"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A.; SHCHERBAKOVA, Ye.Ya.

Correlation existing between morphological and physiological changes in Asperigillus niger mutants. Mikrobiologiia 33 no.2:252-260 Mr-Ap '64. (MIRA 17:12)

1. Institut mikrobiologii AN SSSR i Nauchno-issledovatel'skiy institut konditerskoy promyshlennosti.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A., akademik

Life elsewhere in the universe. Vest. AN SSSR 33 no.9:23-29 S '63. (MIRA 16:9)

(Plurality of worlds)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A., akademik

Urgent problems of microbiology. Vest. AN SSSR 33 no.3:82-90 Mr '63. (MIRA 16:3)

(MICROBIOLOGICAL RESEARCH)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A., akademik; PARIYSKAYA, A.N.; PETROVA, K.Z.

Transmission of biochemical characteristics in bacteria by transformation. Dokl. AN SSSR 151 no.2:443-445 Jl '63. (MIRA 16:7)

1. Institut mikrobiologii AN SSSR.
(Nucleic acids) (Bacteria)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A., akademik; SOLNTSEVA, L.I.; KURANOVA, N.F.

Polyploid yeastlike fungi from the genus Candida. Dokl. AN SSSR 152 no.1:212-215 S '63. (MIRA 16:9)

1. Institut mikrobiologii AN SSSR.
(Candida (Fungus)) (Polyploidy)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.; LYSENKO, S.;

"An ultra-high vacum and micro rganisms"(USSR)

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy, 8 - 20 May 1964.

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IMSHENETSKIY, A. A.; ABYZOV, S. S.;

" A technique and some results of meteorite microbiological investigations" (USSR)

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy, 8-20 May 1964.

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IMSHENETSKIY, A. A.

"The tasks of cosmic microbiology."

report presented at 4th Intl Cong, Hungarian Soc of Microbiologists, Budapest, 30 Sep-3 Oct 64.

Inst of Microbiology, AMS USSR, Moscow.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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KRISS, A.Ye.; MISHUSTINA, I.Ye.; MITSKEVICH, I.N.; ZEMTSOVA, E.V.; IMSHENETSKIY, A.A., akademik, otv. red.; GOL'DIN, M.I., red.izd-va; GUSEVA, A.P., tekhn. red.; KISELEVA, A.A., tekhn. red.

[Microbial population of the Pacific Ocean; species and geographical distribution] Mikrobnoe naselenie mirovogo okeana; vidovoi sostav, geograficheskoe rasprostranenie. Moskva, Izd-vo "Nauka," 1964. 295 p. (MIRA 17:1)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A.

Cell-free fixation of nitrogen. Usp. mikrobiol. 1:61-74 '64.
(MIRA 18:9)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKIY, A.A.; KRASIL'NIKOV, P.A.; KRISS, A.Ye.; MEYSEL', M.K.; MISHUSTIN, Ye.N.; RAUTENSHTEYN, Ya.I.; SKRYABIN, G.K.

Boris IAkovlevich El'bert, 1890-1963; an obituary.
Mikrobiologiia 33 no.2:378-379 Mr-Ap '64. (MIRA 17:12)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKIY, A.A., akademik; BOGROV, N.; LYSENKO, S.

Resistance of micro-organisms to deep vacuum. Dokl. AN SSSR 154 no.5:1188-1190 F'64. (MIRA 17:2)

1. Institut mikrobiologii AN SSSR i Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKIY, A.A.

" The decomposition of high molecular weight substances in soil."

report submitted for Symp on Ecology of Soil Bacteria, Liverpool, UK, 6-10 Sept 1965.

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IMSHENETSKIY, A.A.; ZHIL'TSOVA, G.K.

Possibility for identifying nucleoids in the cells of bacteria as related to the age of their cultures. Mikrobiologiia 34 no.2:305-312 Mr-Ap '65. (MIRA 18:6)

1. Institut mikrobiologii AN SSSR.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKIY, A.A.; RAUTENSHTEYN, Ya.I.; KAZANSKAYA, T.B.; BEKHTEREVA, M.N.

Pavel Andreevich Agatov, 1905- ; on his 60th birthday. Mikrobiologiia 34 no.4:749 Jl-Ag '65. (MIRA 18:10)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKIY, A.A., akademik; YEFIMOCHKINA, Ye.F.; NIKITIN, L.Ye.; ZANIN, V.A.

Bacterial decomposition of cholesterol in the human blood serum.
Dokl. AN SSSR 161 no.3:701-703 Mr '65.

(MIRA 18:4)

1. Institut mikrobiologii AN SSSR.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.A., akademik; BROTSKAYA, S.Z.; KORSHUNOV, V.V.

Effect of the proteinase of molds on the blood thrombi. Dokl. AN SSSR 163 no.3:737-740 Jl '65. (MIRA 18:7)

1. Institut mikrobiologii AN SSSR.

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L 15647-66 EWT(1)/EWA(d) GW

ACC NR: AP6005548 SOURCE CODE: UR/0030/66/000/001/0036/0045

AUTHOR: Imshenetskiy, A. A. (Academician)

ORG: none

TITLE: Meteorites and the problem of the existence of extraterrestrial life

SOURCE: AN SSSR. Vestnik, no. 1, 1966, 35-45

TOPIC TAGS: meteorite, carbonaceous chondrite, ~~extraterrestrial life, organical elements~~ astrobiology

ABSTRACT: Possible extraterrestrial origins of life-like forms in carbonaceous chondrites are explored. A specific feature of all carbonaceous chondrites is the inclusion of organic substances (6—8%) which are normally synthesized on Earth by live cells: cytosine, purine, amino acids, aliphatic acids, fats, pristane, phytane, etc. The following arguments are said to favor the hypothesis of the biogenic origin of these substances: 1) Infrared and ultraviolet spectroscopic and mass spectrographic evidence has been recently presented indicating that the compounds extracted from carbonaceous chondrites are similar in composition to those extracted from terrestrial sedimentary rocks; 2) substances found

Card 1/3

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ACC NR: AP6005548

in carbonaceous chondrites are thought to have resulted only from biosynthesis, i.e., amino acids, purine and pyrimidine bases, and the dissociation products of chlorophyll (pristane and phytane); 3) determination of free radicals yielded values (10^{16} - 10^{19}) close to those which are characteristic of turf, lignite, and coal; 4) the C^{12}/C^{13} ratio in carbonaceous chondrites indicates a lower content of C^{13}, which is characteristic of carbonaceous substances of biogenic origin; 5) numerous compounds extracted from carbonaceous chondrites are active optically. It has been frequently suggested that chondrites are of terrestrial origin, and that they followed the moon at the time of its escape from Earth. This hypothesis, although it may well explain the similarity between organic substances of terrestrial and meteoritic "origin" has not gained much recognition. In addition to chemical analyses, paleomicrobiological methods are used to study meteorites. Morphological formations discovered under microscope, called "organized elements," were thought by some observers to be organic fossils. In the author's view, the origin of the organized elements has not yet been firmly established. The following assumptions are possible: 1) Organized elements are either mineral formations or contaminants, an unlikely possibility since as many as 1700 particles, 20—30 μ in diameter, were found in 1 mg of meteorite; 2) organized elements are variously shaped particles of dead organic matter included in carbonaceous chondrites; 3) organized elements belong to the group of "preprotobionts," i.e., abiotic microspheres or coacervates consisting of organic matter and preceding

Card 2/3

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L 15647-66
ACC NR: AP6005548

living matter in time; 4) organized elements are fossilized living organisms of extraterrestrial origin. Arguments based on chemical analyses and morphology involve conceivably a great deal of subjective judgment, and the question of whether a certain form is of biological or inorganic origin is still debatable. The only indisputable evidence for the existence of life in meteorites would be the extraction from these meteorites of living and reproducing organisms. Methods of microbiological analysis of meteorites are being developed at the Microbiological Institute of the Academy of Sciences, USSR. A specially designed chamber, provided with a drilling device and sterilized in a large autoclave, is used for extracting samples both from the surface and from the deep-seated portions of the meteorite under conditions which prevent microbes from entering into the meteorite from without. Much of what has been learned from the examination of meteorites still remains obscure. This can be easily understood if we consider the fact that the search is being carried on in the domain of the newly evolved sciences, space chemistry and exobiology. Orig. art. has: 7 figures and 5 tables. [VM]

SUB CODE: 06, 03/ SUBM DATE: none/ ATD PRESS: 4201

Card 3/3

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

ACC NR: AP7013154

SOURCE CODE: UR/0025/65/000/012/0082/0082

AUTHOR: Fesenkov, V. G. (Academician; Chairman of Committee); Inshenetskiy, A. A. (Academician; Director of Institute)

ORG: [FESENKOV] Committee on Meteorites, AN SSSR (Komitet po meteoritam AN SSSR); [INSHENETSKIY] Institute of Microbiology, AN SSSR (Institut mikrobiologii AN SSSR)

TITLE: Collection of new meteorites

SOURCE: Nauka i zhizn', no. 12, 1965, 82

TOPIC TAGS: meteorite, meteor observation

SUB CODE: 03

ABSTRACT:

Another feature article in the Soviet press encourages the readers to be vigilant in a search for new meteorites. General information is presented, such as that three meteorites fall to earth annually in each area of a million square kilometers. Only 1,800 meteorites have been discovered throughout the world. The Academy of

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ACC NR: AP7013154

Sciences USSR has a collection of 300 Russian and foreign meteorites, one of the largest in the world. During the past two hundred years only 134 meteorites have been discovered in Russia; about half were observed during falling, while the other half cannot be identified as to date of falling. During the last ten years the Committee on Meteorites of the Academy of Sciences has received only twelve new meteorites. Almost all were found by chance by local inhabitants. The authors emphasize how important it is for people to report suspected meteorite finds to the Academy of Sciences and note that there is an established monetary reward for each find. Particular emphasis is given to the importance of finding newly fallen meteorites that might contain evidence on the existence of life in space. Accordingly, instructions are given on the proper recovery, storage and packing of finds in order to prevent any contamination. It is requested that small (10-20 g) pieces of suspected meteorites be sent to the Academy of Sciences for analysis, while great care is taken to safeguard the main body until a report is given. [JPRS: 34,593]

Card 2/2

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKAYA, YU. A.

