"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

The effect of frictional heat upon heat transference in the case of large gas velocities. M. P. Shirokov. *Izvest. Vsesoyuz. Teplotekh. Inst.* 1936, No. 9, 25-30; *Chem. Zentr.* 1936, I, 3877; cf. *C. A.* 31, 4855[7].—The quantity of heat transferred from the gas to the walls is calcd. according to the method of Osborn and Reynolds from the no. of particles striking the walls and the kinetic energy of the particles. The relation obtained is $q = (g.c_p.r_0/\bar{u}) \times (\theta + A(\bar{u})^2/2.g.c_p)$ where g = the const. of gravity; c_p = the sp. heat of the gas; r_0 = friction; $\bar{u}$ = the mean velocity; θ = the temp. difference between gas and wall; and A = the mech. equiv. of heat. This value of q is k times the normal value where $k = [\theta + (A(\bar{u})^2/2.g.c_p)] \div \theta$. In regions of higher velocities, comparable to the velocity of sound, the difference is considerable. The relations are calcd. for flat tubes and plates. The results obtained agree well with those of earlier measurements.

M. G. Moore

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Theory of heat exchange and flow resistance at high velocities. M. Shirokov. *Tech. Phys. U. S. S. R.* 3, 56-72(1936)(in German). - By means of the methods of Karman and Latzko a differential equation has been derived which describes the heat exchange in a cylindrical tube for a gas flowing at high velocity. Special equations have been derived for the case of an incompressible gas and it has been shown that in certain cases these equations may be applied to the more general case. Math.

Harold Gershinowitz

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

2

Mechanism of the viscosity of liquids. M. F. Shirokov (Voronezh Univ.). *Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk, Inst. Mashinovedeniya, Soveshchanie Vyazkosti Zhidkostei i Kolloid. Rastvorov (Conf. on Viscosity of Liquids and Colloidal Solns.)* 1, 25-30(1941).—Theoretical review. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

21

Combustion in a turbulent flow of heated air in a cylindrical carbon canal. M. F. Shirokov and M. A. Kovner. *J. Tech. Phys.* (U. S. S. R.) 11, 359-66(1941).—Theoretical research was undertaken with regard to underground gasification of coal in mine drifts. For the purpose of derivation of the kinetics of oxidation in a stream of air moving in a turbulent (non-laminar) flow through a cylindrical channel of carbon, one starts with the partial differential equation of diffusion of oxygen in flowing air. A "turbulent diffusion coeff." D is defined phenomenologically by $\rho\gamma'\mu_0' = D\,\partial\gamma/\partial x$, where ρ is the density of the gas at a given point, γ the mean relative concn. of oxygen ($\gamma = c/\rho$), γ' its turbulent pulsation, μ_0' the turbulent pulsation of the velocity component along the coordinate x. (1) An exact theory leads to an expression for γ^*, a function of s (the cylindrical coördinate along the axis of the channel), defined by $\gamma^* = (\gamma_0 - \gamma_m)/\gamma_0$, where γ_0 is the relative oxygen concn. at the outset, γ_m its mean value over the cross section considered. The expression is $\gamma^* = [1 - \varphi(s)]/[1 - (r_0[1 - \varphi(s)]/2lk)]$, where $\varphi(s)$ is an integral, involving as parameter R (Reynolds' no.) and the diam.; l its length; r the output of gas in l/min.; k the chem. reaction velocity const. By assuming for the latter the values given for oxidation of carbon spheres ($k_0 = 7.077 \times 10^8$ cm./sec.; $E = 38{,}000$ kg-cal/mol.), the calcd. γ^* can be compared with exptl. data obtained with Reynolds' nos. 0.865×10^4 to 2.29×10^4. There is some accord, but the calcd. values drift away from exptl. data especially with rising temp. (2) A more elementary derivation, formally patterned after the theory of heat exchange, leads to $\gamma^* = 1 - \exp[-(0.08s/r_0)/[R^{1/2} + 0.04\,(r/k)]]$, which fits the exptl. data a little better than the exact equation. The second expression has been obtained on the simplifying assumption that diffusion across a layer of laminar flow can be disregarded. It also does not presuppose constancy of γ at the wall. (3) An expression is also derived for the length of the "oxygen zone" defined as the distance in the channel where the oxygen concn. is 1/100 of the original concn. $l_{0.1} = 87\,k_0/(R^{1/2} + (0.04\,r/k))$. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

CA

2

Viscosity of liquids and transfer of momentum by waves. M. F. Shirokov (Voronezh State Univ.). *Izvest. Nauk S.S.S.R., Otdelenie Tekh. Nauk, Inst. Mashinovedeniya, i Sovershenstvo Vyazkosti Zhidkostei i Kolloid Rastvorov* (Conf. on Viscosity of Liquids and Colloidal Solns.) 2, 35-42(1944).—In contrast to Brillouin's conclusion that, owing to absorption, transfer of momentum through waves runs counter to viscosity, a theory is developed that derives viscosity from that very mechanism. With U_ν = energy d. of waves of frequency ν, β_ν and α_ν = scattering and absorption coeff., resp., a = sound velocity, one obtains $\eta = {}^1/_3 \int U_\nu/(\alpha_\nu + \beta_\nu)\, d\nu$, which on integration leads to $\eta = lU/3a$, where U = energy d. of all mol. vibrations and l = mean path of the wave. By the same theory, one derives for the heat cond. $\lambda = {}^1/_3\, a\rho C_v l$, where ρ = d. and C_v = heat capacity at const. vol. This is identical with Debye's formula except for the factor ${}^1/_3$ instead of ${}^1/_4$. With $\rho C_v = 3kn$ where n = no. of mols. per unit vol., and the distance between mols. $d = (1/n)^{1/3}$, and $l \approx 2d$, this becomes $\lambda = 2kd^{-2}a$; whence $\eta/\lambda = T/a^2$. The latter expression for the ratio of viscosity and heat cond. lends itself to exptl. check. Actually, the exptl. values are from 5 to 60 times higher; inasmuch as the formula for λ is in fair agreement with exptl., it means that the theoretical formula for η falls short of the exptl. values. If scattering is considered as orderless reflection, l proves to depend only on α and $\eta/\lambda = [(\alpha + \beta)/\alpha]T/a^2 = \gamma T/a^2$; thus, the deviation of the theoretical and the exptl. η/λ by a factor γ is accounted for. On freezing, α becoming $= 0$, η becomes infinite, while thermal cond. λ remains finite. With the assumption that a and α do not tend to zero at $T = 0$, it is shown that η tends to 0 when T approaches the abs. zero, which corresponds to superfluidity of He II.

N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

PA 4T111

SHIROKOV, M. F.

1945

USSR/Physics
Acoustics
Noise, propellers
Propellers - analysis

"The Sound of a Moving Aircraft Propeller," M. F. Shirokov, 3 pp

"CR Acad Sci" Vol XLIX, No 8

A theoretical solution of the differential equation of acoustics in the case of a moving propeller. Continuation of an earlier study. (CR Acad Sci URSS, XLIX, No 7 (1945)

4T111

Moscow Aviation Inst.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SA

A52
H

534.231

The energy equation in acoustics of moving media and some of its applications. SHEROKOV, M. F., AND FRADKINA, E. M. *C.R. Acad. Sci. URSS*, 52 (*No.* 1) 29-32 (1946).—The energy equation is set up and applied to the sound field acting upon a moving sound receiver (e.g. one exposed to a wind or connected to an aircraft). A formula is deduced for the sound intensity registered by the receiver and a polar diagram of the distribution of sound intensity in the space surrounding the source is constructed. A general formula for the Doppler effect is established. L. S. G.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

4 2

4000

M. F. On the role of gravitation in the structure ... 1947

Source: Mathematical Reviews. Vol 10 No. 1

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

PA-XT35

SHIROKOV, M. F.

Jan 1947

USSR/Physics Gases - Thermodynamics

"An 'Antiscientific' Book on Thermodynamics," N B Varshavik, M A Leontovich and M F Shirocov, 6pp

"Zhurn Eksp Fiz" Vol XVII, No 1

The author in the revised book formulates a new law of thermal capacities according to which (at 0° centigrade) for gases and vapors = z.2.0075 cal/degrees. Formula for sodid and liquid bodies also given.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M. F.

Apr 47

USSR/Physics
Dielectrics - Constants
Electrolytes - Conductivity

"The Work of O. K. Davtyan on the Dielectric Permeability and Conductivity of Electrolytes," E. M. Fradkina, M. F. Shirokov, I. A. El'tsin, 1½ pp

"Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki" Vol XVII, No 4

Authors maintain that there a number of serious errors in two articles published in the "Journal of Physics" and "Izvestiya Akademii Nauk" by Datyan on "Dielectrical Properties and Electrostriction of Solutions and Electrolytes," and "The Complexity of Electrical Conductivity of Electrolytes in an Alternating Electric Field." Eight quotations are presented to show the errors in Davtyan's work.

PA 34T76

Chair Theoretical Physics, Moscow State U.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

N

8

921 Singularity-free Solutions of the Schwarzschild-Nordstrom Type for a Point Charge, (Classical Electron Theory). M. F. Shirokov. Zhur. Eksptl. i Teoret. Fiz. 18, 236-42(1948)(in Russian).

