ACCESSION NR: AP4040569

SUBMITTED: 29Jan64 DATE ACQ: 19Jun64 ENCL: 00

SUB CODE: AS, MM NO REF SOV: 007 OTHER: 005

Card 2/2

CHUVIKOV KIY, Vladislav Sergeyevich; NOVOZHILOV, V.V., nauchn. red.; OSVENSKAYA, A.A., red.

[Principles of dynamics in the structural mechanics of a ship] Printsipy dinamiki v stroitel'noi mekhanike korablia. Leningrad, Izd-vo "Sudostroenie," 1964. 191 p.
(MIRA 17:7)

L 24690-65 EWT(d)/EWT(m)/EWP(w)/EWP(k) EM

ACC NR: AP6015812 SOURCE CODE: UR/0040/65/029/002/0261/0281

AUTHOR: Novozhilov, V. V. (Leningrad); Sleptsyan, L. I. (Leningrad)

ORG: none

TITLE: Saint Venant principle in the dynamics of bars

SOURCE: Prikladnaya matematika i mekhanika, v. 29, no. 2, 1965, 261-281

TOPIC TAGS: metal stress, fabricated structural metal

ABSTRACT: Approximate solutions to equations describing the behavior of bars under stress are given, and some specific examples are given. This work is based on TIMOSHENKO ("Theory of Oscillations in Engineering", Gostekhizdat, 1932) and others. Orig. art. has: 6 figures and 6 formulas. [JPRS]

SUB CODE: 13 / SUBM DATE: 17Dec64 ORIG REF: 010 / OTH REF: 010

Card 1/1 FW

NOVOZHILOV, V.V. (Leningrad)

Plastic disintegration. Prikl. mat. i mekh. 29 no.4:681-689 Jl-Ag '65. (MIRA 18:9)

ACC NR: AP6030743 SOURCE CODE: UR/0040/65/029/004/0681/0689

AUTHOR: Novozhilov, V. V. (Leningrad)

ORG: none

TITLE: Plastic loosening

SOURCE: Prikladnaya matematika i mekhanika, v. 29, no. 4, 1965, 681-689

TOPIC TAGS: cyclic load, plasticity, elastic stress, plastic deformation, aluminum alloy

ABSTRACT: The term "loosening of solids" caused by plastic deformation (or plastic loosening) is understood to mean their monotonic volume increase which can be explained physically by formation of microcavities in the solid. The solid is treated as a free-flowing medium with strong cohesion among its particles; principal attention is paid to alternated plastic deformations. Two yield criteria--one recommended by L. Prandtl and J. Guest (accounting for the effect of normal stresses σ_n on the critical tangential stresses in St.-Venant's criterion), and the other derived by F. Schleicher (accounting for the effect of the mean normal stress σ on the critical value of the mean tangential stress in the Mises criterion)--are generalized with the purpose of investigating the process of plastic loosening in strain-hardening materials.

Card 1/5

L 44711-66
ACC NR: AP6030743

The stress-strain relationships under plastic deformation are discussed from two different viewpoints: 1) the strain-hardening phenomenon is ascribed to internal microelastic forces (of intergranular nature), assuming a constant coefficient of internal friction; and 2) the strain-hardening is assumed to be caused only by an increase in the internal-friction factor.

The analyses in both cases lead to the conclusions that any plastic deformation is followed by a residual increase in volume (i.e., plastic loosening) which is proportional either to the length of the "path" of plastic deformation (in the case of the Prandtl-Guest criterion) or to the work causing the plastic deformation (in the case of Schleicher's criterion); the additional plastic deformations due to σ_n (Prandtl-Guest) are reduced to plane deformation (omnidirectional expansion in the plane of shear), and the additional plastic deformations due to σ (Schleicher) result in an omnidirectional (three-dimensional) expansion. An experimental investigation should make clear which criterion produces results closer to the truth.

The effect of normal stresses σ and σ_n on the plastic deformation is small in cases of steady loading. In the case of cyclic (alternated) loading, the additional plastic deformations in each cycle caused by σ

Card 2/5

ACC NR: AP6030743

and σ_n are accumulated and increase monotonically (proportionally to the number of cycles), as does the plastic loosening. After a large number of cycles, the additional plastic deformations caused by normal stresses can reach a considerable value and lead to fracture. Therefore, cyclic loading is a special case from which one can get an idea of the corrections which should be introduced in the theory of plasticity in order to account for the effect of normal stresses σ and σ_n considered in the yield criteria.

. . Three tubular aluminum-alloy specimens (120 mm long, 30 mm outside diameter, 2 mm wall thickness) were tested in alternated torsion, and their elongation (ε_1) and variation in diameter (ε_2) were exactly measured after each cycle; the results are shown in diagrams (Figs. 1 and 2, respectively), where n is the number of cycles, and lines 1, 2, and 3 stand for specimens. Specimen 1 was subjected to 69 cycles, and specimens 2 and 3 collapsed after 21 and 26 cycles, respectively. As the thickness of the specimens could not be measured exactly, no comparative evaluation of the Prandtl-Guest and Schleicher criteria can be given, since according to the first criterion, the thickness must be constant, and according to the second, it must change in the same proportion as the length and diameter. The theoretical considerations are qualitatively confirmed by the testing. Appropriate experimental investigations are being continued and their results will be published in the near future.

Card 3/5

L 44711-66

ACC NR: AP6030743

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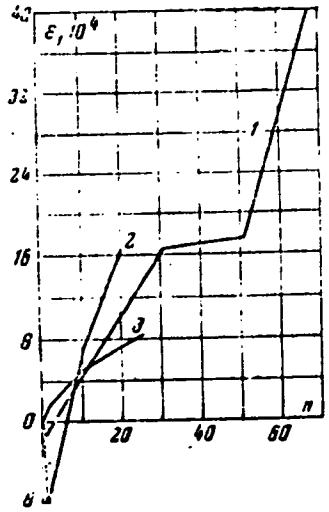


Fig. 1. Elongation vs the number of cycles.

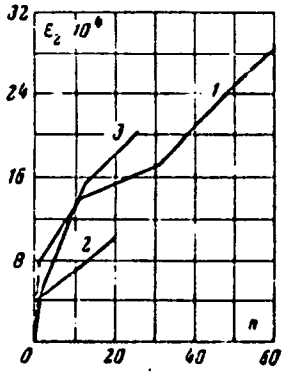


Fig. 2. Relative diameter increase vs the number of cycles.

Card 4/5

L 44711-66

ACC NR: AP6030743

The correlation between the theory of plastic loosening and dislocations, together with their role in plastic deformation, are briefly discussed. It is necessary to bear in mind that the formulas expressing both criteria, which are taken as initial equations in this investigation, describe quasi-static isothermal deformation. It must therefore be considered that the cyclic deformations proceed at a slow rate. The possibility of extending the results obtained here to the cases of fast alternating loading can be decided after a special investigation, although the qualitative aspect of the phenomenon should apparently be valid also in the case of fast cyclic loading.

It is believed that the final decision on the applicability of simple mechanical models used in the theory of plasticity can be made only in the future on the basis of the statistical theory of solids, which accounts for their structural defects; regrettably, the theory is now in a state of initial development. Orig. art. has: 2 figures and 5 formulas. [FSB: v. 2, no. 4]

SUB CODE: 20 / SUBM DATE: 29Mar65 / ORIG REF: 012 / OTH REF: 007

hs

Card 5/5

L 08072-67 EWT(d)/EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/EM
ACC NR: AP6034146 (N) SOURCE CODE: UR/0424/66/000/005/0103/0111

AUTHOR: Novozhilov, V. V. (Leningrad); Rybakina, O. G. (Leningrad) 24 B

ORG: none

TITLE: The outlook for establishing a strength criterion under complex loading 26 26

SOURCE: Inzhenernyy zhurnal. Mekhanika tverdogo tela, no. 5, 1966, 103-111

TOPIC TAGS: ~~strength criterion~~, cyclic load, cyclic strength, ~~simple loading~~, ~~complex loading~~, ~~proportional loading~~, ~~nonproportional loading~~, ~~loading path~~

ABSTRACT: An attempt is made to establish a general criterion for the strength of a body (specimen) under a complex (nonproportional) path of loading by using the relationship $N.\varepsilon_p^2 = C$ derived by L. F. Coffin for cyclic fatigue strength. Here N is the number of cycles, ε_p - the amplitude of plastic deformation, and C a constant. The sought for general strength criterion which has to be valid for any complex loading must turn into the above formula under conditions of symmetric cyclic loading. The proposed criterion has the form of the Ludwick-Messnager strength curve supplemented in its practical application by the basic formulas of plasticity theory (the plastic stress-strain relationships). The

24

Card 1/2

L 08072-67

ACC NR: AP6034146

interrelation between this criterion and the strength theories in the case of a simple (proportional) path of loading is discussed and the results obtained here can be regarded as the generalization of the Ya. B. Fridman theory of strength. The application of the proposed criterion in the case of cyclic loading furnishes results close to those obtained through the L. Coffin criterion, and its uses in particular cases of complex loading, such as uniaxial tension combined with hydrostatic pressure (or with omnidirectional tension) give results which agree with actual strength conditions. A specific feature of the criterion derived here is that it contains the stress invariant as well as the invariants of strain. It also contains three constants: two are associated with resistance to fracture and the third is a new introduced constant - the index of embrittlement of the material, which was badly needed as a quantitative measure for the effect of the state of stress on the ultimate plastic deformation. The authors do not consider their proposal as final and indisputable, but as the very first step in constructing a strength criterion for solids under complex loading. Orig. art. has: 5 figures and 32 formulas.

SUB CODE: 20/ SUBM DATE: 10May66/ ORIG REF: 006/ OTH REF: 005/
ATD PRESS: 5102

Card 2/2

PROSKURYAKOV, V.A.; NOVOZHILOV, Ye.N.

