GOL'DANSKII APPROVED FOR RELEASE: Thursday, September 26, 2002

Indication of chain reactions by nitric oxide. V. I. Gol'danskii. *Uspekhi Khim.* 15, [illegible] (1946).—Following a review of previous exptl. and theoretical work on the inhibiting effect of small amts., and the accelerating effect of large amts., of NO on the thermal decompn. of ethers, hydrocarbons, and aldehydes, particularly by Hinshelwood, *et al.*, and Rice, *et al.* (35 references, up to 1944) G. proposes a generalized reaction mechanism. In the instance of Me_2O, the elementary steps of the decompn. are assumed to be: (0) $CH_3OCH_3 = CH_3 + CH_3O$ ($CH_3O + CH_3OCH_3 = CH_4$ + products), (1) $CH_3 + CH_3OCH_3 = CH_4 + CH_2OCH_3$; (2) $CH_2OCH_3 = CH_2O + CH_3$; (3) $CH_3 + CH_3 = C_2H_6$ or $C_2H_4 + H_2$; (4) $CH_3 + NO = CH_3NO$; (5) $CH_3OCH_3 + NO = CH_3NO + CH_3O$ ($CH_3O + CH_3OCH_3 = CH_4$ + products); (6) 2 [illegible] products. From known activation and bond energies, the order of magnitude of the rate consts. at 800° K. and 1 atm. is evaluated to: $k_0 = 10^{-5}$; $k_5 = 5 \times 10^{-}$ [illegible]; $k_1 = 10^{-12}$; $k_4 = 10^{-11}$; $k_3 = 5 \times 10^{-11}$. With n_1 = [CH_3], c = [CH_3OCH_3], λ = [NO]/c, W = reaction rate, then $W_3/W_4 = 10^{-13} n_1/10^{?} \lambda$; hence, at $\lambda >$ [illegible] chain rupture through recombination 3 becomes negligible as compared with step 4. In the absence of NO, $W = k_0c + k_1 \sqrt{2k_0/k_3} c^{3/2}$ and the chain length $\nu = W/2k_0c$. In the presence of NO, it follows from the reaction mechanism W = [illegible] $10^{11} + 2.5 \times 10^{11} \div (10^{?}/\lambda) + 5 \times 10^{11} \lambda$ and [illegible] $+ 5 \times 10^{11} \lambda$). The concn. λ_{min} corresponding to the limit of inhibition by NO = 4.5×10^{-4}; at [illegible] 5.45×10^{4}, W (initial) = 2.35×10^{14} [illegible] 12.5 as against ν_{min} = 1 assumed by Hinshelwood; accordingly, the values of the mean and [illegible] chain length, 23 and 300, resp., are different from those arrived at by Hinshelwood, 17 and 400, resp. [illegible] whether λ (initial) $> \lambda_{min}$ or $< \lambda_{min}$, the [illegible] is inhibited or is catalyzed by NO. In the first case, NO accelerates and the kinetic curve (change in [illegible]) shows two inflections, whereas in [illegible] inhibition) there is but one inflection. [illegible] energy E_5 of the decompn. reaction 5 [illegible] than assumed (45 kg.-cal./mole), that is k_5 [illegible] than assumed, inhibition would be completely [illegible] catalysis and unobservable. This is [illegible] on a series of plots of W (initial) against λ for various values of E_5, from 29.8 to 44.8 kg.-cal./mole, [illegible]. Inhibition, at any λ, dis[illegible] $k_5 = 10^{-?}$, even though the chain [illegible] = 600 for $\lambda = 10^{-4}$). Consequently, [illegible] on E_5 and k_5, genuine chain reactions may be [illegible] uninhibited by small amts. of NO, as was observed in the case of the thermal decompn. of acetaldehyde, and still follow the mechanism given. N. T.

Catalytic hydrogenation of organic compounds in the liquid phase. II. Kinetics of hydrogenation of oleic acid
V. I. Gol'danskiĭ and S. Yu. Elovich. *J. Phys. Chem. (U.S.S.R.)* 20, 1085-93(1946)(in Russian); cf. C. I. 39, 5100*. Solns. of 0.7 g. of oleic acid in 20 cc. of AcOH + Ac_2O were shaken with H in the presence of 0.1 g. of Pt on $BaSO_4$. The rate of consumption of H increased with the rapidity of shaking up to 300 (at 15°) or 600 (at 40°) shakes per min. and remained const. at a more intense agitation. It is concluded that below 300-600 shakes the rate r of reaction is detd. by diffusion, and at higher frequencies by the kinetics of the chem. process. At 15° r was of zero order for the first 50-60% of the reaction. At 40° the zero-order equation was valid up to 85-90%. The difference was due to sepn. of stearic acid crystals at 15°. The r was proportional to the H pressure in both diffusion and kinetic regions. In the kinetic region r was proportional to the amt. of catalyst; in the diffusion region r increased less steeply and tended toward a limit detd. by the rate of soln. of H. The greater the amt. of catalyst, the greater was the frequency of agitation required to reach the kinetic region. From the increase of r with temp. between 20° and 75° the energy of activation was calcd. to be 6000 ± 1000 cal. mole in the diffusion and 9000 ± 1000 cal. mole in the kinetic region. L. I. B.

Heterogeneous ionic catalysis. (Study of esterification and of hydrolysis of esters in the vapor phase.) V. I. Gol'danskii and N. M. Chirkov (Inst. Chem. Phys., Acad. Sci. U.S.S.R., Moscow). *J. Phys. Chem.* (U.S.S.R.) 20, 1333–45 (1946) (in Russian). The reaction between EtOH and AcOH vapors at 75° in a glass vessel is immeasurably slow, but is much accelerated by HCl (1–30°, of AcOH). In the presence of HCl the equil. between equimol. amts. of EtOH, AcOH, EtOAc, and H_2O is reached at 92 mol. % of EtOAc. This makes measurement of the rate of esterification easier than that of hydrolysis. The rate of esterification up to 40% transformation is independent of time. This zero-order rate v is proportional to the surface area of the glass, which was varied by inserting glass tubing. Therefore, the reaction is completely heterogeneous. The v rapidly increases with p/p_s, p being the total gas pressure and p_s that pressure at which droplets appear on the wall. At $p/p_s = 0.7$, v is immeasurably small; at $p/p_s = 1.0$ it is 10 times that at $p/p_s = 0.8$. If the v values at different temps. (15–82°) are compared at a const. p, the temp. coeff. of v is neg. If the comparison is made at a const. p/p_s, the temp. coeff. is pos. and corresponds to an energy of activation of 15,000 cal./mol. which is almost equal to that in the liquid phase. The exponential increase of v with p/p_s, the proportionality between v and glass surface, and the agreement between the activation energies confirm the hypothesis (G., *et al.*, *Compt. rend. acad. sci.* (U.S.S.R.) 52, 777–9 (1946)) that the reaction takes place in the liquid adsorption layer. From v the thickness of this layer is calcd. to be 10^{-5} cm. at $p/p_s = 0.7$ and 10^{-6} cm. at $p/p_s = 0.8$(?). The above esterification is the first example of a heterogeneous catalysis in a multimol. adsorption layer.

J. J. Bikerman

A58-51A METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Heterogeneous catalysis in polymolecular adsorption layers. V. I. Goldanskiĭ, N. N. Semenov, and N. M. Chirkov. *Compt. rend. acad. sci. U.R.S.S.* 52, 777-9 (1940) (in English); cf. *C.A.* 41, 2073a.—EtOH was esterified with AcOH in the presence of 0.6–18.0% HCl at 26–330 min. and 45.82° with varying surface area of the glass vessel. The rate of the initial zero-order reaction was proportional to the area. Equil. was obtained at 62% esterification in the adsorbed layer as compared with 66% in the liquid phase but the temp. coeff. were practically identical.

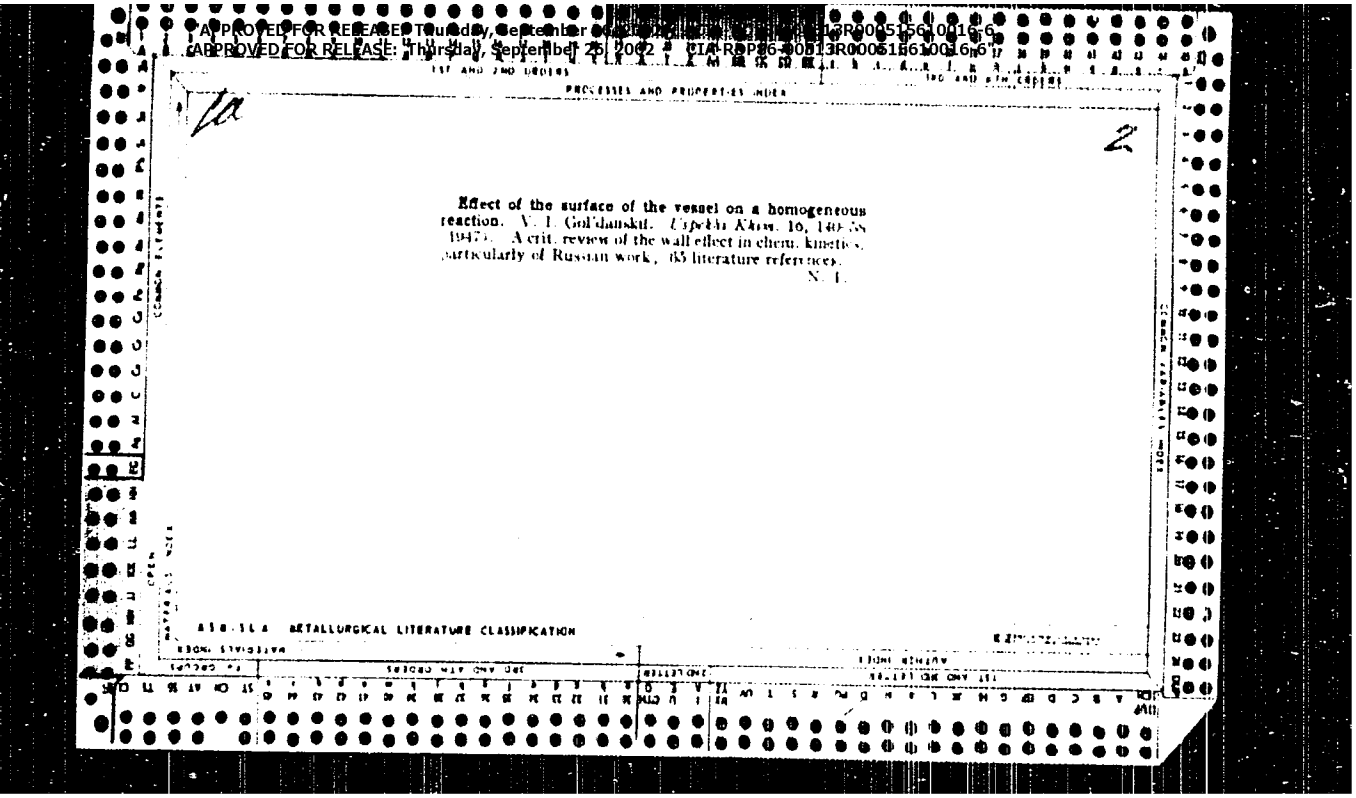
G. C. A.

