PROKOSHKIN, Dmitriy Antonovich; VASIL'YEVA, Yelena Valentinovna; SAMARIN, A.M., otv. red.

[Niobium alloys] Splavy niobiia. Moskva, Izd-vo "Nauka," 1964. 330 p. (MIRA 17:4)

1. Chlen-korrespondent AN SSSR (for Samarin).

S/167/61/000/002/003/003
D224/D301

AUTHORS: Sharipkulov, R.S. and Prokoshkin, V.A.

TITLE: Mechanical and certain physico chemical properties of chromium-manganese steel

PERIODICAL: Akademiya nauk UzSSR. Seriya tekhnicheskikh nauk. Izvestiya, no. 2, 1961, 85 - 91

TEXT: The steels investigated contained less than 0.1 % C. 16 compositions of chrome-manganese steel free from other alloy elements were melted alongside the chromium-nickel steel X18H9T (Kh18N9T). The metal was forged into billets, 12 mm diameter, 14 x 14 mm^2, 20 x 20 mm^2, and it was also rolled into strip 45 x 5 mm^2. Short-term tests to fracture were carried out at temperatures of 20 and 600° on KRD-3-type specimens after soaking for one hour at 1100° and quenching in water, followed by tempering at 750° for 10 hours. The influence of temperature and time of soaking during tempering of quenched specimens on the formation of the σ-phase (intermetal-

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lic compound FeCr) was studied on steel X17 16 (Kh17G16) (16.74 % Cr, 16.3 % Mn, 0.14 % Ni, 0.29 % Si, 0.07 % C). The steels were also subjected to corrosion testing. Such tests were carried out in boiling 55 % nitric acid. The specimens, 30 x 20 x 2.5 mm^3, were first quenched from 1100° in water. 7 steels were tested for 4 cycles of 30 hours each, the remainder for 4 cycles of 25 hours each. It was found that a chromium-manganese steel having an austenitic structure approaches in its mechanical properties the steel Kh18N9T both at room temperature and at 600°, and in some cases is even superior. A steel containing up to 13 % Cr and up to 11 % Mn exhibits a superior U.T.S. owing to its austenite-martensite-type structure. Steels having an austenitic-ferritic structure have mechanical properties practically equivalent to those of steel Kh18N9T at 20° after quenching. Heating to 500-850° causes formation of the σ-phase which results in a drastic decrease in mechanical properties of these steels. Chromium-manganese steels containing 13 and 17 % Cr and 10 and 15 % Mn, respectively, are closest with respect to their resistance to nitric acid attack to steel Kh18N9T. There

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are 4 figures, 4 tables, and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: F.M. Becket: Am. Iron and Steel. Inst., 173-194, 1930.

ASSOCIATION: Institut metallurgii AN SSSR, Gornyi otdel AN UzSSR (Institute of Metallurgy AN SSSR, Department of Mining AN UzSSR)

SUBMITTED: May 16, 1960

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PROKOSHKIN, Yu. D.

4820
FORMATION OF NEUTRAL MESONS BY HIGH-ENERGY NUCLEONS. M. S. Kozodaev, A. A. Tyapkin, Yu. D. Bayukov, A. A. Markov, and Yu. D. Prokoshkin. (Inst. of Nuclear Problems). Izvest. Akad. Nauk S.S.S.R. Ser. Fiz. 19, 589-603(1955) Sept.-Oct. (In Russian)
A general review and corrective data for π^0 formation are presented. 30 references. (R.V.J.)

PROKOSHKIN, Yu. D.

USSR/ Physics - Pie-mesons

Card 1/1 Pub. 22 - 21, 60

Authors : Tyapkin, A. A.; Kozodaev, M. S.; and Prokoshkin, Yu. D.

Title : Formation of Π^0-mesons with protons of 670 Mev of energy at the nuclei of various elements

Periodical : Dok. AN SSSR 100/4, 689-692, Feb 1, 1955

Abstract : Experiments with the formation of Π^0-mesons through a proton collision with another proton are described. The protons in the experiments had an energy of 670 Mev. Formations of Π^0-mesons were observed on nuclei of various elements, namely: D, Li, Be, B, C, Al, C, Cd, Sn and Pb. The experiments were conducted with the acceleraton of the Institute of Nuclear Problems of the Acad. of Scs., USSR. Five references: 3 USA and 2 USSR (1952-1954). Graphs.