Oxidation of Kenderlyk oil shale by atmospheric oxygen in an aqueous-alkali medium. Trudy VNIIT no.13:5-9 '64. (MIRA 18:2)

L 26674-66 EWT(d)/EWP(h)/EWP(l)
ACC NR: AP6009551 SOURCE CODE: UR/0413/66/000/005/0093/0094

AUTHORS: Amel'kovich, I. I.; Artamonov, Yu. G.; Dyatlov, Ye. S.; Magirovskiy, N. P.; Novoshilov, Yu. I.; Orlov, S. F.; Pikkuvirta, P. O.; Podkovyrin, A. I.; Polyachenko, V. A.; Senchenko, L. P.; Fedoseyev, O. V.; Shubin, L. V. 32 B

ORG: none

TITLE: Machine for gathering, hauling, and transportation of felled trees. Class 45, No. 179539 [announced by Onega Tractor Factory (Onezhskiy traktornyy zavod); Leningrad Kirov Factory (Leningradskiy Kirovskiy zavod); Leningrad Forestry Technical Academy im. S. M. Kirov (Leningradskaya lesotekhnicheskaya akademiya)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 5, 1966, 93-94

TOPIC TAGS: tractor, forestry, forestry product

ABSTRACT: This Author Certificate presents a machine for hauling, gathering, and transporting felled trees, consisting of a mono-axle tractor, semitrailer with steering axle connected with the tractor by a universal joint, and a hoist. To insure a continuous pick-up of felled trees and their loading on the machine, the latter is equipped with a movable boom, to the end of which is attached a pincer clamp. To improve the maneuverability of the machine, the movable boom is mounted on the tractor frame and the pick-up device on the frame of the semi-trailer. To

UDC: 629.114.4:634.0.377.4

Card 1/2

L 26674-66

ACC NR: AP6009551 O

prevent damage to the movable parts, the latter are protected by means of pipe fastened above the saddle hitch device. To facilitate the loading of large packets of trees, a pulley is attached to the protective pipe (see Fig. 1).

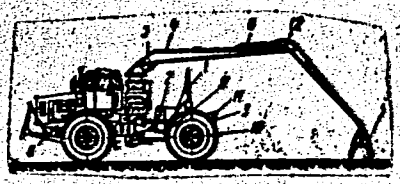


Fig. 1. 1 - pick-up assembly; 2 - hoist; 3 - saddle-hitch device; 4 - movable boom; 5 and 6 - power cylinders; 7 - pincer clamp; 8 - mono-axle tractor; 9 - semitrailer; 10 - steering axle of semitrailer; 11 - protective pipe; 12 - pulley.

Orig. art. has: 1 diagram.

SUB CODE: 13,02/ SUBM DATE: 15Jul64

Card 2/2 BLG

DOGVAL', Viktor Ivanovich; LIVSHITS, Erik Abramovich; LYSOCHENKO, Aleksandr Alekseyevich; NADEZHIN, Konstantin Nikolayevich; NOVOZHILOV, Yuriy Ivanovich; SOKOLOV, Nikolay Aleksandrovich; FEDOSEYEV, Oleg Vasil'yevich; YASKUNOV, Nikolay Pavlovich; MAGIROVSKIY, N.P., red.; PAVKRASHOV, A.P., red.; POD"YEL'SKAYA, K.M., tekhn. red.

[TDT-40M diesel timber-skidding tractor] Trelevochnyi traktor TDT-40M. Pod red.N.P.Magirovskogo. Petrozavodsk, Gos. izd-vo Karel'skoi ASSR, 1961. 355 p. (MIRA 14:10)
(Tractors—Design and construction)

NEL'SON, I.A.; NOVOZHILOV, Yu.L.; KOTKOVSKAYA, B.D.

Preliminary treatment of water with ultrasonic and magnetic fields as a means for increasing the strength of cement solutions and concrete. Nauch. trudy PermNIUI no.6:165-179 '64. (MIRA 18:2)

NOVOZHILOV, Yu.L.

Ultrasonic device for combatting boiler scale. Nauch. trudy Perm NIUI no.3:203-207 '63. (MIRA 17:3)

NOVOZHILOV, Yu.E., inzhener.

Automatic regulation of the condensate level in tubine condensers. Energetik 5 no.4:10-11 Ap '57. (MLRA 10:6)
(Turbines)

NOVOZHILOV, Yu.N., inzh.

Light and sound signaling circuit on direct and alternating current.
Energetik 5 no.9:29 S '57. (MIRA 10:10)
(Signals and signaling)

8 (6)

SOV/91-59-4-8/28

AUTHORS: Ushakov, I. K., Novozhilov, Yu. N., Engineers

TITLE: The Automatic Washing of Screens of a Shore Pumping Station (Avtomatizatsiya promyvki setok beregovoy nasosnoy)

PERIODICAL: Energetik, 1959, Nr 4, p 13 - 15 (USSR)

ABSTRACT: At one GRES, the four rotating screens of the shore pumping station were rapidly clogged by the large amount of dirt contained in the cooling water. For removing the dirt, the motors moving the screens and the washing pump had to be switched on frequently. The authors devised and built a relay system which automatically cleans the screens. If the screens are clogged, there will be a difference between the water levels in front of the screen and behind it. This difference is measured by two floats which are connected by cables to counterweights. Further, the cables are connected to the mercury switch of the contact device. Figure 1 shows the arrangement of the floats and Figure 2 shows the mercury switch. The latter actuates a relay system, shown in Figure 3, whereby the drive motor of the screen is switched

Card 1/2

The Automatic Washing of Screens of a Shore Pumping Station

on. As soon as the motor of the screen works, the washing pump is started and continues its operation until the movement of the screen has stopped.
There are 4 diagrams.

NOVOZHILOV, Yu.N., inzh.

Automated supply of fuel oil in boiler furnaces. Energetik 10 no.3:11-12 Mr '62. (MIRA 15:2)

(Furnaces)
(Petroleum as fuel)

NOVOZHILOV, Yu.N., inzh.

Dynamic coupling between VTI system controllers. Energetik 10 no.11:28-29 N '62. (MIRA 15:12)
(Boilers)

NOVOZHILOV, Yu.N., inzh.; ABRAMOV, G.I., inzh.

Automation of operating processes of boiler units at the Novo-Ryazan Thermal-Electric Power Station. Za indus.Riaz. no.2:35-39 D '61. (MIRA 16:10)

NOVOZHILOV, Yu.N., inzh.

Improvement of an air heating network in boiler heaters.
Energetik 11 no.11:12-13 N '63. (MIRA 16:11)

NOVOZHILOV, Yu.N., inzh.

Change in the control speed due to the replacement of KDU motors.
Energetik 12 no.1:35 Ja '64. (MIRA 17:3)

NOVOZHILOV, Yu.N., inzh.

Automatic pressure control of gas flow to electric power plants.
Energetik 12 no.3:14-15 Mr '64. (MIRA 17:4)

NOVOZHILOV, Yu.N., inzh.; YENYAKIN, Yu.P., inzh.; PROGUNOV, V.A., inzh.

Automation of hot air supply control in boilers with rotating regenerative air superheaters. Elek. sta. 35 no.8:71-72 Ag '64. (MIRA 17:12)

L 62861-65

ACCESSION NR: AP5019031 UR/0286/65/000/012/0065/0067
621.873.132
621.868.277.3

5
B

AUTHOR: Artamonov, Yu. G.; Novozhilov, Yu. I.; Yaskunov, N. P.

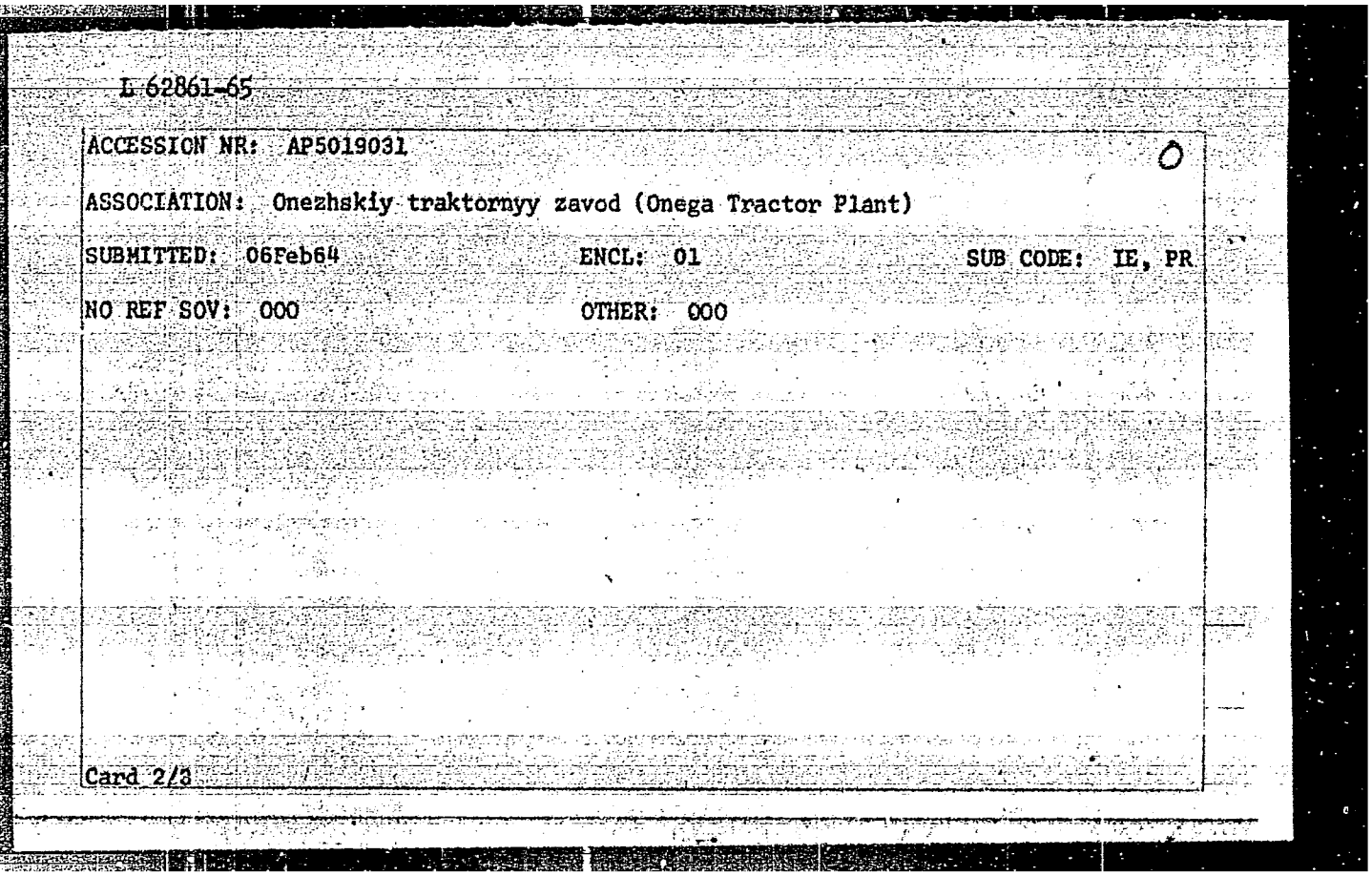
TITLE: A lift for a hauling tractor. Class 35, No. 172013