ASM-TSA METALLURGICAL LITERATURE CLASSIFICATION

GOL'DANSKIY, V. I. Chem. Scien. Sept.

Dissertation: "Ionic Catalysis in Polymolecular Adsorption Layers." Inst of Chemical Physics, Acad Sci USSR, 25 Feb 47.

So: Vechernyaya Moskva, Feb, 1947 (Project #17836)



PROCESSES AND PROPERTIES INDEX

1a

2

Effect of the surface of the vessel on a homogeneous reaction. V. I. Gol'danskiĭ. *Uspekhi Khim.* 16, 140-58 1947). A crit. review of the wall effect in chem. kinetics, particularly of Russian work, 65 literature references. N. L.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

USSR/Catalysis
Chemistry - Esterification

Feb 1947

"On Heterogeneous Ionic Catalysis," V. G. Khomyakov and N. Chirkov, 14 pp

"Acta Physicochimica" Vol XXII, No

A study of acid-catalyzed reactions of esterification and ester hydrolysis in the vapor phase and the discovery of a new type of catalysis, heterogeneous catalysis in which [illegible] layers.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

CA

Multimolecular adsorption and condensation of vapor on glass as studied by optical methods. B. V. Deryagin, I. Gol'dzinskii, and B. V. Karpov. *Doklady Akad. Nauk S.S.S.R.* 57, 665-7(in Russian)(1947). The adsorbed films were examd. by detn. of the parallel and perpendicular components of reflected polarized light on the surface in question with the green Hg line as light source. The method permits detn. of the thickness of the layer of absorbed material. Adsorption isotherms for EtOH, AcOH, H_2O, and Et_2O [illegible] glass or a very smooth [illegible] of vapor of alkali [illegible] were observed.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

2

Application of polarization microscopic technique in the study of catalysis in multimolecular adsorbed layers. [illegible] Gol'danskii and V. V. Karpov. *Doklady Akad. Nauk S.S.S.R.* **57**, 793-6(1947). The technique was explained in the previous paper (C. A. **40**, 1884[illegible]). A study of [illegible] is briefly reported. The kin[illegible]

[illegible] characteristics in the adsorbed layer are identical with that in the liquid state if the adsorbed layer contains at least [illegible] mol. layers. G. M. Kosolapoff

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

CA

Multimolecular adsorption on mica. A. I. Gol'dfarb and N. M. Chirkov. *Doklady Akad. Nauk S.S.S.R.* **58**, 1665-7 (1947). Adsorption on mica of vapors of H_2O, EtOH, AcOH, EtOAc and aq. HCl was studied by the method of residual pressure. The results are given graphically. EtOAc gives most pronounced adsorption with layer thickness reaching 3 to 5 mm., increasing with rate. EtOH, H_2O, AcOH and 5% aq. HCl. Microscopic [illegible] under hypsometer accord with Polanyi theory. G. M. Kosolapoff

USSR/Chemistry - Oxidation Nov/Dec 48
Chemistry - Reactions, Gaseous

"Awarding of the Prize Imeni A. N. Bakh for 1948," V. I. Goldanskiy, 1 p

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 6

On 3 May 48, the Elu[illegible] Council, Phys Chem Inst imeni L. Ya. Karpov, awarded subject prize to [illegible]ksay Markovich Emanuel, director, Intermediate Products Lab (same Institute), for his work, "The Study of the Intermediate Products of Gaseous Oxidizing Reactions."

33/49T24

V.I. Goldansky. The dependence of the rate of the heterogeneous catalytic reaction on the amount of the catalyst. Pp. 1274-80.

In the article are given the general relations between the rate of the heterogeneous catalytic reaction and the amount of the catalyst for monomolecular, bi-molecular reactions, also for complex processes including not only the adsorption-kinetic stage, but also, the stages of solution of the gaseous reagents in a liquid phase, and the diffusions in the liquid phase towards the washed solid particles of the catalyst. The case of an energetically homogeneous surface of the catalyst for which the Langmuir isothermserves as initial adsorption equation was studied.

Institute of Physical Chemistry of
the Acad. of Sciences U.S.S.R.
Moscow
February 27, 1948

SO: Journal of Physical Chemistry (USSR) 22, No. 11, 1948

Translation 251467, 30 Oct 54

USSR/Chemistry - Films Aug 48
Chemistry - Absorption

"The Problem of the Dual Electric Layer," V. I. Gol'danskiy, Inst of Physicochem, Acad Sci USSR, 4 pp

"Dok Ak Nauk SSSR" Vol LXI, No 5

Shows that, knowing width and electroconductivity of absorption films and quantity of electrolytes in the films (assuming electrolyte is completely dissociated), it is possible to determine potential which emerges on adsorbent's surface and also to delimit full potential value of dual film and potential of its diffuse part.

24/49T16

CA

2

Adsorption of water vapor and of aqueous solutions of hydrogen chloride on mica. N. V. Fok, V. I. Gol'danskii, and N. M. Chirkov. *Doklady Akad. Nauk S.S.S.R.* 61, 673-6(1948).—Adsorption measurements were made on muscovite surfaces of 21,000 sq. cm., with an accuracy of 0.3 mm. Hg and 0.1°, by the combined method of detn. of the residual pressure on releasing the vapor into vacuum and of removal of the adsorbed layer by freezing out and evacuating. The adsorptive capacity of mica is improved considerably by preliminary adsorption of HCl (from HCl + H_2O vapor), resulting in a strongly adherent film of 2.5×10^{14} mols. HCl/sq. cm. Adsorption of H_2O on this film gave a typical Langmuir curve with a level portion extending from p/p_s = 0.02 to 0.1, the thickness of the unimol. layer, 3.5 A., proves that the true surface area is close to the geometric area. Above p/p_s = 0.1, the adsorbed films are multimol., the adsorption isotherms rising very nearly exponentially. With pure H_2O, and with H_2O + 17, 23, 25, and 32.5% HCl, the max. thickness k (at p/p_s) was resp., 215 and 83, 72, 50, and 13A. If the exits are viewed as adsorption of H_2O from H_2O + HCl, then H_2O is adsorbed to a greater degree from aq. solns. of HCl than from pure H_2O. Adsorption of H_2O from HCl + H_2O and its desorption from pure H_2O but on a surface with an adsorbed monolayer of HCl involved marked hysteresis: it is absent in adsorption from pure H_2O on

NO-4

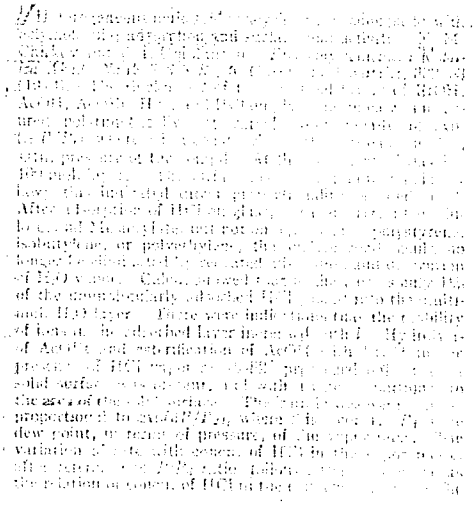
Journal of Chem. Phys. A3, e1948-

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

a HCl freemica surface. The activation of the surface by preliminary adsorption of a monolayer of HCl is illustrated by the values of h_{max} for H_2O 128Å on HCl covered mica 72Å on the HCl and H_2O in the multimol films adsobbed from 23% HCl shows that at low film thickness (small p/p3) the HCl content in the film is far below that of the soln. and approaches it as the thickness increases: eg, in f lms of 15, 30, 40, and 70Å HCl= 7.5, 13.5, 19, and 21.6% CCl_4 is adsorbed on mica much les than H_2O.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

GOLDINSKIY, V.I.



APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

USSR/Nuclear Physics - Nuclear Bombardment Fission — Feb 50

"Nuclear Conversions During Bombardment by High-Energy Particles," V. I. Gol'danskiy, 22 pp

"Uspekh Fiz Nauk" Vol XL, No 2

Presents short review of experimental data and theoretical reports on nuclear conversions by bombardment with high-energy particles, especially according to two types: "deep splitting" and fission. Studies yield of isotopes and

159T73

USSR/Nuclear Physics - Nuclear Bombardment (Contd) — Feb 50

isobars when various elements (copper, arsenic, carbon, thorium, U-235, bismuth, lead, etc.) are bombarded by high-energy particles (190, 90, 32, etc., mev; deuterons, neutrons, alpha-particles).

159T73

Radioactive Isotopes of Iron and Their Application in Chemistry and Biology. (In Russian.) V. I. Goldanskii and M. B. Neiman. *Uspekhi Khimii* (Progress in Chemistry), v. 19, May-June 1950, p. 320-341.

Discusses, on the basis of the literature, physical characteristics of iron isotopes, Fe^{52} to Fe^{59}, production of test specimens of radioactive Fe, and application in chemistry, metallurgy, biochemistry, and biology. 114 ref.

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

GOL'DANSKIY, V. I.

1952 "New Chemical Elements in D.I.Mendeleyev's Periodic System," Priroda, 41, No.7,

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
Nuclear Phenomena

3-22-54
Print

Scattering and absorption of high-energy nucleons. V. I. Gol'danskiĭ, A. L. Lyubimov, and B. V. Medvedev. *Uspekhi Fiz. Nauk* 48, 531-84(1952).—A survey is given of scattering and absorption of high-energy nucleons, in particular of nucleons of several hundred m.e.v. produced in accelerators, but also of such processes observed in cosmic radiation. The production of neutrons by bombardment of various nuclei with high-energy protons and deuterons is described. Tables for the relative output, relative intensities and cross sections, and diagrams for angular distributions and intensity distributions for a no. of cases are given. The possibilities of making use of the following effects for the registration of high-energy particles are discussed: the reaction $C^{12} + X \rightarrow C^{11} + X + n$; fission of heavy nuclei; neutron-proton scattering with registration of the recoil protons; emission of visible light by high-energy charged particles in a medium of high refractive index (Cherenkov effect). The latter effect is considered as the most promising. The exptl. results for *n-p*, *p-p*, *n-d* and *p-d* scattering are revie[illegible] and their theoretical attempts at interpreting the [illegible] results. So far only phenomenological theories have be[illegible] rather successful, which are based on the assumption of [illegible]dependent interactions: a central field interaction gives the [illegible]ssect effect for low energies; a tensor interaction appears [illegible]ary for the description of high energy effects. As yet no [illegible] theory is available which describes correctly all the exptl. data. 50 references.

E. Gora

MEC, ENG. Geophy. (3)

Nuclear Science Abst. 935
Vol. 8 No. 3
Feb. 15, 1954
Physics

Scattering and Absorption of High-Energy Nucleons. V. I. Goldanskii, A. L. Lyubimov, and B. V. Medvedev. Uspekhi Fiz. Nauk 49, 3-47 (1953) Jan. (In Russian)

A review is presented of the present knowledge of nuclear cross sections for high-energy neutrons and for elastic scattering and inelastic collisions. A theoretical consideration of interaction of nucleons with nuclei and absorption of nucleons and their connection with cosmic rays is given. 67 references. (J.S.R.)

GOL'DANSKIY, V.I.; ASTAKHOV, K.V., redaktor; DUKOV, V.M., redaktor.