Institute of Microbiology, USSR Academy of Sciences, Moscow.
Influence of lichens on the development of the Azobacter.
SO: MIKROBIOLOGIA, Vol. 19, No. 2, March/April 50.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKIY, A.I.

Heavy mineral concentration in alluvium, based on experimental data. Sov.geol. 2 no.7:81-88 Jl '59. (MIRA 13:1)

1. Vsesoyuznyy institut mineral'nogo syr'ya (VIMS).
(Mineralogy)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.I., kand.geol.-mineral.nauk (Moskva)

In the Central Asia Economic Region. Priroda 52 no.7:114-115 Jl '63. (MIRA 16:8)

(Soviet Central Asia--Economic conditions)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.I.

Genesis of the Tobol' titanium deposit in the Turgay trough. Sov. geol. 7 no.5:140-146 My '64 (MIRA 18:2)

1. Sovet po izucheniyu proizvoditel'nykh sil AN SSSR.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, A.I., kand.geol.-mineral.nauk (Moskva)

Kimberlite of the Russian platform. Priroda 54 no.2:117-118 F '65. (MIRA 18:10)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

ARKHANGEL'SKIY, L.N., inzh.; IMSHENETSKIY, A.M., inzh.; TEMERTI, G.F., inzh.

Automatic control of compressor stations. Ugol' Ukr. 7 no.7: 33-35 Jl '63. (MIRA 16:8)

1. Institut gornogo dela AN UkrSSR (for Arkhangel'skiy).
2. Trest Donetskpromavtomatika (for Imshenetskiy, Temerti).
(Air compressors) (Automatic control)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, S.

Game breeding and management is a science for mature transformers. IUn.tekh. 4 no.6:18-21 Je '60. (MIRA 13:9)
(Wildlife, Conservation of)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, S., aspirant

Salutary fat of a harmful animal. Nauka i zhizn' 29 no.9:77 S '62. (MIRA 15:10)

1. Moskovskaya veterinarnaya akademiya.

(Susliks)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, S.

Bird subordination. Nauka i zhizn' 30 no.5:70 My '63.
(MIRA 16:10)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

PATRIKEYEV, B.; IMSHENETSKIY, V.

Improving the assembly of large-panel buildings. Na stroi. Ros. 3 no.3: 7-10 Mr '62. (MIRA 16:2)

1. Glavnyy insh. upravleniya Sverdlovskgorstroy (for Patrikeyev).
2. Nachal'nik tekhnicheskogo otdela upravleniya Sverdlovskgorstroya (for Imshenetskiy).
(Sverdkovsk--Apartment houses)(Precast concrete construction)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

VOROSHILIN, Ye.; IMSHENETSKIY, V.

Experimental kindergarten and nursery school made of elements for industrial buildings. Na stroi.Ros. 4 no.6:15 Je '63. (MIRA 16:6)

1. Glavnyy inzhener upravleniya Sverdlovskgorstroy (for Voroshilin). 2. Nachal'nik tekhnicheskogo otdela upravleniya Sverdlovskgorstroy (for Imshenetskiy).
(Sverdlovsk--Schoolhouses--Design and construction)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V.B., inzh.; SEMINA, O.I., red.

[Building large-panel apartment houses in Sverdlovsk] Krupnopanel'noe domostroenie v Sverdlovske. Sverdlovsk, TSentr. biuro tekhn. informatsii, 1962. 27 p. (MIRA 17:8)

1. Russia (1917- R.S.F.S.R.) Sverdlovskiy ekonomicheskiy administrativnyy rayon. Upravleniye stroitel'stva.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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IMSHENETSKAYA, V.F.

Comparative evaluation of the effectiveness of an erythromycin base and erythromycin ascorbinate on a model of experimental meningitis. Antibiotiki 8 no.6:533-535 Je'63 (MIRA 17:3)

1. Nauchno-issledovatel'skiy ordena Trudovogo Krasnogo Znameni institut neyrokhirurgii imeni N.N. Burdenko AMN SSSR.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

VOROSHILIN, Ye.; IMSHENETSKIY, V.

Assembly of a schoolhouse by means of a ringed-frame indicator. Na stroi. Ros. 6 no.2:22-23 F '65. (MIRA 19:1)

1. Glavnyy inzh. upravleniya Sverdlovskgorstroy (for Voroshilin).
2. Glavnyy tekhnolog upravleniya Sverdlovskgorstroy (for Imshenetskiy).

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V. I.

DECEASED
C. '63

1964

METALS
STEEL HARDENING

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V.N., dotsent

Device for automatic regulation of a voltage supporting transformer. Nauch. zap. KHIMSKH Fak. elek. sel'khoz. 1 no.10:33-46 '58. (MIRA 16:7)

(Electric power distribution)
(Electric transformers)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V.N., dotsent; BAZHENOV, I.G., assistent

Electric protection in electrified livestock farms. Nauch. zap. KHIMSKH Fak. elek. sel'khoz. 1 no.10:63-74 '58. (MIRA 16:7)

(Electricity in agriculture—Safety measures)
(Stock and stockbreeding)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, Vladimir Nikolayevich, dotsent

Circle diagram of a three-phase asynchronous motor in single-phase operation. Izv. vys. ucheb. zav.; elektromekh. 4 no.3:73-83 '61. (MIRA 14:7)

1. Zaveduyushchiy kafedroy proizvodstva i raspredeleniya elektroenergii v sel'skom khozyaystve Khar'kovskogo instituta mekhanizatsii sel'skogo khozyaystva.
(Electric motors, Induction)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V.N., dotsent; ISAYENKO, A.V., inzh.

Decrease in the maximum current in an overcurrent protection system using operative a.c. with low-power transformers. Izv. vys. ucheb. zav.; energ. 6 no.8:22-28 Ag 63. (MIRA 16:9)

1. Khar'kovskiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva. Predstavlena kafedroy proizvodstva i raspredeleniya elektroenergii v sel'skom khozyaystve.
(Electric power distribution)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, Vladimir Nikolayevich, dotsent

Operation of three-phase asynchronous electric motors connected to a single-phase three-wire network carrying 440-220 volts. Izv. vys. ucheb. zav.; elektromekh. 7 no.5:598-606 '64. (MIRA 17:9)

1. Zaveduyushchiy kafedroy proizvodstva i raspredeleniya elektroenergii v sel'skom khozyaystve Khar'kovskogo instituta mekhanizatsii i elektrifikatsii sel'skogo khozyaystva.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V.N., dotsent; ISAYENKO, A.V., inzh.

UKZ-type charge compensating device. Izv. vys. ucheb. zav.; energ. 7 no.9:83-86 S '64.

(MTRA 17:11)

1. Khar'kovskiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva. Predstavlena kafedroy proizvodstva i raspredeleniya elektroenergii v sel'skom khozyaystve.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENETSKIY, V.N., dotsent; ISAYENKO, A.V., insh.

Automation of the preparation of a drive for the reclosing of a sectionalizing switch. Izv.vys.ucheb.zav.; energ. 8 no.12:84-87 D '65. (MIRA 19:1)

1. Khar'kovskiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva. Predstavlena kafedroy proizvodstva i raspredeleniya elektroenergii v sel'skom khozyaystve. Submitted December 19, 1964.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENIK, V.S.; NADEZHIN, D.K.

Gas dyn[illegible]del of a II-type supernova outburst. Astron.zhur. 41 no.5 829-841 S-O '64. (MIRA 17:10)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENNIK, B.K.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 28-40, 20 Feb - 2 Apr 1954)

Name	Title of Work	Nominated by
Gubkin, S.I. Moguchiy, L.N. Savitskiy, L.N. Zatulovskiy, M.I. Mikityuk, V.D. Volkov, S.S. Chirkov, B.P. Imshennik, B.K.	"Deformability of Magnesuim Alloys"	Institute of Metallurgy, Academy of Sciences USSR

SO: W-30604, 7 July 1954

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

ERSHENNIK K.P. and N.A. BUKHMAN

Svarka zagotovok instrumenta po metodu Ignat'eva no stykovykh mashinakh; instruktsiia slia mastera i tekhnologa po svarke. Moskva, Mashgiz, 1944. 17 p. deagrs.

At head of title: Vsesoiuznyi nauchno-issledovatel'skii instrumental'nui institut.

Butt welding of half-finished tools according to Ignat'ev's method; instructions for skilled workmenaand selding technologists.

DLC: TS227.B92

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENNIK, K.P.

22-583. Welding and Joining of Cutting Tools With Spot Welding Machines. K. P. Imshennik. *Avtogennoe Delo (Welding)*, July 1947, p. 24-26. (In Russian.)

The electrode and fittings for the above and other information concerning recommended procedures for joining hard-alloy tools to other metals used as holder or support.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENNIK, K.P.

B

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Choice of Optimum Conditions for Flash Welding. (In Russian.) K. P. Imshennik. *Avtogennoe Delo* (Welding), Oct. 1949, p. 12-15.

On the basis of experimental and theoretical data, a diagram is presented which permits rapid determination of optimum welding conditions for individual cases.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENNIK, K.P.