Institution : Acad. of Scs., USSR, Institute of Nuclear Problems

Presented by: Academician L. A. Artsimovich, December 22, 1954

PROKOSHKIN, Yu.D PROKOSHKIN, Yu. D.

CARD 1 / 2 PA - 1784

SUBJECT USSR / PHYSICS
AUTHOR PROKOŠKIN, JU.D.
TITLE The Relations between the Angular Distributions of Particles and their Decay Products.
PERIODICAL Žurn.eksp.i teor.fis, 31, fasc.4, 732-732 (1956)
Issued: 1 / 1957

In some cases no direct data are available concerning the character of the production- and interaction processes of these particles because of their short life. It is therefore necessary to content oneself with investigating the distribution of the secondary particles, i.e. of the decay of primary particles. For this purpose it is, however, necessary to know how the distribution functions of the primary and secondary particles are connected.
The present work investigates the practically important case in which the secondary particles move with the velocity of light and in which the angular distribution $W(\cos\vartheta, \varphi)$ of the primary particles does not depend on the azimuthal angle φ and can be represented by a linear combination of terms such as: $W_n = (1/2)(n+1)\cos^n\vartheta$ with integral n. The distribution $F(\cos\vartheta)$ of the secondary particles is an analogous linear combination and is also explicitly written down. With the help of these expressions it is possible to show that, in case of any even (odd) n the angular distribution $F_n(\cos\vartheta)$ is a polynomial which consists of even (odd) powers of the cosine. A common property of the functions F_n is their rapid modification in the immediate vicinity of the

Zurn.eksp.i teor.fis,31,fasc.4,732-732 (1956) CARD 2 / 2 PA - 1784

point $\beta = 1$. With diminishing β the anisotropy of angular distribution vanishes rapidly. Only in the case of $\beta \sim 1$ are the angular distributions of the primary and secondary particles similar to each other. The greater the power n the more rapidly will anisotropy vanish. Even in the case of very high values of β is the angular distribution of the secondary particles still nearly isotropic. A high measuring accuracy is then necessary in order to be able to determine the angular distribution of the primary particles. This applies e.g. in the case of investigations of the angular distribution of neutral pions in the vicinity of their production threshold.

Up to very high even values of the exponent n the radicals of the equation $F_n(\cos \vartheta) = 1/2$ are within a small angular range of about $\vartheta^* = \arccos(1/\sqrt{3})$. A consequency of this peculiarity of the functions F_n, which is of considerable practical importance, consists in the fact that the yield of secondary particles under the "isotropic" angle ϑ^* depends only little on the velocity of the primary particle. For $n = 2$ the yield does not depend on β at all. Therefore it is possible to obtain data on the total production cross section of neutral pions on the occasion of nucleon collisions. For this purpose it is necessary that the γ-quanta yield be measured only under one angle. The "isotropic" properties of the angular distributions of secondary particles shown here make it ponsiderably more easy to measure the energy dependence of the total cross sections.

INSTITUTION: Institute for Nuclear Problems of the Academy of Science in the USSR.

PROKOSHKIN, Yu.D.

"Investigation of Neutral Pion Production by 390-660 Mev Nucleons (Review), paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

PROKOSHKIN, Yu. D.

AUTHOR: Prokoshkin, Yu. D. and Tentyukova, G. N. 120-2-4/37

TITLE: Investigation of the energy spectrum of protons of the internal beam of a phasotron. (Issledovaniye Energeticheskogo Spektra Protonov Vnutrennego Puchka Fazotrona.)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, No.2, pp. 18 - 22 (USSR).

ABSTRACT: The amplitude of radial oscillations in cyclo- and phasotrons is considerable and the internal beams are therefore not monoenergetic. The mean energy spread for particles at the inner target of the phasotron may be of the order of tens of Mev and the theoretical evaluation of the particle energy spread can be obtained in a very rough approximation only. In experiments which use the internal beam, the accuracy is very low, owing to the absence of any date on the spectrum of bombarding particles. At energies at which the cross-sections for reactions change very rapidly (meson formation near the threshold etc.) measurements become impracticable if the energy spectrum is not known. A method is therefore needed which permits experimental determination of the energy spectrum of the internal beam. Such a method has been suggested by Prokoshkin (Ref. 1) and is discussed

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Investigation of the energy spectrum of protons of the internal . . . beam of a phasotron.