It is shown that, for a point charge e_0, Einstein's gravitation equations and those of the electromagnetic field have a general solution containing an arbitrary function μ (r), which, through a convenient choice of that function, describe gravitational and electromagnetic fields, free from singularities in all the range of r from zero to infinity. For a certain μ (r), the result is the singularity-free solution of Einstein and Rosen for a neutral particle of mass m. For the electron, the function μ is chosen among $\mu = -2\log(1 - e^{-kr})$, with a constant $k = 1/r_0$. The solution is a regular one, leading, in the calculation of the particle's mass, to the known expression $r_0 = e_0^2/mc^2$. Thus, r_0 corresponds to the classical electron radius. It is shown that the electron has a regular relativistic energy-momentum four-vector and that its energy-momentum tensor satisfies the Laue theorem.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

1. SHIROKOV, M. F.

2. USSR (600)

4. Physics and Mathematics

7. Classical Theory of Fields. By D. Ivaninko and A. Sokolov. (New Problems, Moscow-Leningrad, State Technical Press, 1949). Reviewed by M. F. Shirokov. Sov. Kniga, No. 8, 1950.

9. [redacted] Report U-3081, 16 Jan. 1953. Unclassified.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

GVOZDKOV, N.N.; SHIROKOV, M.F.

Friction and heat emission of a wedge in turbulent gas flow. Vest. Mosk.un. 8 no.10:105-115 O '53. (MLRA 7:1)
(Turbulence) (Gases, Flow of)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M. F.

USSR/Physics - Heat Exchange Oct 53

"Turbulent Friction and Heat Exchange of a Wedge in a Gaseous Stream," N.N. Gvozdkov and M.F. Shirokov, Chair of Teoretic Phys

Vest Mos Univ, Ser Fizikomat i Yest Nauk, No 7, pp 105-115

Attempts to compute the friction and heat exchange of a wedge in a stream for given temp distribution on its faces, taking into account the large velocities of circulation around the wedge. Refers to realted works of L. Ye. Kalikhman (Prik Mat i Mekh, Vol 9, No 3, 1945; Vol 10, No 4, 1946).

273T96

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

6229

PART PLAYED BY THE GRAVITATIONAL FIELD IN THE FORMATION OF THE MASS OF AN ELECTRON. Ya. I. Pugachev and M. F. Shirokov. Zhur. Eksptl'. i Teoret. Fiz. 24, 378-82(1953) Apr. (In Russian).

The gravitational field of a point charge, the electromagnetic field of which is determined by equations of linear electrodynamics with higher derivatives, is investigated. As a rule, the gravitational field is found to be divergent, and both the mass m and charge e_0 of the particle are introduced into the theory as integration constants independent of each other. The regular solution can only be obtained when a definite relationship exists between m and e_0. Unlike in the special theory of relativity, the mass cannot be of electromagnetic origin only. Its gravitational part is found to be $\approx {}^1/_8\, e^2\kappa_0/c^2$, and cannot be neglected even in the first approximation. (Science Abstracts)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.F.

Incompetence of A.A.Vlasov's theory of multiple particles. Zhur. eksp.i teor.fiz. 24 no.5:601-609 My '53. (MLRA 7:10)
(Particles, Elementary)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M. F.

USSR.

537.525.8

3522. On the theory of striae in gaseous discharge. M. F. SHIROKOV. *Dokl. Akad. Nauk SSSR*, 89, No. 5, 837-40 (1953) *In Russian*. English translation, *U.S. National Sci. Found. NSF-tr-128*.

Equations relating the distance between striations ("periods") to the tube diam., and the electron diffusion coefficient, etc., are derived. Exptl. values of the period in various conditions, and obtained by other authors, are in agreement with the theory. Thirteen references are given. BB J. D. CRAGGS

MET

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.F.

USSR/ Mathematics - Theory of relativity

Card 1/1 : Pub. 77 - 9/22

Authors : Shirokov, M. F., Doctor Physical-Mathematical Sci., Professor

Title : The theory of relativity

Periodical : Nauka i Zhizn' 8, 20-23, Aug 1954

Abstract : The theory of relativity is outlined in a descriptive form. The Michelson experiment with the velocity of light is also described. Illustrations.

Institution : .....

Submitted : .....

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

[illegible], [illegible].

Teploobmen v tsilindricheskoi trube pri bol'shikh skorostiakh potoka. (In: Vsesoiuznaia konferentsiia po skorostnoi aviatsii. Moskva, 19[illegible]. Trudy, p. 1[illegible]7-1[illegible]3)

Title tr.: Heat exchange in a cylindrical tube at high flow speeds.

TL505.V72 1935

Sc. Aeronautical Science and Aviation in the Soviet Union. Library of Congress, 1955.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M. F.

FD-802

USSR/Physics - Relativity Theory

Card 1/1 Pub. 146-15/21

Author : Shirokov, M. F.

Title : Center of inertia in the general theory of relativity

Periodical : Zhur. eksp. i teor. fiz., 27, 251-256, Aug 1954

Abstract : A correlation is derived, covariant in the meaning of the general relativity theory and determining a vector similar to the non-relativistic inertia center. For the coordinates of the inertia center in a system with a weak gravitational field, an approximate formula is found that shows that this center is determined by the distribution of rest masses and of masses corresponding to the kinetic and potential energies of the system determined by the familiar mass-energy relation. Indebted to S. S. Bokshe and F. S. Ageshin. Seven references, 2 foreign.

Institution : Moscow State University

Submitted : November 26, 1953

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Distr: 4E3c/4E4f

1055. Fradkina, E. M., and Shirokov, M. F. The noise of a rotating aircraft propeller during its forward movement in a medium, and movement of the medium in relationship to the sound receiver (in Russian) *Trudi NAI* no. 51, 5–14, 1955; *Ref. Zh. Mekh.* 1956, Rev. 5068.

5

2

Application of the theory of a delaying potential to the equation of acoustics in Lamb's form enables the following equations to be obtained for the sound pressure set up in the moving unlimited medium by a variable volume force

$$p = \frac{e^{i\omega t}}{4\pi} \int_{\Omega} (K_0 \operatorname{grad} f)\, dx\, dy\, dz,$$

$$f = \left[r'\left(1 - \frac{v}{c}\cos\vartheta\right)\right]^{-1} \exp - \frac{i\omega r}{c}$$

in which $K_0(x, y, z)$ is the amplitude value of the density which varies according to the harmonic law with angular velocity ω of the volume force, f is the function of the coordinates of the power wave at the moment t, c the velocity of sound, r' the distance from the imaginary sound source to the observer, v the speed of movement of the medium, and ϑ the angle between r and v.

The point source of this type is an acoustic dipole, the sound characteristic of which essentially depends upon v/c and the orientation K. The equations obtained make it possible (using L. Ya. Gutin's method, *Zh. tekhn. Fiz.* 6, p. 899, 1936) to calculate the approximate value of the power radiation of the propeller. The sound field of the propeller in the moving medium cannot in

1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

B-2

Category : USSR/Theoretical Physics - Theory of Relativity and Unified Field Theory

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 155

Author : Shirokov, M.F.
Title : General Theory of Relativity or Theory of Gravitation?

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 1, 180-184

Abstract : Criticism of V.A. Fok's point of view concerning the physical scope of the general theory of relativity (Referat. Zhurnal Fizika, 1954, 5661; 1956, 24708). The author does not agree with V.A. Fok's statements concerning the unacceptability of the term "general theory of relativity" and on the advantages of the harmonic system of coordinates.

Card : 1/1

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

of it, R - the distance of the body from any other body of the system. For the motion of the relativistic center of inertia of a given body in the system of reference connected with the center of inertia of the total system the following law is obtained: $(d^2Y^\mu/ds^2) + \Gamma^\mu_{\alpha\beta}(dx^\alpha/ds)(dx^\beta/ds) = 0$, which may be formulated as follows: The center of inertia of any body of the system moves along a geodetic line in the field of gravitation of the other bodies. This theorem can be used for the direct derivation of the relativistic laws of motion of finite masses from the above equation.
There follows the derivation of the relativistic equations of motion from the solution of the equations of gravitation in second FOK'S approximation. (V.A.FOK, Žurn.eksp.i teor.fis,9,375 (1939)). This derivation shows that, with FOK'S method, expanded bodies are replaced by mass points in their centers of inertia.
In conclusion the relativistic equations of motion are investigated as a consequence of the solution of the equations of gravitation in second approximation according to the method developed by A.EINSTEIN,L.INFELD, B.HOFFMAN (Annal.of Math. 39, 55 (1938)).

INSTITUTION: Moscow State University

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SOV/124-58-10-10739

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 10, p 3 (USSR)

AUTHOR: Shirokov, M. F.

TITLE: On the Preferential Systems of Computation in Newtonian Mechanics and the Theory of Relativity (O preimushchestvennykh sistemakh otscheta v n'yutonovskoy mekhanike i teorii otnositel'nosti)

PERIODICAL: V sb.: Dialekt. materializm i sovrem. yestestvozn. Moscow, Gospolitizdat, 1957, pp 59-81

ABSTRACT: Bibliographic entry

Card 1/1

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.F.

AGRANAT, N.N.; SHIROKOV, M.F.

Theory of yield value determination of disperse systems by the cone penetrometer method. Koll. zhur. 19 no.1:9-13 Ja-F '57. (MLRA 10:4)

1. Moskovskiy aviatsionnyy institut im. S. Ordzhonikidze.
(Plasticity) (Suspensions)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.F.

56-7-11/66

AUTHOR SHIROKOV, M.F.