IMSHENNIK, K.P.

USSR/Engineering - Welding, Processes Nov 51

"Nature and Role of Fusion Process in Butt Welding," Prof A. S. Gel'man, Dr Tech Sci, TsNIITMASh, K. P. Imshennik, Cand Tech Sci, VNII MSS, N. S. Kabanov, Cand Tech Sci, TsNIITMASh

"Avtogen Delo" No 11, pp 11-15

Discusses results of studying fusion process with rapid motion-picture camera and oscillograph. Establishes formation of molten metal bridges and determines

200T63

USSR/Engineering - Welding, Processes (Contd) Nov 51

existence time of each bridge as equal to 0.002 sec. Welding zone, as was observed, contains considerable amts of CO and CO_2 in atm, which factors, combined with sharp decrease in O content, protect surfaces of molten metal against oxidation.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

ULITSKIY, Ye.Ya.; IMSHENNIK, K.P., nauchnyy redaktor; KONTSEVAYA, E.M., redaktor; KRYNOCHKINA, K.V., tekhnicheskiy redaktor.

[Technological methods for economizing on high-speed steel] Tekhnologicheskie sposoby ekonomii bystroreshushchei stali. Moskva, Vses. uchebno-pedagog. izd-vo Trudrezervizdat, 1954. 45 p. (MLRA 7:12)

(Tool steel)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

DMSHENNIK, K.P.; BUKHMAN, N.A.; VLADISLAVLEV, V.S., professor, retsenzent; KOLLI, A.Ya., inzhener, redaktor; MATVEYEVA, Ye.N., tekhnicheskiy redaktor.

[Technology of soldering hard-alloy cutting tools] Tekhnologiia paiki tverdosplavnogo instrumenta. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1954. 160 p. (MLRA 8:2)
(Cutting tools) (Solder and soldering)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENNIK, K.P.

32-6-19/54

AUTHOR: IMSHENNIK, K.P., LANDA, V.A.

TITLE: The Application of the Electronographic Method of the Investigation of Oxide Films on the Surface of Hard Alloys. (Primeneniye elektronograficheskogo metoda na poverkhnosti tverdykh splavov, Russian)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol 23, Nr 6, pp 699-701 (U.S.S.R.)

ABSTRACT: The electronographic method is employed for the investigation of partly oxide sulphide films on metal surfaces. BK8, T5K10, T15K6 and T60K6 oxides were determined and treated before and after oxidation on the films of hard alloys. In the case of the hard alloy BK-8 it was confirmed that the diffraction lines correspond both to the WC carbide tungsten lines as well as to the WO_3 tungsten oxide. The electrograms taken of the T5K10- and T15K6 hard alloy surfaces had a weak carbide-tungsten line. This is explained by the fact that if carbide titanium is contained in the T60K6 hard alloy surfaces a hard WC is formed in the TiC solution, which leads to a decrease of the WC of the free phase in the hard alloy. It was proved by the electrograms taken from the T60K6 hard alloy surfaces that they are titanoxides which are in the modification basis of rutile. Titano-oxides are known to be chemically very stable and it is very difficult to remove them, which explains the bad penetrability of the T30K4 soldered parts and of T60K6 titanium hard alloys. The electrogram

Card 1/2

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32-6-19/54

The Application of the Electronographic Method of the Investigation of Oxide Films on the Surface of Hard Alloys.

taken from the surface of the T60K6 hard alloy did not confirm the existence of titano-oxide and the electrogram lines corresponded to the TiC carbide titanium lines. Therefore the surface must be cleaned by grinding when titanium hard alloys are soldered. Titano-oxides are removed with the aid of the following reaction: $T_iO_2 + 2\ K_2S_2O_2 = Ti(SO_4)_2 + 2\ K_2SO_4$. The titanium salt obtained can easily be washed away with water. Electrograms were made in order to test this theory. The hard alloy was washed with boiling water and what was left was removed from the paper by grinding (TiO_2 and $K_2S_2O_7$). The electrograms of T30K4 and T60K6 proved the presence of T_iO_2 of the rutile modification at a temperature of 1000°, whilst that of TI5K6 proved WO_3-tungsten oxide. Rutile is to be considered as titano-oxide. In order to obtain the radiogram for T60K6, measurements according to the formula R = d =Lλ are carried out, from which L mm=24m0,d = 2,19, and thus the intensity = 30 can be computed.

ASSOCIATION: Not given

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

Card 2/2

1. Vsesoyuznyy nauchno-issledovatel'skiy instrumental'nyy institut.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

SLEZNIKOV, G.I., inzh.; ANNENKOVA, Ye.G., kand.tekhn.nauk; GRUDOV, P.P., kand.tekhn.nauk [deceased]; DEGTYARENKO, N.S., kand.tekhn.nauk; IMSHENNIK, K.P., kand.tekhn.nauk; KASENKOV, M.A., kand.tekhn. nauk; MEL'NIKOV, N.F., inzh.; MALOV, A.N., kand.tekhn.nauk; POKROVSKIY, B.V., inzh.; POLYAK, S.M., kand.tekhn.nauk; POLYANSKIY, A.N., kand.tekhn.nauk; POPILOV, L.Yu., inzh.; POPOV, V.A., kand. tekhn.nauk; RUBINSHTEYN, S.A., kand.tekhn.nauk; SOKOLOV, N.L., inzh.; SHAMIRGON, S.A., inzh.; SHESTOPAL, V.M., kand.tekhn.nauk; SHUKHOV, Yu.V., kand.tekhn.nauk; ACHERKAN, N.S., prof., doktor tekhn.nauk, glavnyy red.; VLADISLAVLEV, V.S., red. [deceased]; POZDNYAKOV, S.N., red.; ROSTOVYKH, A.Ya., red.; STOLBIN, G.B., red.; CHERNAVSKIY, S.A., red.; KRYLOV, V.I., inzh, red.; KARGANOV, V.G., inzh., red.graficheskikh rabot; SOKOLOVA, T.F., tekhn.red.

[Metalworking handbook in five volumes] Spravochnik metallista v piati tomakh. Chleny red.soveta: V.S.Vladislavlev i dr. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry. Vol.3. Book 2. [Ferrous and nonferrous metal products] Sortament chernykh i tsvetnykh metallov. 1958. 204 p. Vol.4. 1958. 778 p. (MIRA 12:1)
(Metalwork)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

DEGTYARENKO, N.S., kand.tekhn.nauk; VOLKOV, S.I., kand.tekhn.nauk; PODOSENOVA, N.A., kand.tekhn.nauk; IMSHENNIK, K.P., kand.tekhn. nauk; BRISKIN, Ya.I., inzh.; UVAROVA, A.F., tekhn.red.

[Technological processes for manufacturing metal-cutting tools; handbook] Tekhnologiia izgotovleniia metallorezhushchikh instrumentov; rukovodiashchie materialy. Pod red. N.S.Degtiarenko. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry. No.1. [Preparatory operations] Zagotovitel'nye operatsii. 1959. 162 p.

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy instrumental'nyy institut.

(Metal-cutting tools) (Metalwork)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

14(0) SOV/32-25-4-69/71

AUTHOR: Imshennik, K., Deputy Director, VNII for Scientific Work

TITLE: Conference of Laboratory Workers of Plants Manufacturing Instruments and Machines (Konferentsiya rabotnikov laboratoriy instrumental'nykh i mashinostroitel'nykh zavodov)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 4, p 510 (USSR)

ABSTRACT: From November 19 until 26, 1958 the Seventh Conference of Workers in Plants Manufacturing Instruments and Machines was held at the Vsesoyuznyy nauchno-issledovatel'skiy instrumental'nyy institut (VNII) (All-Union Scientific Research Institute of Instruments). There were 103 participants representing 59 organizations. Papers were read by cooperators of the VNII, representatives of the Central Plant Laboratories of the Plants " Frezer", "Kalibr", and others. They dealt with the successful work done in the past three years at the institute mentioned above as well as in the plants cited. It was concerned with new compositions of weakly alloyed and alloyed steels for instruments, and soldering and fluxing materials for fixing hard alloys, new materials for the protection of instruments against corrosion, a new design of instruments (Plant "Frezer"), the automation

Card 1/2

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Conference of Laboratory Workers of Plants Manufacturing SOV/32-25-4-69/71
Instruments and Machines

of the chemical cleaning of files (File Manufacturers), and hardening with high-frequency current heating (File Manufacturers and Tashkentskiy Instrumental'nyy zavod (Tashkent Instrument Plant)) etc. It is recommended in the decisions of the conference to complete the technology of instrument manufacture according to the method of plastic deformation, to develop new compositions of instrument steels etc. The question of the standardized manufacture of instruments for plants operating with thermal processes was also discussed, and it was recommended to improve the exchange of experience among plant laboratories.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

MIKHAYLOVA, P.K.; IMSHENNIK, K.P., kand. tekhn.nauk, red.; SEMENCHENKO, V.A., red. izd-va; DEMKINA, N.F., tekhn. red.

[Methods for the structural metallographic analysis of hard alloys]Metodika strukturnogo metallograficheskogo analiza tverdykh splavov. Pod red. K.P.Imshennika. Moskva, Mashgiz, 1962. 38 p. (MIRA 16:3)

(Nonferrous alloys--Metallography)
(Ceramic metals--Metallography)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

S/020/60/131/06/16/071
B014/B007

AUTHOR: Imshennik, V. S.

