, 46, 2212, 1964; 47, 1454, 1964), which describe the effects of the nonlinear interaction of the waves in the plasma and in which spontaneous effects are neglected compared with induced effects. Dispersion equations are derived for second sound in different quasistationary states and conditions for the stability of the states are given. It is shown that the quasistationary Card 1/2 UDC: 533.9

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V. N.; Shapiro, V. D. AUTHOR: Tsytovich,

44,55

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

TITLE: Nonlinear stabilization of plasma beam instabilities

SOURCE: AN UkrSSR. Fiziko-tekhnicheskiy institut. Doklady, no. 076/P030, 1964.

Nelineynaya stabilizatsiya puchkovykh neustoychivostey plazmy, 1-14

TOPIC TAGS: plasma beam, plasma wave, plasma instability

ABSTRACT: The possibility of the stabilization of beams in plasmas is discussed, especially for the case where ion temperature greatly exceeds the electron temperature. The chief mechanism responsible for limiting beam or stream instabilities is wave scattering by a large number of ions. The problem is discussed in terms of the spectral shift of the plasma waves from the resonant to nonresonant regions. If the shift occurs in a period less than or of the order of the time of growth of the waves, then stabilization occurs. This occurs in some instances without the presence of strong external noise. General stability criteria are derived from the nonlinear kinetic equations for the beams with large velocity spread. It is shown that the small velocity spread leads to a modified criterion of instability where the electron thermal velocity exceeds that of the ions. Orig. art. has: 56 formulas.

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L 9000-66 EWT(1)/ETC/EPF(n)-2/EWG(m) IJP(c) AT  SOURCE CODE: UR/0207/65/000/005/0015/0022  ACC NR. AP5027265  AUTHORS: Liperovskiy, V. A. (Moscow); Tsytovich, V. N. (Moscow)	0
ORG: none  TITLE: On the decay of longitudinal Langmuir plasma oscillations into ion-acoustic waves	
TOPIC TAGS: turbulent plasma, nonlinear theory, nonlinear processes arising as a result of	
ABSTRACT: In view of the important excited by beam instabilities, of the the high intensity of oscillations excited by beam instabilities, of the the high intensity of oscillations excited by beam instabilities, of the intensity of oscillations excited by a frequency of the paper, and in connection with a number of other in proposed turbulent neating schemes, and in connection with a high level in the present recently been carried out. This subject is further investigated in the present recently been carried out. This subject is further investigated in the present paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper. It is shown that the present problems concerning the paper, in which several one-dimensional self-consistent problems concerning the paper. It is shown that the paper of the	
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TSYTOVICH, V.N.; SHVARTSBURG, A.B.

Theory of nonlinear interaction of waves in a magnetoactive anisotropic plasma. Zhur. eksp. i teor. fiz. 49 no.3:797-806 S '65. (MIRA 18:10)

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CAYLITIS, A.; TSYTOVICE, V.M.

Theory of nonlinear interaction between transverse and longitutinal placema waves. Izv. vys. ucheb. zav.; radiofiz. 7 no.6:
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KOVRIZHNYKH, L.M.; TSYTOVICH, V.N.

Effects of the decay of transverse electromagnetic waves in

Effects of the decay of transverse electromagnetic waves in

a plasma. Zhur. eksp. i teor. fiz. 47 no.4:1454-1462 0 '64.

(MIRA 18:1)

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GAYLITIS, A.; TSYTOVICH, V.N.

Radiation due to the scattering of charged particles by electromagnetic waves in an isotropic plasma. Zhur. eksp. i teor. fiz. (MIRA 18:1) 47 no.4:1468-1482 0 '64.

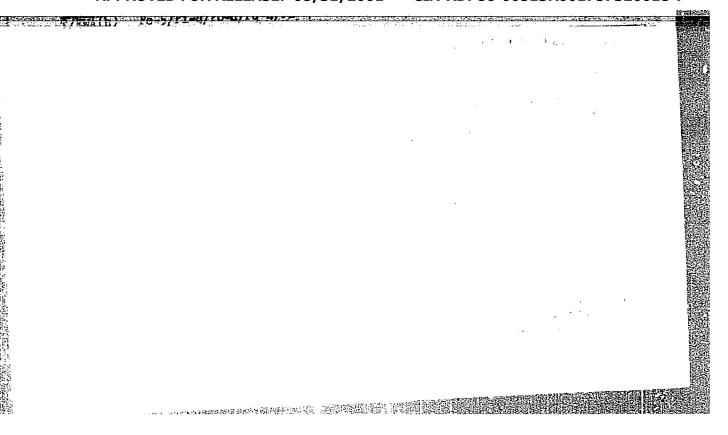
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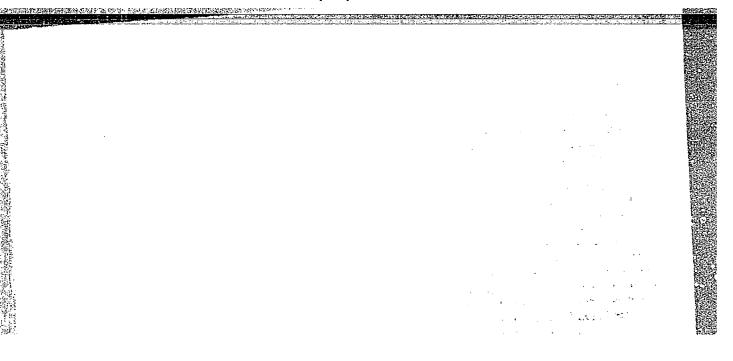
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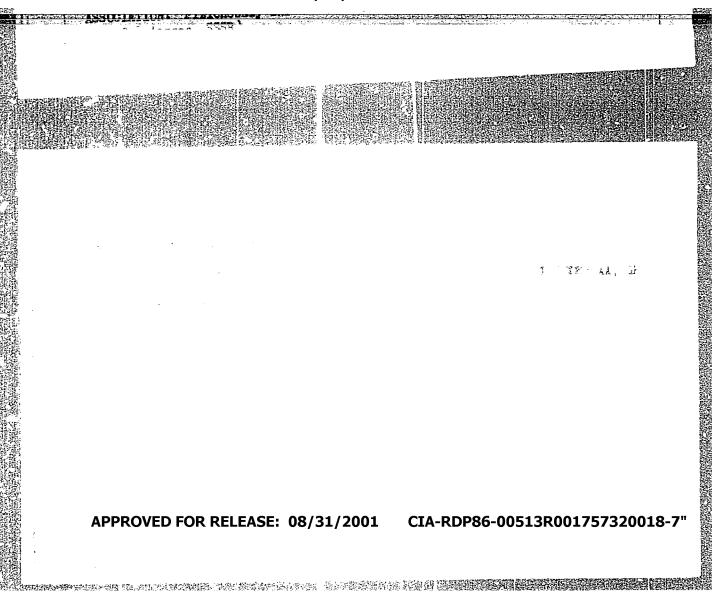
Nonlinear theory of the interaction between electron beams and transverse waves in a plasma. Zhur. tekh. fiz. 35 no.1:14-25 (MIRA 18:3) Ja 165.