TITLE On the Interaction Between Gravitational-Capillary and Magneto-Hydrodynamical Waves.
(O vzaimodeystvii gravitatsionno-kapillyarnykh i magnitno-gidrodinamicheskikh voln.- Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 7, pp 67-71 (USSR)

ABSTRACT The present paper proves the uniqueness of the solutions of the equations of magnetic hydrodynamics of a well conductive perfect liquid. Furthermore, the suitability of the rigorous solution by C. Walen (Ark. f. mat., astr., o.fysik, Vol. 30A, 15; Vol 31B,3, 1944) in the presence of gravitational and capillary forces on the surface of the liquid is demonstrated. The magneto-hydrodynamical waves are described by the following system of equations:

$$\varrho d\vec{v}/dt = -\nabla(p + U) + [\vec{j}\,\vec{B}]/c; \quad \mathrm{rot}\,\vec{H} = 4\pi\vec{j}/c$$

$$\partial\varrho/\partial t + \mathrm{div}(\varrho\vec{v}) = 0; \quad \mathrm{rot}\,\vec{E} = -\partial\vec{B}/c\partial t; \quad \vec{E} + [\vec{v}\,\vec{B}]/c = 0.$$

Here U denotes the potential fo the forces of non-electromagnetic origin, and $H = H_0 + h$. From this system of equations nonrelativistic equations for the conservation of

CARD 1/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

On the Interaction Between Gravitational-Capillary and Magneto-Hydrodynamical Waves. 56-7-11/66

momentum and energy are obtained by means of an ansatz mentioned here within the volume τ, which is bounded by the surface S. The system of equations mentioned above at certain conditions, which are mentioned, has a unique solution, which satisfies the corresponding initial conditions and boundary conditions. Proof is outlined in short. When taking account of the influence exercised by the field of gravity acting on the surface of the liquid S and by the capillary forces, the equations for the discontinuities of the physical quantities on the surface separating the two media can be taken as boundary conditions. There are rigorous Walen solutions which satisfy the boundary conditions mentioned here and are therefore to be considered as a solution of the problem mentioned in the heading. The problem is then further developed in a concrete form. The author studies several simple special cases which presuppose the linear approximation and fields which are vertical or parallel to the surface of the liquid. The vortex-like magnetohydrodynamical waves on the surface are subject to the same rules of propagation and damping as the potential waves, with the only exception, that current

CARD 2/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Shirokov, M F

PA - 2333

AUTHOR: PRUDKOVSKAYA, O.V., SHIROKOV, M.F.

TITLE: On the Theory of Stationary Strata in the Positive Column of the Gas Discharge. (K teorii stoyashchikh strat v polozhitel'nom stol'be gasovogo razryada, Russian).

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 112, Nr 6, pp 1023 - 1026 (U.S.S.R.).

Received: 4 / 1957 Reviewed: 5 / 1957

ABSTRACT: On the basis of suitable diffusion equations fully rigorous expressions for the period of standing strata can be obtained which agree with the experiment as to order of magnitude. By this means the dependence of the period of the strata on the radius of the tube, on the power of the discharge current and on other factors can be explained. For the layer-like discharge the following system of equations is given: $\delta E_\alpha / \delta x_\alpha = 4\pi e(n_2 - n_1)$ $\frac{\delta n_1}{\delta t} - \frac{\delta(n_1 u_{1\alpha})}{\delta x_\alpha} - D_1 \frac{\delta^2 n_1}{\delta x_\alpha^2} = \beta n_1 - R$, $\frac{\delta n_2}{\delta t} - \frac{\delta(n_2 u_{2\alpha})}{\delta x_\alpha} - D_2 \frac{\delta^2 n_2}{\delta x_\alpha^2} = \beta n_1 - R$. Here index 1 refers to electrons and index 2 to ions. u_1 and u_2 denote the drive velocity of the electrons and the ions, D_1 and D_2 - the diffusion coefficients, β - the coefficients of ionization, R - spatial recombination in the discharge, n_1 and n_2 - the concentration of the electrons and ions respectively. The x-axis is assumed to be equal to the tube axis. After some computations the following quasi-neutral standing periodicity is obtained:

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

PA - 2333

On the Theory of Stationary Strata in the Positive Column of the Gas Discharge.

$$\ell = 2\pi / \sqrt{\beta/(D_1(\mu_2/\mu_1) + D_2)} \; (1 + (\mu_2/\mu_1))$$

Starting from a more complete system of equations which also takes several conditions into account, also a more complicated dispersion equation can be obtained. By means of the aforementioned equation the period of standing oscillations can be obtained from the known pressure of the gas and from the temperature of the electrons (for a certain radius of the tube and a certain gas). The results of thus computations for argon and neon are shown together in a table. In the most simple case investigated here the dispersion equation for a high-frequency discharge is fully identical with the dispersion equation given by the authors. The amplitude of the high-frequency field, however, must not be too large. A further table demonstrates for neon the dependence of the period of the layers on the temperature of the electron gases at constant pressure. (2 tables).

ASSOCIATION: State University Moscow.
PRESENTED BY: Member of the Academy N.N.BOGOLYUBOV,
SUBMITTED: 12.9.1956
AVAILABLE: Library of Congress.

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

24(4), 24(7)

AUTHORS: Shirokov, M.F., and Prudkovskaya, O.V. SOV/155-58-2-41/47

TITLE: Oscillations in Electron-Ionic-Plasmas (Kolebaniya v elektronno-ionnykh plazmakh)

PERIODICAL: Nauyhnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 2, pp 192-199 (USSR)

ABSTRACT: The author arrange a very general system of equations for the motions and for the electrodynamics of a plasma which is understood as a system of charged and neutral particles. The equations describe very completely arbitrary processes in these media and permit to obtain the limits for the application of the older theories of plasm oscillations. The equations show that in essential there exist three kinds of oscillations. If the degree of charge of the plasm is not great, then there appear diffusion oscillations of the electron-ionic gas and acoustic oscillations of the neutral gas; otherwise there are several electro-acoustic oscillations.
There are 24 references, 10 of which are Soviet, 6 American, 4 English, and 4 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov)

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SOV/56-34-6-16/51

On Velocity and Temperature Discontinuities Near the Walls of a Body Around Which Rarefied Gases Move With Velocities Near to or Larger Than That of Sound

and of the temperature on the boundary gas - wall. The relations found by these calculations express also the boundary conditions for the gas-dynamical flows of rarefied gases. Then expressions are given for the vector of the heat flow and of the tensor of the viscous forces. The obtained relations for the discontinuities of the velocities do not contain anything new with respect to the expressions derived previously in the molecular-kinetic theory. But one obtains essentially new relations for the discontinuity of the temperature, which are essentially different from the corresponding Maxwell (Maksvell) formula. The formulae then are specialized for two-dimensional flows. There are 3 references, 0 of which is Soviet.

ASSOCIATION: Moskovskiy aviatsionnyy institut (Moscow Aviation Institute)
SUBMITTED: November 20, 1957

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M F

20(1,4) PHASE I BOOK EXPLOITATION SOV/2543

Akademiya nauk SSSR. Laboratoriya dvigateley

Teoriya, konstruktsiya, raschet i ispytaniye dvigateley vnutrennego sgoraniya (Theory, Design, Calculation, and Testing of Internal Combustion Motors) Moscow, Izd-vo AN SSSR, 1958. 174 p. (Series: Its: Trudy, vyp. 4) Errata slip inserted. 3,000 copies printed.

Ed. of Publishing House: V.M. Klennikov; Tech. Ed.: T.A. Prusakova; Editorial Board: M.D. Apashev, Doctor of Technical Sciences, M.N. Zagryazkin, Candidate of Technical Sciences, Yu. B. Sviridov, Candidate of Technical Sciences, S.Z. Izrantsev, Engineer, and E.G. Yevgrafov, Engineer.

PURPOSE: This book is intended for workers of scientific research institutes, students of schools of higher education (vuzes), design bureaus, and to promote exchange of experimental information on the thermodynamics of internal combustion engines.

COVERAGE: This collection consists of 14 articles based mainly on research work done by the author in 1955-1956. Part I is devoted to working processes in gas turbine power plants and to theoretical and experimental work connected with investigation of the flow of gases. Part II contains articles on the investigation of processes in piston engines. Part III deals with the measurement of high temperatures of gases. The collection is number 4 of the Transactions of the Engine Laboratory of the Academy of Sciences, USSR. No personalities are mentioned. There are no references.

4. Markulov, I.A., and N.I. Tumanov (deceased). Calculation of Gas Characteristics in an Adiabatic Process With Changing Heat Capacity Taken Into Consideration 32

The equation obtained of the adiabatic curve of a gas with changing heat capacity and its graphical representation make possible a rapid and very exact calculation of the gas characteristics of air and the combustion products of kerosene. Changes of temperature in the adiabatic process are from 200° to 2,500°K. There are 3 Soviet references.

5. Shirokov, M.F., and I.I. Semenov. Problems of the Theory of Similitude in Flame Stabilization Behind a Poorly Streamlined Body 44

The author states that the problem is very complicated, and may be defined by a complex system of hydrodynamic differential equations and by chemical kinetics and diffusion. This article considers only stationary processes in which the fields of components of velocity vectors, pressures, density, etc., are only functions of three-dimensional coordinates and are independent of time. In these conditions it is no longer necessary to formulate the initial conditions. Experiments show that the flame stabilization is well achieved by poorly streamlined bodies (stabilizers). In this case, the circulation zone behind the stabilizer is the ignition source. There are 6 references: 4 Soviet, and 2 English.

6. Kalinin, N.K. Calculation of Hydraulic Losses in the Flow of Gases in Heat Exchangers Through Channels or Lengthwise Through Pipes 52

The article consists of two parts. The first presents a method for calculating gas characteristics for any system of flows in the outlet from a heat exchanger based on heat transfer data. Part two provides a method for calculating gas characteristics for flows through circular pipes in heat exchangers. It is possible to determine by the second method the gas characteristics in the outlet without making a full heat calculation and without knowing the length of pipes, and in special cases without knowing the diameter of pipes. It is also possible to determine the M number directly in the outlet and inlet according to the given hydraulic resistance without making a heat calculation. There are 2 Soviet references.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, Mikhail Fedorovich; LEL'CHUK, V.L., red.; KOLESNIKOVA, A.P., tekhn.red.