[New elements in the periodic system of D.I.Mendeleev] Novye elementy v periodicheskoi sisteme D.I.Mendeleeva. Moskva, Izd-vo Akademii nauk SSSR, 1953. 164 p.
(Chemical elements) (MLRA 7:8)

USSR.

577. On Cherenkov radiation of cosmic ray particles in the atmosphere. V. L. GOL'DANSKII and G. ZHDANOV. *Zh. eksper. teor. Fiz.*, 26, No. 4, 405–16 (1954) In Russian.

The contribution of this radiation to the continuous spectrum of the luminosity at night is calculated and found to contribute less than 10% in agreement with previous estimates [Abstr. 4347 (35-9)]. It is shown that, however, a single burst of radiation could be observed by a registering device (e.g., photomultiplier) provided the radius of the collector is large and the resolution short, $\sim 10^{-9}$ sec. The observation of Cherenkov radiation from wide air showers is shown to afford a sensitive means of detecting these showers where the density of particles is so low as to make detection by counters difficult. The amplitude of radiation in this case is given as a function of distance from the axis of the shower.

G. E. ZHDANOV

GOL'DANSKIY, Vitaliy Iosifovich, doktor fiziko-matematicheskikh nauk;
KIPNIS, S.Ye., redaktor; ISLENT'YEVA, P.G., tekhnicheskiy redaktor

[New chemical elements] Novye khimicheskie elementy. Moskva, Izd-vo "Znanie," 1955. 36 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii, Ser. 3, no.2) (MLRA 8:3)
(Chemical elements)

GOL'DANSKIY, Vitaliy Iosifovich; GRIGOROVA, V.A., redaktor; MURASHOVA, N.Ya., tekhnicheskiy redaktor

[New elements in D.I.Mendeleev's periodic system] Novye elementy v periodicheskoi sisteme D.I.Mendeleeva. Izd.2-oe, perer. i dop. Moskva, Gos.izd-vo tekhniko-teoret. lit-ry, 1955. 166 p. (MLRA 9:4)

(Chemical elements) (Periodic law)

GOL'DANSKIY, Vitaliy Iosifovich, doktor fiziko-matematicheskikh nauk; KIPNIS, S.Ye., redaktor; FURMAN, G.V., tekhnicheskiy redaktor.

[Nuclear reaction and methods of effecting it] IAdernye reaktsii i metody ikh osushchestvleniia. Moskva, Izd-vo "Znanie," 1955. 39 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser. 3, no.47) (MLRA 8:12)
(Nuclear reactions)

BARANOV, P.S.; GOL'DANSKIY, V.I.

Yield and angular distribution of high-energy photoneutrons.
Izv.AN SSSR.Ser.fiz.19 no.5:607-608 S-O '55. (MLRA 9:4)
(Cosmic rays) (Nuclear physics)

GOL'DANSKIY, V.I.; ZHDANOV, G.B.; NESTEROVA, N.M.; CHUDAKOV, A.Ye.

Cerenkov radiation in extensive air showers. Izv.AN SSSR.Ser.fiz.19 no.6:747-748 N-D '55. (MLRA 9:4)

1.Fizicheskiy institut imeni P.N.Lebedeva Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

USSR/Nuclear Physics - Pi meson decay FD-2212

Card 1/1 Pub. 146-17/25

Author : Gol'danskiy, V. I., and Podgoretskiy, M. I.

Title : Problem of the disintegration of slow negative pi-mesons

Periodical : Zhur, eksp. i teor. fiz. 28, 620, May 1955

Abstract : The authors discuss the very interesting conclusion from the report of W. Fry and R. George (Phys. Rev., 93, 1427, 1954) on the observation of 18 cases of $\pi\mu$ decay in the radiation of a photoemulsion by slow negative pi-mesons at the ends of tracks of negative pi-mesons. Five references.

Institution : Physics Institute im. P. N. Lebedev, Academy of Sciences

Submitted : January 22, 1955

USSR/Nuclear Physics - Neutron detection

FD-2213

Card 1/1 Pub. 146-18/25

Author : Baranov, P. S., and Gol'danskiy, V. I.

Title : Scintillational high-threshold detector of neutrons

Periodical : Zhur. eksp. i teor. fiz. 28, 621-623, May 1955

Abstract : The authors pose the interesting task of realizing a simple sufficiently effective (better than the usual low effectiveness of the order 10^{-4} to 10^{-3}) detector of high-energy neutrons on the basis of the reaction C^{12} (n,2n) C^{11} with threshold 20.2 Mev, as a result of which positron-active isotope C^{11} is formed with period of 20.5 minutes and maximum energy of beta-plus spectrum of about 1 Mev. They present the block schema for the setup, and give the curve for determining the optimum duration of observation of C^{11} disintegration. They thank A. V. Kutsenko and T. I. Kovaleva for aid in the construction of the apparatus. Seven references: e.g. K. O. Oganesyan, Otchet In-ta yadern. problem AN SSSR (Reports of the Institute of Nuclear Problems, Acad. Sci USSR), 1953, in which report the cross section of the above-mentioned reaction is stated to remain practically constant in the energy interval of neutrons from 90 Mev ($23 \cdot 10^{-27}$ cm^2) to 380 Mev ($21 \cdot 10^{-27}$ cm^2).

Institution : Physics Institute im. P. N. Lebedev, Academy of Sciences USSR

Submitted : January 25, 1955

USSR/Nuclear Physics - Photoneutron yield FD-2214

Card 1/ 2 Pub. 146-19/25

Author : Gol'danskiy, V. I., and Shkoda-Ul'yanov, V. A.

Title : Maximum yield of photoneutrons and a new method for the determination of the integral cross-sections of gamma-neutron reactions for high-energy photons

Periodical : Zhur. eksp. i teor. fiz. 28, 623-626, May 1955

Abstract : In photoneutron investigations the source of photoneutrons is usually thin specimens in which electron-photon multiplication of the original gamma quanta is absent. In the present work the aim of the authors is to determine the yield of photoneutrons under conditions of completely developed electronphoton cascade; that is, a different aim, namely to determine the maximum coefficient of transformation of photons into neutrons. They claim that these measurements permit one to determine the integral cross-sections of reactions in the formation of photoneutrons (S.Z. Belen'kiy, Lavinnyye protsessy v kosmicheskikh luchakh [Shower processes in cosmic rays], State Tech Press, 1948). They conclude that the determination of the maximum yield of photoneutrons in the development of a shower from

high-energy photons is of interest in the possible transformation of the electron-photon component of cosmic rays into nucleons. Four references e.g. A. B. Migdal, ibid. 19, 1945

Institution : Physics Institute im. P. N. Lebedev, Acad Sci. USSR; Institute of Chemical Physics, Acad. Sci. USSR

Submitted : January 25, 1954

USSR/Nuclear Physics - Photoneutrons of high energy FD-2357

Card 1/1 Pub. 146 - 9/24

Author : Baranov, P. S., and Sol'danskiy, V. I.

Title : Yield and angular distribution of high-energy photoneutrons

Periodical : Zhur. eksp. i teor. fiz. 28, 746-748, Jun 1955

Abstract : The authors note the absence of data on the yield and angular distribution of high-energy photoneutrons because of the difficulty of recording of these neutrons. To obtain such data they employed a high-threshold scintillation detector with 1-2% effectiveness based on the occurrence in organic luminophors of the reaction $C^{12}(n,2n)C^{11}$ described by P. S. Baranov and V. I. Sol'danskiy, Ibid. 28, 1955], namely in the case of Fe, C, Al, and Sb nuclei and bremsstrahlung with energies up to 340 Mev. Results are presented in 4 graphs. They note that their measurements of the cross-section of the reaction $C^{12}(gamma,n)C^{11}$ point to the increase (in the interval of energy of gamma quanta from 50 to 340 Mev) of the yield of direct photoeffect to a quantity of the order of 10^{-28} cm²/eff. quantum. Six references: e.g., A. E. Gorbunov, Trudy FIAN', 1953, V. I. Gol'danskiy and V. A. Zhdova-Ul'yanov, ZhETF, 28, 1955.

Institution : Physical Institute im. P. N. Lebedev, Academy of Sciences USSR

Submitted : January --, 1955

Category : USSR/Nuclear Physics - Nuclear Reactions

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6907

related particles of both types in single interval t. Calculations are given for the correlation function and for its dispersion in the absence and presence of a background, and the question of the accuracy of the method is discussed. Advantages of the correlation method over its particular version--the known coincidence method -- lie essentially in the possibility of performing measurements with longer time intervals between the related conversion acts and with high radiation intensity. Examples of the possibilities of the method are given (determination of the cross sections of nuclear reactions, identification of the reaction products, and determination of the half lives).

Card : 2/2

USSR/Nuclear Physics - Fission

FD-3248

Card 1/2 Pub. 146 - 7/44

Author : Gol'danskiy, V. I.; Pen'kina, V. S.; Tarumov, E. Z.

Title : Fission of heavy nuclei by high-energy neutrons

Periodical : Zhur. eksp. i teor. fiz., 29, No 6(12), Dec 1955, 778-789

Abstract : Exposition of the results of an investigation of the fission of various heavy nuclei in the region of atomic numbers Z = 74-92 by neutrons with nominal energies 120 and 380 Mev. The experimental portion was carried out in the course of 1950-1951. The authors evaluate the thresholds of fission which is connected with the preliminary emission by the fissioning nuclei of neutrons. This evaluation is based upon a comparison of the binding energy and the critical energy of fission. They also evaluate the average number of neutrons which are emitted during fission of heavy nuclei. The mentioned experiments were conducted on the synchrocyclotron of the Institute of Nuclear Problems, Academy of Sciences USSR, in the case of U-235 and U-238 and others (Bi, Th, Pb, Tl, Au, Pt, W). Twenty-

seven references: e.g. K. O. Oganesyan, Otchet In-ta yadernykh problem AN SSSR [Reports of the Institute of Nuclear Problems, Acad. Sci. USSR], 1953; V. P. Dzhelepov, E. M. Golvin, Yu. M. Kazarinov, Otchet In-ta yad. probl. AN SSSR, 1950; etc.

Institution : Institute of Chemical Physics, Academy of Sciences USSR

Submitted : July 11, 1955

539.17 : 519.2

9905. **On a possible application of the correlation function to the study of nuclear transformations.** V. I. GOL'DANSKII AND M. I. PODGORETSKII. *Dokl. Akad. Nauk SSSR*, 100, No. 2, 237–40 (1955) In Russian.

The usual method of studying the characteristics of a transformation by registering in a time T the numbers of two types of events l and k and the number of coincidences, is a partial example of a statistical method in which T is divided into n intervals and the numbers of events, r_l and r_k, and their product $r_l r_k$ are averaged over n. Expressions for the average value and standard deviation of the correlation function $\Phi_{lk} = \overline{r_l r_k} - \overline{r_l}\,\overline{r_k}$ are given in the case when l and k are either independent or correlated, also in the presence of background. In addition to all problems studied by the coincidence method, the correlation method can be used, e.g. for the determination of (*a*) reaction cross-sections [e.g. for $Be^9(n\alpha)He^6 \xrightarrow{\beta} Li^6$ by the study of $\overline{r_\alpha}$ and $\overline{r_\beta}$], (*b*) the identification of reaction products, (*c*) half-life determinations without separation of the sample from the equilibrium mixture.

W. J. SWIATECKI

USSR/Physics - Nuclear fission

Card 1/1 Pub. 22 - 13/47

Authors : Goldanskiy, V. I.; Tarumov, E. Z.; and Pen'kina, V. S.