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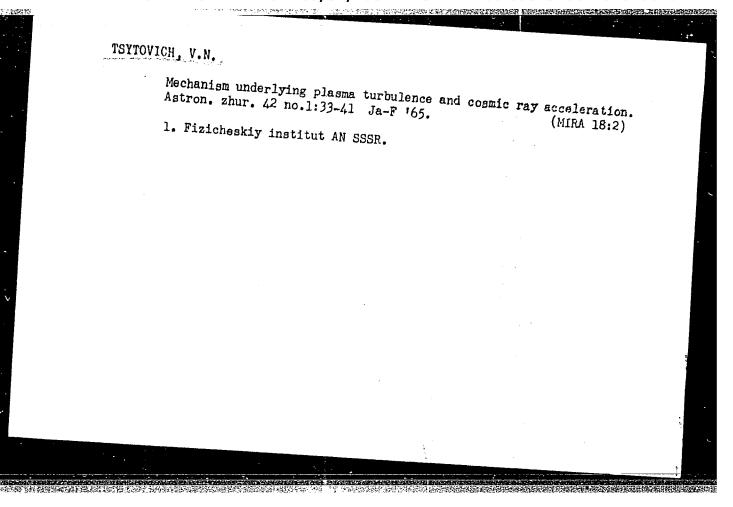


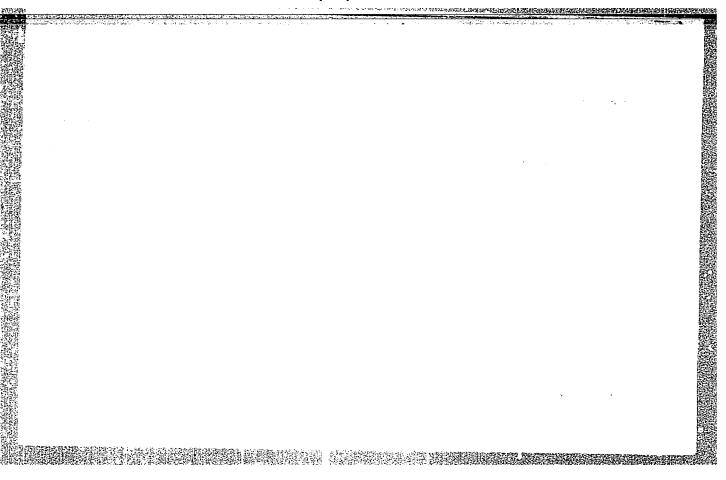


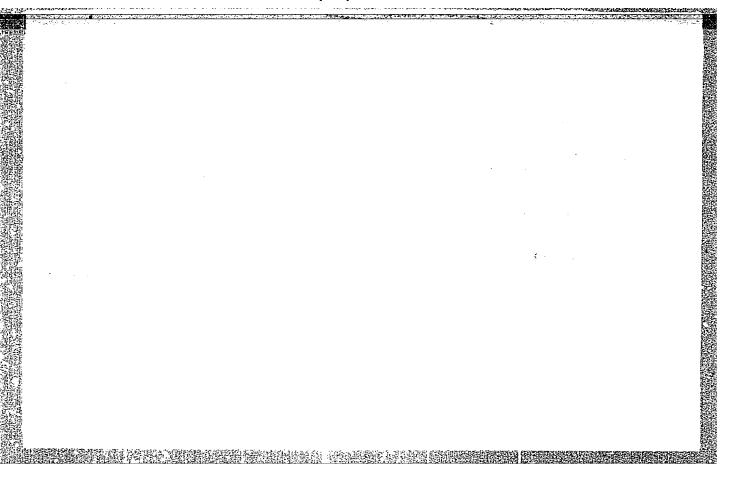
#### ISYTOVICH, V.N.