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 12, 1965, 66-67

TOPIC TAGS: tractor, logging, hoist, lift

ABSTRACT: This Author's Certificate introduces a lift for a hauling tractor. The device contains a rotating column, a boom and lever which are moved by hydraulic cylinders, and a jaw grab with hydraulic drive. The grab is mounted on the free end of the lever. The device is designed for loading and hauling both individual logs and bundles of logs. The unit has two pulleys through which the winch cable from the tractor passes. One of these pulleys is mounted on an axle which hinges the boom to the rotating column, while the other pulley is mounted on the boom by hinges which connect it with the lever and with the rotating column.

Card 1/3



L 62861-65

ACCESSION NR: AP5019031

ASSOCIATION: Onezhskiy traktornyy zavod (Onega Tractor Plant)

SUBMITTED: 06Feb64 ENCL: 01 SUB CODE: IE, PR

NO REF SOV: 000 OTHER: 000

Card 2/3

L 62861-65

ACCESSION NR: AP5019031

ENCLOSURE: 01

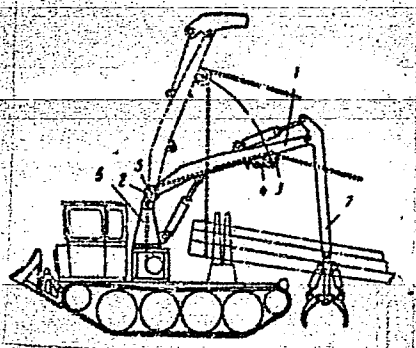


Fig. 1. 1--boom; 2 and 3--pulleys; 4--cable; 5--axle; 6--rotating column; 7--lever

Card 3/3

NOVOZHILOV, Yu.N.

Control and protection of equipment from vibration, shocks, and impacts. Prom. energ. 20 no.5:30-31 My '65. (MIRA 18:7)

NOVOZHILOV, Yu.N., inzh.

Double-pulse control system of turbines with back pressure.
Elek. sta. 36 no.9:77 S '65. (MIRA 18:9)

USSR/Physics - Quantum Mechanics Mar 52

"Application of Fok's Functionals to Problem of Proper (Self) Energy," Yu. V. Novozhilov, Leningrad State U

"Zhur Eksper i Teoret Fiz" Vol XXII, No 3, pp 269-275

Fok's method (cf: V. A. Fok, Sov Phys 6,425, 1934) is used to derive Dirac's eqs contg electromagnetic mass and radiational corrections. Presented derivation is simpler than conclusions based on application of perturbation theory in method of secondary quantization of electron and radiation fields. Indebted to Acad V. A. Fok. Received 25 Jun 51.

21T71

NOVOZHILOV, Yu. V.

21T71

NOVOZHILOV, Yu. V.

USSR/Physics - Self-Energy 11 Mar 52

"Proper Energy of the Electron and Radiation Corrections," Yu. V. Novozhilov

"Dok Ak Nauk SSSR" Vol LXXXIII, No 2, pp 207-210

Quantizes the scalar electromagnetic field with respect to indefinite metric as proposed in a work by S. N. Gupta (cf. Proc Phys Soc, 63_A, 681, 1950).

Acknowledges the helpful discussions of Acad V. A. Fok. Submitted by Acad V. A. Fok, 14 Jan 52.

214T87

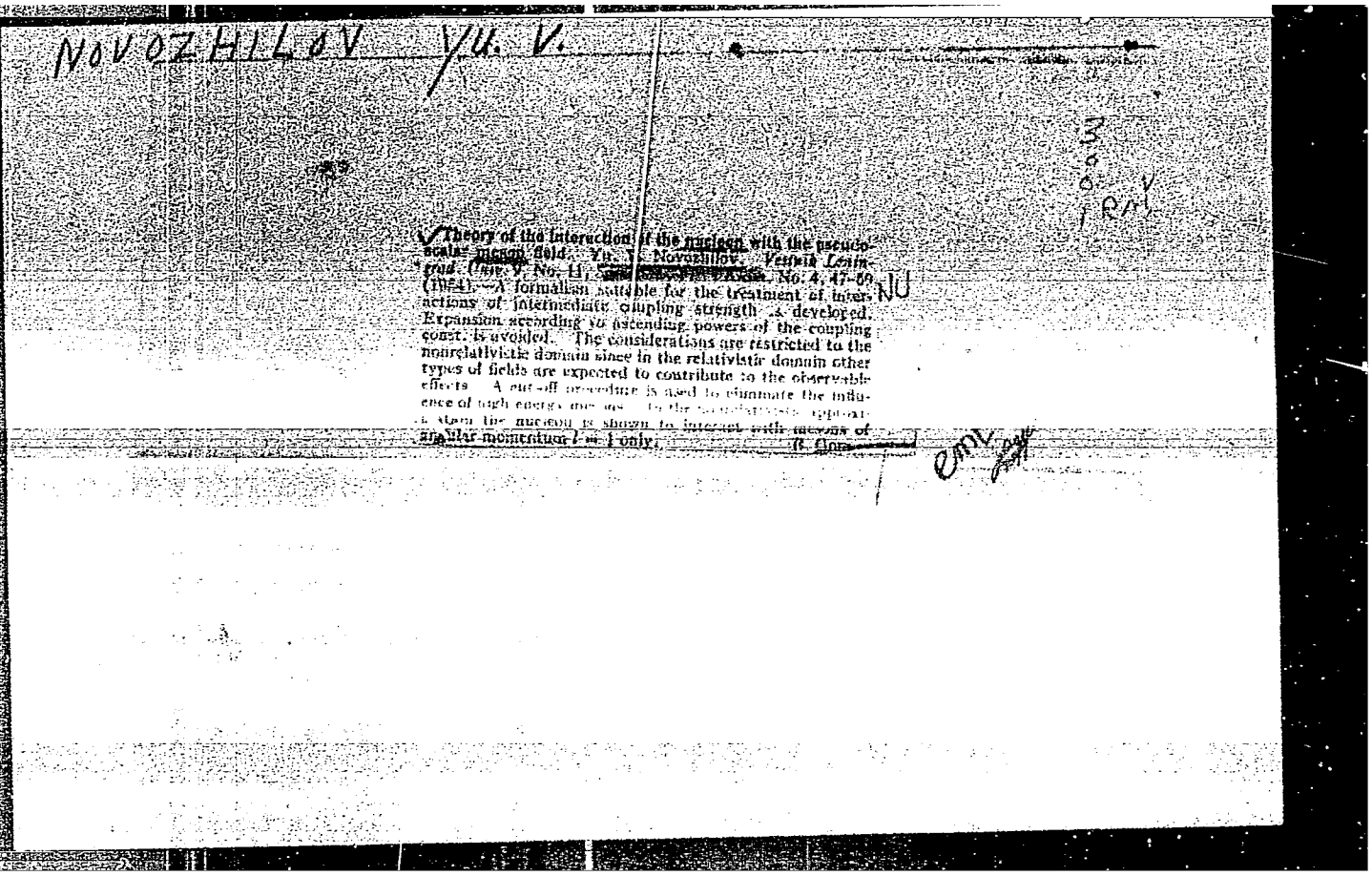
NOVOZHILOV, Yu. V.

USSR 1

530.145

3045. On the choice of the "unperturbed" energy operator in the theory of the interaction of a nucleon with the pseudoscalar meson field. Yu. V. Novozhilov. *Dokl. Akad. Nauk SSSR*, 92, No. 5, 931–3 (1953) In Russian. English translation, *U.S. National Sci. Found. NSF-tr-217.*

Pseudoscalar coupling and charge symmetric theory are assumed. It is found that for a non-relativistic nucleon the only interactions of importance occur with mesons which have angular momenta $l = 0$ and $l = 1$. For large values of the coupling constant, mesons with $l = 0$ interact with the nucleon much less strongly than those with $l = 1$. In this case the "unperturbed" Hamiltonian is chosen to be that containing emission and absorption operators for mesons with $l = 1$. As a check on this procedure, values of the magnetic moments of the proton, $\mu_P = 2{\cdot}3\mu_0$, and neutron, $\mu_N = -1{\cdot}75\mu_0$, are obtained, which are in better agreement with experiment than the results of weak-coupling theory. G. FIELD



NOVOZHILOV, YU. V.

Theory of the interaction of the nucleon with the pseudoscalar meson field. Yu. V. Novozhilov. *Vestnik Leningrad. Univ.* 9, No. 11, Ser. Fiz. No. 4, 47–69 (1954).—A formalism suitable for the treatment of interactions of intermediate coupling strength is developed. Expansion according to ascending powers of the coupling const. is avoided. The considerations are restricted to the nonrelativistic domain since in the relativistic domain other types of fields are expected to contribute to the observable effects. A cut-off procedure is used to eliminate the influence of high energy processes. In the [illegible] approximation the nucleon is shown to interact with mesons of angular momentum $l = 1$ only. 16 Refs.

Novozhilov, Yu. V.