Title : Fission of heavy nuclei with high energy neutrons

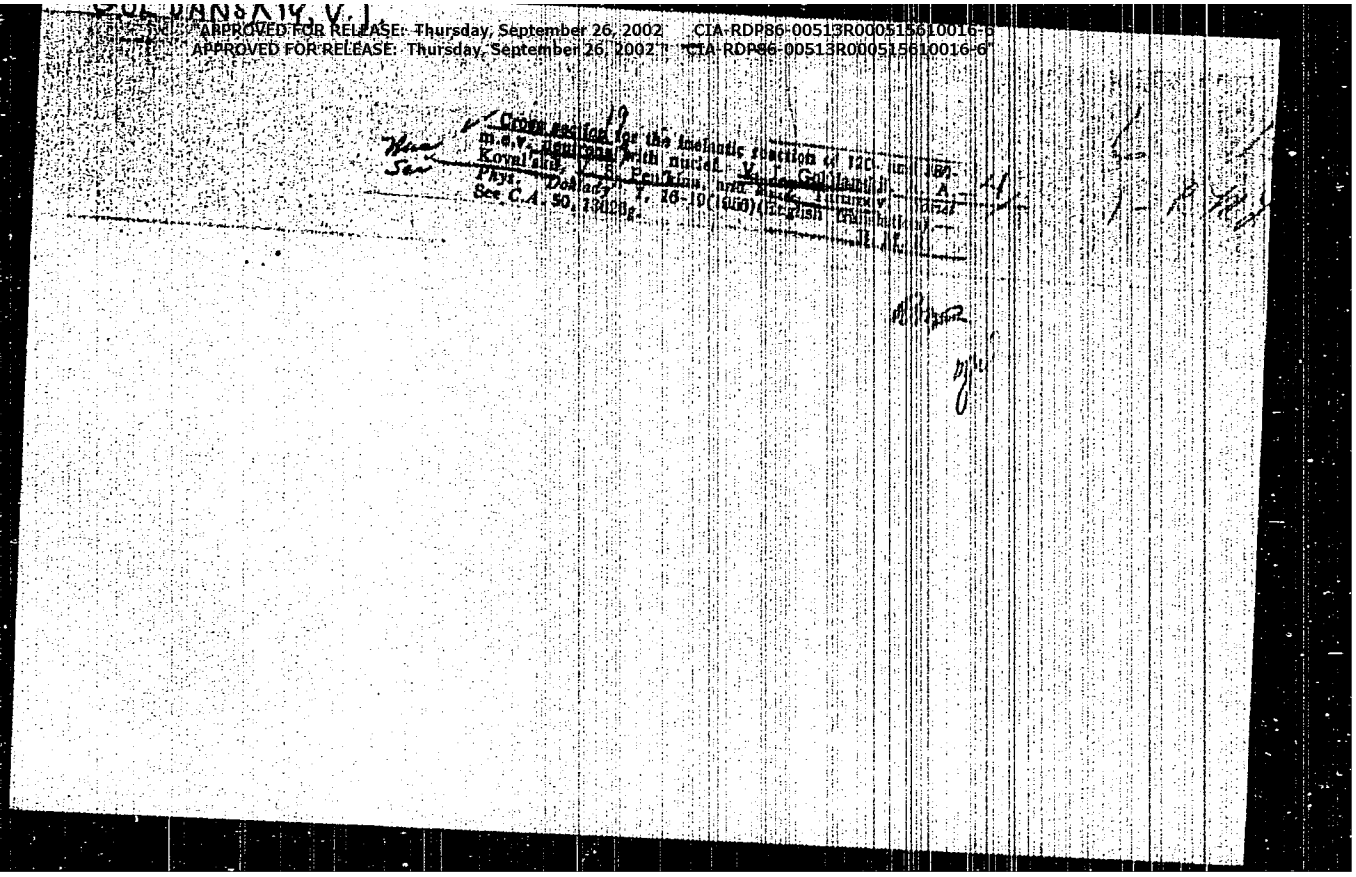
Periodical : Dok. AN SSSR 101/6, 1027 - 1030, Apr. 21, 1955

Abstract : Experiments conducted with the synchrotrone of the Acad. of Sc., USSR, Institute of Nuclear Problems are described. The experiments were conducted for the purpose of establishing some data concerning the fission of atomic nuclei by neutrons of various energies. The number of neutrons participated in the nuclear fission at various energies, and the cross section of the fission reaction were determined. The experiments were conducted with nuclei of the following atoms: U^{235}, U^{238}, Th, Pb, Tl, Pt, and W. Results of the experiments are in good agreement with the theory of Geylikman. Eleven references: 6 USSR, and 5 USA (1947-1953). Tables; graphs.

Institution : Acad. of Sc., USSR, Institute of Physical Chemistry

Presented by: Academician A. I. Alikhanov, January 21, 1955

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6



APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6

GOL'DANSKII, V. I.

1-12422

Fission of large nuclei by high-energy neutrons. V. I. Gol'danskii, V. S. Pen'kina, and B. Z. Tarumov. Soviet

Nucl Sci Cit, 50, 10557d. Phys., JETP 2, 677-87(1956)(Engl. translation).—See B. M. B.

GOL'DANSKIY, V.I.

GOL'DANSKIY, V.I.

4128
(γ,p) REACTIONS ASSOCIATED WITH THE FORMATION OF GROUND STATE NUCLEI. V. I. Gol'danskii [P. N. Lebedev Inst. of Physics, Academy of Sciences, USSR]
Soviet Phys. JETP 3, 791-4 (1956) Dec.
The contribution of the individual levels to such (γ,p) reactions, which can be obtained from experimental data regarding the cross sections of reverse (p,γ) reactions that take place without capture emission of γ rays, is determined. (T.J.)

Category : USSR/Nuclear Physics - Nuclear Reactions C-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3228

Author : Gol'danskiy, V.I.
Inst : Physics Institute, Academy of Sciences USSR
Title : (γ, p) Reactions Associated with Formation of Ground-States in Nuclei

Orig Pub : Zh eksperim. i teor. fiziki, 1956, 30, No 5, 969-971

Abstract : The contribution of the individual levels in the (γ, p) reactions with light nuclei is estimated. For this purpose, experimental data are used on the cross sections of the reverse (p, γ) reactions with production of the final nucleus in the ground state. Using the principle of the detailed balancing, the author calculates the cross sections of the (γ, p) reactions for the B^{10}, C^{12}, N^{14}, O^{16}, and S^{32} in the energy range from 2 to 5 Mev above the threshold. Since data concerning the levels obtained in the (p, γ) reactions with productions of ground-states of nuclei are quite scant, it is impossible to construct in this manner the cross sections σ_0 (γ, p) in the region of "giant" resonance. The integral cross sections corresponding to the known levels reach approximately 10% of the integral section in the region of the "giant" resonance, measured in the (γ, p) reaction. The data on the (p, γ)

Card : 1/2

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6

GOL'DANSKII, V.I.

3513

ON THE EXISTENCE OF OCTUPOLE ISOMERIC TRANSITIONS WITH HALF-LIFE $T_{\frac{1}{2}} = \sim 10^{-8}$ sec. IN NUCLEI WITH ODD A NUMBERS. V.I. Gol'danskii and V.S. Evseev (Lebedev Inst. of Physics). Izv. Akad. Nauk S.S.S.R. Ser. Fiz. 20, 987-74(1956) Aug. (In Russian)

Discussions are offered on transitions, spins, and unit levels in odd A. Illustrations are given of possible octupole transitions of nuclei with N, Z = 21 to 51, N, Z = 51 to 82, and, N, Z = 82 to 126, and the schemes of nuclear excited states at various levels for Rh^{103}, Lu^{175}, and Au^{197} are presented. (R.V.J.)

BALABANOV, Yefim Mikhaylovich, kandidat fiziko-matematicheskikh nauk; GOL'DANSKIY, Vitaliy Iosifovich, professor, doktor fiziko-matematicheskikh nauk; KIPNIS, S.Ye., redaktor; FURMAN, G.V., tekhnicheskiy redaktor

[Thermonuclear reactions] Termoiadernye reaktsii. Moskva, Izd-vo "Znanie," 1956. 60 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser. 3, no.s.43-44) (MLRA 9:11)
(Nuclear reactions)

SUBJECT USSR / PHYSICS
AUTHOR GOL'DANSKIJ, V.I.
TITLE On Molecular Neutronoscopy.
PERIODICAL Žurn.eksp.i teor.fis, 31, fasc.4, 717-718 (1956)
Issued: 1 / 1957

The employment of strong, short pulses of monoenergetic neutrons makes it possible to use a new method for the investigation of the structure and the properties of molecules. This method may be described as "molecular neutronoscopy". It is characterized by the fact that the target formed by the molecules to be investigated is bombarded with short "packets" of monoenergetic neutrons ($E_0 \sim 1 - 10$ eV) and by determining the following quantities: binding energy of the molecules, probability of various molecular transformations under the influence of neutrons, and several other characteristics. These quantities are determined from the shape of the spectrum of the times of flight and from the angular distribution of the scattered neutrons. With the possibilities it offers, this method is best employed with the help of "cold" neutrons. At first a formula for the energy spectrum of the scattered neutrons is given. If neutron energies are sufficiently high, also nonelastic acts of scattering with a decay of the molecule are possible. The analysis (with respect to times of passage) of the position and the intensity of lines and bands offers a wide range of possibilities for determining the energy of the bindings torn by the neutrons, the tearing probability, and the excited levels of the molecules. Additional possibilities of applying this method follow from a development of the theoretical notions concerning the scattering of neutrons with excitation of mole-

[illegible] APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

"[illegible] Thermonuclear [illegible]," [illegible], Series III, No. [illegible], pp. [illegible], [illegible].

Translation [illegible]

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

GOL'DANSKIY, V.I.

5894

INELASTIC INTERACTION CROSS SECTIONS OF 120 AND 380 MEV NEUTRONS WITH NUCLEI. V. I. Gol'danskiĭ, A. A. Koval'skiĭ, V. S. Pen'kina, and E. Z. Tarumov. (Inst. of Chemical Physics). Doklady Akad. Nauk S.S.S.R. 106, 219-222(1956) Jan. 11. (In Russian).

Experiments were carried out on the phasatron of the Institute of Nuclear Problems to study the optical nuclear model. The inelastic cross sections of 120 and 380-Mev neutron interactions with heavy nuclei (σ_a) were measured. To determine σ_a, the absorption of primary neutrons was measured on a threshold detector. The results were checked by using several types of detectors (ionization chambers, non-threshold detectors, and fission chambers). Diagrams of 120- and 380-Mev neutron absorption for hydrogen, lead, aluminum, and uranium, and tabulations comparing the data obtained from the experiments and the data of other authors are given. (R.V.J.)

GOL'DANSKIY, V I

CARD 1 / 2 PA - 1939

SUBJECT USSR / PHYSICS

AUTHOR GOVORKOV, B.B., GOL'DANSKIY, V.I., KARPUCHIN, O.A., KUZENKO, A.V. PAVLOVSKAJA, V.V.

TITLE The Elastic Scattering of γ -Quanta with an Energy of up to 120 MeV by Protons.