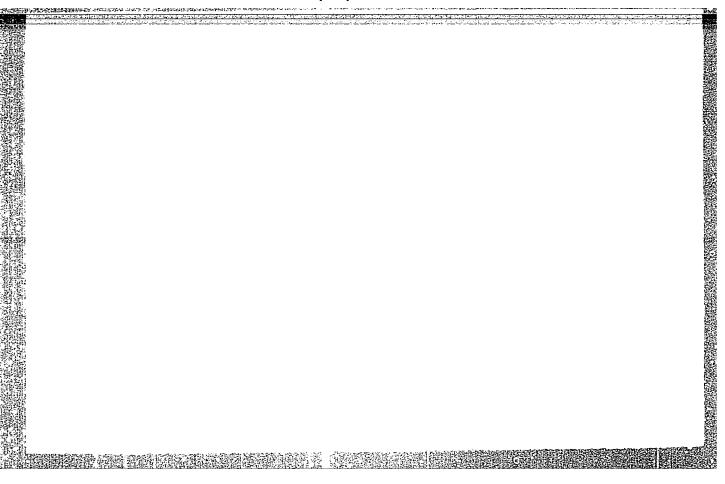
Theory of cyclotron radiation of ions in a plasma. Zhur. takh. fiz. 34 no.9:1701-1705 S 164. (MIRA 17:10)

1. Fizicheskiy institut imeni Lebedeva, Moskva.









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GAYLITIS, A.K.; TSYTOVICH, V.N.

Acceleration by radiation and the generation of fast particles under cosmic conditions. Part 3: Time measurements of the intensity of radio-emission sources. Astron. zhur. 41 no.3: 452-463 My-Je (4. (MIRA 17:6)

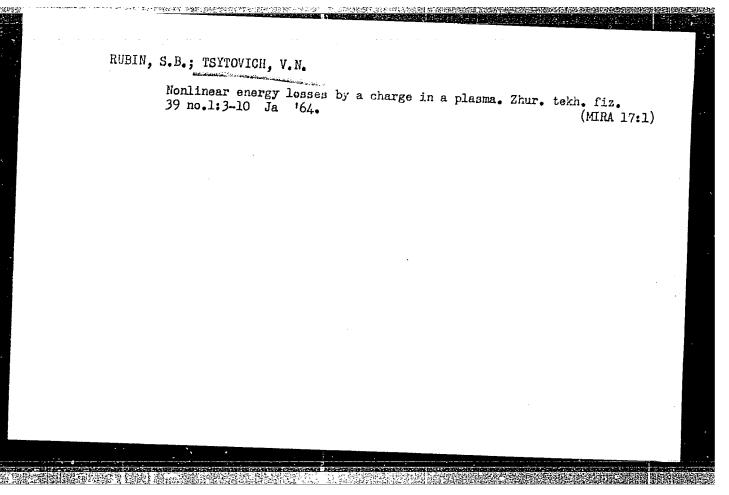
1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR.

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"

TSYTOVICH, V.N.; SHAPIRO, V.D.

Interaction between an electron beam and an optically active medium. Zhur.tekh. fiz. 34 no.4:764-767 Ap '64. (MIRA 17:4)

l. Fizicheskiy institut imeni Lebedeva, Moskva.



GAYLITIS, A.K.; TSYTOVICH, V.N.

Effect of the medium on synchrotron acceleration of relativistic particles. Izv.vys. ucheb.zav.; radiofiz. 6 no.6:1103-1114 (MIRA 17:4)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

TSYTOVICH, V.N.

Effect of radiation on relativistic particles moving in a magnetic field. Izv. vys. ucheb. zav.; radiofiz. 6 no.5:918-927 '63.

1. Fizicheskiy institut imeni Lebedeva AN SSSR. (MIRA 16:12)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"

ISYTOVICH, V.N.

Induced resonance scattering and radiation in a medium. Dokl. AN SSSR 154 no.1:76-79 Ja 64. (MIRA 17:2)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR. Predstavleno akademikom I.Ye. Tammom.

ACCESSION NR: AP4009914

\$/0057/64/034/001/0003/0010

AUTHOR: Rubin, S.B.; Tsy\*tovich, V.N.

TITLE: On the non-linear energy loss by a charge moving through a plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.1, 1964, 3-10

TOPIC TAGS: plasma, cold plasma, non-linear waves, moving charge in plasma, charge cluster

ABSTRACT: The relativistic motion of a distribution of charge (cluster of charged particles) through a cold plasma is treated in the hydrodynamic approximation. Only' the motion of the electrons is considered, the role of the ions being only to assure that the plasma as a whole is neutral. The dimensions of the moving charge distribution may be comparable with the wavelength of the waves it excites; therefore non-linear effects may be important, and these are taken into account. Only such motions are considered as do not give rise to multi-velocity flow (turbulence). The relativistic hydrodynamic equations are written in cylindrical coordinates. The moving charge distribution is transformed to rest at the origin of coordinates, and it is assumed that the azimuthal velocity remains zero. Maxwell's equations are in-

 $Card^{1/2}$ 

ACC, NR: AP4009914

troduced and two non-linear equations are derived for two velocity functions. One of these functions is the usual relativistic quantity  $(1-v^2)^{-1/2}$  and the other is essentially the stream function. The electromagnetic field strengths are expressed in terms of these velocity functions. The non-linear equations for the plasma velocity are linearized by assuming the dependent variables to differe only slightly from their undisturbed values. The linearized equations are solved and an expression is obtained for the rate of energy loss by the moving charge. The rate of energy loss is proportional to the square of the total charge, in agreement with the usual linear theory. The non-linear plasma equations, of course, cannot be solved in general. Two special cases are discussed: 1) the longitudinal dimension of the moving charge is small, although its transverse dimensions are not; 2) the transverse dimensions of the moving charge are small, although its longitudinal dimension is not Conditions for the appearance of multi-velocity flows are quoted from earlier work (V.N.Tsy\*tovich,DAN SSSR,142,No.63,1962) and it is concluded that in the ultra-relativistic case there is a wide range of conditions in which the non-linear effects are important and turbulence does not develop. For case 1) the solution is completed and an involved expression is obtained for the rate of energy loss by the moving charge. The equations for case 2) are simplified by expanding in powers of the radius and retaining only the lowest order terms. The equations are reduced to those

Card 2/3

ACC. NR: AP4009914

of a one dimensional problem which, it is asserted, can be treated as was case 1). Abstracter's note: The exposition is this section relies heavily on the earlier work cited above. It is shown that by assuming an expression for one of the velocity functions, the other velocity function and the corresponding charge distribution can be obtained. An example is worked through and a very involved expression to obtained for the charge distribution. "The authors are sincerely grateful to V.I.Veksler for continued interest and numerous discussions." Orig.art.has: 52

ASSOCIATION: none

SUBMITTED: 10Dec62

DATE ACQ: 10Feb64 .