TITLE: The Isothermal Burst of a Gas Cloud

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 131, No. 6, pp. 1287 - 1290

TEXT: It is shown in the present paper that in the isothermal case an asymptotic solution for the problem of the burst of a gas cloud exists. In the investigation carried out forces of internal attraction and of the magnetic field are not taken into account. Equation (1) the particular solution of the one-dimensional gas dynamic equation for a constant temperature as suggested by A. D. Sakharov is given. This particular solution is brought into the forms (2) and (3) respectively for the case investigated, which are known from publications (Refs. 1-3). Solutions of this kind were obtained in papers by L. I. Sedov et al. (Ref. 5) for the isoentropic motion of a gas. As the most important property of this solution its asymptotic character for an arbitrary initial distribution of the density and the velocity of motion of the gas are described. In the case of an isoentropic burst there exists no asymptotic solution, and it is therefore possible, by using the solution for the isothermal burst, immediately to show the asymptotic

Card 1/2

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The Isothermal Burst of a Gas Cloud

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character of solutions (2) and (3) respectively for the initial distribution of gas density. Two regions are obtained for the solution of the initial distribution of gas density: the region of isothermal incident rarefaction waves, and the region of waves reflected from the center. It is further shown that within the entire region the reflected waves coincide asymptotically with the solutions (2) and (3) respectively. For the incident rarefaction waves this does not hold. The author assumes that (2) and (3) are asymptotic also for an arbitrary initial density distribution and the velocity of motion of the gas. Finally, the author gives a criterion (9) for the applicability of the formula for the isothermal burst, in which only processes like the so-called true absorption of emission are taken into account in the gas. In conclusion, the author thanks A. D. Sakharov, Yu. A. Romanov, and I. N. Mikhaylov for discussing the problem. There are 8 Soviet references.

PRESENTED: December 25, 1959, by A. D. Sakharov, Academician

SUBMITTED: March 5, 1959

Card 2/2

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B109/B207

24.2120 (3717, 3817, 1538)

AUTHORS: Imshennik, V. S., Morozov, Yu. I.

TITLE: Analysis of the instability of a beam of charged particles in an electron plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 640-649

TEXT: In continuation of papers by D. Bohm, E. P. Gross (Phys. Rev., 75, 1851, 1949), A. I. Akhiyezer, Ya. B. Faynberg (ZhETF, 11, 1262, 1951), and G. V. Gordeyev (ZhETF, 27, 24, 1954), the instability caused by excitation of longitudinal electron vibrations is studied on the assumption that the velocity of the beam particles be considerably higher than the thermal velocity of plasma electrons. According to L. D. Landau and M. Ye. Gertsenshteyn, the dispersion relation reads

$$\frac{4\pi ie^2}{km}\int_0 \frac{df_o}{du}\frac{du}{p+iku} = 1 \qquad (1),$$

where $p = \Gamma - i\Omega$; the distribution function reads

Card 1/10

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$$f_0 = n_0\left\{\frac{1}{\sqrt{2\pi}V_0}\exp\left[-\frac{u^2}{2V_0^2}\right] + \frac{\alpha}{\sqrt{2\pi}V_1}\exp\left[-\frac{(u-U)^2}{2V_1^2}\right]\right\} \qquad (2)$$

($\alpha = mn_1/Mn_0$; M denotes the mass of the beam particles, m the electron mass, n_1 the density of the beam particles, n_0 the density of the electron plasma, and U the beam velocity).

$$\frac{1}{\mu\varkappa^2}(1 + i\sqrt{\pi}\xi_0 W(\xi_0)) + \frac{\alpha}{\nu\varkappa^2}(1 + i\sqrt{\pi}\xi_1 W(\xi_1)) = -1, \qquad (3)$$

is obtained from (1) and (2), where

$$\left.\begin{aligned} &\mu^{1/2} = \frac{V_0}{U} = \frac{1}{U}\sqrt{\frac{k_0T_0}{m}};\ \nu^{1/2} = \frac{V_1}{U} = \frac{1}{U}\sqrt{\frac{k_0T_1}{M}};\ \varkappa = \frac{kU}{\Omega_0};\\ &\Omega_0 = \sqrt{\frac{4\pi n_0 e^2}{m}},\\ &\xi_0 = \frac{\omega}{\sqrt{2\mu}\varkappa} + i\frac{\gamma}{\sqrt{2\mu}\varkappa};\ \xi_1 = \frac{1}{\sqrt{2\nu}}\left(\frac{\omega}{\varkappa} - 1\right) + i\frac{\gamma}{\sqrt{2\nu}\varkappa};\\ &\omega = \frac{\Omega}{\Omega_0};\ \gamma = \frac{\Gamma}{\Omega_0}. \end{aligned}\right\} \qquad (4);$$

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W denotes the functions

$$W(\xi)=e^{-\xi^2}\left(1+\frac{2i}{\sqrt{\pi}}\int_0^{\xi}e^{t^2}dt\right). \qquad (5)$$

investigated by V. N. Fadeyeva and N. M. Terent'yev (Tablitsy znacheniy integrala veroyatnostey ot kompleksnogo argumenta, M., 1954). If (3) is applied to the case of a monochromatic beam and a cold plasma, the following equation holds:

$$\frac{1}{\eta^2-3\varkappa^2\mu}+\frac{a}{(\eta-\varkappa)^2-3\varkappa^2\nu}=1,\ \eta=\omega+i\gamma. \qquad (6)$$

from which

$$\frac{1}{\sqrt{2\mu}\cdot\varkappa}|\omega+i\gamma|\gg 1,\quad \frac{1}{\sqrt{2\nu}\cdot\varkappa}|\omega-\varkappa+i\gamma|\gg 1. \qquad (7)$$

follows for the limit of applicability of hydrodynamic approximations, and from which at $\nu=\mu=0$, the simple relation

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$$\left.\begin{aligned} x_{max} &= (1+\alpha^{1/3})^{2/3}, \\ \omega(x_{max}) &= (1+\alpha^{1/3})^{1/3}. \end{aligned}\right\} \qquad (10)$$

follows, where $\chi_{max}(\alpha)$ is the wave number of the limit of vibration excitations. Furthermore,

$$\left.\begin{aligned} x_{opt.} &\approx 1+\frac{3}{2^{2/3}}\alpha^{2/3}-\frac{1}{4}\alpha, \\ \omega(x_{opt.}) &\approx 1-\frac{1}{2^{1/3}}\alpha^{1/3}+\frac{3}{2^{2/3}}\alpha^{2/3}-\frac{5}{16}\alpha, \\ \gamma(x_{opt.}) &\approx \frac{3^{1/2}}{2^{1/3}}\alpha^{1/3}-\frac{3^{1/2}}{2^{2/3}}\alpha^{2/3}+\frac{3^{1/2}}{16}\alpha. \end{aligned}\right\} \qquad (13)$$

(Fig. 1a), where $\chi_{opt} = \chi$ for maximum $\gamma(x)$ (Fig. 1б: $\gamma(\alpha)$, $\omega(\alpha)$ at $\chi = \chi_{opt}$). Fig. 2 shows the course of $\gamma(\chi)$, $\omega(\chi)$ at $\alpha = 10^{-3}$. In first approximation, the heat-correcting equations ($\mu \neq 0$, $\nu \neq 0$) are for $\alpha \ll 1$ read

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$$\left.\begin{aligned} x_{\text{опт.}} &\approx 1+\frac{3}{2}\mu+\frac{3\cdot 2^{1/3}}{\alpha^{1/3}}\nu, \\ \omega(x_{\text{опт.}}) &\approx 1+\frac{3}{2}\mu+\frac{3}{2^{2/3}\alpha^{1/3}}\nu, \\ \gamma(x_{\text{опт.}}) &\approx \frac{3^{1/3}}{2^{1/3}}\alpha^{1/3}\left(1-\frac{\mu}{2}\right)-\frac{3^{1/3}}{2^{1/3}\alpha^{1/3}}\nu. \end{aligned}\right\} \quad (15).$$

For $\alpha = 1$ one has

$$x_{\text{опт.}} \approx \sqrt{3}+\frac{7\cdot 3^{1/3}}{2}\nu, \quad \omega(x_{\text{опт.}}) \approx \frac{\sqrt{3}}{2}+\frac{7\cdot 3^{1/3}}{4}\nu, \quad \gamma(x_{\text{опт.}}) \approx \frac{1}{2}-\frac{9}{4}\nu. \quad (16).$$

Assuming $\mu = \nu$ and using (10) one obtains

$$\begin{aligned} x_{\max} &= (1+\alpha^{1/3})^{3/2}+\frac{3}{2}(1+\alpha^{1/3})^{3/2}\mu+\frac{9}{2}(1+\alpha^{1/3})^{3/2}\frac{1}{\alpha^{1/3}}\nu, \\ \omega(x_{\max}) &= (1+\alpha^{1/3})^{3/2}+\frac{1}{2}(1+\alpha^{1/3})^{3/2}(3+4\alpha^{1/3})\mu-\frac{1}{2}(1+\alpha^{1/3})^{3/2}\frac{1}{\alpha^{1/3}}\nu. \end{aligned} \quad (17).$$

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In accordance with (7), these equations lead to

$$\frac{\nu^{1/2}}{\alpha^{1/3}} \ll 1, \quad \mu^{1/2} \ll 1 \qquad (18).$$

If, however,

$$\frac{\nu^{1/2}}{\alpha^{1/3}} \gg 1, \quad \mu^{1/2} \ll 1 \qquad (19),$$

$$\Gamma = \frac{\pi}{2} \frac{\Omega^3}{k^2} \frac{df_o}{du}\bigg|_{u=\frac{\Omega}{k}} \qquad (20a)$$

is obtained from (3) in first approximation. This permits a simple estimation of the maximum γ; $\varkappa_{opt}$ is determined from the condition $(\varkappa - \omega)^2 = \nu\varkappa^2$, so that for $\omega \approx 1$ one finds $\gamma \approx \frac{\alpha}{\nu}$. R. I. Izraileva (unpublished paper) determined the limits of the range of vibration excitations on the basis of (3); Fig. 3 shows the dependence of the limits