PERIODICAL Dokl.Akad.Nauk 111, fasc.5, 986-991 (1956)
Issued: 1 / 1957

Experiments were carried out by means of the 265 MeV-synchrotron of the Physical Institute "P.N.LEBEDEV" of the Academy of Science in the USSR. For the purpose of reducing the photon load of individual counters work was carried out in such a manner that the duration of the impulses of the synchrotron amounted to 1000 μ sec (instead of the usual 30 μ sec). The spectrum of the electrons impinging upon the target of the synchrotron was nearly triangular with the base of 75 to 119 MeV and with the maximum at 97 MeV. The elastic γ p-scattering at these energies was investigated by registration of the scattered γ -quanta solely with the help of telescopes which consist of scintillation counters. An attached drawing illustrates this experimental order. Observation was carried out with two telescopes which were fitted simultaneously under the angles 90 and 90°, 45 and 90°, 45 and 135° (in the laboratory system). Each telescope consisted of four liquid-scintillation-counters with a solution of terphenyl in toluene. The recording threshold for the γ-quanta in the case of both telescopes amounted to ~ 40 MeV. The light pulses emitted from the scintillators were recorded by means of photoelectronic multipliers

GOL'DANSKIY, V.I.

ON MOLECULAR NEUTRONOSCOPY. V. I. Gol'danskii (Academy of Sciences, USSR). Soviet Phys. JETP 4, 644-6(1957) May.

It is proposed to subject molecules under investigation to bombardment by short pulses of monoenergetic neutrons (E_0 = 1 to 10 ev) and to determine the binding energy of the molecules, the probability of various molecular conversions induced by the neutrons, and other characteristics from the type of time-of-flight spectrum and of the angular distribution of the scattered neutrons. The possibilities, advantages, and disadvantages of this method are discussed. (M.H.R.)

120-c-10/3c

AUTHORS: Baranov, P.S., Gol'danskiy, V.I., and Roganov, V.S.

TITLE: A High Energy Neutron Dosimeter (Dozimetr neytronov vysokoy energii)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, No.6, pp. 45-49 (USSR)

ABSTRACT: The most sensitive detectors of fast neutrons at the present time are liquid scintillators which record neutron-proton events which take place in the volume of the scintillator (efficiency of a few %). However, these detectors are very sensitive to the electron-photon background. In the present paper, a detector is described employing liquid, organic scintillators. It has an efficiency higher by one order than those previously described (Ref.2). The detector has sufficient sensitivity for use as a high energy neutron dosimeter. The liquid employed is a solution of p-terphenyl in xylol (3.5 g/litre). The detector has a threshold of 20.6 MeV and is based on the reaction $C^{12}(n,2n)C^{11}$. The efficiency of the detector is almost independent of neutron energy in the range 40 - 400 MeV. The detector can be used to measure neutron fluxes corresponding to the tolerance dose with an accuracy of 6%. The dosimeter is not very sensitive to the background of charged particles and photons.

AUTHOR: Gol'danskiy, V.I., Professor (Moskva) 26-12-17/49

TITLE: Synthesis of Element 102 (Sintez elementa 102)

PERIODICAL: Priroda, 1957, No 12, pp 79-80 (USSR)

ABSTRACT: On July 9, 1957, a group of Swedish, American and British scientists officially announced the artificial forming of the 10th transuranic element 102. It was obtained by bombarding the curium isotope Cm^{244} by ions of the carbon isotope C^{13}. The new element was named nobelium and its symbol is No. There are 5 references which are American and British.

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Card 1/1

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

The Yield and Angular Distribution of Fast Photoneutrons From Deuterium and Carbon. 56-5-7/[illegible]

[illegible]

ASSOCIATION: Physics Institute im. P.N. Lebedev of AN USSR (Fizicheskiy institut imeni P.N. Lebedeva Akademii nauk SSSR)

SUBMITTED: May 26, 1957

AVAILABLE: Library of Congress

Card 2/2

means of special photo-emulsions, which had been produced in N. A. Perfilov's laboratory and which, while being highly sensitive, were, at the same time, finely grained. The lecture aroused much interest and many problems, in particular concerning the properties of photo-emulsions, were raised. V. I. Gol'danskiy gave a report on the work carried out 1950-1951 by A. Ye. Ignatenko, A. I. Mukhin, V. S. Pen'kina, V. A. Shkoda-Ul'yanov and V. I. Gol'danskiy on the synchrocyclotron which now belongs to the United Institute for Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy). In the course of this work the authors investigated the emission of secondary neutrons (with energies of up to ~ 15 - 20 MeV) from four different nuclei - from beryllium to lead - under the action of primary neutrons with the average energy of ~ 120 MeV and ~ 300 MeV. Also this lecture raised several problems. Perfilov and Gol'danskiy then repeated their lectures in the seminars for radiation research in Berkeley and in the National Laboratory in Brookhaven. Besides, Gol'danskiy gave a report in this seminar on the results obtained by the work performed by P. S. Baranov, V. S. Roganov and Gol'danskiy concerning the investigation of photo-neutrons by means of the synchrotron of the Physical Institute of the AN. All these reports will be published in the

The Trip Undertaken by the Delegation of the AN USSR to the USA, in Order to Take Part in the Gordon Conference on Nuclear Chemistry. 53-4-11/11

sity at Palo Alto, after which they returned to Berkeley. In the course of the next three days a visit was paid to the Yosemitne National Park, and on July 7 they flew to Chicago. At the Enrico Fermi Institute for Nuclear Research they displayed interest in particular for work connected with the physics of elementary particles. On the following day a visit was paid to the Argonne National Laboratory. A report on this visit and what the two scientists were shown is given. The two Soviet scientists spent the next two days with sight-seeing in New York, and two further days were spent in visiting the Brookhaven National Laboratory. On July 12 they travelled by plane to Paris, where they visited the Radium Institute and the Nuclear- and Acceleration Center at Orsay. On July 13 they returned by plane to Moscow. In conclusion, the author gives a summary of the impressions he received during his stay in America. There is 1 Slavic reference.

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Card 4/4

The Dependence of the Cross Section of the Photoproduction of Neutral Pions on the Atomic Weight of Nuclei (Russian)

is then obtained. Such a dependence $\sigma_{\pi^0} = f(A)$ can be explained qualitatively by the fact that the mesons are produced in the entire volume of the nucleus but are then subjected to re-absorption. Therefore only a part of the thus produced mesons is emitted from the nucleus. For a quantitative investigation of the problem of re-absorption of mesons, however, three hitherto neglected circumstances have to be taken into account: 1) The yield of photoproduction of neutral pions in the energy interval considered here is several times greater than the yield of neutral pions (? perhaps better described as; charged pions ?). 2) The probability of the scattering of mesons by nucleons is greater than the probability of a re-charge. 3) The cross sections of the reactions $\pi^- + p \rightarrow \pi^0 + n$ and $\pi^+ + n \rightarrow \pi^0 + p$ are in the case of small meson energies considerably greater than the cross sections of the inverse process.

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

Card 2/2

YEMEL'YANOV, V.S., otv.red.; BARDIN, I.P., red.; VINOGRADOV, A.P., red.; GOL'DANSKIY, V.I., red.; GULYAKIN, I.V., red.; DOLIN, P.I., red.; YEFREMOV, D.V., red.; KRASIN, A.K., red.; LEBEDINSKIY, A.V., red.; MINTS, A.L., red.; MURIN, A.N., red.; NIZE, V.E., red.; NOVIKOV, I.I., red.; SEMENOV, V.F., red.; SOBOLEV, I.N., red.; BAKHAROVSKIY, G.Ya.; nauchnyy red.; BERKOVICH, D.M., nauchnyy red.; DANOVSKIY, N.F., nauchnyy red.; DELONE, N.N., nauchnyy red.; KON, M.A., nauchnyy red.; KOPYLOV, V.N., nauchnyy red.; MANDEL'TSVAYG, Yu.B.; MILOVIDOV, B.M., nauchnyy red.; MOSTOVENKO, N.P., nauchnyy red.; MURINOV, P.A., nauchnyy red.; POLYAKOV, I.A., nauchnyy red.; PREOBRAZHENSKAYA, Z.P., nauchnyy red.; RABINOVICH, A.M., nauchnyy red.; SIMKIN, S.M., nauchnyy red.; SKVORTSOV, I.M., nauchnyy red.; SYSOYEV, P.V., nauchnyy red.; SHORIN, N.A., nauchnyy red.; SHREYBERG, G.L., nauchnyy red.; SHTEYNMAN, R.Ya., nauchnyy red.; KOSTI, S.D., tekhn.red.

[Concise atomic energy encyclopedia] Kratkaia entsiklopediia "Atomnaia energiia." [___Tables of isotopes (according to published data available at the beginning of 1958)] ___Tablitsa izotopov (po dannym, opublikovannym k nachalu 1958. 12 p. Gos. nauch. izd-vo "Bol'shaia sovetskaia entsiklopediia," 1958. 610 p. (MIRA 12:1)

1. Sotrudniki Bol'shoy Sovetskoy Entsiklopedii (for Bakharovskiy, Berkovich, Danovskiy, Delone, Kon, Kopylov, Mandel'tsvayg, Milovidov, Mostovenko, Murinov, Polyakov, Preobrazhenskaya, Rabinovich, Simkin, Skvortsov, Sysoyev, Shorin, Shreyberg, Shteynman).
(Atomic energy)

BARANOV, P. S., GOLDANSKIY, V. I. and ROGANOV, V. S.

"High-Energy Neutron Dosimeter."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, 1 - 13 Sept 58.

AUTHOR: Gol'danskiy, V.I., Professor 25-58-3-36/41

TITLE: Is There a Limit to the Number of Chemical Elements? (Yest' li predel chisla khimicheskikh elementov?)

PERIODICAL: Nauka i Zhizn', 1958, Nr 3, p 76 (USSR)

ABSTRACT: At the request made by a reader of this periodical, the author gives a detailed answer to the question concerning a limit to the number of chemical elements. The names of such Soviet scientists as D.I. Mendeleyev, G.N. Flerov, and K. A. Petrzhak.

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Card 1/1 1. Chemical elements-Abundance

GOLDANSKIY, V. I.
P. N. Lebedev Physical Institute of the USSR Academy of Sciences, Moscow

"A Tentative Unified Classification of Elementary Particles, Including Leptons," Nuclear Physics, Vol. 5, pp. 531-539, 1958 (North Holland Publishing Co., Amsterdam)

Abstract: A unified classification of all families of elementary particles, that is of baryons, Bose mesons and light fermions (leptons: μ, ν, e) is proposed.

The classification is based on extension of the isobaric multiplet principle to leptons. One of the corollaries of the scheme is that the six leptons known at present are the only ones that may exist. In weak interactions leading to the production of leptons the change of the 3-projection of the isobaric spin is $\Delta T_3 = \pm \frac{1}{2}$. When viewed from this angle the values of the ΔT_3 in various ways of hyperon β-decay indicate that many different modes of decay are possible, excepting a few cases that are specially mentioned.

The selection rules for T_3 are not sufficient to explain the absence of weak interactions involving formation of various electrically neutral lepton pairs. The absence of such interactions can be explained by introducing for leptons a certain Number $N = Q - l/2m$ (Q = electric charge, m = neutrino charge) and postulating the selection rule $\Delta N = 1$ for weak interactions involving lepton production.