ENCL: 00

SUB CODE: PH

NR REF SOV: 003

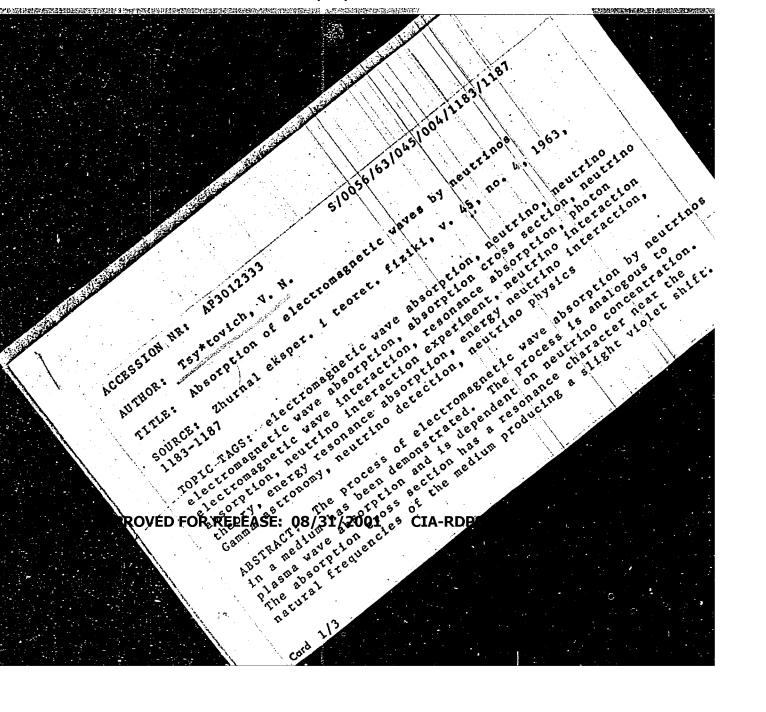
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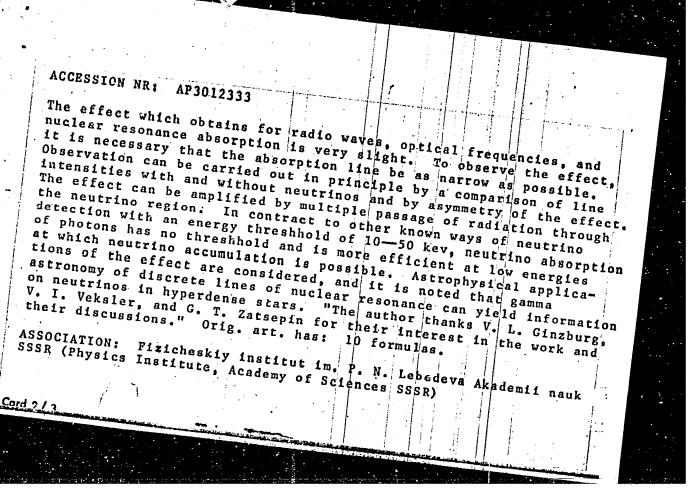
Card .3/3

# TSYTOVICH, V.N.

Acceleration of charged particles by plasma waves. Izv. vys. ucheb.zav.; radiofiz. 6 no.3:641-644 '63. (MRA 16:9)

1. Fizichoskiy institut imeni Lebedeva AN SSSR. (Plasma (Ienized gases))





ACCESSION NR: AP3004316

\$/0033/63/040/004/0612/0624

AUTHOR: Tsy\*tovich, V. N.

TITLE: Acceleration by radiation and the problems of generation of fast particles in cosmic conditions

SOURCE: Astronomicheskiy zhurnal, v. 40, no. 4, 1963, 612-624

TOPIC TAGS: magnetically active plasma, Fermi acceleration, magnetohydrodynamic wave, radiation acceleration, particle charge, radiation pressure, Cherenkov radiation, Bre msstrahlung, transversal wave, quasilongitudinal oscillation

ABSTRACT: The study of fast cosmic particles is connected with three parameters: the medium, the radiation, and the fast particles. The medium, where the particle motion occurs, is a magnetically very active plasma. The Fermi acceleration in the form of magnetohydrodynamic waves is the boundary case of radiation acceleration. The force acting on the particle charge can be greater in the medium than the radiation pressure; it depends upon the wave length and the radius of the particle. A charged particle moving within a vacuum cannot omit and absorb electromagnetic waves; therefore, only a dispersion of electromagnetic waves takes place. In the medium an absorption and an emission are possible when the condition of Cherenkov radiation

