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ON THE QUESTION OF THE SPIN AND PARITY OF THE τ-MESON, L. S. Shapiro, J. I. Dolinskii, and L. P. Blabakov (Moscow State Univ.). Soviet Phys. JETP 5, 139-30(1957) Aug.

A comparison of the experimental data on the energy spectrum and angular distribution of the π mesons formed in positive and negative τ decay with theoretical curves leads to the conclusion that the most probable spin and parity values for the meson are 0^-. (L.T.W.)

DOLINSKIY, YE. I.

AUTHOR SHAPIRO, I.S., DOLINSKIJ, E.I., MISHAKOVA, A.P. PA - 2084

TITLE On the Spin and Parity of the τ-Meson (K voprosu o spine i chetnosti τ-mezona).

PERIODICAL Zhurnal Eksperimental'noi i Teoret. Fiziki, 1957, Vol 32, Nr 1, pp 173-175 (U.S.S.R.)
Received 3/1957 Reviewed 4/1957

ABSTRACT On the strength of consideration which formerly have not been taken into account, the present work shows that experimental data exclude the possibility investigated by MARSHAK. The authors hereby base on the following considerations. 1) The isotopic spin $I_{3\pi}$ of the system of 3 pions occurring on the occasion of τ-decay is equal to 1. This assumption made also by other authors results from the GELL-MANN scheme according to which the τ-meson has the isotopic spin $I_{\tau} = 1/2$. The slow decay $\tau^{+} \rightarrow \pi^{+} + \pi^{+} + \pi^{-}$ can be explained by the non-conservation of isotopic spin. 2)K-mesons which decay according to the scheme $\tau'^{\pm} \rightarrow \pi^{\pm} + 2\pi^{0}$ are identified with τ-mesons. 3) According to various experimental data $W_{\tau}/W_{\tau'} \sim 4$ is true for the ratio of probabilities of τ- and τ'-decay. Assuming validity of conditions 1) and 2), it holds that $W_{\tau}/W_{\tau'} = (4F + \Phi)/(F + \Phi)$. Here F denotes a quantity which can be obtained by integrating the squares of the moduli of the matrix-elements, which are symmetric with respect to the momenta of all pions, over the energies of the pions. Φ denotes an analogous quantity which can be obtained from the matrix-elements which are symmetric only with respect to the momenta of the identical pions. It is found that $\Phi \sim 0$, i.e. pions are produced only in states that are symmetric with respect to

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On the Spin and Parity of the τ-Meson.

the momenta of all 3 particles. If this assumption is correct the spectrum of positive pions in the case of τ'-decay must be identical with that of positive pions in the case of τ-decay. The lowest orbital momenta corresponding to these data are given in a scheme which contains also the orbital momenta and matrix-elements used by DALITZ. A diagram shows the curves for the energy spectrum of pions which have been computed from the matrix elements of the symmetric states. The curves corresponding to the spins and symmetries (parities) 1^+, 1^-, and 2^+ differ considerably from the experimental spectrum. Also the curve for the case 2^- agrees less well with the experimental value than the curve corresponding to case 0^-. Some conclusions. A) The combination 0^- is the most probable for spin and parity. B) Combinations 1^+, 1^-, and 2^+ are practically excluded. Thus the most probable values are especially those that lead to an occurrence of the so-called " $\tau - \Theta$ " -problem. (1 illustration)

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Dolinskiy, E. I.

AUTHORS: Shapiro, I. S., Dolinskiy, E. I., Blokhintsev, L.D., 20-6-14/42

TITLE: Problem of Interaction of Muon With Nucleons (K voprosu o vzaimodeystvii μ-mezonov s nuklonami).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 6, pp. 946 - 948 (USSR)

ABSTRACT: The present report investigates the angular distribution of neutrons which were obtained at the capture of a negative muon by a proton in μ-mesohydrogen. The negative muon is assumed to be polarized. In this case the angular distribution of the neutrons in a general case will be generally anisotropic because of the nonconservation of the parity with weak interactions, in which case both the sign and the size of anisotropy depend on the form of interaction. The energy of interaction of a nuon with a nucleon taking account of the nonconservation of parity can be written down conjugated complex in the form $H = \sum_k (\overline{\Psi}_n O_k \Psi_p)(\overline{\Psi}_\nu [g_k - g_k' \gamma_5] O_k \Psi_\mu) +$

In this case O_k means the operators known from the theory of the β-decay which are composed of the Dirac matrices. It further holds k = s,p,v,a,t, in which case s,p,v,a,t signifies the scalar, pseudoscalar, vectorial, pseudovectorial, and tensorial variant of interaction. With $g_k = -g_k$ the variant proposed by L.D. Landau (reference 1) of the theory with a longitudinal polarized neutrino is obtained. The formula $W(\theta) = 1 + \alpha\cos\theta$, holds for the angular distribution of the neutrons, in which case θ denotes the angle between the

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direction of emission of the neutron and the negative direction of polarization of the negative muon. The terms valid in the case of the presence of all variants of interaction is given for α The values of α for the different variants of interaction (on the assumption of longitudinal neutrino)are summarized in a table.Such formulae can also be obtained for the capture of negative muons by protons which are bound to nuclei.In this case α depends on the matrix elements of the nuclei which renders the interpretation of the experimental data difficult.Besides the anisotropy of angular distribution of the neutrons, also the fact can be utilized for the determination of the form of interaction that the neutrons formed during the process $\mu^- + p \rightarrow n + \nu$ are generally polarized. This polarization takes place both transversally and longitudinally. A table contains the amounts of longitudinal polarization of the P-neutrons obtained at the capture of unpolarized negative muons by free protons in the case of a longitudinal neutrino.These data hold also approximately for the capture of muons by nuclei.There are 1 figure,1 table and 4 references,2 of which are Slavic.

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

PRESENTED: May 27, 1957, by D. V. Skobel'tsyn,Academician

SUBMITTED: May 18,1957

AVAILABLE: Library of Congress

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SOV/56-34-3-41/55

AUTHORS: Dolinskiy, E. I., Blokhintsev, L. D.

TITLE: The Absorption of Polarized Negative Myons by Nuclei (Pogloshcheniye polyarizovannykh μ^--mezonov yadrami)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 759 - 761 (USSR)

ABSTRACT: According to I. S. Shapiro and others (Reference 1) the distribution of the neutrons formed in the capture of polarized negative myons by free protons, can be represented in the form $1 + \alpha\cos\Theta$. The present report gives the results of calculation of the coefficient α for the case of absorption of negative myons by protons which are bound in nuclei, for the scalar (s), vectorial (v), tensorial (t) and pseudovectorial (a) variant of the 4-fermion-interaction of myons with nucleons. The nucleus is described by the shell model and the recoil of the nucleus is neglected. The calculation is carried out in non-relativistic approximation with respect to the nucleons. The interaction of the neutron being emitted with the nucleus was taken into account by means of

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a complex potential which allows the application of a certain probability of absorption of the neutron in the nucleus. The value obtained for α can be still reduced due to various causes which are briefly summarized here. First, terms for the wave functions of the proton and of the neutron are written down. The wave function of the neutron is written down here also by taking account of the spin orbit interaction. The wave function of the neutrino was applied in form of a plane wave. Subsequently, formulae for the emission of a neutron with the energy $E_N = \hbar^2 k_N^2/2m$ under a given angle Θ in the absorption of a negative myon are written down in the subshell characterizable by the quantum numbers n, j, l. These formulae hold for the superposition of the s, v, t and a-variants. The total effect of all closed subshells is obtained by summarizing the corresponding formulae by way of n, j, l. The formulae given here, also describe the absorption of a negative myon by 1 proton which is located above the closed shells. The formulae given here might form a good approximation for the double magic nuclei. The details of the calculation and the numerical estimations for

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The Absorption of Polarized Negative Myons by Nuclei SOV/56-34-3-41/55

concrete nuclei will be given in a separate report. There are 4 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: December 9, 1957

Card 3/3

21(7), 24(5)

AUTHOR: Dolinskiy, E. I. SOV/56-35-5-40/56

TITLE: On a Possibility of Determining the Parity of Strange Particles (Ob odnoy vozmozhnosti opredeleniya chetnosti strannykh chastits)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 5, pp 1293-1294 (USSR)

ABSTRACT: An experiment is discussed which makes it possible to determine the relative parity of K-mesons and hyperons. The author investigates the absorption of a K^--meson from the S-state by a polarized proton with production of a Y-hyperon (Y here denotes either a Λ-or a Σ-hyperon) and of a pion $K^- + p \to Y + \pi$. K-meson spin is assumed to be equal to zero and hyperon spin to be 1/2. The conservation of parity and the angular momentum in the above reaction leads to the relations with

$$\xi_K \xi = (-)^{L+1} \text{ with } L = 0 \text{ or } L = 1.$$

There are two possibilities: a) $\xi_K \xi = +1$, in which case $L = 1$ and b) $\xi_K \xi = -1$, where it holds that $L = 0$. Here ξ_K denotes the internal parity of the K-meson, ξ - the relative parity

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of the hyperon and proton, L - the orbital moment of the relative motion of the hyperon and pion in their center of mass system. In the two above-mentioned cases, the hyperons are emitted isotropically. Expressions are then given for the degree of polarization of the emitted hyperons. The experiment discussed can be carried out also on polarized nuclei. The author thanks I. S. Shapiro for discussing this paper.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: July 5, 1958

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SOV/56-35-6-26/44

24(5), 21(7)

AUTHORS: Dolinskiy, E. I., Blokhintsev, L. D.