5(0),24(0)

AUTHOR: Gol'danskiy, V. I., Professor SOV/30-59-1-6/57

TITLE: The Tenth Transuranium (O desyatom zaurranovom elemente)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 1, pp 52-58 (USSR)

ABSTRACT: In the present article, the author describes the investigations for obtaining the tenth transuranium. On July 9, 1957, an international group of English, Swedish, and American scientists, who carried out their investigations in Stockholm, declared that they had succeeded in discovering the new element which was designated as nobelium (No). But later this proved to be untrue, and was mentioned by the participants of the group in a publication (Ref 1). Further investigations for obtaining various isotopes of element Nr 102 and determining their properties were carried on in the USSR and in the USA. Soviet investigations for the synthesis of element Nr 102 were taken up in autumn 1957 with the 150 cm cyclotron of the Institut atomnoy energii Akademii nauk SSSR (Institute of Atomic Energy, Academy of Sciences, USSR). Under the direction of G. N. Flerov, Corresponding Member, Academy of Sciences, USSR, the following physicists and chemists took part: S. M. Polikanov, A. S. Karamyan, A. S. Pasyuk,

Card 1/2

GOLDANSKIY, V I.

19

(γ,p) reactions leading to nuclei in the ground state. V. I. Goldanskii. *Acta Phys. Acad. Sci. Hung.* 9, 177-84 (1958)(in Russian).—G. ests. the contribution of individual energy levels to photonuclear (γ,p) reactions of B^{10}, C^{12}, N^{14}, O^{16}, and S^{32} (Paul, *et al.*, *C.A.* 49, 15540*i*). The max. cross sections for these reactions are exceeded by a large factor (about 10) under resonance conditions. A. Kremheller

3

1-25

2

SU

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Distr: 4E3d/4E3c

21(1) 307 32?2

Gol'danskiy, Vitaliy Iosifovich.

V mire elementarnykh chastits (In the World of Elementary Particles) Moscow, Izd-vo "Znaniye," 1959. 61 p. (Series: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy. Seriya IX, 1959, no. 26) 35,000 copies printed.

Sponsoring Agency: Vsesoyuznoye Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy.

Ed.: I.B. Faynboym; Tech. Ed.: L.Ye. Atroshchenko.

PURPOSE This book is intended for the general public and may facilitate the orientation of students in theories, concepts, techniques and the state of modern research in the study of elementary particles.

COVERAGE: The booklet gives a historical review of world-wide research into the nature of elementary particles and treats of many facets of elementary particle study, e. g. decay schemes of elementary particles; the production of particle-antiparticle, positron-e[illegible] and neutrino-anti-neutrino pairs;

Card 1/

2(7) PHASE I BOOK EXPLOITATION SOV/3108

Baldin, Aleksandr Mikhaylovich, Vitaliy Iosifovich Gol'danskiy, and Iosif Leonidovich Rozental'

Kinematika yadernykh reaktsiy (Kinematics of Nuclear Reactions) Moscow, Fizmatgiz, 1959. 296 p. 8,000 copies printed.

Ed.: Ye. Ye. Zhabotinskiy; Tech. Ed.: S. S. Gavrilov.

PURPOSE: This book is intended for physicists exploring the atomic nucleus and elementary particles.

COVERAGE: The book consists of two parts. The first part describes characteristics of motion with relativistic velocities giving relativistic transformations and utilizing two main coordinate systems. It also describes the classical kinematics of interactions producing two or more particles, as well as cases of nonrelativistic interactions and conversions with the participation of photons. The second part analyzes the scattering matrix and on the basis of the latter and the Dirac theory introduces Clebsch-Gordan, Racah, Z, and X coefficients in vector addition. It also analyzes the emergence of polarized particles in nuclear reactions and the regularities of this emergence. In general the book describes one of the chief methods of processing experimental data in modern nuclear physics and

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6) PHASE I BOOK EXPLOITATION SOV/2713

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; polucheniye i primeneniye izotopov (Reports of Soviet Scientists: Production and Application of Isotopes) Moscow, Atomizdat, 1959. [illegible] p. (Series: Its: Trudy, vol. 6) [illegible] copies printed.

Eds. (Title page): G.V. Kurdyumov, Academician, and I.I. Novikov, Corresponding Member, USSR Academy of Sciences; Ed. (Inside book): [illegible] Tech. Ed.: Z.D. Andreyenko.

PURPOSE: This book is intended for scientists, engineers, physicians, and biologists engaged in the production and application of atomic energy for peaceful uses; for professors and graduate and undergraduate students of higher technical schools where nuclear science is [illegible] and for the general public interested in atomic science and technology.

COVERAGE: This is volume 6 of a [illegible]-volume set of reports delivered by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy held in Geneva from September 1 to 13, [illegible] contains [illegible] reports on: [illegible] modern methods for the production of [illegible] active isotopes and their labeled compounds, [illegible] with the aid of isotopes in the field of [illegible] building, and agriculture, and [illegible] 6 was edited by: [illegible] Prusakov, Candidate of Chemical Sciences; and [illegible] Medical Sciences. See [illegible] for titles of volumes of the set. References appear at the end of the articles.

21(1) [illegible] 050

Gol[illegible] Kutsenko and [illegible]

Statistika [illegible] pri registratsii [illegible] (Statistics of [illegible] in Recording of Nuclear Particles) Moscow, Fizmatgiz, [illegible] p. [illegible] copies printed.

Ed.: B. L. [illegible] Tech. Ed.: [illegible]

PURPOSE: This book is intended for research [illegible] in nuclear physics and elementary particles.

COVERAGE: The authors examine statistical problems in the recording of separate particles. The problems [illegible] based predominantly on discrete (Poisson and binomial) distributions. They also engage in [illegible] analysis of problems relating to [illegible] observation of radioactive [illegible] disintegration, statistics of readings in scaling and coincidence circuits, as well as in [illegible] with lead time. No personalities are mentioned. References accompany each chapter.

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GOL'DANSKIY, V., doktor fiz.-mat.nauk

Cherenkov-Vavilov radiation. IUn.tekh. 3 no.2:37-40 F '59.
(MIRA 12:1)
(Cherenkov radiation)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

BOL'DANSKIY, V.I.

21 (0), 24 (0)

AUTHOR: Tyagunov, G. A. SOV/89-7-2-18/24

TITLE: Scientific Conference of the MIFI (Nauchnaya konferentsiya MIFI)

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 2, pp 176-177 (USSR)

ABSTRACT: The yearly scientific meeting was held from [illegible] April to 15 May 1959 in the Moskovskiy inzhenerno-fizicheskiy institut (Moscow Physical Engineering Institute). More than [illegible] scientists from 100 different institutes attended the [illegible] conferences. A total of 148 lectures were held. The following lectures are specially mentioned: [illegible] on the thermo-nuclear examination [illegible] on the physical foundations of molecular generators and amplifiers, A. I. Leypunskiy on the construction of a fast reactor, [illegible] on the theory of the peripheral collision of [illegible] and nucleons, A. B. Migdal on superfluidity and moment of inertia of the nuclei, [illegible] electromagnetic gravity wave, V. I. [illegible] which are excited within the nucleus shell and methods of [illegible] Bogdanov and L. A. [illegible] on the analysis of the possible experiments for the determination of the measurements of the μ-mesons, V. I. [illegible] on the spectrum of [illegible] and crystalline hydrogen under pressure [illegible] and an instrument for measuring the absorption curves, [illegible] Lyapidevskiy and G. V. [illegible] of the diffusion chamber, [illegible] for linear electron acceleration [illegible] Ryazin, [illegible] and [illegible] electron capture under betatron conditions of the acceleration Ye. G. [illegible] on optimum wave length for [illegible] generator, [illegible] and [illegible] on magnetic [illegible] electron accelerator, [illegible] Zorin, [illegible] on the [illegible] of the [illegible] and V. V. [illegible], [illegible] and [illegible] Chernukov on examination of the electron [illegible] in the system of the electron with consideration of the scattering field, [illegible] Krayev on impulse method for measuring the heat [illegible] capacity of liquids and the theory of this method, [illegible] Dubshinshteyn, [illegible] to the eutectic [illegible] flows in a [illegible] Petrovichev on heat transfer [illegible] Royzin on special conditions when [illegible]

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the impulse technique, [illegible] construction of an impulse [illegible] semi-conductor elements, [illegible] judge the characteristics [illegible] N. I. Kalinin on the [illegible] computer, [illegible] technological [illegible] systems with high physical energy [illegible] started, [illegible] a reactor control [illegible] linearity, [illegible] of the isotope method of defining [illegible] of the metal [illegible] examination of the [illegible] and other elements in [illegible] radiography, [illegible] heat of [illegible] and G. N. Fedorov and [illegible] on determination of the diffusion coefficient of [illegible] nickel steel. The literature [illegible] these lectures will be published by the MIFI [illegible]

Card 3/3

24 (5)

AUTHORS: Gol'danskiy, V. I., Smorodinskiy, Ya. A. SOV/56-36-6-60/66

TITLE: Singularities of the S-Matrix and the ρ^0-Meson (Osobennosti S-matritsy i ρ^0-mezon)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1950 - 1951 (USSR)

ABSTRACT: In the introduction the authors discuss the possibilities of detecting the existence of a second neutral meson (ρ^0) with T = 0 and strangeness, and also discuss methods which have already been suggested (Refs 1-6). In the following, the π p scattering reaction at $E_\pi > 270$ MeV is investigated; the scattering cross section is assumed to have two kinds of singularities: a) singularities connected with the "isobaric" state, e.g. $\pi^+ + p \rightarrow$ "isobars" (T = 3/2, I = 3/2); the S-matrix has a pole in the complex plane, the cross section curve has the known resonance shape; b) the production threshold of a new particle e.g. $\pi^- + p \rightarrow \rho^0 + n$; (occurrence of a branching point on the material axis). In this case, which is further investi-

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gated, three kinds of discontinuities occur: "steps", "dips", and "peaks". The latter have a smaller width (order of magnitude 10 - 20 Mev) and a small probability, so that the observed maxima with T = 1/2 at pion energies of 680 - 940 Mev (according to D. Frish) were connected with a ρ^0-production (ρ_0-mass 1200 and 1520 m_e). Another possibility of distinguishing between resonance- and threshold singularities is based on a comparison between interactions in systems with different isotopic spin but with the same energies. An investigation of the magnitude of singularity makes it possible to estimate the upper limit of the possible production cross section of the ρ^0-meson. The following holds:

$$2\left(\frac{\delta\sigma(\mathcal{E})}{\sigma(\mathcal{E})}\right)^2 = \left(\frac{\sigma(E_0+\mathcal{E})-\sigma_{thresh}}{\sigma_{thresh}}\right)^2 + \left(\frac{\sigma(E_0-\mathcal{E})-\sigma_{thresh}}{\sigma_{thresh}}\right)^2$$

E = threshold energy, σ = elastic cross section. It further holds that $\delta\sigma(\mathcal{E})/\sigma(\mathcal{E}) = (k/4\pi)\sigma_\rho(\mathcal{E})/\sqrt{\sigma(\mathcal{E})}$; k is the pion wave vector, σ_ρ the production cross section of the ρ^0-meson at a

pion energy of $E + \varepsilon$. These deliberations were made except by the authors of this paper also by Pontekorvo et al (Ref 7). There are 7 references, 5 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR). Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: April 4, 1959

21(7)