Card 1/3

ACCESSION NR: AP3004316

is fulfilled, i.e., when the particle velocity is higher than the wave velocity. In a magnetically active plasma with Cherenkov radiation and absorption, processes of magnetic Bremstrahlung including radiation and absorption are possible. The radiation action depends upon the particle charge, the wavelength, the ratio of the wave velocity to the particle velocity, and the particle energy. The solution of the equation of interaction shows that the acceleration by radiation takes place when a difference exists between the energies obtained by the particle in collisions; and the mechanism of the radiation action on the particle is the boundary case of the Fermi mechanism. Radio emission in the cosmos penetrates into plasma and is there transformed into plasma oscillations. A transformation of transversal waves into plasma oscillations is possible because of nonlinear interaction of waves after dispersion on inhomogeneities. The plasma waves in a magnetic field correspond to the so called quasi-longitudinal oscillations. The acceleration of a particle which moves with a nonrelativistic velocity along the force lines is given by a formula. Plasma waves within a magnetically active plasma have great refraction indices, and under these conditions the accelerative effect generates the ordinary and extraordinary waves. The problem of Alfven waves and injection as sources of particle acceleration is discussed with transformation of the formulas developed earlier. The discussion resulted in the conclusion that the energy density of particles cannot exceed the energy density of the radiation. Orig. art. has: 3 figures and 37 formulas. Card 2/3

ACCESSION NR: AP3004316

ASSOCIATION: Fizicheskiy institut im. Lebedeva Akademii nauk SSSR (Institute of Physics, Academy of Sciences SSSR)

SUBMITTED: 04Nov62

DATE ACQ: 20Aug63

ENCL: 00

SUB CODE: AS

NO REF SOV: 012

OTHER: 001

Card 3/3

ACCESSION NR: AP4017032

s/0141/63/006/006/1103/1114

AUTHORS: Gaylitis, A. K.; Tsy\*tovich; V. N.

TITLE: Effect of the medium on the synchrotron acceleration of relativistic particles

SOURCE: IVUZ. Radiofizika, v. 6, no. 6, 1963, 1103-1114

TOPIC TAGS: relativistic particle, synchrotron acceleration, relativistic electron, radio astronomy, acceleration by radiation, optical synchrotron radiation, synchrotron electron loss, Compton effect, inverse Compton effect, earth radiation belt, chromosphere flare,

ABSTRACT: The authors study the acceleration of relativistic electrons moving in a magnetic field, brought about by transverse electromagnetic waves for which the deviation of the dielectric constant from unity can be appreciable. The energy acquired by the particle

Card 1/32

ACCESSION NR: AP4017032

is calculated and the dependence of the particle acceleration on its energy is analyzed. The possible role played by such an acceleration mechanism in discrete radioastronomy sources is considered. It is pointed out that ultrarelativistic electrons can become selectively accelerated by transverse electromagnetic waves and thus offset possible synchrotron losses. The fact cited as evidence in favor of this assumption is that the Crab nebula shows no variation in the optical synchrotron radiation, although synchrotron losses of electrons should be appreciable in this energy region. It is also pointed out that acceleration by transverse waves during the initial stage of supernova envelope expansion resolves some of the difficulties connected with the inverse Compton effect. It is deduced from the results of the article that it is possible for electrons to become accelerated to an energy 2--10 MeV in the internal regions of the outer radiation belt. Consequently fast electrons should be produced whenever radio emission from a chromosphere flare passes through the inner zone of the radiation belt.

Card 2/3

# TSYTOVICH, V.N.

Theory of the motion of charges along the axis of a channel in a medium. Zhur. tekh. fiz. 33 no.7:795-800 Jl 163. (MIRA 16:9)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR, Moskva. (Plasma (Ionized gases)) (Electromagnetic waves)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"

TSYTOVICH, V.N.

Acceleration by radiation and the generation of fast particles in outer space. Astron.zhur. 40 no.4:612-624 J1-Ag '63. (MIRA 16:8)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR. (Cosmic rays)

# TSYTOVICH, V.N.

Acceleration of electrons in the earth's radiation belts. Geomag. 1 aer. 3 no.4:616-625 Jl-Ag 163 (MIRA 16:11)

1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR.

# TSYTOVICH, V.N.

Absorption of electromagnetic waves on neutrinos. Zhur. eksp. i teor. fiz. 45 no.4:1183-1187 0 '63. (MIRA 16:11)

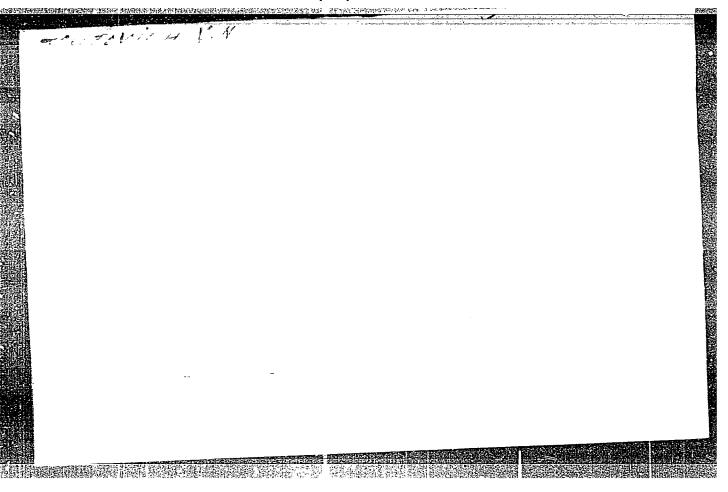
1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR.

SVETOZAROVA, G.I.; TSYTOVICH, V.N.

Spacial dispersion of relativistic plasma in a magnetic field.

12v. vys. ucheb. 2av.; radiofiz. 5 no.4:658-670 '62. (MIRA 16:7)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR.
(Plasma (Ionized gasss)) (Magnetic fields)



# Workmen become engineers. Sov. profesoluzy 18 no.19:23-25 0 '62. (MIRA 15:9) 1. Predsedatel' Tomskoge oblastnoge seveta professional'nykh soyuzov. (Tomsk Province—Trade unions) (Tomsk Province—Evening and continuation schools)

BOGOSLOVSKIY, Boris Borisovich. Prinimali uchestiye: VOSKRESENSKIY, K.A., dotsent; TSYTSARIN, G.Y., kand.geograf.nauk. FETROVA, K.A., red.; GEORGIYEVA, G.I., tekhn.red.