TITLE: Absorption of Polarized μ^--Mesons by Nuclei (Pogloshcheniye polyarizovannykh μ^--mezonov yadrami) The Angular Distribution of Neutrons (Uglovoye raspredeleniye neytronov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 6, pp 1488-1498 (USSR)

ABSTRACT: The investigation of the nuclear absorption of negative muons makes it possible to determine the non-electromagnetic interaction between muons and nucleons. The process of the nuclear absorption of muons develops via an intermediate stage with formation of a mesic atom according to (1): $\mu^- + P \rightarrow N + \nu + Q$, (P - proton, N - neutron, ν - neutrino). In the introduction, several earlier publications dealing with this subject are discussed. Most of the theoretical papers, (as e.g. references 1 - 3), operate with the nuclear shell model with j-j coupling. In reference 4 measurements of the ratio between muon decay probabilities are compared with the theoretical results obtained by Tolhoek and Luyten (Tolkhuk, Luyten) (Ref 3) (Gamow-Teller interaction type). In a number of papers (Refs 5-9) the asymmetry of neutron

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SOV/56-35-6-26/44

Absorption of Polarized μ^--Mesons by Nuclei. The Angular Distribution of Neutrons

angular distribution from (1), (absorption of polarized muons) was investigated. Several authors (Refs 5, 9, 10) found that the nuclei themselves show polarization after the capture of polarized muons. In reference 8 the circular polarization and the angular distribution of γ-quanta in μ^--radiation capture was investigated, references 11 and 12 deal with the investigation of the total depolarization of μ^--mesons in hydrogen. In the present paper the authors investigate neutron angular distribution from (1) when using μ^--mesons, which are produced as a decay product of π^--mesons polarized along the direction of their flight. (1) may be considered to be a direct process for the neutron angular distribution of which $1 + P_{\mu}\alpha\cos\Theta$ holds (P_{μ} is the degree of polarization of the μ^--mesons at the instant of capture, α - the asymmetry coefficient, and Θ - the angle between the direction of polarization and the direction in which the neutron is emitted). By taking the non-conservation of parity into account, the Hamiltonian for four-fermion interaction between muon and nucleon is set up. As the binding energy of the μ^--meson in the K-orbit in the mesic atom is considerably lower than its rest energy, the wave function for

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the muon can be used in non-relativistic approximation. For the nucleus the shell model with j-j coupling is used. The recoil energy of the nucleus is neglected. The potential of the shell model and the interaction potential between neutron and nucleus is assumed to be spherically symmetric. The spin-orbit interaction of the emitted neutron with the nucleus is not taken into consideration because this case has already been dealt with by reference 13. The results obtained by theoretical considerations are numerically evaluated for the neutron emission probability $dW(E_N, \Theta)$ and for the asymmetry $\alpha(E_N)$ for the O^{16} and the Ca^{40} nucleus. Calculations are carried out with a coupling constant $g_k = c_k(10^{-49}$ erg.cm^3).
The numerical results obtained are shonw by 2 tables and 4 figures. They can be summarized as follows: The energy spectrum has a maximum at $E_N \approx 5$ Mev. The major part of μ^--mesons is absorbed by protons of the external shells of the nucleus. For the angular distribution of neutrons it holds that

Card 3/4 $q(\Theta) = 1 + P_\mu \tilde{\beta} \alpha_H \cos \Theta$, α_H is the asymmetry coefficient for

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μ^--capture in hydrogen (without consideration of hyperfine structure), $\tilde{\beta}$ for O^{16} and $Ca^{40} \approx +0.5$. Degree of polarization of μ^--mesons in the K-shell of the mesic atom: $\tilde{P} \sim 0.15 - 0.20$ (Refs 14, 22), α_H is between -1 and +1/3, for $\tilde{\beta} \lesssim 0.5$ the asymmetry of neutron angular distribution is of the order 3 - 10%. The authors in conclusion thank I. S. Shapiro for his interest and his discussions, and they also thank M. K. Akimov, who carried out numerical computations on the electronic computer "Strela" of the MGU. There are 4 figures, 2 tables, and 25 references, 10 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: June 24, 1958

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DOLINSKIY, E. I., Candidate Phys-Math Sci (diss) -- "The capture of negative mu-mesons by atomic nuclei". Moscow, 1959. 8 pp (Moscow Order of Lenin and Order of Labor Red Banner State U im M. V. Lomonosov, Sci Res Inst of Nuclear Phys), 150 copies (KL, No 23, 1959, 160)

DOLINSKIY, YE. I. and BLOKHINTSEV, L. D.

"Absorption of Polarized μ^--Mesons by Nuclei ; The Neutron Angular Distribution," Nuclear Physics, Vol. 10, No. 5, 1959, pp. 527-540 (No. Holland Publ. Co. Amsterdam)

The angular distribution of neutrons emitted in the absorption of polarized μ^--mesons by nuclei is calculated. Numerical computations are carried out for $_8O^{16}$ and $_{20}Ca^{40}$.

Moscow State Univ.

21(7), 24(5)

AUTHOR: Dolinskiy, E. I.

SOV/56-36-4-32/70

TITLE: The Absorption of μ^--Mesons by Polarized Nuclei. The Angular Distribution of Neutrons (Pogloshcheniye μ^--mezonov polyarizovannymi yadrami. Uglovoye raspredeleniye neytronov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1179-1184 (USSR)

ABSTRACT: In the present paper the author investigates the angular distribution of the neutrons emitted by polarized nuclei in the case of the absorption of unpolarized μ^--mesons. The form of angular distribution and, in particular, the character of its asymmetry with respect to the polarization direction of the nucleus depends on the variant of the four-fermion interaction between the muons and the nuclei, and further on the degree of non-conservation of parity in μ^--capture, the degree of polarization of the nucleus, and on certain properties of the nucleus. The results obtained by measurements refer to nuclei the spin of which is caused entirely by a proton which is located above the closed proton subshells of the nucleus ("external proton"). Muon absorption passes through an intermediate stage (formation of a mesic atom) according to $\mu^- + P \rightarrow N + \nu$. The duration

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of this process is $10^{-6} - 10^{-7}$ sec; a fine-structure interaction occurs on the K-orbit of the mesic atom. The anisotropic angular distribution has the form $dW(E_N,\theta) \sim 1 + P_\mu \alpha(E_N)\cos\theta$. θ denotes the angle between the direction of the departure of the neutron and the direction of polarization of the nucleus, $\alpha(E_N)$ is the asymmetry coefficient calculated by the author already in a previous paper in collaboration with L. D. Blokhintsev (Ref 1). For the total angular neutron distribution it holds that $dW(E_N,\theta) = dW_{background}(E_N) + dW_{nucl}(E_N,\theta) + dW_\mu(E_N,\theta)$. The second term denotes the angular distribution of neutrons flying off after direct interaction with the external proton, the third term denotes the angular distribution of those which fly off after interaction with the filled-up subshells. Whereas the formula for dW_μ has already been calculated (Ref 1), in the present paper an expression is found for dW_{nucl}; the background is assumed to be isotropic and E_N as given. The formulas (6a) and (6b) give

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The Absorption of μ^--Mesons by Polarized Nuclei. The Angular Distribution of Neutrons SOV/56-36-4-32/70

the result. For the μ^--capture in F^{19} a numerical estimate is made. With $dW_{nucl}(\Theta) = const(1+P^i_{nucl}\alpha_H\cos\Theta)d\Omega_N$ and the assumption that the external proton be in the $2s_{1/2}$-state, the value of $\sim$5% is obtained for the maximum possible anisotropy of neutron angular distribution. The author finally thanks I. S. Shapiro for discussions. A mathematical appendix is attached to this paper. There are 4 references, 2 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute for Nuclear Physics of Moscow State University)

SUBMITTED: October 8, 1958

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S/056/60/039/006/054/063
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AUTHORS: Akimova, M. K., Blokhintsev, L. D., Dolinskiy, E. I.