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$\varkappa_{lower}$ (I), $\varkappa_{upper}$ (II), $\varkappa_{hydro} = \varkappa_{max}$ (III) on ν at $\alpha = 10^{-3}$, $\mu = 0.5 \cdot 10^{-4}$. The comparatively great difference between $\varkappa_{hydro}$ and $\varkappa_{upper}$ is due to (18). If

$$\rho = n_0 a_0 \exp\left[i(\vec{k}\vec{r}) + pt\right], \quad \rho_1 = \alpha' n_1 a_1 \exp\left[i(\vec{k}\vec{r}) + pt\right] \quad \text{(I)}$$

is substituted for the perturbed values of the plasma and the beam,

$$\left|\frac{a_1}{a_0}\right| = \frac{M(\alpha)}{\alpha'}, \quad M(\alpha) = \sqrt{[\omega^2 + \gamma^2 - 1]^2 + 4\gamma^2},$$

$$\operatorname{tg}\varphi = \pm\frac{2\gamma\omega}{\omega^2 - \gamma^2 - 1}, \quad \cos\varphi = \pm\frac{\omega^2 - \gamma^2 - 1}{M(\alpha)}, \quad \alpha' = \frac{n_1}{n_0}. \qquad (21)$$

follows from the hydrodynamic equations on the assumption that (18) holds for the amplitude and phase of vibrations (+ electron beam, - ion beam). If only $\alpha = 1$ (electron beam) is considered, equation

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23718

Analysis of the instability of a beam of... S/057/61/031/006/002/019 B109/B207

$$\left.\begin{aligned} E &= E_0 \exp\left(\frac{\Omega_0 t}{2}\right)\cos\psi, \\ \rho_1 &= n_0 E_0 \frac{e\sqrt{3}}{mU\Omega_0}\exp\left(\frac{\Omega_0 t}{2}\right)\cos\left(\psi-\frac{\pi}{6}\right), \\ \rho_0 &= n_0 E_0 \frac{e\sqrt{3}}{mU\Omega_0}\exp\left(\frac{\Omega_0 t}{2}\right)\cos\left(\psi-\frac{5}{6}\pi\right), \\ u_1 &= E_0 \frac{e}{m\Omega_0}\exp\left(\frac{\Omega_0 t}{2}\right)\cos\left(\psi-\frac{4}{3}\pi\right), \\ u_0 &= E_0 \frac{e}{m\Omega_0}\exp\left(\frac{\Omega_0 t}{2}\right)\cos\left(\psi-\frac{2}{3}\pi\right). \end{aligned}\right\} \quad (22)$$

is obtained for the electric field E and for velocity perturbations in the plasma u_0 and in the beam u_1 in the particular case of an asymptotic wave; here

$$\psi = \sqrt{3}\frac{\Omega_0}{U}x - \frac{\sqrt{3}}{2}\Omega_0 t \qquad (II),$$

wherefrom all other properties of the waves can be deduced. The authors thank Yu. I. Kuznetsov, L. I. Shibarshov, Yu. A. Romanov, E. Z. Tarumov, V. A. Teplyakov, and G. F. Filippov for valuable advice. There are 3

Card 8/10

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23718

Analysis of the instability of a beam of... S/057/61/031/006/002/019
B109/B207

figures, 1 table, and 16 references: 7 Soviet-bloc and 9 non-Soviet-bloc.

SUBMITTED: September 16, 1960

Legend to Fig. 1a:
1) $\varkappa_{max}$, $\varkappa_{opt}$.

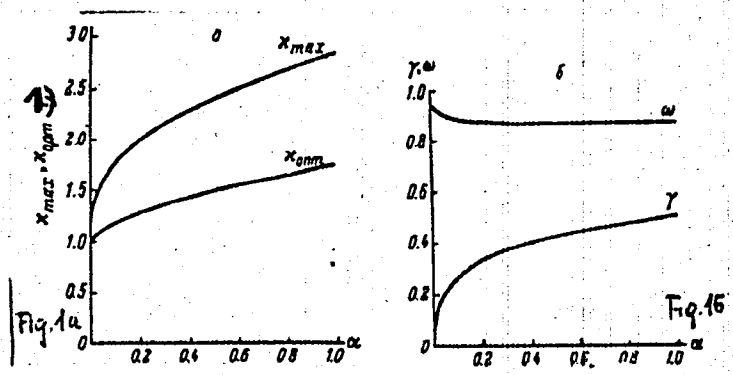

Fig. 1a

Fig. 1б

Card 9/10

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29572
S/033/61/038/004/006/010
E032/E514

26.2311

AUTHOR: Imshennik, V. S.

TITLE: On the thermal conductivity of plasma

PERIODICAL: Astronomicheskiy zhurnal, 1961, Vol.38, No.4, pp.652-655

TEXT: The thermal conductivity can be computed by the Chapman-Anskog method as described by S. Chapman and T.G.Cowling (Ref.1: The mathematical theory of non-uniform gases", Cambridge University Press, 1939). Such calculations have been reported by Chapman (Ref.2: Astrophys. J., 120, 151, 1954) and the quantitative result obtained by him turned out to be very inaccurate. Chapman confined his calculations to the first approximation only and assumed that the correction which would be introduced by taking the second approximation in the case of plasma would be less than 25%. However, this assumption is only correct in the case of a simple gas. It may be shown that the second approximation leads to an increase in the thermal conductivity of plasma by a factor of 2.5 as compared with the first approximation in the case of $Z = 1$, and by a factor of 8 in the case of $Z \gg 1$. The thermal

Card 1/5

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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conductivity monotonically increases with Z and M, where M is the ratio of the ion and the electron masses. The present author has carried out calculations using the method described in Ref.1 and has found the following expression for the thermal conductivity of plasma

$$[\lambda]_2 = [\lambda_e]_1 \cdot \frac{433}{604} \cdot \frac{1 + \frac{180\sqrt{2}}{433}\frac{1}{Z} + \frac{1375\cdot\sqrt{2}}{144}\frac{1}{Z}\frac{1}{M^{1/2}} + \frac{6875}{866}\frac{1}{Z^2}\frac{1}{M^{1/2}} + \frac{265\sqrt{2}}{866}\cdot\frac{1}{Z^3}\cdot\frac{1}{M^{1/2}} + \frac{755}{433}\cdot\frac{1}{Z^4}\frac{1}{M^{1/2}} + \frac{180\sqrt{2}}{433}\frac{1}{Z^5}\frac{1}{M^{1/2}}}{1 + \frac{53}{151\cdot\sqrt{2}}\cdot Z + \frac{72}{151\cdot\sqrt{2}}\cdot\frac{1}{Z} + \frac{72875}{21744}\frac{1}{M^{1/2}} + \frac{1375\cdot\sqrt{2}}{144}\frac{1}{Z}\frac{1}{M^{1/2}} + \frac{1375}{302}\frac{1}{Z^2}\cdot\frac{1}{M^{1/2}}}, \quad (1)$$

where as before (Ref.1)

$$[\lambda_e]_1 = \frac{75}{64}\cdot k\cdot\left(\frac{kT}{\pi m_e}\right)^{1/2}\cdot\left(\frac{2kT}{e^2}\right)^2\cdot\frac{1}{L}. \quad (2)$$

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In these expressions k is Boltzmann's constant, m_e is the electronic mass, T is the plasma temperature (assumed equal for ions and electrons), $L = \ln\left[1 + (4dkT/e^2)^2\right]$ and d is the average distance between the plasma particles. In order to show that the second approximation is entirely sufficient, one can use the Lorentz approximation in the case of large Z and M, i.e. the ions are stationary and the electrons do not collide with each other. The problem can then be solved exactly and the electron distribution function is of the form

$$\Phi(x, v_x, v) = n\beta^3\pi^{-\frac{3}{2}}\exp(-\beta^2v^2)\left[1 + v_x \cdot h_x(v)\right], \tag{7}$$
$$\beta = \left(\frac{m_e}{2kT}\right)^{1/2}, \qquad h_x(v) = (4 - \beta^2v^2)\frac{v^2}{CT}\cdot\frac{dT}{dx},$$
$$C = 2\pi nZ\left(\frac{e^2}{m_e}\right)^2 L,$$

where n is the number of electrons per unit volume. Hence one can calculate the energy flux $q_x = \int v_x \cdot \frac{m_e}{2} \cdot v^2 \cdot \Phi(x, v_x, v)\, d\vec{v}$,

Card 3/5

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

and the corresponding thermal conductivity is (Ref.6: L.Spitzer,Jr: "Physics of fully ionized gases" (Russian translation, Moscow, 1957))

$$\lambda_A = \frac{3.60}{Z} \cdot k \left(\frac{kT}{\pi m_e}\right)^{1/2} \left(\frac{2kT}{e^2}\right)^2 \frac{1}{L}. \quad (8)$$

On the other hand, when $Z \gg 1$ it can be shown from Eqs.(1) and (2) that

$$[\lambda]_2 = \frac{433 \cdot \sqrt{2}}{212 \cdot Z} \cdot [\lambda_c]_1 = \frac{3.39}{Z} k \left(\frac{kT}{\pi m_e}\right)^{1/2} \left(\frac{2kT}{e^2}\right)^2 \cdot \frac{1}{L}. \quad (6)$$

Comparison of Eqs.(6) and (8) show that the difference between $[\lambda]_2$ and λ_A is less than 10%. In the special case of a hydrogen plasma $Z = 1$ and $\sqrt{M} = 42.9$. There,

$$[\lambda]_2 = 0{,}845 \cdot k \left(\frac{kT}{\pi m_0}\right)^{1/2} \left(\frac{2kT}{e^2}\right)^2 \cdot \frac{1}{L} + 0{,}033 \cdot k \left(\frac{kT}{\pi m_0}\right)^{1/2} \left(\frac{2kT}{e^2}\right)^2 \cdot \frac{1}{L}. \quad (4)$$

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On the thermal conductivity of plasma

29572
S/033/61/038/004/006/010
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It is concluded that the thermal conductivity, calculated from Eqs.(1), (4) and (6), gives the correct result to within 10 to 20% for all the possible values of Z and M. There are 7 references: 2 Soviet (1 a translation from English) and 5 non-Soviet. The other three English-language references read as follows: Ref.3: R. Landshoff, Phys. Rev., 76, 804, 1949; Ref.4: R. S. Cohen, L. Spitzer, P. Routly, Phys. Rev., 80, 230, 1950; L. Spitzer, R. Härm, Phys. Rev., 89, 977, 1953.