2 3 9-EML

Electromagnetic properties of the nucleon. Yu. V. Novozhilov. *Vestnik Leningrad. Univ.* 9, No. 11, *Ser. Mat., Fiz. i Khim.* No. 4, 61-6(1954).—A formalism for the treatment of pseudoscalar meson-nucleon interaction of intermediate strength developed by N. (cf. preceding abstract) is used to calc. the magnetic moments of the nucleons. The results depend on the value of 1 parameter only which is proportional to the coupling const., and contains the ratio of 2 cut-off integrals as a factor. With a suitable choice of this parameter the values $\mu_n = -1.92$ μ_0 and $\mu_p = 2.31$ μ_0 are obtained which compare reasonably well with the exptl. values $\mu_n = -1.91$ μ_0 and $\mu_p = 2.78$ μ_0 for the magnetic moments of neutron and proton. E. G.

EML
RBW

Novozhilov, Yu. V.

USSR/Physics - Causal operators

Card 1/1 Pub. 22 - 12/45

Authors : Novozhilov, Yu. V.

Title : Causal operators in the quantum theory of a field

Periodical : Dok. AN SSSR 99/4, 533-536, Dec 1, 1954

Abstract : It is suggested that the so-called "causal" operators ($\chi, \bar{\chi}$ and $\bar{\Phi}$) be used in order to overcome difficulties encountered in the interpretation of field states by the quantum theory of a field with ordinary operators (ψ, $\bar{\psi}$ and φ). The causal operators impose upon the states of a field the causal dependence of the following states on the preceding ones. For better understanding, an examplary application of the causal operators to an electron-positron field is considered. Three references 2-USSR (1951-1953).

Institution : Leningrad State University im. A. A. Zhdanov

Presented by: Academician V. A. Fok, June 13, 1954

USSR/ Physics - Quantum mechanics

Card 1/1 Pub. 22- 15/56

Authors : Novozhilov, Yu. V.

Title : On the quantum theory of a field with the "causal" operators

Periodical : Dok. AN SSSR 99/5, 723-726, Dec. 11, 1954.

Abstract : The quantum theory with the so-called "casual" operators (χ, $\bar{\chi}$ and φ) is discussed. Properties of the casual operators are described through the corresponding solutions of Dirac's boudary problem, a solution of which in the $\chi(x)$ is given as follows: $\chi(x) = i \int S(x-x') \gamma_4 \chi(x')\, d\vec{x}'$. The meaning of the casual operators and the possibilty of their application to the Keisenberg method are explained. It is stated that the use of the casual operators makes it possible to consider not only descrete relationships, but also relationships of more general types. Four USSR references (1934-1954).

Institute: The Leningrad State University im. A.A. Zhdanov.

Presented by: Academician B.A. Fok, July 13, 1954.

BOGOLYUBOV, Yu.V.

Quantum field theory of causal operators and the Schwinger functional. Dokl. AN SSSR 104 no.1:47-50 S '55. (MLRA 9:2)

1.Leningradskiy gosudarstvennyy universitet imeni A.A. Zhdanova. Predstavlene akademikom V.A.Fokom.
(Field theory) (Quantum theory)

NOVOZHILOV, YU. V.

The Intermediate Connection Method in the Mezo Theory
Vest. Leningrad U., Ser. Fiz. i Khim., no. 1, 1956, p. 51

NOVOZHILOV, Yu.V.; KUNI, F.M.; KHALFIN, L.A.

On the method of intermediate coupling in the theory of mesons.
Vest. Len.un.11 no.4:51-68 F '56. (MLRA 9:7)
(Mesons)

NOVOZHILOV, Yu V.

CARD 1 / 2 PA - 1620

SUBJECT USSR / PHYSICS
AUTHOR NOVOŽILOV, JU.V.
TITLE The Quantum Theory of The Field with Causal Operators.
PERIODICAL Žurn.eksp.i teor.fis, 31, fasc.3, 493-503 (1956)
ISSUED: 12 / 1956

This work systematically develops a field theory with causal operators on the basis of the principle of the smallest action.

The basic equations. The principle of the smallest action. Here $\chi(x)$ and $\bar{\chi}(x)$ denote the operators of the nucleon field and $\varphi(x)$ denotes the operators of the meson field. Let it be assumed that it is known whether these causal operators in the case of any intervals between the points x,y,z anticommutate or commutate: The main problem is the determination of the basic unit vector in the entire fourdimensional space for the fields which are in interaction. The vector of state $\Omega = \int C(\xi') d\xi' \Omega(\xi')$ is determined if the development coefficients $C(\xi') = (\Omega(\xi'), \Omega)$ are known. For the principle of the smallest action two formulations are given.

The Vector of State Ω as a SCHWINGER Functional: The mathematical apparatus investigated here can be equivalent only to such an apparatus of the usual "threedimensional" theory in which variations are permitted which destroy the principle of the stationarity of action. The treatment of this problem in space and time must be closely connected with the representation of exterior sources or invariant exterior parameters.

NOVOZHILOV, YU.V

PA - 2009

AUTHOR: NOVOŽILOV,JU.V.
TITLE: A Variation Principle and a Virial Theorem for the Continuous Spectrum of the DIRAC Equation.

PERIODICAL: Zhurnal Eksperimental'noi i Teoret.Fiziki 1956, Vol 31, Nr 6, pp 1084-1086 (U.S.S.R.)
Received: 1 / 1957 Reviewed: 3 /1957

ABSTRACT: The present communication generalizes the variation principle, valid for the whole amplitude, for the case of the DIRAC equation and deduces a virial theorem for the continuous spectrum of the DIRAC equation. These results can then be used for the theory of scattering of high-energy electrons by nuclei. The following functional is investigated:

$$I\left\{\Psi_1, \Psi_2\right\} = \int \Psi_2^+ (\vec{r}) \left[\vec{\alpha}\vec{p} + \beta m + V(\vec{r}) - E\right] \Psi_1(\vec{r})\, d\vec{r}$$

where the functions Ψ_i do not agree in general with the result Ψ_i of the DIRAC equation $\left[\vec{\alpha}\vec{p} + \beta m + V(\vec{r}) - E\right] \Psi_i = 0$. For the exact functions it therefore applies that $I\left\{\Psi_1, \Psi_2\right\} = 0$. For the present we confine ourselves to such potentials V as decrease more quickly at $r \to \infty$ than $1/r$. Asymptotic expressions are given for the test functions Ψ_1 and Ψ_2 and the asymptotic expressions for the exact functions Ψ_1 and Ψ_2 have the same structure as in the case of test

CARD 1 / 3

A Variation Principle and a Virial Theorem for the Continuous Spectrum of the DIRAC Equation. PA - 2009

equation is found for the virial theorem of the continuous spectrum of the DIRAC equation:

$$\left[m\frac{\partial}{\partial m} + E\frac{\partial}{\partial E}\right](U_2^+ F(\vec{V}_1, \vec{V}_2)) = (pE/2\pi)\int \Psi_2^+ \left[V + \vec{r}\ \nabla V\right]\varphi_1\, d\vec{r}.$$

This virial theorem is used at high energies $E \gg m$. In the case of a non-central field $\partial(U_2^+ F(\vec{V}_1, \vec{V}_2))/\partial\lambda = -(pE/2\pi)\int \Psi_2^+ \frac{\partial V}{\partial\lambda} \Psi_1\, d\vec{r}$ is found for the virial theorem.

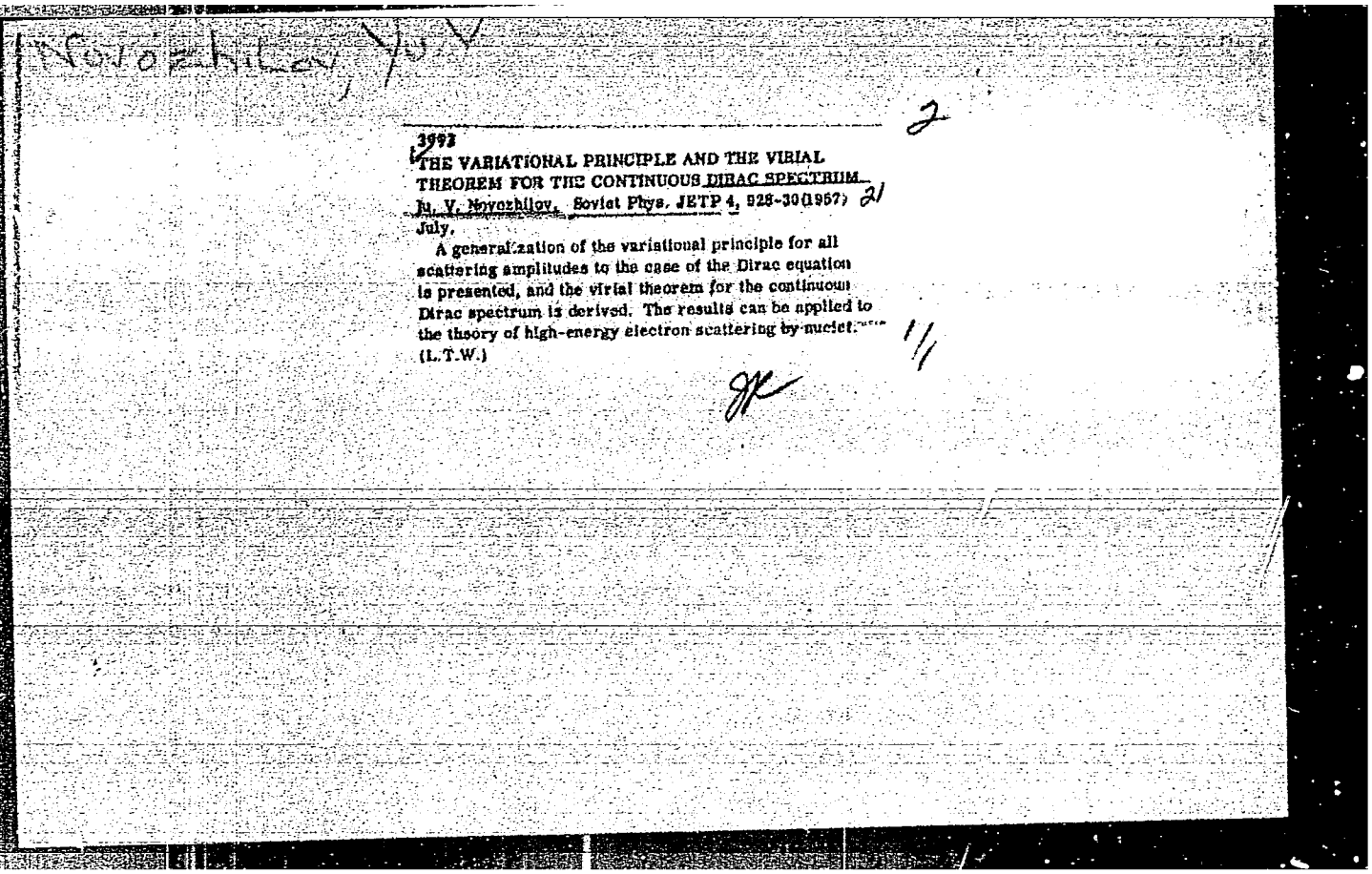
ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress

CARD 3 / 3

Iu. V.
NOVOZHILOV and TULUB, A. V.