TITLE: Angular Distribution and Polarization of Neutrons Emitted in Muon Capture of Some Light Nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 6(12), pp. 1806-1817

TEXT: A study of the angular distribution and polarization of neutrons emitted from nuclei as a result of the reaction $\mu^- + P \rightarrow N + \nu$ gives information on the muon-nucleon weak interaction constant. Formulas for angular distribution and polarization (Refs. 1-4) have been obtained in different approximations, and numerical calculations have been made for several concrete cases. The very extensive calculations presented here are based on the theory of universal Fermi interaction, and have been made on the assumption that the interaction of "stripped" fermions can be described by V- and A-type four-fermion coupling. All relativistic terms which are of first order in v_n/c (v_n - nucleon velocity), including weak

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magnetism and effective pseudoscalar interaction, are taken into account. The Hamiltonian H_{eff} describing the muon capture is taken from Ref. 7, and from the universal Fermi interaction with conservation of the vector current it follows that

$$g_V^{(\mu)} = 0.972\, g_V^{(\beta)},\ \mu = 1+\mu_P - \mu_N = 4.71,\ g_A^{(\mu)} = 0.999\, g_A^{(\beta)},\ \text{and}$$

$g_P^{(\mu)} = 8g_A^{(\beta)}$; $g_V^{(\beta)}$ - Fermi coupling constant for β-decay of nucleons; μ_P, μ_N - anomalous magnetic moments of proton and neutron in nuclear magnetons; $g_A^{(\beta)}$ - Gamow-Teller coupling constant for β-decay of nucleons. These assumptions and results of a previous paper (Ref. 3) are used to derive formulas for the emission probability of neutrons with given kinetic energy from a nucleus, for the angular distribution and the polarization for the case of direct neutron emission:

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$$dW(E_N, \theta) = G^{(\mu)2} W_0(E_N)\,[I(E_N) + P_\mu K_1(E_N)\cos\theta]\, dE_N d\Omega_N / 4\pi, \quad (4)$$

$$I(E_N) = (1 + 3\lambda^2) + 2[1 + 2\lambda\mu - \lambda^2(\varkappa - 1)]\,\gamma_1(E_N) + \\ + [2\mu^2 + \lambda^2(\varkappa - 1)^2 + 1]\,\gamma_2(E_N), \quad (5)$$

$$K_1(E_N) = -\{(-1 + \lambda^2)\beta_0(E_N) + 2[-1 + 2\lambda\mu + \\ + \lambda^2(\varkappa - 1)]\,\beta_1(E_N)\gamma_1(E_N) + [2\mu^2 - \lambda^2(\varkappa - 1)^2 - 1]\,\beta_2(E_N)\gamma_2(E_N)\}, \quad (6)$$

где

$$G^{(\mu)} = g_V^{(\mu)} \cdot 10^{49}\ \text{эрг}^{-1}\cdot\text{см}^{-3}, \quad \lambda = -g_A^{(\mu)}/g_V^{(\mu)}, \quad \varkappa = g_P^{(\mu)}/g_A^{(\mu)},$$

$$q(E_N, \theta) = 1 + P_\mu \alpha_1(E_N)\cos\theta, \quad (7)$$

$$\alpha_1(E_N) = K_1(E_N)/I(E_N). \quad (8)$$

$$P_N^{\parallel}(E_N) = L_1(E_N)/I(E_N), \quad (9)$$

$$L_1(E_N) = -2\{\lambda(\lambda + 1)\beta_0(E_N) + \\ + \lambda[2(\mu + 1) - \varkappa]\,\beta_1(E_N)\gamma_1(E_N) + [\mu^2 - \lambda(\varkappa - 1)]\,\beta_2(E_N)\gamma_2(E_N)\}. \quad (10)$$

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The angle, Θ, of neutron emission is measured with respect to the direction of polarization of the μ^- mesons; their degree of polarization on the K-orbit of the mesic atom at the instant of capture is denoted by P_μ. The neutron kinetic energy lies in the interval (E_N, E_N+dE_N). The coefficients W_o, β_k, and γ_k have been calculated by the computer "Strela" of MGU (Moscow State University) for the nuclei of C^{12}, Ne^{20}, Si^{28}, and S^{32} on the following assumptions: The state of the protons in the nucleus may be described by the nuclear shell model with jj-coupling; spin-orbit splitting of proton levels is neglected. A square-well potential for the shell model is assumed with $R = r_o A^{1/3}$. The interaction between neutron and nucleus is described by a complex square well:

$$V_N(r) = \begin{cases} -U_N(1+i\zeta), & r < R \\ 0 & r > R \end{cases}$$

with the same R; computations are performed for $\zeta = 0$, -0.10, and -0.15; the coordinate dependence of the wave function ψ_μ of the muon on the

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K-orbit is taken into account. Numerical results are summarized in Tables 1 and 2. Fig. 1 shows $W_o(E_N)$ for the three values of ξ (curves 1-3). The values of α in Table 1 are defined by $\psi_\mu = \sqrt{\alpha^3/\pi}\, e^{-\alpha r}$, $\alpha = Zm_\mu e^2/\hbar^2$. Fig.2 shows $\beta_o(E_N)$ again for the three values of ξ. In the final section, the results obtained are compared with experimental data and discussed in detail. Professor I. S. Shapiro is thanked for discussions. A. Ye. Ignatenko is mentioned. There are 7 figures, 3 tables, and 20 references: 8 Soviet, 10 US, 1 Italian, and 1 Japanese.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: July 29, 1960

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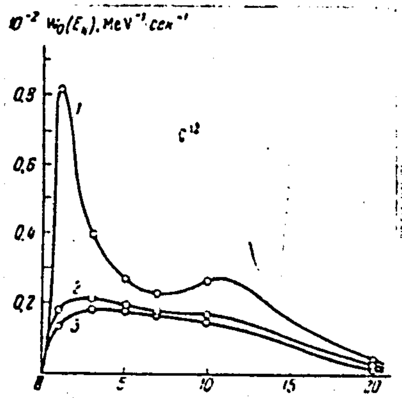

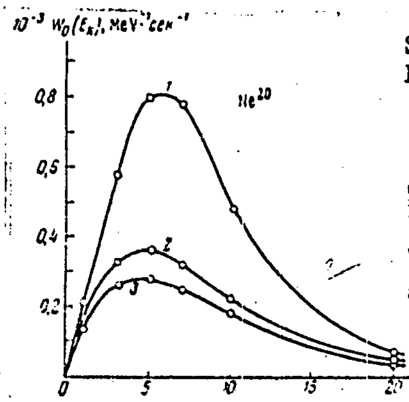

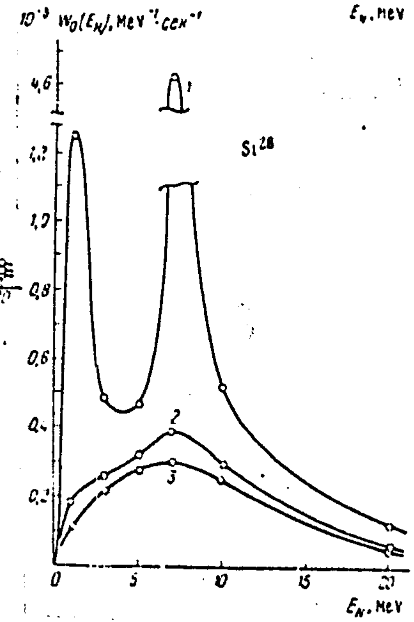

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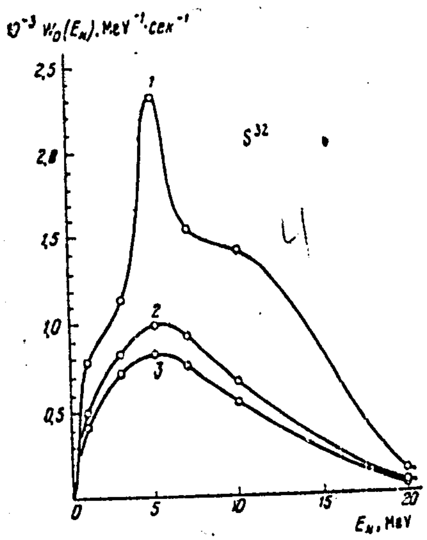

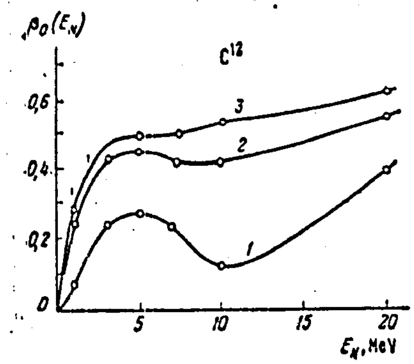

Fig. 4

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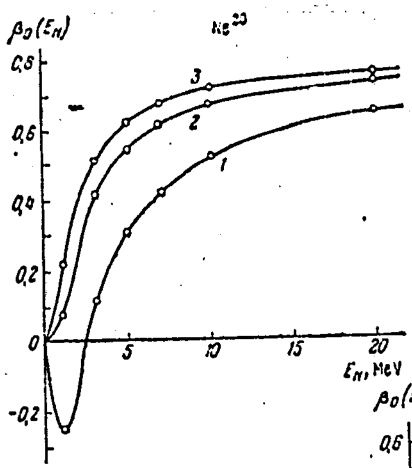

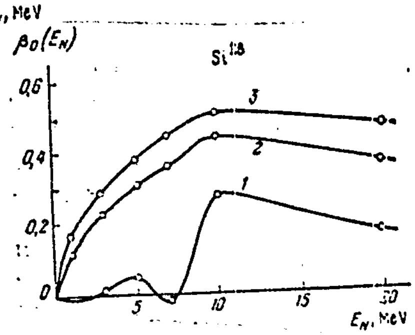

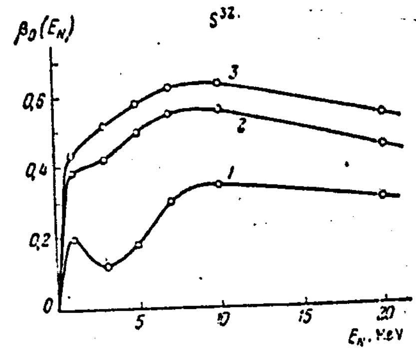

Fig. 2

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B109/B102

AUTHORS: Blokhintsev, L. D., Dolinskiy, E. I.