[Limnology] Ozerovedenie. Moskva, Izd-vo Mosk.univ., 1960.
(MIRA 14:4)

334 p. (Limnology)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"

TSYTSARIN, G.V.

Determining the underground component of the runoff of rivers from hydrochemical data. Sbor. rab. po gidrol. no.1:87-90 159. (MIRA 15:2)

1. Moskovskiy gosudarstvennyy universitet. (Runoff)

# TSYTSARIN, G.V.

Use of hydromechanical data for determining the underground component of streamflow. Biul.MOIP. Otd.geol. 31 no.4:108-109 J1-Ag '56. (MLRA 9:12)

(Stream measurements)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"

MAKSIMOVICH, Georgiy Alekseyevich; TSYTSARIN, G.V., redaktor; PERVAKOV, I.L., redaktor; MAL'CHEVSKIY, G.N., redaktor karv; KOSHELEVA, S.M., tekhnicheskiy redaktor.

[The chemical geography of inland waters] Khimicheskaia geografiia vod sushi. Moskva, Gos.izd-vo geogr. Mitery, 1955. 327 p. (MIRA 8:4) (Hydrology) (Water, Underground)

TSYTSARIN, G. V.

Lakes.

Steep-banked mountain lakes. Vop.geog. 26, 1951.

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

AUTHOR:

Tsytsarin, G.V.

SOV/5-58-5-15/20

TITLE:

The Borate Waters of the Trans-Emba Channels (Boratnyye vo-

dy zaembenskikh protok)

PERIODICAL:

Byulleten' Moskovskogo obshchestva ispytateley prirody,

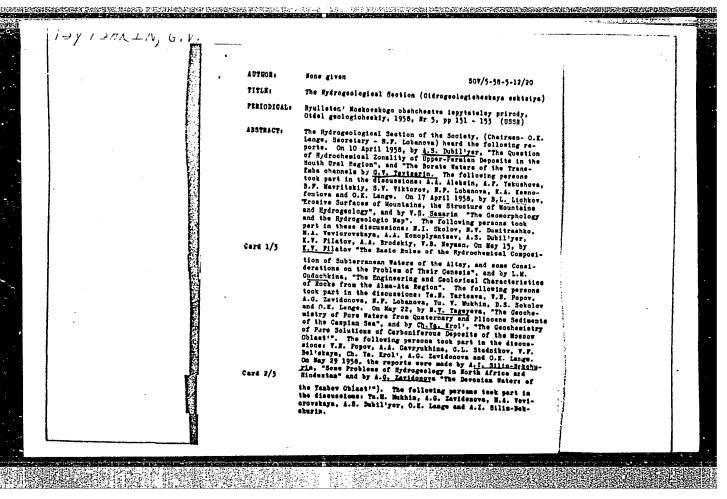
Otdel geologicheskiy, 1958, p 156 (USSR)

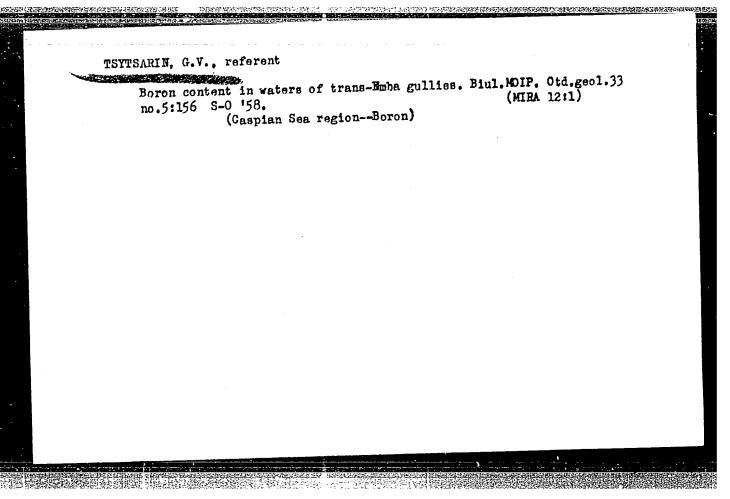
ABSTRACT:

The author sets forth some of the theses of the report he read on 10 April, 1958 in the Hydrogeological Section of the Society. He investigated the presence of Boron (B) in the channels of the Emba river near its estuary on the eastern shore of the Caspian Sea. According to him, the presence and concentration of boron and other dispersed elements in the channels of the river is brought about by the gradual evaporation of the water. He recommends further prospect-

ing for a possible industrial extraction of boron.

Card 1/1





TSYTSARIN, G. V.

Lakes

Steep-banked mountain lakes. Vop. geog. 26, 1951.

9. Monthly List of Russian Accessions, Library of Congress, April 1952 1953, Uncl.

TSYTSARIN, G. V.

Physical Geography

Steep-banked mountain lakes., Vop. geog., 26, 1951.

9. Monthly List of Russian Accessions, Library of Congress, April 1952 1973, Uncl.

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TSYTSARIN, G.V.; SHINKAR, G.G.

Optical instrument for measuring silt density and possibilities
for using it in hydrologic research. Vest.Mosk. un. Ser. 5: Geog.
17 no.1:67-68 Ja-F '62. (MIRA 16:7)

(Silt) (Optical instruments)

AKIMOCHKIN, P.V.; TSYTSARKIN, V.N.; RAZIN, V.N.