AUTHORS: Belousov, A. S., [illegible], Gol'danskiy, V. I. SOV/56-36-1-33/62

TITLE: A [illegible] of the Dependence of the Cross Section of the π [illegible] Upon the Number of [illegible] (...zavisimosti secheniy fotorozhdeniya π-mezonov na slozhnykh yadrakh ot chisla nuklonov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 1, pp 244-248 (USSR)

ABSTRACT: In the present report the attempt is made to take into account the influence exercised by the simultaneous absorption of mesons by two nucleons at the moment of their production upon the dependence upon A of the cross section σ_{π} of neutral pion production [illegible]. First, this dependence is investigated for a [illegible] wave function and for the case of uniform thickness of [illegible] in the nucleus. It is assumed to be necessary and sufficient for the reabsorption of a meson [illegible] a two-nucleon [illegible] at a distance of $r \leqslant l = \hbar/\mu c$. For the nucleon pair the wave function of

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A Generalized Form of the Dependence of the Cross [illegible] SOV/56-36-1-33/62
Section of the π [illegible] Complex
Nuclei Upon the [illegible]

Chu and Goldberger is used: $\psi(\ldots) = [\ldots \hbar/\pi \ldots \alpha \ldots \hbar \ldots + p^{2}]$, where $\hbar^2\alpha^2$, [illegible] the mass of the nucleon. A [illegible] the dependence [illegible] occurring [illegible] in the [illegible] layer having the [illegible] with the mass number A of the nucleus. In addition [illegible] of mesons at the moment of their production, also the influence exercised by the following [illegible] in the nucleus must be taken into account. The third chapter of this paper deals with the dependence of [illegible] σ_{π} [illegible] A for Fermi's distribution of nucleon density in the nucleus. Consideration of the various forms of nucleon density distribution in the nucleus would complicate all calculations considerably. The authors therefore endeavored to take the distribution of nucleon density into account in a purely phenomenological manner without any presuppositions as to the concrete form of the two-nucleon wave function. By assuming a certain character of nucleon density [illegible] and a certain

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CIA-RDP86-00513R000515610016-6"

A Generalized Form of the Dependence of the Cross Section of the π-Meson Photoproduction on Complex Nuclei Upon the Number of Nucleons

SOV/56-36-1-35/62

probability of the absorption of the meson at the instant of its production by this density, it is possible to determine the dependence of the cross section σ_{π^0} on A. This dependence

contains the parameter f_0, i. e. the probability of the

production of a meson in the center of the nucleus without two-nucleon absorption. Next, an expression is derived for the probability of the photoproduction of a meson, averaged over the entire nucleus. Also in the formula it is necessary to introduce factors by which the usual meson reabsorption is taken into account. The values of f_0 corresponding to the

experiment and the form of the dependence $\sigma_{\pi^0} = f(A)$ agree

with the values obtained in the second part of this paper. In conclusion, an expression is given for the production of fast proton pairs due to the reabsorption of positive pions. The authors thank Ye. M. Leykin for discussing their work. There are 3 figures and 9 references, 5 of which are Soviet.

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A Generalized Form of the Dependence of the Cross Section of the π^- Meson Photoproduction on Complex Nuclei Upon the Number of Nucleons

307/56-36-1-33/62

ASSOCIATION: Fizicheskiy Institut im. P. N. Lebedeva Akademii Nauk SSSR (Physics Institute Imeni P. N. Lebedev of the Academy of Sciences, USSR)

SUBMITTED: July 10, 1959

Card 4/4

21 (8)

AUTHORS: Gol'danskiy, V. I., Podgoretskiy, M. I. SOV/56-37-1-56/64

TITLE: A Possible Way of Identifying New Transuran Elements (Vozmozhnyy sposob identifikatsii novykh transuranovykh elementov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 1, pp 315 - 317 (USSR)

ABSTRACT: In the present "Letter to the Editor" a simple way of determining the genetic connection between the mother-isotope A and the long-lived daughter-isotope B is described. This method is based upon measuring the periods of time between two adjoining decays of B and B (τ_{BB}), and between adjoining decays of A and B (τ_{AB}); $\overline{\tau}_{AB} < \overline{\tau}_{BB}$. If n is assumed to be the average frequency of the decays of B, τ - the radioactive decay constant B, and ε the degree of efficiency of the recording of the decays of B; and if, further, (M + 1) decays of B (i.e. M intervals BB) at N decays of A (N intervals AB) are observed, it holds for the case of an uninterrupted observation of decays of A and B that: $\varkappa = (\overline{\tau}_{BB} - \overline{\tau}_{AB})/\overline{\tau}_{AB} = \varepsilon\lambda\left[\varepsilon n + (1 - \varepsilon)\lambda\right]$; $\varkappa$ characterizes the connection between the decays of A and B and is called correla-

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tion coefficient. If the decay of B is quite independent of the decay of B, then $\varkappa = 0$ ($\lambda/n \to 0$), with $g = 1$, it holds that $\varkappa = \lambda/n$. The absolute error committed in determining $\varkappa$ is obtained according to the formula

$$\Delta\varkappa \approx \frac{gn+\lambda}{gn+(1-g)\lambda}\left[\frac{1}{M}+\frac{1}{N}\left\{1-\frac{g\lambda(g\lambda+2gn}{(gn+\lambda)^2}\right\}\right]^{1/2}$$

With $g = 1$ the above is simplified to the approximation formula $\Delta\varkappa \approx \left[(1+\varkappa)^2/M+1/N\right]^{1/2}$. In conclusion, a simple numerical example is given.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR). Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: April 10, 1959

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

GOLDANSKII, V. I.

"On the Direct Neutron Exchange Interaction of Complex Nuclei Leading to Possible Large Changes of the Nuclear Spin"

Nuclear Physics, v. 19, no. 3, Jan. 1960, [illegible] (North-Holland Publishing Co., Amsterdam)

Abstract: It is shown that it may be possible to observe a process of direct interaction of complex nuclei in which these nuclei, being on the outer boundary of the Coulomb potential barrier, exchange neutrons. If the neutrons in the outer shells have large momenta, their exchange may result in a large change of the spins of the interacting nuclei and in the excitation of otherwise inaccessible levels corresponding to all possible values of the nuclear spin and its projection for different arrangements of a given number of neutrons in the outer shell.
The exponent characterizing the probability of the process under consideration is estimated according to a method proposed by L. D. Landau) and applied to some other problems by I. M. Lifshitz).

P. N. Lebedev Physical Institute, USSR Academy of Sciences, Moscow

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

24(5),21(0)
AUTHOR: Gol'danskiy, V. I.

SOV/56-36-2-27/63

TITLE: On the Direct Neutron Exchange Interaction of Complex Nuclei (O pryamom neytronnom obmene vzaimodeystvii slozhnykh yader)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 2, pp 536-538 (USSR)

ABSTRACT: In the present paper the author shows that it should be possible to observe the process of direct interaction between complex nuclei in which the nuclei exchange neutrons are located on the external surface of the Coulomb (Kulon) potential barrier. By direct neutron exchange we understand an exchange that does not lead to the formation of an intermediate nucleus. The following two processes would be possible:

$$_8O^{18}_{10}\ (0^+) + {}_{10}Ne^{20}_{10}\ (0^+) \longrightarrow {}_8O^{18}_{10}\ (0,2,4^+) + {}_{10}Ne^{20*}_{10}\ (0,2,4^+)$$ (exchange of neutrons of the $s_{1/2}$-shell)

$$_{36}Kr^{84}_{18}\ (0^+) + {}_{36}Kr^{84}_{18}\ (0^+) \longrightarrow {}_{36}Kr^{84*}_{18}\ (0,2,4,6,8^+) + {}_{36}Kr^{84*}_{18}\ (0,2,4,6,8^+)$$ (exchange of neutrons of the $g_{9/2}$-shell)

In the case of great neutron moments in the external shells

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

On the Direct Neutron Exchange Interaction of Complex Nuclei

SOV/56-36-2-27/63

such an exchange leads to considerable variations of the spins of the interacting nuclei, i.e. to the excitation of levels that are far removed from the ground state with respect to the amount of the moments, which are, however, only weakly excited ($\lesssim$ Mev), i.e. levels which could not be attained by means of other processes. The author investigates the probability of the discussed process. Methods for this purpose have already been suggested by L. D. Landau(Ref 1) and Ye. M. Lifshits (Refs 3,5). By neglecting the same items as in reference 4 the author obtains the following for the approximative probability of a direct neutron exchange process:

$$\Phi = \exp\left\{ 2\sqrt{2}\, Z_1 Z_2 e^2 \sqrt{m}\left(\sqrt{J_1} + \sqrt{J_2}\right)/\hbar E_0 \right\}$$

where the neutron mass m is assumed to be small as against the masses of the nuclei ($m \ll M_i$, $i = 1,2$), and for the energy of the relative motion of the nuclei one assumes $E_0 \gg J_1 m/M_1$. where J_1 and J_2 denote the binding energy in the nuclei 1 and 2 respectively

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

On the Direct Neutron Exchange Interaction of Complex Nuclei

SOV/56-36-2-27/63

This formula is discussed, and by a use of the result obtained by reference 3 as well as of experimental investigations (Refs 5-8) the value of the exponential factor k characterizing the probability of a neutron exchange process is estimated. ($\lg k = \lg \sigma_{(mb)} + \alpha/2.3E_{n\ lab}$). The results obtained by investigating the dependence of neutron transfer cross sections of various nuclei by means of nitrogen nuclei upon the energy of the latter are shown by a figure. The process between nitrogen ($Z_1 = 7$, $J = 10.55$ Mev, $E_b = \left\{14/(14 + A_2)\right\} E_{n\ lab}$) and Be^9, Na^{23}, Al^{27}, and some magnesium isotopes was investigated. For k one obtains: 0.2-0.4 b for Be, C, O and 10-100 b for Na, Mg, and Al. The direct neutron exchange interaction cross section is of the order 10^{-30} - 10^{-29} cm^2
The author finally thanks A. S. Kompaneyets and Ye. M. Lifshits for their valuable advice There are 1 figure and 9 references, 3 of which are Soviet.

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

On the Direct Neutron Exchange Interaction of Complex Nuclei SOV/56-36-2-27/63

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

SUBMITTED: July 24, 1958

Card 4/4

21(7)

AUTHORS: Vasil'kov, R. G., Govorkov, B. B., Gol'danskiy, V. I.