TITLE: Coupling constants in μ-capture

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 6(12), 1961, 1986-1995

TEXT: It is shown that within the universal Fermi interaction theory the best agreement with experimental data is obtained in the theory in which the vector current is conserved. The four coupling constants indicated in Table 1 are determined by experimental studies of the probability of muon capture on the one hand, and of the angular distribution of neutrons on the other. The experiments proved that in the case of negative $\lambda(\lambda = -g_A^{(\mu)}/g_V^{(\mu)})$ for $\mu = 4.7$ and $\mu = 1$, $(\mu = 1 + g_M^{(\mu)}/g_V^{(\mu)})$, and in the case of positive λ for μ = 1 no λ and ϰ $(\varkappa = g_P^{(\mu)}/g_A^{(\mu)})$ exist that would simultaneously satisfy the three experiments considered: determination of capture probability in C^{12} and P^{31} and of neutron angular distribution.

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410820015-0"

Coupling constants in μ-capture

S/056/61/041/006/048/054
B109/B102

$g_A^{(\mu)}$ denotes the axial pseudo vector coupling constant, $g_V^{(\mu)}$ is the vector coupling constant, $g_P^{(\mu)}$ is the effective pseudoscalar coupling constant. In the case of positive λ and for μ = 4.7, κ and λ values may exist within the ranges: $10 \leqslant \varkappa \leqslant 25$, $1.6 \leqslant \lambda \leqslant 6$. The experimental data and those expected theoretically are compared and found to be in better agreement if the vector current is conserved. The comparison also shows that the sign of $g_V^{(\mu)}$ is opposite to that of $g_A^{(\mu)}$. Also, $|g_A^{(\mu)}| > |g_V^{(\mu)}|$. The sign of $g_P^{(\mu)}$ is positive in accordance with theory. The remarkable tendency toward relatively high values of the ratios $|g_A^{(\mu)}/g_V^{(\mu)}|$ and $g_P^{(\mu)}/g_A^{(\mu)}$, compared with theoretical calculations, may possibly be explained by experimental inaccuracies, and this point may yet have to be revised. I. S. Shapiro is thanked for discussions, and V. S. Yevseyev and A. Ye. Ignatenko for having submitted their own findings (L. B. Yegorov, G. V. Zhuravlev, A. Ye. Ignatenko, A. V. Kuptsov, Li Hsüang-ming, M. G. Petrashku. Preprint OIYaI, 1961; V. S. Yevseyev,

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S/056/61/041/006/048/054
B109/B102

Coupling constants in μ-capture

V. I. Komarov, V. Z. Kush, V. S. Roganov, V. A. Chernogorova, M. M. Shimchak. IOYaI, preprint, 1961). There are 3 figures, 2 tables, and 31 references: 6 Soviet and 25 non-Soviet. The four most recent references to English-language publications read as follows: H. Überall. Phys. Rev., 121, 1219, 1961; M. K. Akimova, L. D. Blokhintsev, E. I. Dolinskiy. Nucl. Phys., 23, 369, 1961; E. J. Maier, B. L. Bloch, R. M. Edelstein, R. T. Siegel. Phys. Rev. Lett., 6, 417, 1961; A. Astbury, J. H. Bartley, J. M. Blair, M. A. R. Kemp, H. Mirhead, T. Woodhead. Preprint, Liverpool University, 1961.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: July 23, 1961

Legend to Table 1: (1) coupling constant in μ-capture; (2) diagrams considered; (3) expressed in terms of coupling constants in the β-decay of nucleons.

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S/056/62/042/006/035/047
B104/B108

AUTHORS: Blokhintsev, L. D., Dolinskiy, E. I., Popov, V. S.

TITLE: Analytical properties of nonrelativistic graphs

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 6, 1962, 1636 - 1646

TEXT: Some problems of the nonrelativistic graph technique are studied. A nonrelativistic graph with n internal lines and with l independent closed contours can be represented in the form

$$F_{nl} = \lim_{\delta\to+0} \int \prod_{s=1}^{l} d^3 k_s \, de_s \left\{ \prod_{i=1}^{n} (q_i^2 - 2m_i \mathcal{E}_i - i\delta) \right\}^{-1} .$$

With the aid of a Feynman parametric representation, F_{nl} is derived as a function of the kinematic invariants X and Λ:

$$F_{nl} = (i\pi^{3/2})^l \Gamma(n - 5l/2) \lim_{\delta\to+0} \int_0^1 \prod_{i=1}^{n} d\alpha_i \, \delta\left(\sum_{k=1}^{n} \alpha_k - 1\right) \times \times \prod_{s=1}^{l} \delta\left(\sum_{(s)} \omega_s \alpha_s m_s\right) \Lambda^{-3/2} (X/\Lambda - i\delta)^{-(n-5l/2)}. \quad (8).$$

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X and Λ are homogeneous functions of the first order of the Feynman parameters α_i. The characteristic feature of this integral representation is the δ-function $\delta(\sum_{\langle s \rangle} \omega_\sigma \alpha_\sigma m_\sigma)$, which reduces the number of integrations over α_i as compared to the analogous relativistic case. The number of nontrivial integrations in (8) over α_i remains constant when internal lines are added to the initial graph, which pairwise connect the apexes of the graph. Real singularities of single-contour graphs are investigated, and an explicit expression is obtained for the amplitude of a triangular graph. There are 3 figures and 2 tables.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University). Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR)

SUBMITTED: January 23, 1962

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410820015-0"

S/056/62/043/005/045/058
B125/B104

AUTHORS: Blokhintsev, L. D., Dolinskiy, E. I., Popov, V. S.

TITLE: On the Feynman amplitudes for nonrelativistic processes

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 5(11), 1962, 1914-1926

TEXT: The nonrelativistic limit $F_{nl}^{(0)}$ of the relativistic amplitude F_{nl}^{r} of an arbitrary Feynman graph is ascertained for the case when the kinetic energy transferred in the outer vertexes and the energy liberated at each vertex of the graph is low with respect to the virtual particles. All inner lines of the Feynman graph are to represent scalar particles. l is the number of independent closed contours. Results: For $\beta \ll 1$, F_{nl}^{r} can be written as the sum of the principal term $F_{nl}^{(0)}$ of the expansion of F_{nl}^{r} with respect to the small parameter β, and of the relativistic correction $F_{nl}^{(1)}$. For $n > 5l/2$, $F_{nl}^{(0)}$ coincides with the nonrelativistic amplitude having

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singularities with respect to the nonrelativistic invariants. For $n < 5l/2$, $F^{(0)}_{nl}$ depends only on the mass of the virtual particles, but not on the nonrelativistic kinematic invariants. The entire dependence on the nonrelativistic invariants and all nonrelativistic singularities are contained in the small relativistic correction $F^{(1)}_{nl}$. At $n = 5l/2$, the amplitude $F^{(0)}_{nl}$ depends logarithmically on the nonrelativistic invariants. The order of magnitude of the relativistic corrections to the principal terms in the expansion of the amplitude F^{r}_{nl} with respect to β is given by

$$F^{r}_{nl} = F^{(0)}_{nl}(1 + \delta_{nl}); \qquad (24)$$

$$\delta_{nl} \sim \begin{cases} \beta^2 & \text{при } 2n - 5l = 0 \\ \beta & \text{при } 2n - 5l = \pm 1 \\ \beta^2 \ln \beta & \text{при } 2n - 5l = \pm 2 \\ \beta^2 & \text{при } 2n - 5l = \pm 3, \pm 4, \ldots \end{cases} \qquad (25).$$

On the Feynman amplitudes for... S/056/62/043/005/045/058
B125/B104

The graphs with $n < 51/2$ are not essential in describing nonrelativistic processes. They contribute nothing to the mechanism of the direct nuclear reactions. The multidirectional β graphs are always nonrelativistic. For the triangular graphs for the reactions of the type A+x ⟶ B+y (L. D. Blokhintsev et al. ZhETF, 42, 1636, 1962) the nonrelativistic approximation has an accuracy of ~ 10% in a large range of energies of the incident particles. In convergent β graphs, the relativistic propagators for particles possessing a spin can be replaced by propagators not depending on spin. There are 4 figures and 1 table.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University); Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR)

SUBMITTED: June 18, 1962

Card 3/3

S/056/62/043/006/054/067
B102/B186

AUTHORS: Blokhintsev, L. D., Dolinskiy, E. I., Popov, V. S.