[Physical principles of gas dynamics and their application to processes of heat exchange and friction] Fizicheskie osnovy gazodinamiki i primeneniia ee k protsessam teploobmena i treniia. Moskva, Gos.izd-vo fiziko-matematicheskoi lit-ry, 1958. 340 p.
(Gases, Kinetic theory of) (MIRA 11:7)
(Heat exchangers) (Friction)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.F.; VAULIN, Yu.P.

Heat exchange and friction in flows of reacting gaseous mixtures. Nauch. dokl. vys. skoly; fiz.-mat. nauki no.1:128-135 '58. (MIRA 12:3)

1.Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Heat--Transmission) (Gas flow)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.F.; SEMENOV, I.I.

Problems of the theory of similarity in the stabilization of a flame behind a bluff body. Trudy Lab.dvig. no.4:44-51 '58. (MIRA 12:11)
(Combustion) (Aerodynamics)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

PHASE I BOOK EXPLOITATION SOV/3405

Soveshchaniye po voprosam kosmogonii. 6th, Moscow, 1957

Vnegalakticheskaya astronomiya i kosmologiya; trudy soveshchaniya (Extragalactic Astronomy and Cosmology; Transactions of the 6th Conference on Problems of Cosmogony, June 5-7, 1957) Moscow, AN SSSR, 1959. 273 p. Errata slip inserted. 1,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR.

Ed. of Publishing House: L.V. Samsonenko; Tech. Ed.: G.N. Shevchenko; Editorial Board: D.A. Frank-Kamenetskiy (Resp. Ed.) Professor; B.A. Vorontsov-Vel'yaminov, Corresponding-Member.

PURPOSE: The book is intended for astronomers and physicists studying problems of general cosmology.

COVERAGE: The book is a collection of papers on cosmogony read by scientists participating in a conference held in Moscow on June 5-7, 1957. The papers review recent observational and theoretical work in extragalactic astronomy, gravitational theory, theory of relativity, red shift, radio astronomy, formation of chemical elements, thermodynamics of the universe, entropy, etc. No personalities are mentioned. There are references following most of the reports.

Markaryan, B.Ye. Spiral Galaxy N 101 51

Martynov, D.Ya. Reliability of Observational Data in Extragalactic Astronomy 70

Krasovskiy, V.I. and P.V. Shcheglov. Application of Electronic-Optical Methods to Extragalactic Astronomy 89

Vitkevich, V.V. Discrete Sources of Radio Emission (Radio Stars) and Prospects for their Study 94

Ginzburg, V.L. Experimental Verification of the General Theory of Relativity (Summary of Report) 114

Vlasov, A.A. Spatial, Non-homogeneous Distributions of the System of Gravitating Particles 116

Soorodinskiy, A.Ya. Isotropic Models of the Universe 131

Lifshits, Ye.M. Gravitational Stability in the General Theory of Relativity (Summary of Report) 141

Zel'manov, A.L. Relativistic Theory of an Anisotropic Non-Homogeneous Universe 144

Shirokov, M.F. Theory of Red Shift in Spectra of Distant Nebulae 175

Shklovskiy, I.S. Radio Astronomy and Cosmology (Summary of Report) 186

Cherdyntsev, V.V. Conditions of Formation of Atomic Nuclei According to Data on Their Distribution 192

Frank-Kamenetskiy, D.A. Origin of Chemical Elements From the Point of View of the Theory of Internal Structure and Stellar Evolution 200

Zaritskiy, Ya. P. Problems of Statistical Physics and Thermodynamics of Gravitating Systems 214

Idlis, G.M. Structural Infinity of the Universe and the Metagalaxy as a Typical Populated Cosmic System (Summary of Report) 270

Plotkin, I.M. Some Remarks on the Growth of Entropy 228

Stanyukovich, K.P. On the Thermodynamics of the Universe 219

Maan, G.L. General Problems of Cosmology 243

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

24(5) PHASE I BOOK EXPLOITATION SOV/3313

Akademiya nauk SSSR. Institut filosofii

Filosofskiye voprosy sovremennoy fiziki [sbornik]; (Philosophical Problems of Modern Physics; Collection) Moscow, Izd-vo AN SSSR, 1959. 426 p. Errata slip inserted. 7,000 copies printed.

Ed.: I. V. Kuznetsov and M. E. Omel'yanovskiy; Ed. of Publishing House: V. K. Moroz; Tech. Ed.: S. G. Markovich.

PURPOSE: This book is intended for physicists but may be read gainfully by other scientists and the educated layman interested in the philosophical questions of advanced physics.

COVERAGE: This book contains 12 articles on philosophical problems in physics. Problems are divided into three subject divisions: 1) general problems; 2) problems of quantum theory; 3) problems in the theory of relativity. The views of Einstein, Bohr, Born, Planck, Pauli, Schrödinger, Heisenberg, Janossy, et al. are presented, and subjected to criticism from the Soviet side by Omel'yanovskiy, Polikarov, Fok, et al. Questions dealing

Card 1/4

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

with idealism, agnosticism, and dialectical materialism in the philosophy of physics are discussed. This collection of articles is the third in a series under the same title. Earlier volumes were published in 1952 and 1958. References accompany each article.

TABLE OF CONTENTS:

Foreword 3

Omel'yanovskiy, M. E. Dialectical Materialism and the Problem of Reality in Quantum Physics 5

Janossy, L. Philosophical Problems of Modern Physics 55

Kuznetsov, I. V. Basic Ideas in the Work of Max Planck 81

Fok, V. A. The Interpretation of Quantum Mechanics 154

Bohr, N. Discussions With A. Einstein on Epistomological

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Problems in Atomic Physics 177

Einstein, A. Answer to the Criticism [of N. Bohr, V. Pauli, et al.] 223

Terletskiy, Ya. P. The Intertransmutability of Elementary Particles 249

Aleksandrov, A. D. The Theory of Relativity as a Theory of Absolute Space-Time 269

Shirokov, M. F. The Materialistic Essence of the Theory of Relativity 324

Fataliyev, Kh. M. The Philosophical Implication of a Four-Dimensional Continuum in the Theory of Relativity 370

Kursanov, G. A. The Evaluation of Einstein's Philosophical Views on the Nature of Geometric Concepts 393

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M. F., VAULIN, E. P., CHESNOKOV, N. A. (Moscow)

"Experiments Related to the Acceleration of Ionized Gases (Gas-Discharge Plasma) by Electrodynamic Forces in a Special Test Arrangement."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

S/029/60/000/06/05/020
B008/B007

AUTHORS: Shirokov, M., Professor, Brodovskiy, V., Post-graduate Student

TITLE: Paradoxes of Time

PERIODICAL: Tekhnika molodezhi, 1960, No. 6, pp. 10-13

TEXT: This is a report concerning new conceptions of the passing of events and the newly discovered properties of time. They essentially consist in the fact that the rate at which time passes within a body or in a system consisting of such bodies depends on their rate of motion. The authors mention a number of examples taken from cosmic research and nuclear physics, which confirm what has been found by modern science, that time passes more slowly in a moving than in a resting body. Experimental observations of relativistic changes of time in moved bodies and gravitational fields have become possible with the help of artificial Earth-satellites and cosmic rockets. In supplementation of the present subject the editors mention two time-hypotheses. The first, the so-called theory of symmetric or causal mechanics, was recently published by Astrophysicist Professor N. A. Kozyrev of Leningrad. His hypothesis is based on the irreversibility of time.

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Paradoxes of Time

S/029/60/000/06/05/020
B008/B007

Academician L. A. Artsimovich, Academician P. L. Kapitsa, and Academician I. Ye. Tamm subjected this hypothesis to a sharp critique in an article published on November 22, 1959, in the Newspaper "Pravda". The second new hypothesis is that of the time-quanta. In 1930 the Soviet scientists V. A. Ambartsumyan and D. D. Ivanenko expressed a number of ideas in favor of the introduction of quantum space, the discontinuity of time, and a number of other physical quantities. Also Academician I. Ye. Tamm declared himself in favor of the hypothesis of time-quanta. For the time being, this hypothesis has found no confirmation. There are 7 figures.

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

IVANENKO, D.D., prof., doktor fiziko-matematicheskikh nauk; SHIROKOV, M.F., prof., doktor fiziko-matematicheskikh nauk; GERTSENSHTEYN, M.Ye., kand.fiziko-matematicheskikh nauk; KOSTANEYETS, A.S., prof., doktor fiziko-matematicheskikh nauk

Do gravity waves exist? Znan. sila 36 no.12:6-7 D '61. (MIRA 15:1)

(Gravitation)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

26.2311

S/057/61/031/007/007/021
B108/B209

AUTHORS: Shirokov, M. F., Vaulin, Ye. P., and Chesnokov, N. A.