SUBMITTED: September 23, 1960

Card 5/5

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

S/208/62/002/002/002/014
D234/D301

AUTHOR: Imshennik V.S. (Moscow)

TITLE: Numerical integration of differential equations of the structure of a shock wave in plasma

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 2, no. 2, 1962, 207 - 216

TEXT: The author quotes the equations in question from a previous paper, and considers only the case when radiation can be neglected. The equations are transformed into a single differential equation of the first order, containing electron temperature as a function of mass velocity. Dimensionless variables are introduced. Results of qualitative analysis of the equation for the values of parameters $\gamma = 5/3$, $Z = 1$, $\Phi_0 = 3.20$, γ being the effective exponent of the adiabatic curve, Z the ion charge [Abstractor's note: Φ_0 not defined], are described in detail. It is stated that the qualitative conclusions remain valid also for other values of the parameters (in the first place, the conclusion of the existence of a continuous and a discontinuous solution). Results of numerical

Card 1/2

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integration for several values of the parameters are given. The author expresses his gratitude to V.D. Shafranov for discussion and to M.G. D'yakonikhina for numerical integration of the equations. There are 9 figures, 1 table and 5 Soviet-bloc references.

SUBMITTED: October 27, 1961

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

IMSHENNIK, V.S.

Zemplene's theorem for a hot gas with radiation. Astron.zhur. 39 no.3:545-546 My-Je '62. (MIRA 15:5)
(Gases at high temperatures)

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3.2320 (also 1049)
24.6711
17.4100
10.1410

34014
S/056/62/042/001/036/048
B125/B102

AUTHOR: Imshennik, V. S.

TITLE: Structure of shock waves in a high-temperature dense plasma

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 236-246

TEXT: The structure of shock waves in a plasma qualitatively studied by Ya. B. Zel'dovich (ZhETF, 32, 1126, 1957) and quantitatively studied by V. D. Shafranov (ZhETF, 32, 1453, 1957) can be satisfactorily described with lacking external fields but by taking account of the radiation by hydrodynamic two-temperature approximation with allowance for electronic heat conduction and heat transfer. The present theory applies only for a sufficiently dense plasma. An electrically neutral ideal plasma can be described by the equation of state
$p = p_i + p_e$, $E = E_i + E_e$, $p_i = NkT$, $p_e = NZk\Theta$, $E_i = p_i/(\gamma-1)\varrho$,
$E_e = p_e/(\gamma-1)\varrho$ (1.3) of an ideal gas (where in general $\gamma \neq 5/3$). The equation of motion for this plasma is

Card 1/5

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Structure of shock waves ...

$$\left(1+\frac{Zm}{M}\right)\frac{\partial}{\partial t}(\rho v_i) = -\frac{\partial \Pi'_{ik}}{\partial x_k}, \quad \Pi'_{ik} = \Pi_{ik} + \pi_{ik}, \qquad (1.4),$$
$$\Pi_{ik} = p\delta_{ik} + \left(1+\frac{Zm}{M}\right)\rho v_i v_k - \sigma'_{ik}$$

the energy conservation law

$$\frac{\partial}{\partial t}\left[\rho\left(1+\frac{Zm}{M}\right)\frac{v^2}{2} + \rho(E_i + E_e) + u_r\right] = -\operatorname{div}\left\{\rho \mathbf{v}\left[\left(1+\frac{Zm}{M}\right)\frac{v^2}{2} + \right.\right. \qquad (1.6)$$
$$\left.\left. + w_i + w_e\right] + \mathbf{F}_i + \mathbf{F}_e - (\sigma'_i \mathbf{v}) - (\sigma'_e \mathbf{v}) + \mathbf{F}_r\right\}.$$

and the entropy equation

$$\rho\Theta\, dS_e/dt = -\operatorname{div}(\mathbf{F}_e + \mathbf{F}_r) + \operatorname{div}(\sigma'_e \mathbf{v}) - \qquad (1.11)$$
$$- \mathbf{v}\operatorname{Div}(\sigma'_e - \pi) + c(\Theta, T, \rho) - \partial u_r/\partial t.$$

for an electron gas under the action of radiation, T and Θ are the electron and ion temperatures respectively, Θ ≠ T. The structure of a plasma shock wave with allowance for emission is described by

Card 2/5

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B125/B102

Structure of shock waves ...

$$\rho v = \rho_1 v_1 = j,$$

$$p + \rho v^2 + \pi_{xx} = p_1 + \rho_1 v_1^2 + \pi_{xx1},$$

$$v^2/2 + w - j^{-1}\varkappa_e d\Theta/dx + j^{-1}F_{rx} = v_1^2/2 + w_1 + j^{-1}F_{rx1}.$$

$$\frac{dE_e}{dx} + p_e \frac{d}{dx}\left(\frac{1}{\rho}\right) = \frac{1}{j}\frac{d}{dx}\left(\varkappa_e \frac{d\Theta}{dx}\right) - \frac{1}{j}\frac{dF_{rx}}{dx} + \frac{v}{j}\frac{d\pi_{xx}}{dx} + \frac{c(\Theta, T, \rho)}{j}. \quad (1.13\text{-}1.16)$$

where $\rho = (mZ + M)N$; $j > 0$). The equations (1.13) to (1.16) are consistent with the corresponding equations of V. D. Shafranov and S. I. Braginskiy (ZhETF, 35, 459, 1957). The rate of propagation in the isothermal case is always lower than in the adiabatic case. The nontrivial case

$$c_{1is} < v_1, \quad c_{1ad} < v_1, \quad c_{2ad} > v_2, \quad c_{2is} < v_2 \quad (2.3)$$

which is therefore possible does not characterize the instability of the front of the shock wave with respect to spontaneous emission of the perturbations with $\lambda < \lambda$ propagating isothermally. The subscripts is and ad

Card 3/5

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

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denote "isothermal" and "adiabatic", respectively. The exact criterion $c^*_{2is} = v_2$ with $c^*_{is} = \left[(\partial p_e/\partial \varrho)_\theta + (\partial p_i/\partial \varrho)_{S_i}\right]^{1/2}$ for the boundary between steady and nonsteady solutions of the set of equations (1.13)-(1.16) follows from the condition $c_{1is} < v_1$, $c_{1ad} < v_1$, $c_{2ad} > v_2$, $c_{2is} > v_2$ for a perturbation characterized by two parameters. From $c^*_{2is} = v_2$ and from the Hugoniot adiabates

$$at_2/u_2 + \frac{1}{3}au_2^4 + u_2 = at_1 + \frac{1}{3}au_1^4 + u_1, \tag{3.2}$$

$$\frac{1}{2}u_2^2 + bt_2 + \frac{4}{3}au_2^4 = \frac{1}{2} + bt_1 + \frac{4}{3}au_1^4, \tag{3.3}$$

$$a = 1 + Z, \quad b = \frac{\gamma}{\gamma - 1}(1 + Z), \quad a = \left[\frac{(M + Zm)\sigma_1^2}{k}\right]^4 \frac{\sigma}{jv_1}$$

with $t = kT(M + Zm)v_1^2$ written in dimensionless form and with allowance for radiation equation

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34014

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B125/B102

Structure of shock waves ...

$$\frac{d\Theta}{dv}=\left(w_e+w_l+\frac{v^2}{2}+\frac{F_{rx}}{l}-w_1-\frac{F_{rx1}}{l}-\frac{v_1^2}{2}\right)\left(\frac{A\Theta}{v}+\frac{\gamma+1}{\gamma-1}v+\right.$$
$$\left.+\frac{1}{\gamma-1}\frac{v}{l}\frac{d\pi_{xx}}{dv}+\frac{\gamma}{\gamma-1}\frac{\pi_{xx}}{l}-\frac{\gamma}{\gamma-1}\frac{p_1}{l}-\frac{\gamma}{\gamma-1}\frac{\pi_{xx1}}{l}-\frac{\gamma}{\gamma-1}v_1\right)\times \qquad (3.13)$$
$$\times\left\{\frac{A}{\gamma-1}\left(w_1+\frac{F_{rx1}}{l}+\frac{v_1^2}{2}-w_e-w_l-\frac{v^2}{2}-\frac{F_{rx}}{l}\right)+\frac{q(\Theta,T,p)\varkappa_e}{l^3}\right\}^{-1}.$$

is obtained for the structure of the shockwaves in a plasma. The entire domain of the solutions is divided into a domain with steady and with nonsteady solutions. Academician Ya. B. Zel'dovich and Yu. P. Rayzer are thanked for discussions. The following monographs are mentioned: L. D. Landau, Ye. M. Lifshits (Mekhanika sploshnykh sred, Gostekhizdat, 1953); L. D. Landau, Ye. M. Lifshits (Statisticheskaya fizika, Gostekhizdat, 1951); S. Chandrasekar (Vvedeniye v ucheniye o stroyenii zvezd, IIL, 1950); V. A. Belokon' (ZhETF, 36, 341, 1959). There are 1 figure, 2 tables, and 11 references: 9 Soviet and 2 non-Soviet. The reference to the English-language publication reads as follows: R. Letter. Phys. Rev., 99, 1854, 1955.