TITLE: The complex singularities of the amplitudes of direct nuclear reactions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 6(12), 1962, 2290-2298

TEXT: The complex amplitude singularities on the physical sheet are investigated for non-relativistic single-loop graphs with arbitrary masses. A classification of the singularities is given and rules for separating them are discussed. On the example of the triangular graphs of direct nuclear interactions of the type $A+x \rightarrow B+y+z$ it is shown that complex singularities with respect to the transferred momentum t_{xy} may arise near the physical region. Therefore investigations of the complex singularities are of importance for the dispersion theory of direct nuclear interactions. From the integral representation of the amplitude

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The complex singularities of the... S/056/62/043/006/054/067
B102/B186

$$F_{n1}(\eta_{ij}) = C_{n1}\int_0^1 \prod_{l=1}^{n} d\alpha_l \delta\left(\sum_{k=1}^{n}\alpha_k - 1\right)\delta\left(\sum_{l=1}^{n}\omega_l m_l \alpha_l\right)(X - i\delta)^{-(n-3/2)}, \quad \delta \to +0; \qquad (1)$$

a unique analytic expression is derived for F_{31} of a triangle graph with constant vertices:

$$F_{31}(\eta_{ij}) = C_{31}(\eta_{23}^{0} - \xi_{23})^{-1/2}\varphi(z); \qquad (11)$$

$$C_{31} = i\pi^3\left[\frac{2}{m_2 m_3 (m_1 + m_2)(m_1 + m_3)}\right]^{1/2}, \quad \varphi(z) = \frac{1}{2\sqrt{z}}\ln\frac{1+\sqrt{z}}{1-\sqrt{z}}, \qquad (12)$$

$$z = \frac{\eta_{23} - \eta_{23}^{0}}{\xi_{23} - \eta_{23}^{0}}, \quad \eta_{23}^{0} = m_1(m_2 - m_3)\left[\frac{\eta_{13}}{m_3(m_1 + m_3)} - \frac{\eta_{12}}{m_2(m_1 + m_2)}\right], \qquad (13)$$

$$\xi_{23} = \begin{cases} \eta_{23}^{-} = \eta_{12} + \eta_{13} - 2(\eta_{12}\eta_{13})^{1/2} & \text{при } \eta_{12} < 0,\ \eta_{13} < 0 \\ \zeta_{23}^{+} = \eta_{12} + \eta_{13} + 2i(-\eta_{12}\eta_{13})^{1/2} & \text{при } \eta_{12}\eta_{13} < 0 \\ \eta_{23}^{+} = \eta_{12} + \eta_{13} + 2(\eta_{12}\eta_{13})^{1/2} & \text{при } \eta_{12} > 0,\ \eta_{13} > 0 \end{cases} \qquad (14)$$

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$$(\eta^0_{23} - \xi_{23})^{1/2} = (\omega_{23}|\eta_{12}|)^{1/2} + (\omega_{23}^{-1}|\eta_{13}|)^{1/2} \quad \text{при } \eta_{12} < 0,\ \eta_{13} < 0,$$

$$\omega_{23} = m_3(m_1 + m_2) / m_2(m_1 + m_3). \qquad (15)$$

$$(\eta^0_{23} - \xi_{23})^{1/2} = \begin{cases} (\omega_{23}|\eta_{12}|)^{1/2} + (\omega_{23}^{-1}|\eta_{13}|)^{1/2} & \text{при } \eta_{12} < 0,\ \eta_{13} < 0 \\ (\omega_{23}|\eta_{12}|)^{1/2} - i(\omega_{23}^{-1}\eta_{13})^{1/2} & \text{при } \eta_{12} < 0,\ \eta_{13} > 0 \\ -i(\omega_{23}\eta_{12})^{1/2} + (\omega_{23}^{-1}|\eta_{13}|)^{1/2} & \text{при } \eta_{12} > 0,\ \eta_{13} < 0 \\ -i[(\omega_{23}\eta_{12})^{1/2} + (\omega_{23}^{-1}\eta_{13})^{1/2}] & \text{при } \eta_{12} > 0,\ \eta_{13} > 0 \end{cases} \qquad (16)$$

The η_{ij} are external kinematic invariants (cf. Blokhintsev et al. Nucl. Phys. in print), $\omega_i = \pm 1$ indicates the direction of the i-th inner line of the graph. The analytical properties and the asymptotic behavior of F_{31} are investigated.

$$F_{31}(\eta_{ij}) \approx \begin{cases} \frac{1}{2}\pi C_{31}|\eta_{23}|^{-1/2} & \text{при } \eta_{23} \gg |\eta_{12}|,\ |\eta_{13}| \\ h(\omega_{23})C_{31}|\eta_{13}|^{-1/2} & \text{при } -\eta_{13} \gg |\eta_{12}|,\ |\eta_{23}|. \\ h(\omega_{23}^{-1})C_{31}|\eta_{12}|^{-1/2} & \text{при } -\eta_{12} \gg |\eta_{13}|,\ |\eta_{23}| \end{cases} \qquad (17)$$

The complex singularities of the... S/056/62/043/006/054/067
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is obtained where h(ω) for $0 \leqslant \omega < \infty$ is given by

$$h(\omega) = \begin{cases} \frac{1}{2}\left(\frac{\omega}{1-\omega}\right)^{1/2} \ln \frac{1+\sqrt{1-\omega}}{1-\sqrt{1-\omega}} & \text{при } 0<\omega<1 \\ 1 & \text{при } \omega = 1 \\ \left(\frac{\omega}{\omega-1}\right)^{1/2} \operatorname{arctg} \sqrt{\omega-1} & \text{при } \omega > 1 \end{cases} \quad (18)$$

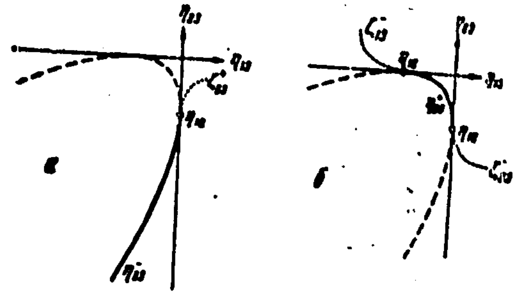
There are 6 figures.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University); Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics)

SUBMITTED: July 24, 1962

Card 4/5

S/056/62/043/006/054/067
B102/B186



$$\eta_{23} = \zeta_{23}^{-} = \eta_{12} + \eta_{13} - 2i(-\eta_{12}\eta_{13})^{1/2} \text{ при } \eta_{12} < 0,\ \eta_{13} > 0,$$
$$\eta_{13} = \zeta_{13}^{-} = \eta_{12} + \eta_{23} - 2i(-\eta_{12}\eta_{23})^{1/2} \text{ при } \eta_{12} < 0,\ \eta_{23} > 0.$$

Fig. 2. Curves of the real and complex singularities of the amplitude F_{31}. a)  for $\eta_{12} < 0$; b)  for $\eta_{12} < \eta_{13} < 0$; solid lines: real singularities of F_{31} on the physical sheet; dashed lines: real singularities, not on the physical sheet; dotted lines: complex singularities on the physical sheet.

DOLINSKIY, E. I.; POPOV, V. S.

"Regge Poles and Resonance Nuclear Reactions."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

NIIYaF MGU (Sci Res Inst Nuclear Physics, Moscow State Univ)

ACCESSION NR: AP4025930 S/0056/64/046/003/0970/0984

AUTHORS: Popov, V. S.; Dolinskiy, E. I.

TITLE: Regge poles and resonance nuclear reactions

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 970-984

TOPIC TAGS: Regge pole, resonance nuclear reaction, resonance level angular momentum, resonance level proper asymmetry, compensation analysis, scattering angle, Breit Wigner term, signature, Alpha particle, carbon 12, complex angular momentum, oxygen 16

ABSTRACT: Resonances in low energy nuclear reactions are considered from the standpoint of the Regge pole concept. The asymmetry that arises from the circumstance that the angular momentum of the resonance level is a complex number (the proper asymmetry of the resonance level -- p.a.l.) is defined, and the possibility of its ex-

ACCESSION NR: AP4025930

perimental observation is considered. Since the p.a.l can be distorted if the contribution from one resonance level (Regge pole) is compensated by the contribution from far resonances, and also by the integral term contained in the "Reggeized" amplitude, the problem of compensation is analyzed and it is shown that there is a wide region of scattering angles in which compensation is unimportant and the p.a.l can be observed experimentally, thus making possible determination of the motion of the Regge poles at energies close to resonance. The formulas for the amplitudes of the reactions of the type $A + x \rightarrow B + y$ are given, which contain along with the main Bright-Wigner terms also the effect of the p.a.l. The signature of the resonance level (a new quantum number) is defined and considered briefly. The data on the phase-shift analysis of elastic resonance scattering of α particles from C^{12} at α-particle energies up to 5 MeV is considered from the point of view of the theory of complex angular momenta, and it is shown that the energy dependence of the small nonresonance phases can yield the trajectories of the

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ACCESSION NR: AP4025930

Regge poles corresponding to the first three excited levels of the component O^{16} nucleus. Orig. art. has: 6 figures, 41 formulas, and 2 tables.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics); Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Nuclear Physics Institute, Moscow State University)

SUBMITTED: 10Aug63 DATE ACQ: 16Apr64 ENCL: 00

SUB CODE: PH NR REF SOV: 008 OTHER: 016

Card 3/3

ACCESSION NR: AP4037598 S/0056/64/046/005/1829/1841

AUTHORS: Popov, V. S.; Dolinskiy, E. I.

TITLE: Group properties of the complex angular momentum

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 5, 1964, 1829-1841

TOPIC TAGS: complex angular momentum, group theory, rotation group, irreducible representation, Regge pole

ABSTRACT: The author considers representations of the rotation group in three dimensions corresponding to arbitrary complex eigenvalues of the angular momentum squared operator. He shows that it is possible to introduce eigenfunctions and to define for them a norm which is finite and rotation-invariant, in spite of the fact that the eigenfunctions are unbounded on the unit sphere. Matrices for finite rotations are also obtained which provide a natural generalization of the group-theoretical properties of the rotation

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410820015-0"

ACCESSION NR: AP4037598

group. However, in contrast to the integer or half-odd-integer eigenvalue cases, when the eigenvalues are arbitrary complex numbers the representations of the rotation group are infinite-dimensional; that is to say there exists no irreducible representation that is finite-dimensional. In this connection questions of convergence of the infinite series that arise in the process of calculations with these complex eigenvalues and the corresponding eigenfunctions are investigated and it is shown that, with appropriate regularization procedures, all answers are finite. The regularization procedure involves, among other things, the use of the concept of a generalized sum of a series, which is the sum of a divergent series obtained by analytic continuation in some parameter such that for certain values of the parameter the series converges to an analytic function in that parameter. Explicit expressions are given for the finite-rotation matrices and addition theorems for them are derived. "The authors express deep gratitude to I. S. Shapiro for numerous fruitful discussions in the course of the work." Orig. art. has: 47

Card 2/3

ACCESSION NR: AP4037598

formulas.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics); Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics, Moscow State University).