TITLE: Some experiments to steady plasma flow in a homopolar

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 7, 1961, 802-805

TEXT: The authors sudied the stream of an ionized gas in a homopolar (Fig. 1) at a pressure of $4\cdot10^{-1}$ mm Hg and in an external magnetic field of H = 250 oersteds. The magnetic field was parallel to the axis of the concentric cylindrical electrodes and perpendicular to the current density vector j. For the measurement of the velocity v, a rotary shaft was used, suspended on a thin thread (length L = 10 cm, radius R = $1.25\cdot10^{-2}$ mm, torsion modulus N = $6.5\cdot10^{11}$ dyne/cm^2). Thin mica reeds of various width (a = 0.2, 0.3, 0.4, 0.5, 0.7 cm) and a length of b = 4 cm were fastened to the thin end of the shaft, perpendicular to the current. The mean velocity was obtained from the torques produced by the current and by the thread. The reed experiments made it possible to determine a maximum a_m = 4 cm,

Card 1/4

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

at and below which the current pinch, due to the insertion of the reed, does not interfere with the velocity measurement. When the plasma stream is laminar, the current density through the cathode is connected with the stream velocity by the relation $\frac{j_1 H}{c} = \frac{45\varrho v^2}{2dR}$. (4); the ratio of the tube width to the cathode radius was $\frac{d}{r_1} = 0.67$; c is the resistivity coefficient, ϱ - the density of the gas. In the case of turbulent flow, the above relation has the form $\frac{j_1 H}{c} \sim \frac{0.3\varrho v^2}{R^{1/4} 2d}$ (5). Applying the logarithm to these relations, one obtains $\log v = \log I - \log(\frac{45 c \eta S_1}{2d^3 H})$ (6) for the laminar case and

$$\lg v = \frac{4}{7} \lg I - \frac{4}{7} \lg \left(\frac{0.3 c \rho^{1/7} \eta^{1/7} S_1}{2d^{1/7} H} \right), \qquad (7)$$

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

for the turbulent case, where $I = j_1 S_1$; S_1 - cathode area. For the laminar flow, a coefficient $c = \frac{10.2}{R_s}$ has to be used (Ref. 2: J. Schmiedel. Phys. Zs., 29, 593; 1930), where R_s is the Reynolds number of the reed in the stream. In the turbulent case, $c \sim 1$. The experimental results are in good agreement with the formulas for the turbulent and the laminar plasma stream, but considering that the Reynolds number $R_s < 2.5$, the flow has to be regarded as being laminar. There are 5 figures and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Moskovskiy aviatsionnyy institut imeni Sergo Ordzhonikidze Kafedra fiziki (Moscow Aviation Institute imeni Sergo Ordzhonikidze, Department of Physics)

SUBMITTED: November 30, 1959

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

KAPLAN, S.A., doktor fiz.-mat. nauk, red.; KIRKO, I.M., doktor fiz.-mat. nauk, red.; STANYUKOVICH, K.P., doktor fiz.-mat. nauk, red.; SHIROKOV, M.F., doktor fiz.-mat. nauk, red.; FRANK-KAMENETSKIY, D.A., doktor fiz.-mat. nauk, red.; VENGRANOVICH, A., red.; LEMBERG, A., tekhn. red.

[Problems of magnetohydrodynamics and plasma dynamics; reports] Voprosy magnitnoi gidrodinamiki i dinamiki plazmy; doklady. Riga, Izd-vo Akad. nauk Latviiskoi SSR. Vol.2. 1962. 660 p. (MIRA 15:12)

1. Soveshchaniye po teoreticheskoy i prikladnoy magnitnoy gidrodinamike. 2d, Riga, 1960.
(Magnetohydrodynamics) (Plasma (Ionized gases))

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

44494

S/033/62/039/005/007/011
E032/E514

2,1706

AUTHORS: Shirokov, M.F. and Fisher, I.Z.

TITLE: Isotropic space with discrete gravitational field sources (Towards a theory of the non-homogeneous isotropic universe)

PERIODICAL: Astronomicheskiy zhurnal, v.39, no.5, 1962, 899-910

TEXT: It is pointed out that all existing relativistic cosmological theories are exceptionally inconsistent. Thus, while on the one hand the average energy-momentum tensor is inserted into the right-hand side of the Einstein equations

$$R_i^k(g) - \frac{1}{2}\delta_i^k R(g) = \frac{8\pi k}{c^4} T_i^k \text{ (micro)}, \qquad (7)$$

the left-hand side of these equations is not subjected to this averaging process. The hybrid equations obtained as a result, in which only one half of the equations is averaged, are incorrect both from the microscopic and macroscopic points of view. In the present paper the author investigates the average behaviour of isotropic space in which gravitational field fluctuations due to

Card 1/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

local irregularities in the mass distribution are small. The case of large average densities of matter is not considered, although extrapolation to this region of the solution found for a weakly nonuniform micro-field does yield interesting predictions as regards the expected behaviour of the exact solution for an average metric at very high densities.. It appears that when the discrete mass distribution is considered, the average metric will not contain singularities. These conclusions are deduced from a new cosmological equation which is derived in the present paper and reads as follows:

$$R_i^k(G) - \frac{1}{2}\delta_i^k R(G) + C_i^k(G) = \frac{8\pi k}{c^4} T_i^k \text{ (macro)} \qquad (48)$$

Comparison with Eq.(7) shows that this equation includes the additional term $C_i^k(G)$, which depends on micro-field fluctuations. It is shown that although Hoyle has reported an equation which in its external appearance is very similar to Eq.(48) and includes the term $C_i^k(G)$, the term was introduced simply as a "correction", whereas in the present theory it is a consequence of the Einstein

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

equations and appears naturally as a result of the averaging process. This new equation is now solved for a flat space, for a space of positive curvature and a space of negative curvature. In distinction to the Friedman model, the extrapolated form of these solutions do not contain a singularity at which the density of matter becomes infinite for some initial instant of time.

ASSOCIATIONS: Moskovskiy gos. universitet (Moscow State University) and Belorusskiy gos. universitet (Belorussian State University)

SUBMITTED: July 15, 1961

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M. F., and VAAULIN, YE. P.,

"Techeniya Neizotermicheskoy Plazmy s Bol'shimi. (High Velocity Non-Isothermal Plasma Flows)"

report presented at the Intl. Symposium on High Temperature Technology held at Asilomar, California, 8-11 Sep 63.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

ACCESSION NR: AP4017718 S/0294/63/001/003/0386/0393

AUTHOR: Shirokov, M. F.

TITLE: Fundamental equations of magnetic gasdynamics of a non-isothermal plasma

SOURCE: Teplofizika vy*sokikh temperatur, v. 1, no. 3, 1963, 386-393

TOPIC TAGS: plasma, non isothermal plasma, magnetic gasdynamics, magnetohydrodynamics, arc discharge, irreversible thermodynamics, particle production, particle annihilation, internal friction, heat conduction

ABSTRACT: It is pointed out that the customary application of ordinary magnetic gasdynamics to a strongly non-isothermal plasma, such as is produced in arc discharges at pressures below 10 mm Hg, is incorrect. The principles of the thermodynamics of irreversible processes are used to derive a system of magnetic-gasdynamic equations for such a plasma. This system, unlike the equations obtained by others, contains equations for the energy and is therefore complete in that it has as many variables as equations. In addition, the new theory makes allowance for particle production and annihilation and for the dissipative processes such as internal friction and heat conduction. It also demonstrates that such a

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

ACCESSION NR: AP4017718

plasma cannot be regarded as homogeneous. Orig. art. has: 39 formulas.

ASSOCIATION: None.

SUBMITTED: 04Jun63 DATE ACQ: 23Mar64 ENCL: 00

SUB CODE: PH NR REF SOV: 001 OTHER: 003

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

PETRUSHEVSKIY, S.A., otv. red.; KOLBANOVSKIY, V.N., red.; PLATONOV G.V., red.; SHAKHPARONOV, M.I., red.; SHIROKOV, M.F., red.; VIGDOROVICH, M.I., red.

[Dialectical materialism and present-day natural science; materials of the All-Russian Seminar of Lecturers in Social Sciences on philosophy problems of present-day natural science] Dialekticheskii materializm i sovremennoe estestvoznanie; sbornik materialov Vserossiiskogo seminara prepodavatelei obshchestvennykh nauk po filosofskim voprosam sovremennogo estestvoznaniia. Moskva, Izd-vo Mosk. univ., 1964. 403 p. (MIRA 17:7)

1. Moscow. Institut povysheniya kvalifikatsii prepodavateley obshchestvennykh nauk. Kafedra dialekticheskogo i istoricheskogo materializma.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Baldin, A.M.

C-5

Category : USSR/Nuclear Physics - Nuclear Reactions

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6008

Author : Baldin, A.M., Shirokov, M.I.
Inst : Physical Institute, Academy of Sciences, USSR
Title : Contribution to the Theory of Reactions with Polarized Particles

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 4, 784-785

Abstract : The tensor moments are obtained for the problem of the collision of two bodies in the most general case (where the initial and final spin states of the particles can be arbitrary). For the particular case considered by Simon (Referat Zhur Fizika, 1954, 12809; 1955, 2140), the equations of this work do not transform into Simon's equations. The discrepancy is due principally to the difference in the definition of the tensor moments; in addition, the formulas obtained do not contain the sign multiplier $(-1)^x$. The method proposed and used to derive the expressions for the tensor moments consists of a successive application of the theory of the Dirac transformations.

Card : 1/1

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Žurn.eksp.i teor.fis,31, fasc.4,734-736 (1956) CARD 2 / 2 PA - 1922

emitted towards the z-axis into the unit solid angle is obtained. $F(\varphi)$ and $F(\eta)$ are determined by the tensor moments T^q_m with $q = 2,4,\ldots 2s - 1$ and $m = 2,4,\ldots q$, and $F(\theta)$ depends upon quite other tensor moments (T^q_o. T^q_o and T^q_m). There are indications that the observed Λ^o-particles are not all polarized vertical to the plane of the reaction $\pi^- + p \rightarrow \Lambda^o + \theta^o$.

The observed cases of the reactions $\pi^- + p \rightarrow \Lambda^o + \theta^o$, $\Lambda^o \rightarrow p + \pi^-$ refer to the energies ~1 and ~ 1,5 BeV. By the increase of experimental results it is probably possible, in the case of these energies, that a precise determination of only the lower limit of the spin value of Λ^o is attainable. The following is then shown: Measuring the angular distribution of the decay products of a particle produced at the threshold of the reaction $\pi^- + p \rightarrow \Lambda^o + \theta^o$ (~755 MeV) furnishes the spin of the Λ^o-particles under the following natural conditions: The spin of the θ^o-particle is equal to zero (which at least is not in contradiction to the data available) and the forces which are active between Λ^o and θ^o have a short range. The tensor moments of the Λ^o-particle with even q which were found are written down. By inserting these concrete expressions into the above formulae for $F(\varphi)$ and $F(\theta)$ the distributions with respect to η and θ which depend on the spin of the Λ^o-particle are obtained. Furthermore, the general formula for $F(\vartheta, \varphi)$ is determined and given.