in the present article. The experimental arrangement permitting the measurement of energy particle distribution is shown schematically in Figure 1. It consists of a system of equally spaced vertical metal wires in the plane perpendicular to the direction of the beam. The beam particles, when accelerated, are displaced towards the target and energise the wires when passing through them. The process goes on until the particles leave the beam on reaching the target. The degree of activation of the wires (which are made very thin so as not to induce appreciable distortion in the beam) varies according to the distance from the target and depends on the value of the free radial particle oscillations a . The activation of the wires induced by the protons, assuming the active cross-section to be constant, (Refs. 2, 3, 4), is given by equation 3 where $\varphi(x,a,\overline{\Delta r})$ is the distribution function of the number of collisions of the particle with the wire for a given $\overline{\Delta r}$, $\overline{\Delta r}$ is the mean increase of the radius per revolution, x is the distance between the given wire and the target. F(a) is

Card 2/5 the function characterising the amplitude distribution

Investigation of the energy spectrum of protons of the internal beam of a phasotron.

of free radial oscillations of the particles, a is the amplitude of above oscillations. J(x) is the wire activity induced by the protons. Further transformation of the function F(a) into the energy spectrum $F(\Delta E_p)$, where E_p is the proton energy, presents no difficulties provided the topography of the magnetic field of the accelerator is known. The procedure of measurement of the particle energy spectrum is thus reduced to the experimental comparison of the activity induced in wires placed at various distances from the target, which is possible if the function $\varphi(x,a,\overline{\Delta r})$ of equation 3 is known. The collision distribution function is determined starting with the equation for the radial movement of the beam as given in equation 4, which can be reduced to a dimensionless equation 5. In the case of a phasotron ($\overline{\Delta r}$ very large) it can be assumed that particle trajectories are a family of trochoids. An expression is obtained for the collision distribution function (equation 7). Experiments were carried out at the phasotron of the Joint Institute of Nuclear Research. (Ob'edinennyi

 Institut Yadernykh Issledovanniy). The proton energy

Investigation of the energy spectrum of protons of the internal beam of a phasotron.

at the target was chosen to be 400, 550 and 650 MeV. The distance of the wire system from the centre of the accelerator was varied. The activity of the threads was measured, in standard geometry, by means of a group of proportional counters. The values for J(x) were found to be constant for the three values of protons energy (within the experimental error of 3%). A plot of J(x) vs. x is given in figure 5. The conditions for the validity of equation 3 are discussed, and the effect of the wire diameter and of the material on experimental results is also investigated. It is shown to be negligible. Finally, from equations 4 - 7 and from the obtained data on the activation J(x), the energy distribution and the distribution of amplitudes of the free radial vibrations of the particles are evaluated for the internal proton beam and are plotted in figure 7 for the following values of parameters: $\overline{\Delta r} = 2 \times 10^{-3}$ cm ; $n = 0.05 \div .1$

(n is the mean number of collisions of particles having amplitude a). The mean proton energy spread obtained was

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Investigation of the energy spectrum of protons of the internal beam of a phasotron.

$\overline{\Delta E}_p$ = (12 ± 3)MeV. A diagram of the experimental arrangement and six graphs of theoretical and experimental results are given. The work has been discussed with V. I. Danilov, V. I. Kol'g, and A. A. Tyapkin. There are 4 references, 2 of which are Slavic.

SUBMITTED: October, 27, 1956.

ASSOCIATION: Joint Institute of Nuclear Research. (Ob"yedinennyy Institut Yadernykh Issledovaniy).

AVAILABLE: Library of Congress.

Card 5/5

PROKOSHKIN, Yu D

AUTHOR PROKOŠKIN, JU.D., TJAPKIN, A.A. PA - 2086

TITLE Investigation of the Excitation Functions for the Reactions $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)Na^{24}$, and $Al^{27}(p,3p\ 3n)Na^{22}$ in the 150 - 660 MeV Energy Range (Issledovanie funkcij vozbuždenija dlja reakcij $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)Na^{24}$ i $Al^{27}(p,3p\ 3n)Na^{22}$ v intervale energij 150 - 660 MeV).

PERIODICAL Zhurnal Eksperimental'noi i Teoret. Fiziki, 1957, Vol 32, Nr 1, pp 177 - 178 (U.S.S.R.)