SUBMITTED: 27Nov63 DATE ACQ: 09Jun64 ENCL: 00

SUB CODE: GP NR REF SOV: 009 OTHER: 009

Card 3/3

ACCESSION NR: AP4043648 S/0056/64/047/002/0697/0707

AUTHORS: Dolinskiy, E. I.; Popov, V. S.

TITLE: Regge poles and resonant nuclear reactions, II.

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 697-707

TOPIC TAGS: resonance scattering, compound nucleus, Regge pole, angular distribution, Coulomb repulsion force, particle scattering

ABSTRACT: The first part of the paper (ZhETF, v. 46, 1830, 1964) was devoted to the possibility of experimentally observing the characteristic asymmetry of a resonance level, arising in the angular distribution of reaction products when the resonances of a compound nucleus are described as moving Regge poles. In this part of the article the authors derive formulas for the characteristic asymmetry, taking the Coulomb interaction into account. Formulas are obtained for the characteristic asymmetry of levels of charged spinless par-

ACCESSION NR: AP4043648

ticles, and it is shown that the Coulomb interaction changes the behavior of the characteristic asymmetry in an essential manner, particularly in the domain of large scattering angles. Numerical calculations are made for the elastic scattering process $C^{12}(\alpha,\alpha)C^{12}$. The numerical calculations lead to the conclusion that the contribution of the characteristic asymmetry to the differential cross section of resonant scattering can reach 5--20% and should be easily observed experimentally, and that account of the Coulomb interaction increases sharply the effect of the characteristic asymmetry for large scattering angles. "The authors thank I. S. Shapiro for discussions and A. S. Kronrod and L. M. Voronina for performing the numerical calculations." Orig. art. has: 3 figures, 27 formulas, and 1 table.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki GKAE (Institute of Theoretical and Experimental Physics GKAE)

ACCESSION NR: AP4043648

SUBMITTED: 02Mar64 ENCL: 00

SUB CODE: NP NR REF SOV: 002 OTHER: 005

Card 3/3

DOLINSKIY, E.I.; BLOKHINTSEV, L.D.; MUKHAMEDZHANOV, A.M.

Use of the diagram summation method in making allowance for interaction in the initial and final states of direct nuclear reactions. IAd. fiz. 1 no.3:426-435 Mr '65. (MIRA 18:5)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

ACC NR: AP7012410 SOURCE CODE: UR/0367/67/005/001/0115/0122

AUTHOR: Blokhintsev, L. D.; Dolinskiy, E. I. -- Dolinsky, E. I.

ORG: Institute of Nuclear Physics of Moscow State University (Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta)

TITLE: Existence effects in quasi-elastic scattering

SOURCE: Yadernaya fizika, v. 5, no. 1, 1967, 115-122

TOPIC TAGS: elastic scattering, graph theory, nuclear reaction

SUB CODE: 20

ABSTRACT: Effects due to the existence of intermediate particles in quasi-elastic scattering reactions are studied using the graph theory of direct nuclear reactions. It is demonstrated in the example of the (N, N'd) reaction that the neglect of such effects leads to large errors. It is noted that the effects considered are not taken into account in the usual calculations of direct reaction amplitudes, using the wave function formalism. Orig. art. has: 4 figures and 22 formulas. [Based on authors' Eng. Abst] [JPRS: 40,393]

Card 1/1

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(A, N)
L 1332-66 EWT(1)/FS(v)-3 DD
ACCESSION NR: AP5020413 UR/0375/65/000/008/0044/0050

AUTHOR: Dolinskiy, I. D. (Candidate of medical sciences, Colonel of medical service)

TITLE: Psychophysiological peculiarities of flight over the sea

SOURCE: Morskoy sbornik, no. 8, 1965, 44-50

TOPIC TAGS: pilot training, physiological effect, physiological tolerance, phychological stress, psychophysiology, physical fitness, instrument flight, rescue

ABSTRACT: The difficulties associated with long flights over the sea stem from the lack of visual orientation and from the extreme meteorological conditions encountered. Since the interaction of physiological and psychological factors, not yet fully understood, may result in illusions, flight must be conducted by instruments. Instrument flying requires experience before pilots gain confidence in the instrument indications and accept them in lieu of erroneous sensations. Trained pilots can scan the instruments, correlate the readings to detect malfunctions, and analyze data. Standardization of the instrument panel facili-

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ACCESSION NR: AP5020413

tates training, and automation of the instrumentation simplifies the technique. In one automation system the images of the instruments are projected on the front cabin window, enabling the pilot to maintain visual contact with his environment while surveying the instruments. It has been noted that certain physical activities during flight reduce the illusion effect and that physically fit crews are less susceptible to illusions. For this reason a well planned and executed program of athletics and sports should be instituted for all air crews. The added danger of flying over water gives rise to fears which can aggravate the illusion effect. This fear can best be overcome by intensive rescue training, which gives the crews confidence in their own survival ability, in the rescue equipment, and in the search and rescue procedure. Since crews are scattered over wide areas when bailing out of fast, high flying planes, the rescue training must emphasize the individual's battle with the elements.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: PH

NO REF SOV: 000 OTHER: 000

Card 2/2

DOLINSKIY, I.M.

Precision guides of rectilinear shifts. Izv.vys.ucheb.zav.; prib. 7 no.6:112 '64. (MIRA 18:2)

1. Leningradskoye ob"yedineniye optiko-mekhanicheskikh predpriyatiy Rekomendovana kafedroy soprotivleniya materialov Leningradskogo instituta tochnoy mekhaniki i optiki.

ACC NR: AP7003094 SOURCE CODE: UR/0237/66/000/007/0043/0047

AUTHOR: Skvortsov, G. Ye.; Panov, V. A.; Zabezhinskiy, A. D.; Dolinskiy, I. M.

ORG: none

14

TITLE: Micro-hardness meter with remote control model PMT-4

SOURCE: Optiko-mekhanicheskaya promyshlennost', no. 7, 1966, 43-47

TOPIC TAGS: hardness, laboratory instrument

ABSTRACT: A description of a device with remote control for measurement of micro-hardness of sections subjected to gamma rays. In the device, the loading of the indentor and all operations necessary for production of imprints with the diamond pyramid into the materials being tested are performed automatically with high accuracy. In addition to the authors, Engineers G. S. Zakharov, Ye. S. Kuleshova, B. I. Tikhomirov took part in the building of the PMT-4 device. Orig. art. has: 2 figures. [JPRS: 38,228]

SUB CODE: 14 / SUBM DATE: 22Mar65 / ORIG REF: 002

UDC: 539.533

Card 1/1

0925 3045

DOLINSKIY, M.Yu.

DIDENKO, V.Ye.; TSAREV, M.N.; DMITRIYEV, M.M.; LEYTES, V.A.; OBUKHOVSKIY, Ya.M.; IVANOV, Ye.B.; CHERTOK, V.T.; URSALENKO, R.N.; KRIGER, I.Ya.; PINCHUK, A.K.; ANTONENKO, N.Z.; SHUL'SON, A.S.; VASIL'CHENKO, S.I.; DRASHKO, A.M.; RAYEVSKIY, B.N.; KUCHIRYAVENKO, D.N.; SAVCHUK, A.I.; ZHURAVLEVA, L.I.; BAUTIN, I.G.; KHRIYENKO, V.Ya.; MOSENKO, N.K.; CHEBONENKO, G.P.; LISSOV, L.K.; MAMONTOV, V.V.; BELUKHA, A.A.; POYDUN, V.F.; VOLODARSKIY, M.B.; KAL'CHENKO, G.D.; LEVCHENKO, V.M.; BASHKIROV, A.A.; VOROB'YEV, M.F.; IL'CHENKO, L.I.; PODSHIVALOV, F.S.; MOGIL'NYY, F.P.; LEVI, A.R.; VASLYAYEV, G.P.; DURNEV, V.V.; OSYPA, S.S.; SAMOFALOV, G.N.; FOMIN, A.F.; LESHCHINA, A.I.; FANKEL'BERG, G.Ye.; KHODANKOV, A.T.; MAKARENKO, I.S.; KARPOVA, K.K.; VASILENKO, I.M.; VOLOSHCHUK, A.S.; SHELKOV, A.K.; FILIPPOV, B.S.; TYUTYUNNIKOV, G.N.; DOLINSKIY, M.Yu.; NIKITINA, P.P.; MEDVEDEV, S.M.; TSOGLIN, M.E.; LERNER, R.Z.; BOGACHEV, V.I.

Mihail IAkovlevich Moroz; obituary. Koks i khim.no.3:64 '56.(MLRA 9:8)
(Moroz, Mikhail IAkovlevich, 1902?-1956)

CHERNENKO, [illegible], inzh.; DUBINETS, V.A., inzh.; LYASH, I.S., inzh.;
KUNETS, G.G., inzh.; DOLINSKIY, N.A., inzh.