INSTITUTION:Electrophysical Laboratory of the Academy of Science in the USSR

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV M.I.

90-5-12/55

AUTHOR SHIROKOV M.I.,

TITLE Reactions with Polarized Particles.
(Reaktsii polyarizovannymi chastitsami - Russian)

PERIODICAL Zhurnal Eksperim. i Teoret.Fiziki, 1957, Vol 32, Nr 5, pp 1022-1035 (U.S.S.R.)

ABSTRACT The paper under review develops a new method for the determination of the statistical tensors of particles which are created at reactions. This method permits to carry out a relativistic generalization and also a direct generalization for the case of nuclear reactions with more than two particles in the final state. In analogy hereto it is possible to utilize the diagonality of the S-matrix with respect to the other physical magnitudes which remain preserved, for the purpose of determining some general properties of the processes taking place in quantum mechanical systems.
Reactions of the type a+b c+d and a c+d are investigated. In this context, a,b,c and d denote either 'elementary particles' or nuclei with the spins i_a, i_b, i_c, i_d. The spin is dealt with in Pauli's approximation and in this sense the treatment is not relativistic. Instead of the S-matrix the scattering matrix $\hat{R} = S - \hat{i}$ is used. The meaning of two formulae given in the paper under review lies in the separation of certain unknown parameters in the form of elements of the S-matrix. The laws of conservation reduce the number of these parameters. The essence of the further considerations are the transformations of the representations of the final and initial states of these reactions by not directly measurable magnitudes s,l,J,

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Reactions with Polarized Particles. 56-3-12/55

M, E to a representation by experimentally measurable magnitudes. The final state of the reactions of the type a+b, c+d is in general described by $(2i_c+1)^2 + (2i_d+1)^2$ c-tensors. But in a totally unpolarized initial state it is possible to considerably reduce the number of the c-tensors by appropriate selection of the quantization axis. Finally the paper under review also derives some conclusions for the reaction a→c+d for the special case $i_c=1/2$, $i_d=0$. A summary of this paper as compiled by the author himself and following the text of the paper is worth noting.
(No reproductions).

ASSOCIATION Academy of Sciences of the U.S.S.R.
PRESENTED BY
SUBMITTED 9.6.1956
AVAILABLE Library of Congress.
Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

56-4-51/54

AUTHORS: Chzhou Guan-Chzhao, Shirokov, M.I.

TITLE: Spin Parity of the Hyperfragment H^4_Λ and the K-Meson
(Spiny i chetnosti giperfragmenta H^4_Λ i K-mezona)
(Letter to the Editor)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 4, pp. 1072-1073 (USSR)

ABSTRACT: Indications concerning the angular correlations in the cascades

$\pi^- + He^4 \longrightarrow H^4_\Lambda + K$, $H^4_\Lambda \longrightarrow He^4 + \pi$, $K \longrightarrow \pi + \pi$ and

$K^- + He^4 \longrightarrow H^4_\Lambda + \pi$, $H^4_\Lambda \longrightarrow He^4 + \pi$

are given for various spin and parity of H^4_Λ and K. The angular correlations were calculated for the following cases:

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

CHZHOU GUAN-CHZHAO [Chou Kuang-chao], SHIROKOV, M.I.

Relativistic theory of reactions involving polarized particles [with summary in English]. Zhur. eksp. i teor. fiz. 34 no.5: 1220-1239 My '58. (MIRA 11:6)

1. Ob"yeninennyy institut yadernykh issledovaniy.
(Particles, Elementary) (Relativity (Physics))

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.I., Cand Phys Math Sci - (diss) "Reactions with polarized particles." [Dubna, 1959], 13 pp (~~United~~ Joint Inst of Nuclear Studies. Laboratory of Theoretical Physics) 160 copies. Mimeographed. Bibliography: pp 12-13 (16 titles) (KL, 20-59, 123)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

21(7), 24(5)

AUTHOR: Shirokov, M. I.

SOV/56-36-5-35/76

TITLE: Azimuthal Symmetry in Reaction Cascades and the Conservation of Parity (Azimutal'nyye simmetrii v kaskadakh reaktsiy i sokhraneniye chetnosti)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1524-1532 (USSR)

ABSTRACT: The present paper carries out an investigation by mathematical means of some angular azimuthal symmetry relations in reaction cascades (triple scattering of protons), which follow from the conservation of parity of such reactions. The following equations are first set up: 1) for any cascades of the type

$a+b \rightarrow c+d \quad (\vartheta_0, \varphi_0), \quad c+e \rightarrow f+g \quad (\vartheta, \varphi), \quad f+h \rightarrow i+j \quad (\vartheta', \varphi')$

it is assumed that $\sigma_{\vartheta,\varphi}(\vartheta', \varphi') = \sigma_{\vartheta,-\varphi}(\vartheta', -\varphi')$ holds (ϑ and φ denote the angles at which the second scattering occurs, and ϑ' and φ' are the scattering angles of the third. 2) For cascades of the type

$a+b \rightarrow a+b, \quad a+e_1 \rightarrow a+e_1 \quad (\vartheta_1, \varphi_1)$

$b+e_2 \rightarrow b+e_2 \quad (\vartheta_2, \varphi_2)$

Card 1/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Azimuthal Symmetry in Reaction Cascades and the Conservation of Parity SOV/56-36-5-35/76

$\sigma(\vartheta_1, \varphi_1; \vartheta_2, \varphi_2) = \sigma(\vartheta_1, -\varphi_1; \vartheta_2, -\varphi_2)$ is assumed.
To 1) there belong e.g. the reactions $K^- + n \rightarrow \Xi^- + K^+$, $\Xi^- \rightarrow \Lambda + \pi$, $\Lambda \rightarrow p + \pi$
to 2) $\pi^- + p \rightarrow \Sigma^- + K^+$, $\Sigma^- \rightarrow n + \pi$, $K^+ \rightarrow \pi + \pi$
Formulas of general applicability are first derived, and in the following the selection rules and azimuthal symmetry are investigated. In the last chapter the author deals with the inverse problem i.e. that concerning the conditions at which parity conservation and azimuthal symmetry are realized (for the case of triple proton scattering on non-polarized spinless targets). It is found that the experimental determination of the most simple (well known) symmetry, viz. that of the twice scattered particles with respect to the plane of the first scattering offers no full proof of conservation of parity. The experiments suggested by the author appear to offer more reliable proof, and several cases are described as full proof. The conservation of parity at the same time means invariance under reversal of time for the elastic scattering of particles with spin 1/2 on spinless particles. The author thanks B. N. Valuyev for discussions. There are 9 references, 6 of which are Soviet.

Card 2/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Azimuthal Symmetry in Reaction Cascades and the Conservation of Parity

SOV/56-36-5-35/76

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: November 28, 1958

Card 3/3

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

24 (5), 21 (7) SOV/56-37-1-51/64

AUTHOR: Shirokov, M. I.

TITLE: On a Symmetry in τ^0-Decay (Ob odnoy simmetrii v τ^0-raspade)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 1, pp 328 - 329 (USSR)

ABSTRACT: In the present "Letter to the Editor" it is shown that, if the decay process $K_2^0 \to \pi^+ + \pi^- + \pi^0$ is invariant with respect to charge conjugation, the angular distribution of the π^+, π^- obeys the symmetry condition $F(-\vec{p},\vec{p}') = F(\vec{p},\vec{p}')$. $\vec{p}$ is proportional to the difference of the momenta of π^+ and π^- in the c.m.s., and $\vec{p}'$ is the sum of these momenta. The amplitude of the transition from the initial state to the state with $\vec{p}$ and $\vec{p}'$ is expressed by $\langle \vec{p}\vec{p}' | S | JM \rangle$ which is developed in the following with respect to the angles ϑ, φ and ϑ', φ' (J is the spin of the K-meson and M is its projection); for $J \neq 0$ (unpolarized K-meson) it holds for the angular distribution in the c.m.s. that $F(\vec{p},\vec{p}') \equiv$

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SOV/56-37-1-64/64

On a Symmetry in τ^0-Decay

$\equiv \sum_M |\langle \vec{p}\vec{p}' | s | JM \rangle|^2$, which is, in turn, written down as an expansion in series. These equations are discussed in the following, and the conditions for charge- and spatial parity are given, as also the case of combined parity. Also the form of the symmetry condition $F(\theta) = F(\pi - \theta)$ is discussed. These equations hold for an arbitrary decay of the kind $a \to b^+ + b^- + c$, where a and c have a certain charge parity, and b^+ and b^- a reciprocal charge conjugation; a, $b^{\pm}$, c may have an arbitrary spin. In the $K^0_{1,2}$-meson there are, however, no other possible decays than $K^0 \to \pi^+ + \pi^- + \gamma$, $K^0 \to \mu^+ + \mu^- + \pi^0(\gamma)$, $K^0 \to e^+ + e^- + \pi^0(\gamma)$. The author finally thanks Professor M. A. Markov and Chou Kuang-chao for discussions.

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.I.; OKONOV, E.O.

Space and charge parity of a proton--antiproton system and its two-meson annihilation. Zhur. eksp. i teor. fiz. 39 no.2:285-292 Ag '60. (MIRA 13:9)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Mesons) (Protons)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

S/056/60/039/003/013/045
B006/B063

AUTHOR: Shirokov, M. I.