SOV/56-37-1-2/64

TITLE: The Photoproduction of Neutral π-Mesons on Hydrogen at Energies of γ-Quanta From Threshold to 240 Mev (Fotorozhdeniye neytral'nykh π-mezonov na vodorode pri energiyakh γ-kvantov ot poroga do 240 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 1, pp 11-22 (USSR)

ABSTRACT: The authors describe investigations of the angular distribution and the energy dependence of the reaction (1): $\gamma + p \rightarrow \pi^0 + p$ for E_γ between the threshold of the photoproduction (145 Mev) of the neutral pions and 240 Mev; the angular distribution at energies near threshold (asymmetric because of interference between S- and P-wave) is described by the formula $d\sigma/d\Omega = A + B\cos\theta + C\cos^2\theta$; the coefficients A, B, and C correspond to the contributions of the E1-, M1-, and E2-absorption of γ-quanta. The energy dependence of A, B, and C near the threshold of pion-photoproduction is investigated. Experiments were carried out on the synchrotron of the

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The Photoproduction of Neutral π-Mesons on Hydrogen SOV/56-37-1-2/64
at Energies of γ-Quanta From Threshold to 240 Mev

FIAN (265 Mev); Figure 1 gives a schematical representation of the experimental arrangement. The first of the five discussed possibilities of observing pion-photoproduction (i.e. recording of the single γ-quanta of π^0-decay) is selected. Recording is carried out by means of two telescopes (90 and 135° or 45 and 90°) consisting of 4 scintillation counters. Measurements were carried out for seven values of the maximum energy of bremsstrahlung in the channels: 130, 150, 170, 190, 210, 230, and 250 Mev. The examination results are shown by diagrams and tables. Figure 2 shows the energy dependence of the γ-quanta originating from π^0-decay for the angles 45, 90, and 135° in the laboratory system (exponential increase of the γ-yield with increasing energy); figure 3 shows the dependence of the coefficients a, b, c, of formula (3) $N(\theta_\gamma) = a(\theta_\gamma)A + b(\theta_\gamma)B + c(\theta_\gamma)C$ upon E_γ, and in table 1 the values of A, B, C, and σ_{tot} are given for E_γ = 160, 180, 200, 220, and 240 Mev. Thus the following was measured for 240 Mev: A = 8.4±0.2, B = 0.9±0.2, C = 6.0±0.6 (10^{-30}cm^2/steradian) and $\sigma_{tot} = (8.1\pm0.3).10^{-29}$cm^2.

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Figure 4 shows A, B and C as functions of E_γ. For higher energies (of up to 450 Mev) the data were obtained from the papers of references 3 and 4. A has a maximum at about 320 Mev, C is entirely in the negative and has a minimum at the same place; B, at about 260 Mev, goes over from the negative to the positive. Figure 5 shows the energy dependence of the total cross sections of the π^0-mesons on protons (part of the data was obtained from references 2 and 4); the curve has a maximum at about 325 Mev; figure 6 shows the shape of the angular distribution of pions for E_γ between 160 and 450 Mev. In conclusion, the results obtained are discussed (comparison of the data relating to π^+- and π^0-photoproduction near threshold, phenomenological analysis - table 2 -, ratio B/A - figure 7, ratio C/A - figure 8; comparison of the results with those obtained by other authors); in an appendix the authors describe a kinematic treatment of the method of recording (1) according to the results obtained by investigating the individual decay proton. The authors finally thank V. V. Pavlovskaya, O. A. Karpukhin, A. V. Kutsenko, and I. A. Yerofeyev for

their assistance in carrying out experiments as well as for their advice and discussions. There are 9 figures, 2 tables, and 22 references, 4 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

SUBMITTED: January 23, 1959

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

24(0)

AUTHOR: Gol'danskiy, V. I.

TITLE: News Concerning the Element No.102 (Novoye ob elemente Nr 102)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol 67, Nr 1, pp 185 - 189 (USSR)

ABSTRACT: This element was produced and discovered on July 9, 1957 by a team of research workers (Sweden, America, England) by means of a cyclotron at Stockholm. It was called Nobelium. In the present paper the author reviews one Russian and two American papers. The Russian paper was published in "Doklady AN SSSR", 1958, Vol 120, p 73". In it G. N. Flerov, S. M. Polikanov, A. S. Khramyan, A. S. Pasyuk, D. M. Parfanovich, N. I. Tarantin, V. A. Karnaukhov, V. A. Druin, V. V. Volkov, A. M. Senchinova, Yu. Ts. Oganesyan, V. I. Khalizev, and G. I. Khlebnikov reported on a Nobelium synthesis carried out on the 150 cm cyclotron of the Institut atomnoy energii AN SSSR (Institute for Atomic Energy of the AS USSR) in 1957.

Card 1/1

AUTHOR: Gol'danskiy, V.I., Professor (Moscow) SOV/26-59-1-29/34

TITLE: New Work on the Synthesis of Element 102 (Novyye raboty po sintezu elementa 102)

PERIODICAL: Priroda, 1959, Nr 1, pp 118 - 121 (USSR)

ABSTRACT: The author gives a survey on international work on the synthesis of element 102. During 1958, the USA and USSR investigated methods of obtaining various isotopes of the new elements and to learn their properties. New methods were required for the identification of isotopes, the life of which does not exceed one second or only fractions of a second. Relevant Soviet research on the synthesis of element 102 was started with the 150-cm cyclotron of the Institut atomnoy energii AN SSSR (Atomic Energy Institute of the AS USSR) in autumn 1957 under the direction of G.N. Flerov. The plutonium isotopes Pu^{239} and Pu^{241} were exposed to oxygen ions having an energy of about 100 Mevs. A new method, a further development of the nuclear recoil method, was employed

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

to establish the life of isotopes of element 102 and the energy of the alpha particles emitted during the isotope formation (Graph 2). The pertinent test arrangement (simplified) is shown on fig. 1. Experiments by the Moscow research group in spring and summer 1958 on the half-life of a new isotope of element 102 showed that it is less than 10 min., a result that differed from results obtained in Stockholm by an international research team. Soviet results were presented in Copenhagen by S.M. Polikanov in Feb 58 and appeared in print later. There are two diagrams, 1 graph, and 5 references, 3 of which are Soviet and 2 English.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

5(4)

AUTHOR:

TITLE:

PERIODICAL

ABSTRACT:

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610016-6"

The Role of [illegible]
Chemical [illegible]

Card 2/4

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particles; $R = r_1 + r_2$ – the sum of the radii of the interacting particles to make sure the author investigated a bimolecular reaction); w(y) – the probability of the tunnel (the penetration of the activation barrier (y < [illegible]) or of the passing over that barrier (y > [illegible]). The course of the calculation is followed step by step. Allowing for a fact [illegible] of the amount [illegible] one may put w(y > [illegible]) = [illegible] and the velocity constant may be considered to be a sum of the usual Arrhenius constant and the constant of tunnel interaction. For a purely parabolic barrier the condition for a noticeable contribution made by the tunnel effect has the form $R > a$. For the characteristic temperature below which the tunnel effect plays a noticeable part it holds practically independent of the shape of the barrier that

T_q = [illegible] [illegible]. [illegible] expressions [illegible] be written down for the [illegible] interaction in the domain $T < T_1$ [illegible] the [illegible] parabolic barrier [illegible] in the case of [illegible] [illegible] constant [illegible] tunnel

The Role of the Tunnel Effect in the Elementary Act of Chemical Reactions at Low Temperatures

interaction for the two alternative energy shapes of the barriers are practically in agreement with experiment. Some theoretical data are given. There are 4 figures and 7 references, 6 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedev Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

PRESENTED: November 6, 1958, by V. N. Kondrat'yev, Academician

SUBMITTED: October [illegible], 1958

Card 4/4

5(4),24(5)
AUTHOR: Gol'danskiy, V. I. SOV/20-127-6-27/51

TITLE: The Temperature Dependence of the Rate of Inverse Spontaneous Predissociation Processes

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1242-1244 (USSR)

ABSTRACT: Concerning kinetics of chemical reactions not only quantum processes, basing on the tunneling effect, are to be considered but also such that are combined with the excitation of discrete energy levels. As an example there are the photochemical processes of the spontaneous predissociation:

$$(I)\ h\nu + AB \longrightarrow AB^{*} \begin{cases} \longrightarrow A + B\ (II) \\ \longrightarrow AB^{+} + e^{-}\ (III), \\ \longrightarrow C + D\ (IV) \end{cases}$$

Many kinds of photolysis proceed similar to this scheme, as for instance

$$h\nu + RCH_3CO \longrightarrow RCH_3CO^{*} \begin{cases} \longrightarrow R + CH_3CO \\ \longrightarrow RCH_3 + CO \end{cases}$$

. All processes of mutual transformation may proceed over the excited inter-

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mediate state AB^*, the inverse spontaneous predissociation with light irradiation of definite wave lengths as well as variations of the reconstruction of radicals or ions. In consequence of the mutual excitation the potential curves do not intersect anymore in one point but a predissociation gap is formed of the width Γ. Because of $\Gamma \ll kT$, the predissociation probability equals zero outside the gap. The reaction constant is derived for the process

$A + B \longrightarrow AB^* \longrightarrow C + D$:

$$Z_{AB}^{CD} = \frac{2\pi}{(\pi kT)^{3/2}} \sqrt{\frac{2}{\mu}} \sigma_i . \Gamma E_o e^{-E_o/kT}$$

(μ = reduced mass of AB, E_o = energy of AB^* level,

$\sigma_i = \sigma_o \frac{\Gamma_i}{\Gamma}$, σ_o being the geometric effective cross section and Γ_i the partial width for the given process). As shown by figure 2 a specific kind of dependence on temperature results.

Card 2/3 The reaction rate attains a maximum at the temperature $T_m = \frac{2}{3} \frac{E_o}{k}$.

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Within the range of $T < T_m$ the temperature coefficient is positive, while for $T > T_m$ the rate of reaction decreases rapidly. The luminescence of some chemical processes already observed at low temperatures is ascribed to such processes. It is suggested that the spectra of such luminescent processes be analyzed. The author thanks N. D. Sokolov and Ye. Ye. Nikitin for his judgment of the paper under review. There are 2 figures and 3 references, 2 of which are Soviet.

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PRESENTED: April 11, 1959, by V. N. Kondrat'yev, academician

SUBMITTED: March 23, 1959

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SOV/20-127-6-29/59

5(4), 24(5)
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TITLE: Tunnel Transitions Between Systems Which Are Described by Morse Potential Curves

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1037-1040 (USSR)

ABSTRACT: In reference 1 and in one of the author's earlier papers (Ref 2) the part played by the tunnel effect was investigated by basing on the assumption of a Maxwell distribution of the relative velocities of the reacting molecules. The tunnel effect is now investigated by basing upon the assumption of a quantum-like energy distribution. As a general example, the transition from the state described by a Morse-potential curve into such a state is chosen as is described by a second oppositely directed Morse curve (Fig 1). The conditions for the setting up of a barrage are deduced: $\alpha\left(\frac{R/2-r_0}{r_0}\right) = K$, $\ln 2$ ($\alpha = 2\pi\nu_0 r_0 \sqrt{\mu/2D}$, where ν_0 = eigenfrequency, r_0 = state of equilibrium = minimum of the potential energy of each of the two curves, μ = reduced mass of

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Tunnel Transitions Between Systems Which Are Described by Morse Potential Curves

the system, D = dissociation energy, R = $2r_0$ = distance between the minima of the two curves). The superposition of the second potential curve leads to a splitting up of the levels of the quantumlike energy distribution in the initial system. The probability of a tunnel transition is calculated. Whereas for the Maxwell distribution the three quantities: height (E_0), barrier, width of the barrier and the thermal energy were decisive for the tunnel transition, the natural oscillation energy ($h\nu_0$) must be added in the case of the quantumlike distribution of energy. Figure 4 is a graphical reproduction of the dependence of the moment of inertia on E/E_0 at different K, so that it becomes possible to use the equation (8) for the probability of tunnel transition. It is proved that the limit of the temperature range mentioned in reference 2, within which the tunnel effect plays a predominant part, holds also for the case of the quantumlike energy distribution. The author thanks D. G. Knorre and N. D. Sokolov for discussing the investigation. There are 4 figures and 3 references, 2 of which are Soviet.

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