SUBMITTED: August 4, 1961

Card 5/5

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L 15571-63 EWA(b)/EPF(c)/EWT(1)/EPF(n)-2/BDS AFFTC/ASD/AFWL/SSD

Pa-4/Pr-4/Pu-4

ACCESSION NR: AP3002798 S/0207/63/000/003/0003/0010

7
69

AUTHORS: Imshennik, V. S.; Morozov, Yu. I. (Moscow)

TITLE: Tensor of energy-impulse radiation in a moving medium under conditions close to equilibrium

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 3, 1963, 3-10

TOPIC TAGS: radiation, hydrodynamics, relativity, tensor

ABSTRACT: In a system of hydrodynamic equations at high temperatures there must be included terms which take into account the role of radiation and also an equation describing the transfer of radiation. Thus it is possible to arrive at an equation of radiational hydrodynamics. The basic problem to be solved consists of the formulation of a relativistically covariant kinetic equation of transfer of radiation with consideration of the motion in the medium. The most significant contributions to this problem were made by L. H. Thomas (The radiation field in a fluid in motion. The Quarterly Journal of Mathematics, Oxford Series, 1930 vol. 1.) and D. L. Sindzh (Relyativistskiy gaz. M., GIIL, 1960). A system of equations

Card 1/3

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ACCESSION NR: AP3002798

of radiational hydrodynamics for the general relativistic case was written by V. A. Prokof'yev (Uravneniye perenosa v relyativistskoy radiatsionnoy gidrodinamike DAN SSSR, 1961, 140, str. 1033.). In equations describing motion in a medium, radiation occurs in the form of a divergence tensor of energy-impulse radiation. Generally speaking, the form of this tensor is very complicated and must be considered simultaneously with equations of the medium and the equation of transfer of radiation. Under conditions close to equilibrium, this tensor can be computed by successive approximations. The authors consider a general equation obtained from a sum of tensors--medium and radiation. Such a procedure greatly simplifies problems of radiational hydrodynamics. By restricting computation of the tensor of energy-impulse to the second approximation (considering hydrodynamic variable terms linear in the gradient), a generalization of the approximation of the radiational heat conductivity is obtained by introducing the mean according to Rosseland; see S. Chandrasekar (Vvedeniye v ucheniye o stroyeniy zvezd. M., IL, 1950) and D. A. Frank-Kamenetskiy (Fizicheskiye protsessy* vnutri zvezd. M., Gos. izd. fiz.-mat. lit., 1959). The authors compute the tensor of energy-impulse of radiation in this approximation. This tensor was computed earlier by Thomas (op. cit.) but his computational procedure is nonstandard and leads to a cumbersome integral.

Card 2/3

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

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ACCESSION NR: AP3002798

The basis of the authors' method is computation of the tensor of energy-impulse of radiation in the natural system of reference and then its transformation to a fixed system of reference by the formula of tensor computation. Thus, the solution of a very wide class of problems of radiational hydrodynamics can be obtained on the basis of several of the derived equations and, for the elementary Galilean case, from some other formulas. Orig. art. has: 51 formulas.

ASSOCIATION: none

SUBMITTED: 14Mar63 DATE ACQ: 16Jul63 ENCL: 00

SUB CODE: PH, AI NO REF SOV: 006 OTHER: 001

Card 3/3

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D'YACHENKO, V.F. (Moskva); IMSHENNIK, V.S. (Moskva)

Incoming cylindrical shock wave in a plasma, taking the front structure into account. Zhur. vych. mat. i mat. fiz. 3 no.5: 915-926 S-O '63. (MIRA 16:11)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

ACCESSION NR: AP4034267 S/0207/64/000/002/0008/0021

AUTHORS: Imshennik, V. S. (Moscow); Morozov, Yu. I. (Moscow)

TITLE: Shock-wave structure including momentum transfer and radiation energy

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 2, 1964, 8-21

TOPIC TAGS: shock wave front, radiation transfer, absorption coefficient, radiation hydrodynamics, shock wave, viscous discontinuity, radiation equilibrium, Eddington method, diffusion approximation

ABSTRACT: The nonlinear problem of shock-wave front structure with radiation transfer at relatively small speeds, when $\beta = v/c \ll 1$, has been considered. The following simplifying assumptions are made: the undisturbed medium with constant density ρ_0 has zero temperature, the absorption coefficient is independent of frequency, the equation of state of an ideal gas is used, and the angular radiation intensity distribution is given according to the Eddington method. Using the following nondimensional coordinates

$$\boxed{A = \frac{RT_1}{D^2}, \quad q = \frac{D}{v}, \quad \eta = \frac{\rho_0}{\rho}, \quad r = \frac{\gamma - 1}{\gamma + 1}}, \qquad (1)$$

Card 1/4

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ACCESSION NR: AP4034267

the set of nonrelativistic radiation hydrodynamic equations according to Eddington are written as

$$\boxed{\begin{gathered} At = \eta^2\left(1-\eta-\frac{K}{2}\right), \qquad S = \frac{q}{r}\left[(1-\eta)(\eta-r) - K\eta\frac{1+r}{2}\right] \\ \frac{dK}{d\tau} = -S - q\eta\left(K + 3\delta_1 t^4\right) \\ \frac{dS}{d\tau} = -3\left(K - \delta_1 t^4\right) - q\eta\left[S + q\eta\left(K + 3\delta_1 t^4\right)\right] \end{gathered}} \tag{2}$$

under initial equilibrium boundary conditions

$$\boxed{K = S = t = 0, \qquad \eta = 1} \tag{3}$$

and final equilibrium boundary conditions

$$\boxed{K = \delta_1, \quad S = -4q\eta_1\delta_1, \quad t = 1, \quad \eta = \eta_1 .} \tag{4}$$

To solve these equations approximately, the shock-wave region is divided into

Card 2/4

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

ACCESSION NR: AP4034267

three parts: the region of strong nonequilibrium, radiation-heated equilibrium region before the viscous discontinuity, and region behind the viscous discontinuity with constant radiation density. For each region a value of η is calculated by applying the appropriate approximations ($K \gg \delta_1 t^4$, $K = \delta_1 t^4$ and $K = \delta_1$, respectively). A qualitative analysis is then proposed for the diffusion approximation of the Eddington equations. The K and 3 are assumed to be independent variables in a KS plane phase analysis, and the Eddington equations are written in the form of an expansion, or

$$\begin{aligned} dK / d\tau &= a(K_j, S_j)(K - K_j) + b(K_j, S_j)(S - S_j) \\ dS / d\tau &= c(K_j, S_j)(K - K_j) + d(K_j, S_j)(S - S_j) \end{aligned} \quad (5)$$

A qualitative representation of integral curves calculated for $\delta_1 \ll 1$, $\delta_1 \sim 1$, $\delta_1 \approx 12/7$ is given graphically. Appendices are added for the angular approximation of the radiation transfer equations and a mean transfer equation when $\beta \neq 0$. Orig. art. has: 3 figures and 84 formulas.

Card 3/4

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ACCESSION NR: AP4034267

ASSOCIATION: none

SUBMITTED: 10Jan64 ATD PRESS: 3060 ENCL: 00

SUB CODE: ME NO REF SOV: 008 OTHER: 003

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

[illegible] EWT(1)/[illegible]/EWG(m)/EPA(w)-2 Pz-6/Po-4/Pab-10/Pi-4 IJP(c)

[illegible]

AC [illegible] S/0207/65/000/001/0003/0013

[illegible] Emshennik, V. S. (Moscow [illegible]

[illegible]

[illegible] fiziki, no. 1, [illegible]

[illegible] rarefied plasma, inelastic [illegible] plasma

[illegible] which makes it possible to determine [illegible]

[illegible]

An analysis of the equations shows the existence of an intense collective [illegible] the plasma clouds from the very start of their interpenetration. This

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ACCESSION NR: AP5[illegible]

[illegible] corresponds [illegible] the predictions of the linear theory but [illegible]

[illegible]

SUBMITTED: [illegible] ENCL: [illegible] SUB CODE: ME

[illegible]

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

L 9628-66 EWT(1)/EWP(m)/ETC/EPF(n)-2/EWG(m)/EWA(d)/FCS(k)/EWA(h)/EWA(c) LIP(c)
ACC NR: AP6000537 WW/AT SOURCE CODE: UR/0040/65/029/006/0993/0996

44,55 44,55

AUTHORS: D'yachenko, V. F. (Moscow); Imshennik, V. S. (Moscow)

82
76
B

ORG: none

TITLE: On a converging cylindrically symmetrical shock wave in the presence of dissipative effects

SOURCE: Prikladnaya matematika i mekhanika, v. 29, no. 6, 1965, 993-996

TOPIC TAGS: shock wave, ionized plasma, high temperature plasma, reflected shock wave, self similar solution