TITLE: A General Relativistic Theory of Reactions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 3(9), pp. 633-638

TEXT: A relativistic generalization of formulas expressing differential cross sections and polarization by phase shifts requires determining the relativistic spin operator of the particles and the transformation functions for the passage from representation in momenta and spin projections to a representation with total momentum conservation in the system of interacting particles. It has been shown by the author and Chzhou Guan-chzhao (Ref. 1), and also by Yu. M. Shirokov (Ref. 2) that the representation by Foldy and Yu. Shirokov (Ref. 3) may be used to describe particles with a spin. There are still other ways of determining the relativistic spin operator (Refs. 4-6). To the various determinations of the spin there correspond various transformation functions and, accordingly, various cross-section and polarization formulas differing

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

A General Relativistic Theory of Reactions S/056/60/039/003/013/045
B006/B063

in their form. It is now shown that there exists a general theory in which the transformation functions and the formulas are the same for all equivalent representations of the inhomogeneous Lorentz group. It is merely presupposed that the rest masses of all particles do not vanish, while the spins may be taken at random. This irreducible representation is designated as NGL representation. Its theory offers a description of such systems whose states can be all obtained by translations, rotations, and Lorentz transformations (and superpositions) from any fixed state. The author thanks Yu. M. Shirokov and I. V. Polubarinov for discussions. There are 15 references: 9 Soviet, 2 British, and 4 US.

SUBMITTED: March 18, 1960

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.I.

[Testing of PC- and PCT-invariances in decay processes; survey] Proverka PS- i PST-invariantnostei v protsessakh raspada; obzor. Dubna, Ob"edinennyi in-t iadernykh issl., 1961. 40 p. (MIRA 14:11)

(Particles (Nuclear physics))—Decay)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

24712
S/056/61/040/005/012/019
B109/B212

24.4400

AUTHOR: Shirokov, M. I.

TITLE: General relativistic theory for a reaction of the type $a + b \rightarrow c + d + e + \ldots$

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 5, 1961, 1387-1391

TEXT: The theory for an $a + b \rightarrow c + d$-type reaction of Chou Kuang-chao, Jacob, and Wick is generalized here, and Jacob's variables are substituted by more suitable ones. For the analysis of the $a + b \rightarrow 1 + 2 + 3$ reaction the momenta $\vec{p}_1$, $\vec{p}_2$, $\vec{p}_3$ of the three particles are replaced by the total momentum $\vec{P}$ and the relative momenta $\vec{p}$ and $\vec{p}'$. In the following, it is assumed that $\vec{P} = 0$. Now, the transformation function $\langle \vec{p}\vec{p}' m_1 m_2 m_3 | \ldots JM \rangle$ is determined, which permits to change over from experimentally determined variables to the total momentum J and its projection M. For two particles the transformation function will read as follows:

Card 1/5

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

$$\langle \vec{p} m_1 m_2 | m_1' m_2' \tilde{p} j m \rangle = \sqrt{\frac{2j+1}{4\pi}}\, D^{j}_{m_1+m_2,m}(-\pi,\vartheta,\pi-\varphi)\,\delta_p \sim \delta_{p,p'}\,\delta_{m_2,m_2'}\,q(m_1,m_2,p) \quad (1),$$

where the total momentum j and its projection m are referred to the center-of-mass system z', y', x'; m_1 and m_2 denote spin projections of the particles 1 and 2, referred to the axes $z_c \| \vec{p}$ and $y_c \| [\vec{z}' \vec{p}']$; m_1' and m_2' are quantized relative to z_c, y_c, x_c; q originates during the transformation of the spin variables from the rest system of the particles into their center-of-mass system. If one considers three particles, it would be possible to change over from the variables $(\vec{p} m_1 m_2)$ to the variables $(m_1' m_2' j m)$ and also from $(\vec{p}' m m_3)$ to $(m m_3 J M)$. The system of particles 1 and 2 is considered to be one particle. Using Jacobi's variables will lead to difficulties in (1). If $\vec{p}$ is a Dalitz variable, and if m_1', m_2', j, and m belong to the Lorentz system $K_{1,2}$, then the transformation function of $(\vec{p}' m m_3)$ in $(m' m_3' J M)$ will have a form equivalent to (1). Another advantage

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

of the Dalitz variables over Jacobi's variables is that the total energy of the three-particle system may be expressed as a function of $|\vec{p}|$ and $|\vec{p}'|$ only:

$$E = E_{1,2} + \sqrt{p'^2 + \varkappa_3^2} = \left[p'^2 + \left(\sqrt{p^2 + \varkappa_2^2} + \sqrt{p^2 + \varkappa_1^2}\right)^2\right]^{1/2} + \sqrt{p'^2 + \varkappa_3^2}. \quad (5).$$

The following results for an element of the S-matrix of the reaction a+ b → 1+2+3:

$$\langle pp' m_1 m_2 m_3 | S | p_a m_a m_b \rangle = \frac{1}{4\pi\sqrt{4\pi}} \sum_{j,m,J,M} (2J+1)\sqrt{2j+1} \times$$
$$\times D^j_{m_1+m_2,m}(-\pi, \vartheta, \pi-\varphi) D^J_{m+m_3,M}(-\pi, \vartheta', \pi-\varphi') \times$$
$$\times \langle m_1 m_2 m_3 j m p | S^{JE} | m_a m_b \rangle D^{*J}_{m_a+m_b,M}(-\pi, \vartheta_a, \pi-\varphi_a). \quad (6)$$

a → 1+2+3 is expressed by

$$\langle pp' m_1 m_2 m_3 | S | JM \rangle = \frac{1}{4\pi} \sum_{j,m} \sqrt{(2j+1)(2J+1)}\, D^j_{m_1+m_2,m}(-\pi, \vartheta, \pi-\varphi) \times$$
$$\times D^J_{m+m_3,M}(-\pi, \vartheta', \pi-\varphi') \langle m_1 m_2 m_3 j m p | S^{Jx} | \rangle. \quad (8)$$

Card 3/5

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

where J denotes the spin of the decaying particle, M its projection, and $\varkappa$ its rest mass. The standard method of adding the momenta by means of the Clebsch-Gordan coefficients results in .

$$\langle pp'n_1n_2n_3|S|p_an_an_b\rangle = \sum Y_{l\mu}(\vartheta,\varphi)\,Y_{l'\mu'}(\vartheta',\varphi')\,\langle i_1i_2n_1n_2|i\sigma\rangle\langle il\sigma\mu|jn_j\rangle\times$$
$$\times\langle ji_3n_jn_3|s'n'\rangle\langle s'l'n'\mu'|JM\rangle\langle iljs'l'p|S^{JE}|sl_ap_a\rangle\times$$
$$\times\langle sl_an\mu_a|JM\rangle\langle i_ai_bn_an_b|sn\rangle Y^*_{i_a\mu_a}(\vartheta_a,\varphi_a). \qquad (9)$$

for the problem 1+b → 1+2+3. All spin projections n are quantized relative to a system z,y,x, and all spherical angles also belong to it. i_1,i_2,i_3 denote the spins of the particles 1,2,3. (9) is relativistic if $\vec{p}$ and $\vec{p}'$ denote Dalitz variables, and if the relativistic spin is described by the representation of Foulda-Yu. Shirokov. (6) may be deduced from (9) after a complicated transformation. An attempt to generalize (6) and (8) did not show any new difficulties. Instead of $\vec{p}_1,\vec{p}_2,\vec{p}_3,\ldots$ Dalitz variables are introduced; the spherical angles are angles between the Dalitz momenta. From the invariance of the transition

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

matrix with respect to spatial reflections the author derives a selection rule; using the relations of Ref. 9 (M. I. Shirokov, ZhETF, 36, 1524, 1959) it reads as follows:

$$\langle q_1\tau_1 \ldots | W(\vartheta, \varphi, \vartheta', \varphi' \ldots) | q_a\tau_a q_b\tau_b \rangle = (-1)^{q_1+\ldots+q_a+q_b} \times \quad (13)$$
$$\times (-1)^{\tau_1+\ldots+\tau_a+\tau_b} \langle q_1, -\tau_1 \ldots | W(\vartheta, -\varphi; \vartheta', -\varphi', \ldots) | q_a, -\tau_a; q_b - \tau_b \rangle,$$

There are 10 references: 5 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: December 3, 1960

Card 5/5

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.I.

Space and charge parity of a proton-antiproton system and its multiple-meson annihilation. Zhur.eksp.i teor.fiz. 41 no.1:190-196 Jl '61. (MIRA 14:7)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Protons) (Mesons)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.I.; SARANTSEVA, V.R., tekhn. red.

[Newton-Wigner's coordinate for a scalar particle] O koordinate N'iutona-Vignera dlia skaliarnoi chastitsy. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 6 p. (MIRA 15:4)

(Quantum field theory)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

34009
S/056/62/042/001/027/048
B102/3108

24.6600

AUTHOR Shirokov, M. I.