"Functional Method in Quantum Field Theory," Uspekhi Fizicheskikh Nauk, Vol 61, No 1, Jan 56, pp 53-102.

SUM: 1360 p 16



Novozhilov, Yu. V.

3993
THE VARIATIONAL PRINCIPLE AND THE VIRIAL THEOREM FOR THE CONTINUOUS DIRAC SPECTRUM. Ju. V. Novozhilov. Soviet Phys. JETP 4, 928-30(1957) July.

A generalization of the variational principle for all scattering amplitudes to the case of the Dirac equation is presented, and the virial theorem for the continuous Dirac spectrum is derived. The results can be applied to the theory of high-energy electron scattering by nuclei. (L.T.W.)

NOVOZHILOV, Yu.V.

Variational principle, scale transformation and the virial theorem in relativistic quantum theory [with summary in English, p.151]. Vest. Len. un. 12 no.4:5-24 '57. (MLRA 10:4)
(Quantum theory)

AUTHOR NOVOZHILOV, YU. V. PA - 2083

TITLE Scale Transformation and the Virial Theorem in the Quantum Field Theory (Masshtabnoye probrazovaniye i teorema viriala v kvantovoy teorii polya).

PERIODICAL Zhurnal Eksperimental'noi i Teoret. Fiziki, 1957, Vol 32, Nr 1, pp 171-173 (U.S.S.R.)

Received 3/1957 Reviewed 4/1957

ABSTRACT Scale transformation here means the transformation of the coordination scale with simultaneous inverse modification of the mass scale $x_\mu \to \lambda x_\mu$, $m \to m/\lambda$, $M \to M/\lambda$; here λ is real and positive, m denotes the mass of the mesons, and M the mass of the nuclei. For reasons of simplicity here neutral meson and nucleon fields are observed. The author here investigates two cases connected with the group of "scale transformations": a) invariance of the field equations with respect to this transformation group and the relations resulting therefrom, b) the virial theorem which is derived by means of scale variations. The field equations for the meson and the nucleon field run as follows. $D(x,M)\psi(x,M) \; i(\gamma_\mu \partial/\partial x_\mu + M)\psi(x,M) = g\gamma_5 \varphi(x,m)\psi(x,M)$ $(\Box - m^2)\varphi(x,m) = -g\bar{\psi}(x,M)\gamma_5\psi(x,M) - 4h\varphi^3(x,m)$ These equations conserve their form in the case of scale transformation if field operators transform themselves as follows. $\psi'(x,M) = \lambda^{3/2}\psi(\lambda x, M/\lambda)$ $\varphi'(x,m) = \lambda\varphi(\lambda x, m/\lambda)$. The term φ^3 is the only nonlinear term that can be added to the meson equation without destroying the scale invariance of the field equations. The relations between transformation of the producing operators a^+, b^+, and c^+ and the absorption operators a, b, c are then explicitly given. From the invariance of the field equations with respect

Card 1/2

PA - 2083

Scale Transformation and the Virial Theorem in the Quantum Field Theory.

to a homogeneous "extension" $x \to \lambda x$ of the space-time-continuum and from the proportional curtailment of the masses results the invariance of the transformation function $U_{1a} = (\Psi(\sigma_a)\Psi(\sigma_1))$. Here $\Psi(\sigma)$ denotes the Heisenberg state-vector. In the special case of $\sigma_a \to +\infty$ and $\sigma_1 \to -\infty$ the transformation function U_{1a} is transformed into the scattering matrix $S_{1a} = (\Psi^{(2)}_{out}\Psi^{(1)}_{in})$. In the case of a BETHE-SALPETER-equation a relation to the nucleus $\bar{Q}$ of the equation results from the constancy of the field equations with respect to the given scale transformation. The virial theorem: In the case of the presence of exterior fields the constancy of the above field equations with respect to the scale transformations given in the beginning, is destroyed. Variation of the scattering matrix δS_{1a} is then not equal to zero. With $\lambda = 1 + \varepsilon$ (- infinitly small) a relation for the summation over the impinging and scattered particles is found. The integral expression here has the form which is typical for a "virial" theorem of the quantum theory of the field. (Without illustrations)

ASSOCIATION Leningrad State University
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SUBMITTED 4. 10. 1956
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Card 2/2

NOVOZHILOV, Yu. V.

AUTHOR NOVOZHILOV, Yu.V.

TITLE On the Reduction of the Two-Nucleon Problem to the One-Nucleon Problem in the Nonrelativistic Domain. (O svedenii dvukhnuklonnoy zadachi k odnonuklonnoy v nerelyativistskoy oblasti -Russian)

56-5-55/55

PERIODICAL Zhurnal Eksperim.i Teoret.Fiziki,1957,Vol 32,Nr 5,pp 1262-1264(USSR)

ABSTRACT The paper under review invstigates the interaction of two nucleons fixed in the points $\vec{r}_1$ and $\vec{r}_2$ and attempts to express the (renormalized) two-nucleon martrix elements by (renormalized) one-nucleon matrix elements.In this context,the author of the paper under review bases himself on the previously published investigations by G.Chew and F.Low (Phys.Rev.,Vol 1o1,p 157o(1955)) as well as by G.Wick (Rev. Mod.Phys.,Vol 17,p 339(1955)). The energy operator has the form $H=H_o+U_1+U_2$, $U_\lambda=\sum_{\vec{k}} V^o_{\vec{k}}(\lambda)e^{i\vec{k}\vec{r}_\lambda} a_{\vec{k}}+V^o_{\vec{k}}+(\lambda)e^{-i\vec{k}\vec{r}_\lambda} a^+_{\vec{k}}$.(λ=1,2). Here $V^o_{\vec{k}}$ contains the operators σ_λ and τ^λ which are related to the nucleon λ; the other denotations are the same as in the first of the above papers.The state with two physical nucleons in interaction with each other Ψ_σ is an eigenstate of the Hamiltonian $H\Psi_\sigma(1,2,\bar{a})=\left[2E_o+E_\sigma(\vec{Q})\right]\Psi_\sigma(1,2,\bar{a})$, ($Q=\vec{r}_1-\vec{r}_2$). In this context,$E_o$ denotes the self-energy of the nucleon and $E_\sigma(Q)$ stands for the static interaction energy of the nucleons.The sign $\sigma=(I',S',I'_3,S'_3)$ characterizes the eigenvalues of the total spin, of the total isotopic spin and of their third projections.As main function system the author of the paper under review

Card 1/2

On the Reduction of the Two-Nucleon Problem to the One-Nucleon Problem in the Nonrelativistic Domain. 56-5-55/55

selects the products of the one-nucleon state vectors $F_{\alpha\beta}(1,2,\bar{a})=F_\alpha(1,\bar{a})F_\beta(2,\bar{a})$, with α and β denoting the spin charge indices. The quantity $F_\alpha(1,\bar{a})$ describes a nucleon with a mesonic cloud and it is the solution of the Schroedinger's equation $(H_0+U_1)F(1,\bar{a})=E_0F(1,\bar{a})$. At $\varrho\to\infty$ the above listed products are solutions of the equation $H\Psi_\sigma(1,2,\bar{a})=\left[2E_0+E_\sigma(\vec{\varrho})\right]\Psi_\sigma(1,2,\bar{a})$, $(\vec{\varrho}=\vec{r}_1-\vec{r}_2)$, and they have the following property of orthogonality: $(F_{\alpha\beta}(1,2,\bar{a}),\ F_{\alpha'\beta'}(1,2,\bar{a}))=\delta_{\alpha\alpha'}\delta_{\beta\beta'}$.

But at finite products these products are nonorthogonal and they are a function of ϱ. The author is looking here for Ψ_σ in the form $\Psi_\sigma=\Psi_\sigma+\chi_\sigma$. It is assumed that the nucleons of the cloud enter with "their" nucleon into by far stronger interaction than with the other nucleon. Finally, the paper under review contains a step-by-step discussion of the computation of the relevant matrix elements. (No reproduction).

ASSOCIATION Leningrad State University.
PRESENTED BY
SUBMITTED 23.2.1957
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Card 2/2

Novozhilov, Yu.V.

56-4-11/54

AUTHOR: Novozhilov, Yu.V.

TITLE: Nuclear Forces and the Scattering of π -Mesons (Yadernyye sily i rasseyaniye π -mezonov)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 4, pp. 901 - 909 (USSR)

ABSTRACT: The interaction of two rigidly connected nucleons in the pseudoscalar mesotron theory with pseudoscalar interaction is investigated. The main part of the two-body problem is represented in form of a one-body problem. Only the states without real mesons and with one real meson are taken into account. The method to renumber the two-body matrix elements into one-boy matrix elements is further developed. These are then calculated according to the method given by Chew, Low. The potential e^{-2R} which consists of 2 parts is calculated: one part is f^4 proportional (f .... interaction constant), the other part depends on the phase of the scattering of π -mesons on the nucleon.