Making a drift with the use of a mine conveyor. Shakht. stroi.
9 no.6:24-25 Je '65. (MIRA 18:7)

1. Rudnik imeni Kominterna, Krivorozhskiy basseyn (for Chernenko,
Dubinets, Lyash). 2. Nauchno-issledovatel'skiy gornorudnyy insti-
tut, Krivoy Rog (for Kunets, Dolinskiy).

DOLITSKIY, Naum Il'ich, kand. tekhn. nauk; SOMINSKIY, V.S., kand. tekhn. nauk, nauchnyy red.; AZAROV, E.K., red.; ONOSHKO, N.G., tekhn. red.

[Plan of the organizational and technical activities of a machinery enterprise] Plan organizatsionno-tekhnicheskikh meropriatii mashinostroitel'nogo predpriiatiia. Leningrad, Lenizdat, 1959. 175 p. (MIRA 14:12)

(Machinery industry)

KUNETS, G.O., inzh.; DOLINSKIY, N.A., inzh.; STOYANOV, A.T., inzh.

Rapid crosscutting with the use of the PML-9 loading machine. Shakht. stroi. 8 no.5:21-22 My'64 (MIRA 17:7)

1. Nauchno-issledovatel'skiy gornorudnyy institut (for Kunets, Dolinskiy). 2. Rudnik imeni Kominterna tresta Leninruda (for Stoyanov).

DOLINSKIY, N.M.

LYUBSKAYA, Antonina Fedorovna; DOLINSKII, N.M., redaktor; PAVLOVA, M.M., tekhnicheskiy redaktor

[Supplementary seeding of meadows] Podsev trav na lugakh. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1956. 44 p. (MLRA 10:3)
(Pastures and meadows)

DOLINSKIY, N. M.

ZAYTSEVA, Aleksandra Alekseyevna; DOLINSKIY, N.M., redaktor; GUREVICH, M.M., tekhnicheskiy redaktor [redacted]

[Spring wheat in extremely arid regions] IArovaia pshenitsa v ostrozasushlivykh raionakh. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1957. 134 p. (MIRA 10:10)

(Kazakhstan--Wheat)

DOLINSKIY, N. M.

NEMLIYENKO, Fedor Yevdokimovich, professor, doktor sel'skokhozyaystvennykh nauk; DOLINSKIY, N.M., redaktor; GOR'KOVA, Z.D., tekhnicheskiy redaktor

[Diseases of corn] Bolezni kukuruzy. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1957. 229 p. (MLRA 10:4)
(Corn (Maize)--Diseases and pests)

DOLINSKIY, N.M.

BEDNOVA, Yevgeniya Timofeyevna; KUZNETSOV, Georgiy Aleksandrovich; DOLINSKIY, N.M., red.; FEDOTOVA, A.F., tekhn.red.; ZUBRILINA, Z.P., tekhn.red.

[Perennial pastures] Dolgoletnie kul'turnye pastbishcha. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1957. 110 p. (MIRA 11:4)
(Pastures and meadows)

DOLINSKIY, N.M.

SAVZDARG, V.E., red.; TULIN, N.S., red.; DOLINSKIY, N.M., red.; GRIGOR"YEV, A.I., red.; GOR'KOVA, Z.D., tekhn.red.

[Heroes of virgin lands; practices of subjugators of virgin lands in Kazakhstan, Siberia, Urals, and Volga Valley] Geroi tseliny; iz opyta pokoritelei tseliny Kazakhstana, Sibiri, Urala i Povolzh'ia. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1957. 566 p. (MIRA 11:4)
(Reclamation of land)

SAVEL'YEV, Stepan Ivanovich, prof., doktor sel'skokhozyaystvennykh nauk; DOLINSKIY, N.M., red.; DEYEVA, V.M., tekhn.red.

[Winter wheat in the Southeast] Ozimaia pshenitsa na IUgo-Vostoke. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 185 p. (MIRA 12:5)
(Russia, Southern--Wheat)

LIVANOV, Konstantin Vital'yevich , kand. sel'khoz. nauk; DOLINSKIY, N.M., red.; DEYEVA, V.M., tekhn. red.; ZUBRILINA, Z.P., tekhn. red.

[Forage crops in the trans-Volga region] Kormovye kul'tury v Zavolzh'e. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1959. 139 p. (MIRA 14:7)

(Volga Valley--Forage plants)

KOZLOV, Aleksey Ivanovich; DOLINSKIY, N.M., red.; PEVZNER, V.I., tekhn.red.; PROKOF'YEVA, L.N., tekhn.red.

[Chistovskii State Farm] Chistovskii sovkhoz. Moskva, Gos. izd-vo sel'khoz.lit-ry, 1960. 69 p. (MIRA 14:2)
(Bulayevo District--State farms)

PEREKAL'SKIY, Fedor Matveyevich, kand. sel'khoz. nauk; DOLINSKIY, N.M., red.; TRUKHINA, O.N., tekhn. red.

[Spring wheat] IArovaia pshenitsa. Moskva, Gos. izd-vo sel'khoz. lit-ry, zhurnalov i plakatov, 1961. 278 p. (MIRA 14:6)
(Wheat)

SUNGATULLIN, Ya.G., inzh.; ZOLOTUKHIN, V.G., inzh.; DOLINSKIY, N.V., inzh.

Flat slabs for floors and attic roofs made of lightweight concrete. Bet. i zhel.-bet. no.11:504-507 N '61. (MIRA 16:8)

(Concrete slabs)

DOLISHNIY, N.V. (Ivano-Frankovsk (obl.), ul. Krupskoy, 25, kv.1)

Plastic properties of the arterial bed in the adrenal gland. Arkh.anat., gist. i embr. 47 no.10:62-67 O '64. (MIRA 18:6)

1. Kafedra normal'noy anatomii (zav. - prof. Ye.F.Mel'man) Ivano-Frankovskogo meditsinskogo instituta.

DOLISHNIY, N.V. (Ivano-Frankovsk, ul.Krupskoy, 25, kv.[illegible]); [illegible], L.Ye.
(Dushanbe, 3, prospekt Lenina, 110, kv.24)

Work of the Second Topical Conference on Collateral Blood Circulation in Ivano-Frankovsk on May 27-30, 1964. Arkh.anat., gist. i embr. 47 no.10:108-114 O '64. (MIRA 18:6)

DOLINSKIY, Pavel Akimovich.

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[Methods of controlling the heating up process of marine engines] Metody kontrolia nagreva sudovykh dvigatelei. Moskva, Morskoi transp. 1954. 173 p. (MLRA 9:1)

(Marine engines) (Diesel motors)

DOLINSKIY, P.A.

122-3-16/30

AUTHOR: Dolinskiy, P.A., Engineer.

TITLE: The Accuracy in the Assembly of Diesel Cylinder Liners (Tochnost' ustanovki gil'zy tsilindra dizelya)

PERIODICAL: Vestnik Mashinostroyeniya, 1957, No.3, pp. 40 - 43 (USSR).

ABSTRACT: The geometric tolerance on the perpendicularity between the crankshaft axis and the cylinder liner axis is expressed by the deviation in mm per metre length. Assembly tolerances from Russian and foreign instruction manuals are compared and found varying erratically. In the last ten years the standard tolerances have increased between two- and four-fold compared with those ruling pre-war. Some standards are related to the liner diameter only and are without reference to the bore/stroke ratio. Resulting from his own service and assembly experience, the author recommends that the proper criterion of perpendicularity should be the maximum shift over the length of the liner resulting from the perpendicularity error. The maximum permitted shift is related in two formulae to the diametral tolerance of the cylinder liner, its total length and the piston stroke. The formulae apply to different cases distinguished by the relation between the sum of the piston length and stroke and the length of the cylinder liner. It is

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The Accuracy in the Assembly of Diesel Cylinder Liners. 122-3-16/30

claimed that the formulae given can be generally applied with consistent results whatever the maker's instructions. There are 4 figures, including 1 graph, 1 table and 7 Slavic references.

AVAILABLE: Library of Congress.

Card 2/2

DOLINSKIY, P.

Increasing precision of the engine crankgear during ship repairs. Mor.flot 17 no.1:10-12 Ja '57. (MLRA 10:3)

1. Starshiy prepodavatel' Odesskogo vysshego morekhodnogo uchilishcha.
(Ships--Maintenance and repair) (Cranks and crankshafts)

DOLINSKIY, Pavel Akimovich,; SOLODKOV, P.A., red.; LAVRENOVA, N.B., tekhn. red.

[Centering the movements of marine diesels] TSentrovka dvizheniia sudovykh dizelei. Izd. 2., perer. i dop. Moskva, Izd-vo "Morskoi transport," 1958. 186 p. (MIRA 11:11)

(Marine diesel engines)

AUTHOR: Dolinskiy, P.A., Engineer SOV/122-58-12-23/32

TITLE: Allowable Out-of-Parallelism of Crank Pin Axes (O dopustimykh otkloneniyakh ot parallel'nosti osey shatunnykh sheyek kolenchatogo vala dvigatelya)

PERIODICAL: Vestnik Mashinostroyeniya, 1958, Nr 12, pp 62-63 (USSR)

ABSTRACT: Specifications for maximum out-of-parallelism of crank pins to crankshaft axis are usually given in figures such as 0.15 to 0.30 mm per metre, regardless of the relative dimensions of the parts thrown out of line by this lack of parallelism. The ratio L/l = (length from top of piston trunk to crank pin axis) / (length of crank pin) is given in Table 1 for various engines, and varies from 5.12 to 11.16. If allowable out-of-parallelism is based on the amount which would permit contact between the top of the piston and the cylinder wall at top or at bottom dead centre, then the relationship (1) $n = l\Delta_R/L$ is obtained, where n is the actual amount which one end of the crank pin is above the other end, and Δ_R is average radial clearance between piston and cylinder when the piston is central in the cylinder. Table 2 gives

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Allowable Out-of-Parallelism of Crank Pin Axes

the value of n for 20 engine models, based on this relationship. n_1 is given also, based on the usual allocance of 0.15 mm per metre out-of-parallelism. In all cases n_1 exceeds n. Actually n should not be so much as to permit the piston to tilt so that more than half the normal radial clearance is absorbed. In this case the relationship (2) n' = 1 x 0.5 ΔR/L should be used to determine the allowable out-of-parallelism of the crank pins.