1, 44, 55 21, 44, 55

ABSTRACT: The shock wave structure of a fully ionized plasma was studied, including dissipative effects. A cylindrical geometry is assumed, and the governing equations consist of the ion-momentum equation, the ion-energy equation, and the electron-energy equation. Initial conditions consist of $\rho = \rho_0$, $u = T = \theta = 0$, and the boundary conditions are given by

$$u = 0, \quad \frac{\partial T}{\partial r} = \frac{\partial \theta}{\partial r} = 0 \quad \text{при } r = 0$$

$$\frac{dr^*}{dt} = u, \quad \frac{k}{M}\rho(T + \theta) = f(t) \quad \text{при } r = r^*$$

A pseudo-self-similar solution is assumed with the parameters ρ_0, μ_0, r_0, and ξ_0 where $tr^* = \xi_0$ and for $\gamma = 5/3$, $\nu = 1.226$. The nondimensional parameters for the

Card 1/2

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flow are then written in the form

$$\rho_0, \quad r_0 = \left(\frac{\mu_0}{\rho_0 \xi_0^4}\right)^{1/(\nu-3)}, \quad t_0 = \xi_0 r_0^\nu, \quad u_0 = \frac{r_0}{t_0}, \quad T_0 = \frac{Mf}{k}\frac{r_0^2}{t_0^2},$$

and the equations are solved numerically for a deuterium plasma. The largest difference between the above solution and a fully self-similar case was observed at the cylinder axis during shock wave reflection. The authors thank V. V. Paleychik for carrying out the numerical computations and Ya. M. Kazhdan for kindly permitting the use of the results of the self-similar solution. Orig. art. has: 9 equations and 5 figures.

SUB CODE: 20/ SUBM DATE: 26Jun65/ ORIG REF: 006/ OTH REF: 003

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610007-2

L 14966-66 EWT(1)/EWT(m)/ETC(f)/EWG(m)/EWP(t)/EWP(b)/ETC(m)-6 IJP(c) JD/WW/GW

ACC NR: AP6002687 SOURCE CODE: UR/0033/65/042/006/1154/1167

AUTHORS: Imshennik, V. S.; Nadezhin, D. K.

ORG: none

100
95
B

21,44,55

TITLE: Thermodynamic properties of matter at high densities and temperatures

SOURCE: Astronomicheskiy zhurnal, v. 42, no. 6, 1965, 1154-1167

TOPIC TAGS: supernova, positron, electron, pair production, photon, iron, helium, thermodynamics, entropy, temperature

ABSTRACT: An examination is made of the thermodynamic properties of matter in the range of densities of $10^5 \leq \rho \leq 10^{10}$ g/cm^3 and in the range of temperatures of $10^9 \leq T \leq 20 \cdot 10^9$ °K. The work is done on the basis of the hypothesis of F. Hoyle and F. A. Fowler (Astrophys. J., Suppl., 91, 201, 1964) on the outbursts of supernova type II. The calculations take into account the relativistic degenerations of electrons and positrons, the production of pairs and photons, and beta processes and nuclear reactions in a mixture of Fe^{56}, He^4, p, n. The calculations assume total statistical equilibrium. Four equations with six unknowns are obtained; e. g.,

$$n_{\pm} = 8\pi \left(\frac{m_e c}{h}\right)^3 \int_0^{\infty} F_{\pm}(\xi)\, d\xi,$$

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ACC NR: AP6002687

for the number of electrons and positrons per unit volume. A density-temperature diagram for the given ranges is shown in Fig. 1.

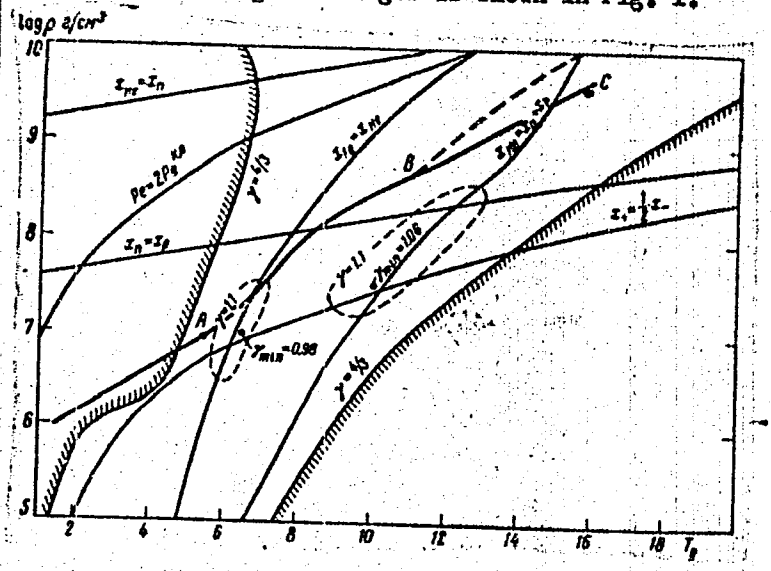

Fig. 1. Density versus temperature.

Entropy per unit mass is shown in Fig. 2.

Card 2/4

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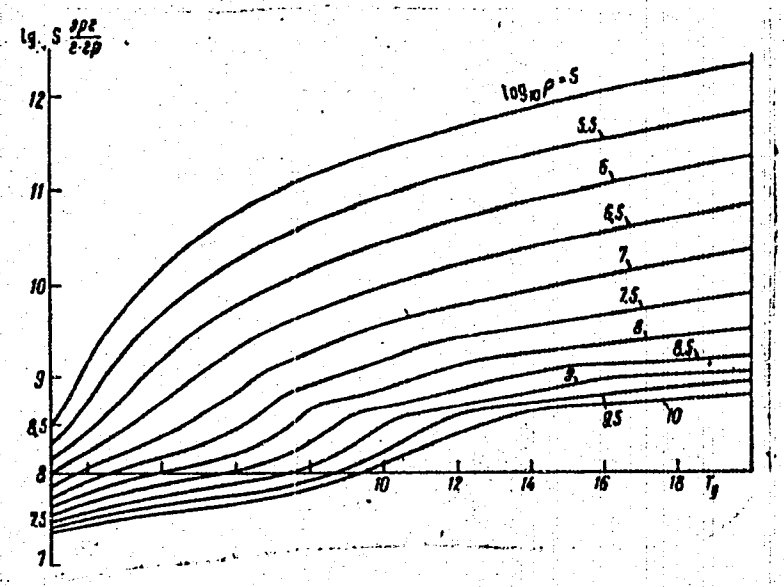

Fig. 2. Entropy per unit mass.

Neutronization at high temperatures is also studied (see Fig. 3), where q is the ratio of the number of neutrons to the number of protons, taking into account the neutrons and protons in the iron and helium nuclei. The authors thank Ya. B. Zel'dovich for discussion and guidance and I. L. Rozhdestvenskaya and V. S. Il'ina for aid in the calculations.

Card 3/4

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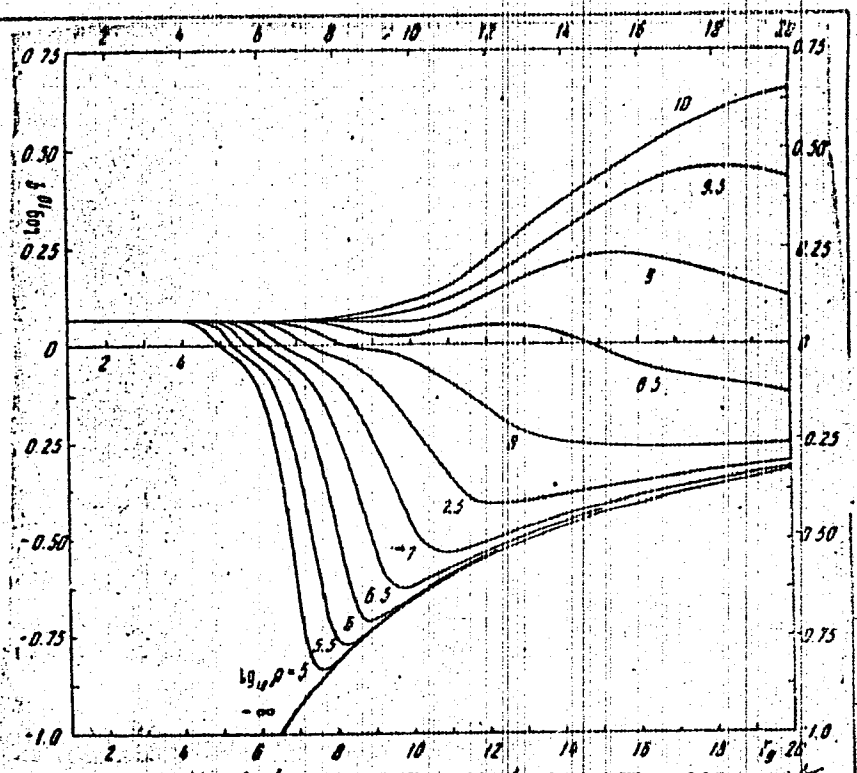
Fig. 3. Value of q.

Orig. art. has: 33 formulas and 9 graphs.



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[illegible]

[illegible] UR/0020/65/162/002/0310/0313

[illegible] Lishenko, [illegible]

[illegible] thermal inhomogeneous system

[illegible], no. 2, 1965, 310-313

[illegible] entropy, [illegible] principle, second thermodynamic law, statistical [illegible] system, additive entropy, nonadditive [illegible]

ABSTRACT: Application of the Caratheodory principle to thermal inhomogeneous systems is discussed. P. S. Epshteyn (Kurs termodinamiki, 1948) states that in a system with elements differing in temperature the entropy is nonadditive. An entirely [illegible] expressed by M. A. Leontovich (Vvedeniye v termodinamiku, 1951) [illegible] It is shown that

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