Card 1/2

56-4-11/54

Nuclear Forces and the Scattering of π -Mesons

ASSOCIATION: Leningrad State University
(Leningradskiy gosudarstvennyy universitet)

SUBMITTED: March 30, 1957

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Card 2/2

NOVOZHILOV, Yu V.

AUTHOR: NOVOŽILOV,JU.V., TULUB,A.V. PA - 2042

TITLE: The Method of Functionals in the Quantum Theory of the Field (Russian).

PERIODICAL: Uspekhi Fizicheskikh Nauk, 1957, Vol 61, Nr 1, pp 53-102 (U.S.S.R.)

Received: 3 / 1957 Reviewed: 3 / 1957

ABSTRACT: The present survey is arranged as follows:

I. The method of functionals in the Quantum Theory of the Field:
Introduction: Art. 1) The quantum theory of the field and the functionals. Art. 2) FOK'S method of functionals: Idea of the method, the deducing functional for the probability amplitudes, the method of the functional and the statistics by FERMI, the equations for the functional of state. Art. 3) The deducing functional for the amplitudes of the new method by TAMM-DANKOV.

II. The deducing functionals for the relativistic functions, and functional integration:
Art. 4) The deducing functionals for the relativistic functions: The T-function and the deducing functional, FEYNMAN'S amplitudes and the deducing functional, the function Q.
Art. 5) The space-time treatment of the quantum theory of the field and the functionals: The basic equations for the fourdi-

Card 1/3

mensional state vector, the generalizing FOK functional, the functional FOURIER transformation.
Art. 6) The variation of the operator and the functional integration of the FERMI field:
In contrast to other methods functional methods permit strict formulation of the equations for the field functions and make it possible to find a formal solution of the problem of fields that are in interaction. This special feature of the method of functionals is important for investigations of a basic character and also for the working out of approximation methods (which differ from the perturbation theory) for the solution of field equations. At present work connected with the method of functionals can be subdivided into two groups (from the point of view of using the functional apparatus): works concerning the investigation of deducing functionals, and works that are connected with the use of functional integration. The idea of the method of the deducing functional was brought forward for the first time by the member of the Academy V.A.FOK in 1928, and was worked out in detail

PA - 2042

The Method of Functionals in the Quantum Theory of the Field (Russian).

in his work of 1934. This method was then used for the solution of several problems in the course of the years that followed, but it was not applied and developed on a large scale until recently. The most important development of the method of functionals is connected with the introduction of the functionals of the exterior sources by SCHWINGER.

ASSOCIATION: Not given
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Card 3/3

SOV/54-58-3-3/19

AUTHOR: Novozhilov, Yu. V.

TITLE: On Asymptotic States of Dressed Particles (Ob asimptoticheskikh sostoyaniyakh oblachennykh chastits)

PERIODICAL: Vestnik Leningradskogo universiteta, Seriya fiziki i khimii, 1958, Nr 3, pp 21 - 23 (USSR)

ABSTRACT: In the present paper the author describes a method according to which equations for asymptotic states of dressed particles with consideration of the vacuum polarization can be deduced. According to the Hamiltonian of the meson and nucleon fields, the vacuum of the interacting Ψ_0-fields, and by means of the creation operators A_1^+, A_2^+ of the dressed particles corresponding to the equations $[H, A_i^+] = E_i A_i^+$ a system of eigenfunctions H can be composed:

$$\Psi_{12\ldots} = A_1^+ A_2^+ \ldots \Psi_0, \quad H\Psi_{12\ldots} = (E_1 + E_2 + \ldots)\Psi_{12\ldots}$$

The operators A_i^+ depend on the creation operators $\varphi^{(-)}(\chi)$, $\psi^{(-)}(\chi)$ and $\bar{\psi}^{(-)}(\chi)$ as well as on the absorption operators $\varphi^{(+)}(\chi)$, $\psi^{(+)}(\chi)$.

Card 1/3

$\bar{\psi}^{(+)}(\chi)$. The function $\Psi_{12\ldots}$ also depends on the distance R_{ij} between the particles. If however $R_{ij} \to \infty$ it is not transformed into a product of the creation operators of the naked particles which act upon the mathematical vacuum. It describes the dressed non-interacting particles. If $R_{ij} \to \infty$ for the asymptotic function $\tilde{\Psi}_{12\ldots} = \tilde{A}_1^+ \tilde{A}_2^+ \ldots \Psi_0$ and thus also for the asymptotic creation operators $\tilde{A}_1^+$, $\tilde{A}_2^+$ . . . of the dressed particles, equations can be found by employing the condition that $\Psi_{12\ldots}$ is an asymptotic function of the $H\{H - E_1 - E_2 - \ldots\} \tilde{\Psi}_{12\ldots} \to 0$, $R_{ij} \to \infty$ as well as of the total momentum $\vec{P}$. As examples were investigated the case of 2 fermions (creation operators A_1^+ and A_2^+) and of 1 boson and 1 fermion (creation operators C^+ and A^+).

SOV/54-58-4-9/18

24(5)

AUTHORS: Novozhilov, Yu. V., Prokhorov, L. V.

TITLE: On the Forces Acting Between Nucleons and Hyperons in Accordance With the Meson Theory (O silakh mezhdu nuklonami i giperonami soglasno mezonnoy teorii)

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1958, Nr 4, pp 80-92 (USSR)

ABSTRACT: This paper deals with the contribution of π-mesons to the nucleon-hyperon-potential without making use of the perturbation theory. For the investigation of the hyperon-nucleon-potential the following conditions are important: the computation of the potential ought to be possible within the scope of the non-relativistic theory. It is assumed that in the case of scattering of π-mesons on hyperons the cross section has a resonance character and that the latter is very considerable so that it is possible to neglect the not-resonance cross section; if there is no maximum of the scattering cross section of π-mesons in the non-relativistic energy range this theory is not permissible in this case. Further: the potentials differ with respect to the degree of their decrease with growing distance; the velocity-

Card 1/2

On the Forces Acting Between Nucleons and Hyperons in Accordance With the Meson Theory

dependent terms in the potential are calculated with linear approximation. The meson cloud is of quasi-static character. Within the framework of this theory of scattering of the dressed particles, expressions are set up for the nucleon-hyperon adiabatic and the velocity-dependent potential and simplified for the non-relativistic case. The asymptotic expansions of these potentials are computed. In continuation of this the properties of the operator Θ are investigated and the possible resonant condition of the scattering of pions and hyperons is determined. It is not possible to obtain the two terms $W_{0\sigma}$ and $W_{\sigma\sigma}$ by the perturbation theory. $W_{0\sigma}$ contains the pion-nucleon scattering cross section σ_1 or the pion-hyperon cross section σ_2 linearly, whereas $W_{\sigma\sigma}$ depends quadratically on σ_i. There are 9 references, 3 of which are Soviet.

Card 2/2

24(5) SOV/54-58-4-10/18

AUTHOR: Novozhilov, Yu. V.

TITLE: Dressed Particles in Quantum Field Theory (Oblachennyye chastitsy v kvantovoy teorii polya)

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1958, Nr 4, pp 93-106 (USSR)

ABSTRACT: In the introduction different interpretations of cloud particles are mentioned in brief (Refs 1-6). It is the aim of the present paper to generalize a method already previously suggested by the author to introduce independent fields for various "clouds" taking vacuum polarization into account. The attempt is made to set up a scheme of scattering in quantum field theory based upon the concept of dressed particles. Part I of the paper deals with the general form of introducing independent fields for the description of dressed particles and groups of particles not in interaction. Part II gives a description of the dressed particles with the "free" Hamiltonian being diagonal. This theory is also applied to the connection of the asymptotic states (Van Hove, reference 1), with the states of the dressed particles not in interaction. For this investigation independent meson, nucleon,

Card 1/2

and antinucleon creation and annihilation operators were introduced for each particle cloud and the basic functions were determined in terms of this operation (6). The expression for the S-matrix has to contain the weight operator (equation 15). The "effective" nonhermitian Hamiltonian (18) was obtained. The term of interaction H_{12} (equation (19), (20)) describes the effect of meson, nucleon, and antinucleon exchange between the individual dressed particles. The S-matrix can be set up in a quite analogue form to the scattering theory with operator H_{12} as perturbation. A representation, in which the Hamiltonian of the "free" dressed particle H_0 is in diagonal position, was introduced. It is possible to develop the perturbation method in the "dressed particle representation" in which perturbation contains only the interaction of real particles. There are 7 references, 1 of which is Soviet.

24(5) SOV/56-35-3-27/61

AUTHOR: Novozhilov, Yu. V.

TITLE: On the Scattering of "Dressed" Particles in the Quantum Field Theory (O rasseyanii "oblachennykh" chastits v kvantovoy teorii polya)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 3, pp 742-749 (USSR)

ABSTRACT: In the present paper the author discusses a scattering theory in which the virtual clouds surrounding the particle are in all cases taken into account with exactitude. The theory is based upon the use of so-called basis functionals Φ, which are represented as the products of single-particle functionals. For the purpose of introducing the Φ-functions the author proceeds from the total Hamiltonian for n nucleons and anti-nucleons (which interact with the meson field)

$H = H_\pi + \sum_i^n \left[H_N(i) + U_i \right]$, where H denotes the Hamiltonian of the free meson field, $H_N(i)$ relates to the i-th naked nucleon and U_i

Card 1/3

is the interaction operator of the i-th nucleon with the meson field, which is set up as linear function of the meson-production and -annihilation operators a^+ and a. For the wave function in a system of n non-interacting dressed particles in dependence on the meson field $\bar{a}$ it holds that $\Phi(1,2,\ldots n;\bar{a}) = \Psi(1,2,\ldots n; a^+)\Lambda_o$, where Λ_o is the vector of state of the vacuum (The physical vacuum here coincides with the mathematical vacuum). For the wave function of the system of non-interacting dressed particles the following equation is finally obtained: $\Psi_a(1,2,\ldots; a^+)\Lambda_o = \sum_{\alpha\beta..} c^a_{\alpha\beta..} F_\alpha(1,a^+)F(2,a^+)\ldots\Lambda_o$.