Results of experimental investigations on selecting compositions of equivalent materials. Vop. gor. davl. no.7:66-69 '61. (MIRA 18:7)

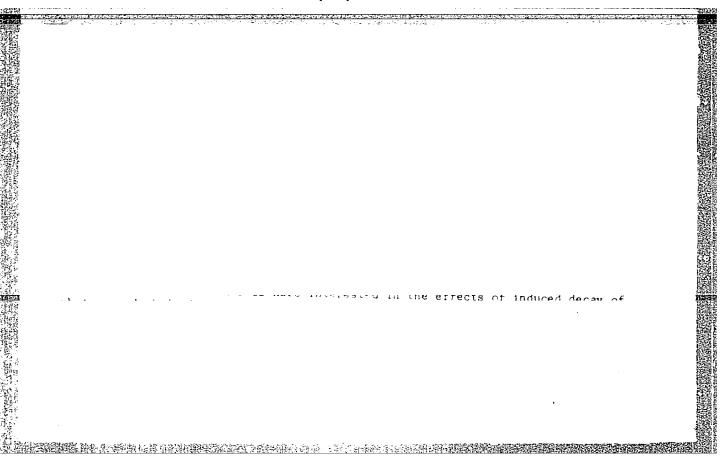
1. Tomskiy politekhnicheskiy institut im. S.M.Kirova.

RUBIENYA, M.V.; TOYTSAPK.H. V.N.

Reliability of supports in a zone of bearing pressure. Von.
gor. davi. nc.21:24-71 164. (Mith. 18.8)

1. Institut gornogo dein Sibirskogo oudeleniya AN SSSR.

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"



TSYTSARIN, V. S.

Kal'kulyutsiya i proverka tsen v stolovoy (Calculation and checking of prices in tables) Moskva, Gostorgizdat, 1953. 44p. tables.

> N/5 781.11 .T8

RODKINA, B.S.; TSYTSARKINA, T.N.; CHEREDNICHENKO, L.M. (Khar'kov)

Antitoxin function of the liver in cancer. Vrach.delo no.12: 1273-1276 D 56. (MIRA 12:10)

1. Otdel patofiziologii (zav. - zasluzhennyy deyatel nauki, prof.S.G.Genes) Ukrainskogo instituta eksperimental noy endokrinologii i khirurgicheskaya klinika (zav. - zasl.deyatel nauki, prof.G.M.Gurevich) Ukrainskogo instituta rentgeno-radio-onkologii. (CANCER) (LIVER)

LEBEDEVA, L.P.; KRYSIN, B.T.; KOLPAKOV, Ya.V.; IGNATOV, L.N.;
MIKHAYLOVSKIY, V.A.; SMIRNOV, G.G.; TSYTSENKO, M.V.

Experimental production of iron-base friction ceramic metals.
Porosh. met. 5 no.8:96-102 Ag '65. (MIRA 18:9)

	L 57596-65 EWG(3)/EWT(d)/EWT(1)/EWP(e)/EWT(m)/EWP(w)/EPF(c)/EWG(s)-2/EWP(1)/EWG(v)/EVP(y)/EPR/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(h) Pe-5/Pf-4/Pr-4/Ps-4/Ps-b/Pw-	)/ 	,	;		
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-	AUTHOR: Kashchenko, I. M.; Krysin, B. T.; Kolpakov, Ya. V.; Smirnov, G. G.; Mikhaylovskiy, V. A.; Tsytsenko, M. V.; Lebedeva, L. P.; Vino-kurov, V. I.; Levin, H. M.; Edel'man, H. I.					
	TITLE: Method for producing friction parts from powder components. Class 47, No. 171702					
	SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 11, 1965,			:	•	I
	TOPIC TAGS: paircraft brake, friction part, powder metallurgy		i			I
	ABSTRACT: An Author fertificate has been issued for a method of producing friction parts (e.g., brake-unit parts) for aircraft from powder components. To reduce wear, the mixture contains 60-70% iron,		-			
	and 2-5% silicon oxide. The mixture is compact molded; at a pressure of 5.8 t/cm <sup>2</sup> and sintered at a temperature of 10600 and a pressure of		٠			
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TSTTSENKO, V.I., inzhener.

Modification of the bearing of the SM-170 coal crusher. Energetik
5 no.219-10 f '57.

(Pulverizers)

Tsytsenka, V.I.

AID P - 4065

Subject

: USSR/Power

Card 1/1

Pub. 26 - 23/33

Author

: Tsytsenko, V. I., Eng.

Title

establishmentenderbina errett, Attalismeldebinates. : Standardizing the fuel mill unit types.

Periodical : Elek. sta., 12, 52, 1955

Abstract

The article describes the conversion of fuel mills to one type in order to facilitate repair and mounting

work. One diagram.

Institution: None

Submitted : No date

CIA-RDP86-00513R001757320018-7" APPROVED FOR RELEASE: 08/31/2001

TSYTSENKO, V.I., inzhener.

New regulating valve for continuous blowdown of boilers.
Elek.sta. 27 no.7:51-52 J1 '56. (MLRA 9:10)

(Boilers--Accessories)

AID P - 3705

TSYTSENKO, Y.I.

Subject

: USSR/Electricity

Card 1/1

Pub. 29 - 10/25

Author

Tsytsenko, V. I., Eng.

Title

Replacement of cast-iron nozzle turbine segments with

steel

Periodical

: Energetik, 12, 15-16, D 1955

Abstract

: The author describes the replacement work done with a AEG, 10,000-kw turbine where cast-iron nozzle segments

were replaced with steel ones. One drawing.