TITLE Estimation of the effective radius of particle interaction

PERIODICAL Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 175 - 177

TEXT Four methods of estimating the effective radius of strong interaction are discussed. 1) Estimate from the last term of an expansion of the angular distribution in Legendre polynomials

$$\sigma(\vartheta) = \sum_{L=0}^{L_э} B_L P_L(\cos\vartheta) \text{ with } B_L = \frac{2L+1}{2}\int_0^{\pi} P_L(\cos\vartheta)\sigma(\vartheta)\sin\vartheta d\vartheta$$

$\sigma(\vartheta)$ is known from measurements for a finite number of points and the B_L will vanish within the limits of error for all $L \geqslant L_э$. $L_э$ may increase as the experimental error decreases. $L_э$ of the last nonvanishing coefficient has to be found. 2) Estimate from the known total channel cross section and

Card 1/4

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

34009

S/056/62/[illegible]

[illegible] radius [illegible] B102/B108

[illegible] the angular distribution at one point. This method is based on an inequality given by V. G. Grishin and V. I. Ogiyevetskiy (ZhEFF, [illegible], 100[illegible] [illegible]; Nu[illegible] Phys. [illegible], [illegible], 1960) $d\sigma(\vartheta')/d\Omega \leq (\sigma/4\pi)\sum(\vartheta')$ for a reaction [illegible], which can be used if the angular distribution $\sigma(\vartheta')$ at one point ϑ' and the total reaction cross section are known. $\sum(\vartheta')$ is the maximum of all $\sum_{J=0}^{J_0}(2J+1)\left[d^J_{m_a+m_b,m_a+m_b}(\vartheta')\right]^2$; $-j_a \leq m_a \leq +j_a$; j_a is the spin of the particle a, J_0 is the maximum total momentum equal to the least of the quantities $l_1+j_a+j_b$, $l_2+j_1+j_2$. For large l, $J \approx l$ (l - orbital angular momentum of initial particles). The inequality holds for all reactions $a+b \to 1+2+\ldots N$, for any N. For an estimate of, e.g., the pion-proton interaction radius, σ will be the total cross section of all channels with a proton in the final state, and $d\sigma(\vartheta')/d\Omega_1$ will be the differential proton cross section for the angle ϑ'. This method is applicable if $\sigma(\vartheta')$ differs considerably from $\sigma/4\pi$. Syan Ting-Chang used the inequality $d\sigma(\vartheta')/d\Omega \leq \frac{\sigma}{4\pi}(\ldots)^2$ [illegible] Estimate from the total cross section of all

Card 2/[illegible]

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

34009

Estimation of the effective radius... S/056/62/042/001/027/048
B102/B108

channels and of the cross section of the channel of elastic scattering. This method is also based on the upper inequality and the optical theorem (W. Rarita and P. Schwed, Phys. Rev. 112, 271, 1958; A. M. Baldin et al. Kinematika yadernykh reaktsiy (Kinematics of nuclear reactions) GIFML, 1959). $(p_a/4\pi a)^2 \leq \frac{\sigma^{el}}{4\pi}(J_0+1)^2$. 4) Estimate from the mean square transverse momentum $\langle p \rangle^2$ by means of the uncertainty relation $r_0 > \frac{\hbar}{2}\left[\langle p \rangle^2\right]^{-1/2}$. M. I. Podgoretskiy and the Laboratoriya vysokikh energiy OIYaI (High-energy Laboratory of the OIYaI) are mentioned. There are 10 references: 5 Soviet and 5 non-Soviet. The references to the English-language publications read as follows: T. M. Blatt, L. C. Biedenharn. Rev. Mod. Phys. 24, 258, 1952; A. Simon. Phys. Rev. 92, 1050, 1953; M. Jacob, G. C. Wick. Ann. of Phys. 7, 404, 1959.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: June 20, 1961

Card: 4/4

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

S/053/62/078/003/004/005
B163/B104

AUTHOR: Shirokov, M. I.

TITLE: Examination of PC- and PCT-invariance in decay processes

PERIODICAL: Uspekhi fizicheskikh nauk, v. 78, no. 3, 1962, 471-497

TEXT: Hitherto no experiments have been performed that enable a conclusion on the PC- or PCT-invariance of the processes under consideration to be drawn. In order to find out whether physical processes are PC invariant or PCT invariant, or both, additional special experiments must be made. Such experiments are of the same type as those required to test T invariance. It is necessary to measure the perpendicular components of the polarization vectors of the decay particles. The difficulties of such experiments are increased by the need to perform them also with negative particles depolarized or captured by matter (μ^-- and K^--mesons). At present, T invariance is established with some reliability only in the case of the β decay of the neutron. The performance of the following experiments is desirable with respect to further confirmation and distinction between PC- and PCT-invariance: (1) Measurement of the

their

Card 1/2

Card 2

PAGE: 08/23/2000 CIA-RDP86-00513R001549520

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.I.; SARANTSEVA, V.R., tekhn. red.

Relativistic causality in the quantum mechanics of a scalar particle. Dubna, Ob"edinennyi in-t iadernykh issledovanii 1963. 12 p.

(No subject heading)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

L 2748-66 EWT(1)
ACCESSION NR: AP5024349 UR/0367/65/002/002/0332/0341

AUTHOR: Shirokov, M. I. 44,55

21 44,55

TITLE: Localizability of field theory with respect to noncommutating coordinates

SOURCE: Yadernaya fizika, v. 2, no. 2, 1965, 332-341

TOPIC TAGS: quantum mechanics, quantum field theory

ABSTRACT: An attempt is made to alter the coordinate concept in quantum field theory. This theory is proposed both to eliminate discrepancies and to increase the number of theories which concur as to general requirements so that a theory can be chosen to fit a given experiment. In addition to numbering the degrees of freedom for the field by the coordinates x_1, x_2, x_3, x_4, eigenvalues of other operators r_μ are proposed as parameters. These operators are similar to the x_μ operator. The kinetic potential of the interaction is assumed to be localizable in terms of these eigenvalues. This interaction is considered to be nonlocal when the ordinary parameters are used. Requirements are then applied within the framework of the ordinary nonlocal field theory for translational and Lorentzian invariance as well as for unitarity of the theory (Hermitian nature of the kinetic potential of the inter-

Card 1/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

L 2749-65
ACCESSION NR: AP5024349

action). That is, it is proposed that a class of translational-Lorentzian-invariant interactions be found with form factors which may be represented as localizable with respect to some coordinate other than x_4. The proposed field operators are not matrices, but certain superpositions of field operators in the x-representation. The results show that use of the coordinate x in field theory is justified by more than its simplicity. Orig. art. has: 46 formulas.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 17Jan65 ENCL: 00 SUB CODE: GP, MA

NO REF SOV: 005 OTHER: 007

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.M.

"Geography of Kalinin Province." M.M. Bocharov. Reviewed by B.A. Shirokov. Izv. Vses. geog. ob-va 85 no.3:308-309 My-Je '53. (MLRA 6:6)
(Bocharov, M.M.) (Kalinin Province--Geography)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

[illegible] and systematic guidance in standardization. Standartizatsiia [illegible] '65. (MIRA 18:4)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

Shimanov, N. I.

YELISEYEV, A.V., inzhener; SHIROKOV, M.T., inzhener.

New method of working chalk beds. Mekh.stroi. 11 no.8:22-23 Ag '54. (MLRA 7:8)
(Chalk)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, Matvey Yevdokimovich; RADZINSKAYA, A., red.; YURGANOVA, M., tekhn.red.

[Darasun Health Resort] Kurort Darasun. Chita, Chitinskoe knizhnoe izd-vo, 1957. 129 p. (MIRA 11:1)
(DARASUN--HEALTH RESORTS, WATERING PLACES, ETC.)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.Ye., podpolkovnik med. sluzhby

Treatment of neurocirculatory dystonia at the spa of Darasun. Voen.-med. zhur no.5:43-46 My '57 (MIRA 12:7)

(NEUROCIRCULATORY ASTHENIA, therapy
phys. ther. (Rus))
(PHYSICAL THERAPY, in var. dis.
neurocirc. asthenia (Rus))

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, Matvey Yevdokimovich. Prinimali uchastiye: PROKOP'YEV, I.M., vrach; KATOLIK, G.M., vrach; KERBELEV, V.I., vrach; SHIROKOVA, N.S., vrach. KHODOS, Kh.G., prof., red.; BORDONSKIY, S., red.; YURGANOVA, M., tekhn.red.

[Darasun Health Resort] Kurort Darasun. Izd.2., dop. i ispr. Chita, Chitinskoe knizhnoe izd-vo, 1960. 142 p. (MIRA 13:11)

(DARASUN-KURORT--THERAPEUTICS, PHYSIOLOGICAL)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.Ye. (Darasun)

Results of treating hypertensives at the Darasun-resort. Vop. kur., fizioter. i lech. fiz. kul't. 25 no.4:361-362 Jl-Ag '60. (MIRA 13:9)
(DARASUN MINERAL WATERS) (HYPERTENSION)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, M.Ie.

Methodology of therapy with potable Darasan mineral water of chronic gastritis. Sbor. nauch. rab. vrach. san.-kur. uchr. profsoiuzov no.1:67-75 '64. (MIRA 18:10)

1. Darasunskiy sanatoriy.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, N.

New apparatus for determination of ammonia and total nitrogen in meat products. Myasnaya Ind. S.S.S.R. 24, No.1, 79-81 '53. (MLRA 6:2)
(CA 47 no.19:10147 '53)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, N., polkovnik

Training troops for winter fighting. Voen.vest. 40 no.2:118-120 F '61. (MIRA 14:2)

(Winter warfare)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

BCS SHIROKOV, N. A.

Glass

1564. Utilization of waste heat from glass tanks.—N. A. SHIROKOV (Stek. Keram., 7, No. 10, 24, 1950). (1 p., 1 fig.)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

SHIROKOV, N.A.

Ribbed coolers. Stek.i ker. 12 no.12:27-28 D '55. (MLRA 9:3)

1. Volodarskiy stekol'nyy zavod.
(Volodarsk--Glass manufacture)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5

IVANOV, V.S.; SMIRNOVA, V.K.; KLEPTSOVA, A.P.; BARABASH, V.I.; TSAREVSKIY, N.Ye.; YEMELIN, Yu.D.; SHIROKOV, N.A.; ZAVALEY, V.M.

Catalytic formation of crotonaldehyde. Part 3: Condensation of acetaldehyde over magnesium, zinc, strontium, cadmium, and barium phosphates. Vest LGU 16 no.22:139-148 '61. (MIRA 14:11)
(Acetaldehyde) (Crotonaldehyde) (Phosphates)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001549520019-5"