From this equation there follows for the basis function Ψ_A $\Psi_A = a^+_{q_1} a^+_{q_2} \ldots \Psi_a$; $A = (q_1, q_2 \ldots; a)$.

The application of the formalism of the scattering theory (according to reference 2, S-matrix), in the case of an investigation of the scattering of dressed particles immediately leads

SOV/56-35-3-27/61

On the Scattering of Dressed Particles in the Quantum Field Theory

to a system of nonlinear integral equations for the scattering amplitudes. If no vacuum polarization exists, the equations for the matrix elements are automatically renormalized and the matrix elements can be expressed in terms of the single-nucleon matrix elements. In an appendix a formula of this paper is discussed. There are 8 references, 1 of which is Soviet.

ASSOCIATION: Leningradskiy gosudarstvenyy universitet (Leningrad State University)

SUBMITTED: April 10, 1958

Card 3/3

NOVOZHILOV, Yu. V., Doc Phys-Math Sci (diss) -- "Cloud particles in the quantum field theory". Moscow, 1959. 10 pp (Leningrad Order of Lenin State U im A. A. Zhdanov), 150 copies (KL, No 23, 1959, 159)

21(1) PHASE I BOOK EXPLOITATION SOV/2825

Novozhilov, Yuriy Viktorovich

Elementarnyye chastitsy (Elementary Particles) Moscow, Fizmatgiz, 1959. 184 p. 15,000 copies printed.

Ed.: G. F. Drukarev; Tech. Ed.: O. V. Speranskaya.

PURPOSE: This book is intended for the general reader with a background in secondary school physics.

COVERAGE: The text reviews the field of elementary particle physics. Concepts are presented without the use of mathematics. Recent findings concerning mirror symmetry, the antiproton, the antineutron, the neutrino, and the nucleon are discussed. No personalities are mentioned. No references are given.

TABLE OF CONTENTS:

Card 1/4

Elementary Particles (Cont.) SOV/2825

Card 2/4

Elementary Particles (Cont.)

21 (7)

AUTHOR: Nevoshilov, Yu. V. SOV/54-59-2-1/24

TITLE: Setting up an S-matrix for Dressed Particles (O postroyenii S-matritsy dlya oblachennykh chastits)

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1959, Nr 2, pp 5-13 (USSR)

ABSTRACT: An S-matrix for dressed particles is set up on the basis of Hamilton's formulas but without the use of the hypothesis on the adiabatic introduction of the field interaction. Thus, this is the problem of setting up a function for noninteracting dressed particles or - which means the same - the disintegration of the complete Hamiltonian H into the "free" Hamiltonian which comprises the effect of proper energy and the operator of interaction of dressed particles. The wave function of the noninteracting dressed particles ψ_n^o can be interpreted in the form of the derivations of the generating operators of the physical particles λ_N^+, $\lambda_{\bar{N}}^+$, λ_π^+, λ_B^+ applied to the physical vacuum ψ_o. The permutation relations of the operators λ^+

Card 1/3

with the absorption operators Λ have a general form. In general, the state of the noninteracting particles can be set up by means of the operators of the physical particles. In the theory of dressed particles, however, the existence of an equation of motion for the field operators which is otherwise missing for noninteracting particles is presupposed. As the consideration of this case is most difficult, a simplified case is assumed where for the calculation of the S-matrix ψ_n^o need not be known and simpler functions $\phi(t)$ with the same asymptotic behavior as $\psi(t)$, ψ_n^o are sufficient. In this way, the author considered in a previous paper (Ref 2) the scattering theory of dressed particles of which the present article is a continuation. In § 2, the theory of dressed particles is considered from a slightly different standpoint than in reference 2. The metric operator $\hat{G}$ is introduced here which plays an important part in theory. In § 3, the explicit expression for the operator $\hat{G}$ is found, and the equation is set up which determines the operator $\hat{G}$ from the effective

interaction operator $\hat{U}$. Besides, the assertion made in reference 2 that the structure of the S-matrix is only determined by the operator $\hat{U}$ is confirmed. In an appendix, the formulas for the operator $\hat{U}$ are derived which in the mentioned previous paper had been set up without any proof. There are 5 references, 2 of which are Soviet.

SUBMITTED: February 5, 1959

24(5)

AUTHORS: Novozhilov, Yu. V., Terent'yev, I. A. SOV/56-36-1-18/62

TITLE: The Two-Nucleon LS-Potential in the Nonrelativistic Meson Theory (Dvukhnuklonnyy LS-potentsial v nerelyativistskoy mezonnoy teorii)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 1, pp 129-139 (USSR)

ABSTRACT: It is of interest to investigate the question as to what potential that is dependent on velocity can be derived from the meson theory without using the perturbation theory. In the present paper the $\vec{LS}$-potential is derived within the framework of a meson theory which is nonrelativistic with respect to the nucleons. Short mention is made of several arguments against such a theory. However, in the case of the two-nucleon problem the here discussed nonrelativistic method of dealing with the problem is perfectly justified. A favorable circumstance is the resonance-light behavior of $(\pi - N)$-scattering. Therefore, the center of mass of the matrix elements for $(\pi - N)$-scattering is not in the nonrelativistic domain, and it is just these matrix elements that occur in the velocity-dependent two-nucleon potential. As to the interaction Hamiltonian, the here discussed

Card 1/3

method of calculating the potential does not depend essentially on the type of interaction. In the present paper the potential caused by pseudovectorial binding is investigated. Calculations were carried out on the basis of the theory of the scattering of "clouded" particles (Ref 6). Renormalization in calculations carried out without the perturbation theory presents considerable difficulties which, however, do not arise in the present paper, because here only the linear approximation with respect to v velocity is used. The problem can then be renormalized in the same manner as in the static case. The first chapter deals in full detail with the initial formulas for the potential, and in the second chapter the potential is calculated. Details of calculations are not discussed because of similarity with potential calculation in the static case. The last chapter gives a short account of an asymptotic development for this potential W_{ij}^{LS}. The expressions found for this potential for the first time make it possible to form an opinion as to the extent to which the representations of the non-relativistic meson theory for (N - N)-scattering in the range of low

energies are correct. The authors thank Member of the Academy V. A. Fok for valuable indications concerning the problem of asymptotic potential development. There are 10 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: May 26, 1958 (initially), and September 27, 1958 (after revision)

S/026/60/000/012/004/009
A166/A027

AUTHOR: Novozhilov, Yu.V., Doctor of Physics and Mathematics (Leningrad)

TITLE: Into the Depths of the Microworld

PERIODICAL: Priroda, 1960, No. 12, pp. 47 - 52

TEXT: The article is an attempt to explain to the layman the significance of Academician Vladimir Aleksandrovich Fok's theory of quantum electrodynamics, as laid down in his monograph "Works on the Quantum Field Theory". The work was mainly concerned with creating a mathematical model of the quantum field theory and an approximate method of calculating atoms. For the work Fok was awarded the 1960 Lenin Prize. Fok developed an exhaustive theory of secondary quantation to describe the processes of the birth and decay of elementary particles. An account of "Fok's Column", the Hartrey-Fok method and the method of Fok's functionals is given, together with an explanation of the need for Dirak-Fok-Podol'skiy's multitemporal formalism. Fok's theory of quantum electrodynamics has subsequently been polished up and some difficulties removed, but the basic tenets remain unchanged. His theory of the interaction of electrons with an electromagnetic field has proved accurate to within millionths when checked by experiment. There are: 1 photo, 1 diagram and 1 Soviet reference.

Card 1/1

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B006/B077

24.4500

AUTHORS: Braun, M. A., Novozhilov, Yu. V.

TITLE: Some Properties of Dressed Particle Operators in the Field Theory

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 5(11), pp. 1317-1322

TEXT: The authors examined the properties of operators of dressed particles, which are determined by single particle states produced when acting on a vacuum. First of all the local relativistic-invariant operator $Q(x)$ of dressed particles is defined, and also the in- and out-operators and some relations between these are given. It is further shown that besides a strong limit at large periods ($t \to \pm \infty$) for the production operators of the dressed particles (which has already been demonstrated by Haag (Ref. 1)) such a strong limit exists also for the annihilation operators of these particles; i.e., the annihilation operators of the dressed particles tend, with $t \to \pm \infty$, to the in- and out-operators of annihilation. The examination of the properties of the operators $Q(x)$

Card 1/2

86904

Some Properties of Dressed Particle Operators in the Field Theory

S/056/60/039/005/021/051
B006/B077

shows that if the expansion in a series for the coupling constant is possible, Q (x) cannot satisfy the causality conditions in their usual form, i.e., the commutator of Q(x) is not equal to zero on a three-dimensional surface. The proof for this is based on the perturbation theory. All considerations are limited to scalar particles of the same type. There are 5 references: 1 Soviet, 1 US, 2 Italian, and 1 Dutch.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: May 25, 1960

Card 2/2

S/054/62/000/001/001/011
B102/B112

24.4400

AUTHORS: Novozhilov, Yu. V., Trifonov, Ye. D.