Institution: None

Submitted : No date

CIA-RDP86-00513R001757320018-7" APPROVED FOR RELEASE: 08/31/2001

TSTTSENIO, V.I., inzhener.

Standardizatien ef impact mills. Elek.sta. 26.ne.12:52 D 155.
(Coal, Pulverized)

(MERA 9:4)

TSYTSENKO, V.I., inzh.

First outdoor-type solid fuel power plant of the U.S.S.R. Elek. sta. 35 no.3:5-8 Mr '64. (MIRA 17:6)

Replacing cast-iron turbine nozzle segments with steel ones.
Energetik 3 no.12:15-16 D '55. (MIRA 9:2)

(Nozzles)

ន

USSR / Human and Animal Morphology (Normal and

Pathological). Nervous System. Peripheral

Nervous System.

: Ref Zhur - Biologiya, No 4, 1959, No. 16929 Abs Jour

: Slobodin, Z. G.; Tsytsorina, N. A. : Karaganda Medical Institute Author

Inst

: On Innervation of the Wrist and Foci Title

: Tr. Karagandinsk. med. in-ta, 1957, 1, No 2, Orig Pub

133-134

: No abstract given Abstract

Card 1/1

38

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001757320018-7"

TSYUMAN, V. P.

Promising types of loading and unloading machinery. Mekh. sil'. hosp. 12 no.10:18 0 '61. (MIRA 14:11)

1. Khar'kovskaya issledovatel'skaya stantsiya Ukrainskogo nauchno-issledovatel'skogo instituta mekhanizatsii i elektrifikatsi! sel'skogo khozyaystva.

(Loading and unloading)

Tsytsurin, E. I., Wave graphs, Sb. rabot po geofiz. i meteorol metodam izmereniy i priboram (Collection of works on geophysics and meteorological methods of measurements and instruments), Leningrad, 1958, p 94-96; (RZhGeofiz 11/59-11128)

KHASIN, A.V.; TSYUELEVSKIY, A.M.

Adsorption drying of ethylene. Khim.prom. no.1:35-38 Ja '63. (MIRA 16:3)

(Bthylene--Drying)

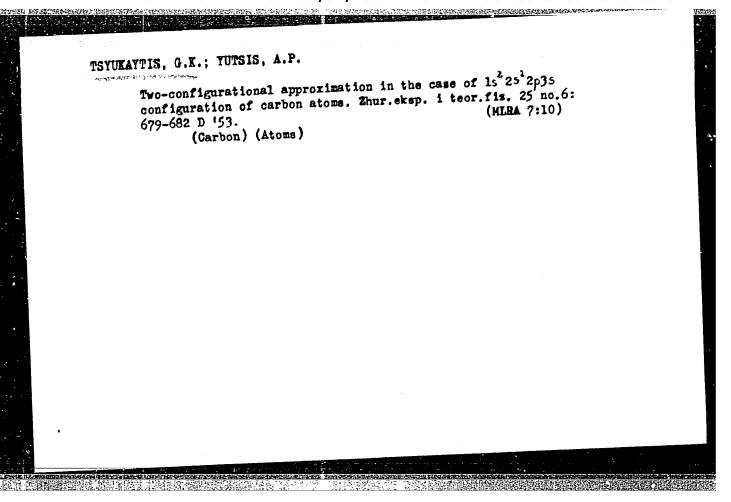
BEL'KEVICH, P.I.; TSYUBUL'KIH, V.M.; KURKEVICH, Yo.A.

Study of peat asphaltenes by infrared spectroscopy. Trudy Inst. (MIMA 14.2)

torf. All BSSE 9:296-300 '6C. (Maghaltnes-Spectra)

(Poat)

(Asphaltnes-Spectra)



# TSYUKHNO, Z. I.

Articular complications in DOCA therapy of adrenal insufficiency. Klin. med., Moskva 30 no. 5:77-78 May 1952. (CLML 22:3)

1. Candidate Medical Sciences. 2. Of the Department of Endocrinology (Head -- Prof. M. A. Kopelevich), Ukrainian Institute for the Advanced Training of Physicians, Khar'kov.

#### CIA-RDP86-00513R001757320018-7 "APPROVED FOR RELEASE: 08/31/2001

USSR/Human and Animal Physiology. Internal Secretion

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Tsynkhno Z.I.

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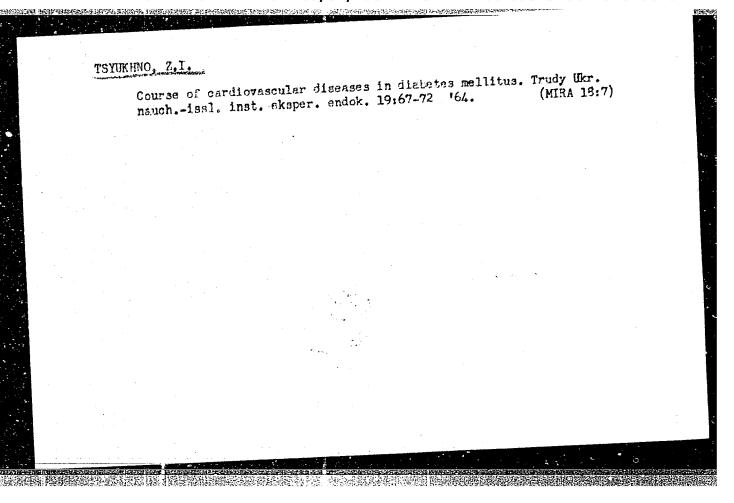
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1. Iz klinicheskogo otdela Ukrainskogo instituta eksperimentalinoy endokrinologii i kafedry endokrinologii Ukrainskogo instituta usovershenstvovaniya vrachey.



ZHUROVA, M.V.; TSYUKHNO, Z.I.

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