There are 2 tables, and 4 references (all Soviet)

Card 2/2

DOLINSKIY, P. A. Cand Tech Sci -- "Study of [redacted]-permissible deviations of axles. [redacted] of crankgear-parts of internal-combustion engines." Odessa, 1961 (Min of Higher and Secondary Specialized Education UkSSR. Odessa Polytechnic Inst). (KL, 4-61, 196)

DOLINSKIY, P.A.; GULIDOVA, T.I., red.; SMYKA, T.V., red.; TIKHONOVA, Ye.A., tekhn. red.

[Centering the movement of marine diesel engines]TSentrovka dvizheniia sudovykh dizelei. Izd.3., perer. i dop. Moskva, Izd-vo "Morskoi transport," 1962. 227 p. (MIRA 15:9)
(Marine diesel engines)

DOLINSKIY, P.A., inzh.

Determination of clearance limits in crank gear assembly joints in marine internal combustion engines. Sudostroenie 28 no.2: 40-43 F '62. (MIRA 15:3)

(Marine engines)

DOLINSKIY, P., kand.tekhn.nauk; starshiy prepodavatel'; TARASYUK, G., starshiy prepodavatel'

Increase requirements of ship designers and builders. Mor.flot 23 no.2:32-33 F '63. (MIRA 16:2)

1. Odesskoye vyssheye inzhenernoye morskoye uchilishche.
(Shipbuilding)

DOLINSKIY, P.A., kand.tekhn.nauk

Methods of increasing the accuracy of the mutual position of crank bearing and connecting rod axes in marine diesel engines. Sudostroenie 30 no.2:49-52 F '64. (MIRA 17:4)

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DOLINSKIY, P.A., kand. tekhn. nauk; SUMOVSKIY, B.Ya., inzh.

Allowed extent of the interlacing of axes of connecting rod heads of a trunk engine. Vest. mashinostr. 44 no.5: 50-51 My '64. (MIRA 17:6)

DOLINSKIY, S.

Stalingrad hydro project today., Tekh.molod., No 1, 1952.

DOLITSKIY, V.A.; KUCHERUK, Ye.V.

Maps of seams and their use in tectonic zoning of platform areas. Izv. AN SSSR. Ser. geol. 28 no.9:61-69 S '63. (MIRA 16:10)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni I.M. Gubkina, Moskva i Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

MUZYCHENKO, Nina Mikhaylovna; YURKEVICH, Tat'yana Yakovlevna; BAKIROV, A.A., prof., glav.red.; RYABUKHIN, G.Ye., prof., red.; USPENSKAYA, N.Yu., prof., red.; ZHDANOV, M.A., prof., red.; DOLITSKIY, V.A., dots., red.; SPIKHINA, A.M., kand. geol. nauk, red.; YUDIN, G.T., kand. geol.-min. nauk, red.; TABASARANSKIY, Z.A., dots., red.; BAKIROV, E.A., dots., red.; BYKOV, R.I., dots., red.; FOMKIN, K.V., kand. geol.-min. nauk, red.; KNYAZEV, V.S., dots., red.; SHIROKOV, V.Ya., st. nauchn. sotr., red.; YUNGAS, S.M., ved. red.; NEVEL'SHTEYN, V.I., ved. red.

[Geological conditions and fundamental characteristics of oil and gas accumulations in the limits of the Epi-Hercynian platform in the south of the U.S.S.R.) Geologicheskie usloviia i osnovnye zakonomernosti razmeshcheniia skoplenii nefti i gaza v predelakh epigertsinskoi platformy iuga SSSR. Pod red. A.A.Bakirova. Moskva, Gostoptekhizdat. Vol.1. [Central Asia] Sredniaia Aziia. 1963. 442 p. Vol.3. [Volga Valley portion of Saratov and Volgograd Provinces] Saratovsko-Volgogradskoe Povolzh'e. 1963. 153 p. (MIRA 17:4)

1. Moscow. Institut neftekhimicheskoy i gazovoy promyshlennosti.

ABRAMOV, F.A., prof., doktor tekhn. nauk; DOLINSKIY, V.A.

Aerodynamic resistance in workings lined with sectional reinforced concrete supports. Krepl. gor. vyr. ugol'. shakht no. 1:73-75 '57. (MIRA 11:7)

1. Dnepropetrovskiy gornyy institut.
(Mine timbering)
(Reinforced concrete construction)
(Aerodynamics)

DOLINSKIY, V.A., gornyy inzhener.

Investigating air flow characteristics in sectional reinforced concrete supports. Shakht. stroi. no.8:14-18 Ag '57. (MLRA 10:9)

1. Dnepropetrovskiy gornyy institut im. Artema.
(Mine ventilation) (Air flow)

MILETICH, A.F., dotsent, kand.tekhn.nauk; DUGANOV, G.V., dotsent, kand.tekhn.nauk; ROMENSKIY, L.P., kand.tekhn.nauk; [redacted] assistent

Establishing ventilation resistance in tubing-lined mines. Izv. DGI 31:208-218 '58. (MIRA 11:7)
(Mine ventilation) (Mine timbering)

ABRAMOV, F.A., prof., doktor tekhn.nauk; DOLINSKIY, V.A., gornyy inzh.

Aerodynamic resistance of mine shafts lined with reinforced concrete tubings. Ugol' Ukr. 3 no.4:16-19 Ap '59.
(MIRA 12:7)

(Shaft sinking) (Aerodynamics)

ABRAMOV, F.A., professor, doktor tekhn.nauk; MAKSIMOV, A.P., dotsent, kand.tekhn.nauk; DOLINSKIY, V.A., gornyy inzh.

Modification of mine shaft lining reinforcement methods. Ugol' 35 no.3:50-54 Mr '60. (MIRA 13:6)
(Shaft sinking) (Reinforced concrete)

DOLITSKIY, V.A.; BERMAN, L.I.

Upthrust at the western end of the Zhiguli bank discovered by borehole observations. Dokl.AN SSSR 138 no.6:1413-1416 Je '61.
(MIRA 14:6)

1. Predstavleno akademikom A.L.Yanshinym.
(Zhiguli Mountains—Faults (Geology))

DOLITSKIY, V.A.

Study of the history of sediment accumulation based on the materials of geophysical exploration of boreholes. Prikl. geofiz. no.29:202-231 '61. (MIRA 14:6)

(Logging (Geology)) (Sediments (Geology))

ABRAMOV, F.A., prof., doktor tekhn.nauk; DOLINSKIY, V.A., gornyy inzh.

Aerodynamic resistance of workings equipped with conveying units. Ugol' 37 no.1:52-55 Ja '62. (MIRA 15:2)

1. Dnepropetrovskiy gornyy institut im. Artema.
(Mine ventilation)

DOLINSKIY, V.A., kand. tekhn. nauk

Analytical determination of the aerodynamic-resistance factors of workings reinforced by ribbed supports. Izv. vys. ucheb. zav.; gor. zhur. 6 no.9:81-88 '63. (MIRA 17:1)

1. Dnepropetrovskiy ordena Trudovogo Krasnogo Znameni gornyy institut imeni Artema. Rekomendovana kafedroy rudnichnoy ventilyatsii i tekhniki bezopasnosti.

ABRAMOV, F.A., doktor tekhn. nauk; DOLINSKIY, V.A., kand. tekhn. nauk

Investigating the coefficient of aerodynamic resistance of inclined mine shafts with the use of new types of supports. Shakht. stroi. 8 no.9:12-13 S '64. (MIRA 17:12)

1. Dnepropetrovskiy gornyy institut imeni Artema (for Abramov).
2. Filial Instituta mekhaniki AN UkrSSR (for Dolinskiy).

ABRAMOV, Fedor Alekseyevich; DOLINSKIY, Vitaliy Andreyevich; IDEL'CHIK, Isaak Yevseyevich; KERSTEN, Igor' Oskarovich; TSODIKOV, Veniamin Yakovlevich; KOMAROV, V.B., prof., doktor tekhn. nauk, retsenzent; GRISHAYENKO, M.I., ved.red.

[Aerodynamic resistance in mine workings and subway tunnels] Aerodinamicheskoe soprotivlenie gornykh vyrabotok i tonnelei metropolitena. [By] F.A Abramov i dr. Moskva, Nedra, 1964. 185 p. (MIRA 18:1)

ABRAMOV, F.A.; DOLINSKIY, V.A.; MINAYEV, B.A.

Aerodynamic resistance of workings with types of support and of shafts in Krivoy Rog Basin mines. Gor.zhur. no.12:54-59 D '64. (MIRA 18:1)

1. Dnepropetrovskiy gornyy institut.