TITLE: Axiomatic method in the quantum-field theory and the properties of symmetry of elementary particles

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 1, 1962, 5 - 10

TEXT: The symmetry properties of elementary particles are studied, which result when the following two postulates are added to the ordinary postulates of quantum mechanics and relativistic invariance (I and II): It is assumed that there is a unique, relativistically invariant, uniform empty space $|0>$ (III), and that the energy spectrum is positive (IV). A quantum theory based on postulates I - IV has been developed by A. S. Wightman et al., whose functions are used in the representation

$$W_{\varphi_1,\ldots,\varphi_n}(\zeta_1,\ldots,\zeta_{n-1}) = \prod_{i=1}^{n} S_{\varphi_i}^{-1}(\Lambda_C)\, W_{\varphi_1,\ldots,\varphi_n}(\Lambda_C\zeta_1,\ldots,\Lambda_C\zeta_{n-1}). \quad (3)$$

$$S^{-1}(\Lambda)\varphi(\Lambda\xi) = U(\Lambda)\varphi(\xi)U^{-1}(\Lambda),$$

Card 1/4

Axiomatic method in the ...

resulting from the invariance under the complex proper Lorentz group $L_+(C)$. $\varphi_1 \cdots \varphi_n$ refer to a field with spin, and $U(\Lambda)$ is a unitary representation of the homogeneous Lorentz group in the Hilbert space. From the invariance of the analytic continuation of the Wightman functions under the complex group $L_+(C)$ it follows that the physical theory is of higher symmetry than would follow from the invariance of the Wightman functions under the space group L_+. $W_{\varphi_1 \cdots \varphi_n}(\xi_1, \cdots \xi_{n-1})$ are invariant under $L_+(C)$ only in the complex region. In order to ascertain whether there exist symmetry properties of $W_{\ldots}$ in the complex region, which could be represented as additional symmetry properties of $W_{\ldots}$ in the physical region, a transformation group R is determined, which is different from $L_+(C)$ and for which $W_{\varphi_1 \cdots \varphi_n}(R\rho_1 \ldots, R\rho_{n-1}) = {}^{\otimes}L_R(\varphi_i) W_{\varphi_1 \cdots \varphi_n}(\rho_1 \ldots, \rho_{n-1})$, where $\rho' = R\rho_i$ are Jost points. It is shown that R can be represented as a product of the real Lorentz group L_+

Card 2/4

Axiomatic method in the ...

and of a group R^0 : $R = L_+ / R^0$, where R^0 can be found with the $\underline{K}$ operators of

$$L^{(1)} = \frac{1}{4}[H+F+H'+F'], \quad K^{(1)} = \frac{1}{4}[H+F-H'-F'], \qquad (11),$$

$$L^{(2)} = \frac{1}{4}[H-F+H'-F'], \quad K^{(2)} = \frac{1}{2}[H-F-H'-F'].$$

$$H = i(M_{32}, M_{13}, M_{21}), \quad H' = i(N_{32}, N_{13}, N_{21}), \qquad (8);$$

$$F = (M_{01}, M_{02}, M_{03}), \quad F' = (N_{01}, N_{02}, N_{03}).$$

M and N are real. Thus, for example, R_1^0 with Euclidean metrics (rotation in four-space) reads $D_1(\sigma) = 1 + i\underline{K}^{(1)}\vec{\sigma}_1 + i\underline{K}^{(2)}\vec{\sigma}_2$, where $\vec{\sigma}$ are real parameters; in pseudo-Euclidean metrics (R_2^0), $D_2(\gamma) = 1 + i\underline{K}^{(1)}\vec{\gamma} + i\underline{K}^{(2)}\vec{\gamma}^*$, where γ is an infinitely small complex parameter. Thus, the physical transformation R is achieved by two independent transformations: (1) the real proper Lorentz transformation, and (2) R_i^0 which refers to internal degrees of freedom only. It is shown that R_1^0 can be identified with the

Card 3/4

four-dimensional isospin group. Academician V. A. Fok is thanked for discussions. There are 3 non-Soviet references. The reference to the English-language publication reads as follows: A. S. Wightman. Phys. Rev., 101, 860, 1956. (S. S. Schweber. Introduction to the Relativistic Quantum Field Theory. Row, Peterson and Co, 1961).

SUBMITTED: December 20, 1961

Card 4/4

NOVOZHILOV, Yu.V.; TRIFONOV, Ye.D.

Axiomatic approach in quantum field theory, and the symmetric properties of elementary particles. Vest.LGU 17 no.4:5-10 '62. (MIRA 15:3)

(Quantum field theory)

NOVOZHILOV, Yu.V.

Axiomatic theory of the symmetry properties of elementary particles. Vest. LGU 17 no.16:5-19 '62. (MIRA 15:9)
(Quantum field theory)

S/020/62/147/001/012/022
B104/B102

AUTHOR: Novozhilov, Yu. V.

TITLE: Gage invariance and axiomatic access to the quantum field theory

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 80 - 83

TEXT: The problem is whether it is possible to obtain a non-zero electric-charge operator by the transformation $A_\mu \longrightarrow A_\mu + \partial f/\partial x_\mu$, $\varphi_j \longrightarrow \varphi_j + ieq_j f\varphi_i$ on condition that the quantum mechanical axioms are fulfilled, and that the axiom of relativistic invariance, the axioms of positivity of the energy and of the uniqueness of the vacuum are valid. The electromagnetic field A_μ is represented as sum $A^1_\mu + A^0_\mu$. Hence the Wightman functions $W_\varphi\{x,A\}$ can be represented as sum $W_\varphi\{x,A^0\} + W_\varphi\{x,A^1\}$. Here $W_\varphi\{x,A^1\}$ is the boundary value of the function $W_\varphi\{z,A^1\}$. A^0_μ describes a spin-0 field, A^1_μ a spin-1 field; f, an arbitrary function of x is an infinitely small operator and q_j is a Hermitean antisymmetric matrix, eq_i the charge. The

Card 1/2

complex Lorentz group $L_+(C)$ is studied thoroughly. It is shown that the vacuum expectation value in space-time transformations transforms according to the M^+ representation of $L_+(C)$. Furthermore, it is shown that A^1_μ is an M and an M^+ vector simultaneously, and that A^1_μ is no scalar with respect to transformations by the generators $M^-_{\mu\nu}$ of $L_+(C)$. Further considerations based on these results give $Q = M^-_{12} + \text{const}$ for the charge operator. Thus the charge operator proves to be an operator of a rotation about axis "3" in the isospin space. Thus, the field A^1_μ is the projection of a pseudovector onto axis "3" of the isospin space.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

PRESENTED: June 11, 1962, by V. A. Fok, Academician

SUBMITTED: June 5, 1962

S/020/62/147/003/020/027
B104/B186

AUTHOR: Novozhilov, Yu. V.

TITLE: The group of the four-dimensional isospin and the hypercharge in axiomatic quantum field theory

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 3, 1962, 600 - 603

TEXT: Assuming the conservation of spatial parity, the author enquires which symmetry group exists in axiomatic quantum field theory which is based on the quantum mechanical axioms, on the axiom of relativistic invariance, on the axioms of positive energy and of uniqueness of the vacuum. It is demonstrated that in gauge invariant theories only a generalized reflection has any sense, and that conservation of the spatial parity of the reflection operator P_L of the spatial coordinates requires also conservation of the isospin parity of P_L. Transition from the group of the three-dimensional isospin to the group of the four-dimensional isospin is possible only when the isospin parity and, consequently, when the spatial parity is conserved. The charge $Q = T_3 + \frac{1}{2} Y$ is obtained as a

The group of the...

consequence of the relativistic invariance, of gauge invariance, and of the possible transition from pseudoeuclidean inner space to euclidean space. Y is the hypercharge which is an isoscalar commutating with $T_3 = \frac{1}{2}\sum_{12}$.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

PRESENTED: June 23, 1962, by V. A. Fok, Academician

SUBMITTED: June 14, 1962

Card 2/2

NOVOZHILOV, Yuriy Viktorovich; DRUKAREV, G.F., red.; LUK'YANOV, A.A., tekhn. red.

[Elementary particles] Elementarnye chastitsy. Izd.2., dop. Moskva, Fizmatgiz, 1963. 204 p. (MIRA 16:9)
(Particles (Nuclear physics))

S/054/63/004/001/001/022
B102/B186

AUTHOR: Novozhilov, Yu. V.

TITLE: Axiomatic theory of the symmetry properties of elementary particles

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 1, 1963, 7-14

TEXT: The author continues previous papers of his (Vestnik LGU, no. 16, 1962; Physics Letters,3,113,1962; DAN SSSR,147,80,1962) and discusses the problem of maximum symmetry in the axiomatic theory, especially with respect to isospin symmetry, the origin of which in the R_3 is investigated. Since isospin symmetry is characterized solely by the electric-charge conservation law, those aspects of the theory are particularly studied which demand electromagnetic interaction being taken into account. Also the problems connected with relativistic invariance, analyticity, gauge invariance etc. are considered. The special isospin properties of the electromagnetic field are investigated and discussed in the light of an

Card 1/2

Axiomatic theory of the symmetry ...

example.

SUBMITTED: December 25, 1962

Card 2/2

NOVOZHILOV, Yu.V.

Axiomatic theory of the symmetry characteristics of elementary particles. Vest. LGU 18 no.4:7-14 '63. (MIRA 16:3)
(Particles (Nuclear physics))

NOVOZHILOV, Yu.V.; TERENT'YEV, I.A.

The inhomogeneous $P(SU_6)$ group in the theory of elementary particles.
Vest. LGU 20 no.10:5-12 '65. (MIRA 18:7)

NOVOZHILOV, Yuriy Viktorovich, doktor viz.-matem. nauk, prof.;
[illegible], A.V., kand. fiz.-matem. nauk, nauchn. red.

[Quantum field theory and elementary particles] Kvantovaia teoriia polia i elementarnye chastitsy. Leningrad, Ob-vo "Znanie" RSFSR, 1965. 39 p. (MIRA 18:10)

NOVOZHILOV, Yu.V.; TERENT'YEV, I.A.

Symmetry of elementary particles in the theory of inhomogeneous groups. Dokl. AN SSSR 165 no.3:530-533 N '65. (MIRA 18:11)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
Submitted February 10, 1965.

NOVOZHILOV, Yu.V.; TERENT'YEV, [illegible]

Theory of SL(6) symmetry of elementary particles. Dokl. AN SSSR 165 no.4:800-803 D '65. (MIRA 18:12)

1. Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova. Submitted June 28, 1965.

NOVOZHILOVA, A. D.

"The Effect of Subliminal Irritation on the Excitability, Absolute Refractory Phase, and Chronaxy of Muscles." Cand Biol Sci, Moscow State Pedagogical Inst, Moscow, 1953. (RZhBiol, No 5, Nov 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (11)

SO: Sum. No. 521, 2 Jun 55

NOVOZHILOVA, A.D.

Effect of direct current of subliminal intensity on the excitability and absolute refractory phase of nerves and the muscle. Uch. zap. MGPI 169:19-28 '62.

Effect of subliminal rhythmical excitation on the functional state of the nerves and the muscle. Uch. zap. MGPI 169:29-40 '62.
(MIRA 17:5)