Received 3/1957 Reviewed 4/1957

ABSTRACT The excitation function for the reaction $C^{12}(p,pn)C^{11}$ (1) was measured by R.AAMONT et al., Phys.Rev.88, 799 (1952), in the energy range from the threshold value to 340 MeV. Comparison of these results with those of L. M.S.SOROKO and B.V.GAVRILOVSKIJ (report of the Institute for Nuclear Problems 1952) indicated a rapid decrease of the cross sections in the 300 to 460 MeV energy range. But according to the measurements of the ratio of cross sections in the case of 290 - 660 MeV energies the cross section of the reaction (1) diminishes much more slowly in this energy interval: $\sigma(670)/\sigma(290) = 0,84 \pm 0,03$. The authors concluded from this that the real reason for this non-agreement is obviously a systematic error ($\sim 15\%$) committed on the occasion of the determination of the absolute cross section in the above mentioned previous works. Results of more recent works show better agreement. The cross sections found in the aforementioned previous works are obviously too high by 15 to 25%. Because of these unclearnesses the authors investigated reaction (1) in the 150 - 660 MeV energy interval. For this purpose a graphite target was installed in the chamber

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Investigation of the Excitation Functions for the Reactions $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)Na^{24}$, and $Al^{27}(p,3p\ 3n)Na^{22}$ in the 150-660 MeV Energy Range.

of the accelerator of the laboratory for nuclear problems. The proton flux passing through the target was determined by means of a gauge thermobattery. By means of a group of proportionality counters the relative activity of graphite targets was measured and a value of 20,8 ± 0,2 minutes was obtained for their half life. The following energy dependence of the cross section of reaction (1) was found (E_p - energy of the protons in the MeV, $\sigma' = \sigma(E_p)/\sigma(660)$ - relative cross section of the reaction).

E_p	150	260	290	350	450	560	660
$\sigma'(C^{11})$	1,49 + 0,06	1,23	1,19	1,16	1,03	0,98	1,00

In the case of E_p 260 to 660 MeV errors of ' are omitted for space saving purposes. These data are also illustrated in a diagram. The data found by the authors agree with other more recent data.

By means of the above method also excitation functions for the reactions $Al^{27}(p,3pn)Na^{24}$ (2) and $Al^{27}(p,3p\ 3n)Na^{22}$ (3) are determined. They are given in a table. The ratio between the cross sections of reactions (1) and (2) decreases monotonously with increasing energy. This is contradictory to the result found by G.CHACKETT, K.CHACKETT et al. according to which this ratio of cross sections decreases rapidly in the 200-500 MeV energy range. This is indicative (in contrast to the data of the present work) of the existence of a maximum of the cross section of reaction (2).

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Investigation of the Excitation Functions for the Reactions $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)Na^{24}$, and $Al^{27}(p,3p\ 3n)Na^{22}$ in the 150-660 MeV Energy Range.

ASSOCIATION United Institute for Nuclear Research.
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PROKOSHKIN, Yu.D.

USSR/Nuclear Physics - Elementary Particles. C-3

Abs Jour : Referat Zhur - Fizika, No 1, 1958, 358

Author : Prokoshkin, Yu.D., Tyapkin, A.A.

Inst : Joint Institute for Nuclear Research.

Title : Formation of π^0 Mesons in pp and pn Collisions in the Energy Range 390 -- 660 Mev.

Orig Pub : Zh. eksperim. i teor. fiziki, 1957, 32, No 4, 750-766

Abstract : Measurements were made of the total cross sections and angular distributions for the reactions of the formation of π^0-mesons in pp and pn collisions at various proton energies. The values of the total cross sections at 660 Mev were found to be $\sigma_{\pi^0} = (3.6 \pm 0.2)$ millibarns, and $\sigma_{pn}^{\pi^0}$ $(7.0 \pm 1.1)^{pp}$ milibarns. In the 390 -- 660 Mev, energy range, the total cross section of the reaction $p + p \rightarrow \pi^0 + p + p$ is proportional to the

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USSR/Nuclear Physics - Elementary Particles. C-3

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 358

maximum momentum of the π^0 meson, raised to the 5.5 power. The angular distribution of the π^0 mesons, which is essentially anisotropic at proton energies of 450 Mev, becomes isotropic as the energy increases to 660 Mev.

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05434
SOV/120-59-3-5/46

AUTHORS: Prokoshkin, Yu. D., and T'ang Hsiao-wei

TITLE: Measurement of the Energy of Electrons and Gamma Quanta With a low Efficiency Counter (Izmereniye energii elektronov i gamma-kvantov schetchikom s maloy effektivnost'yu)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 3, pp 32-34 (USSR)

ABSTRACT: Measurement of electron energies between 50 mev and a few Gev is very difficult and involves the use of large magnets and "total absorption" counters (Ref 1). The problem is even more difficult in the case of gamma rays. The instruments usually used are spectrometers which determine the energy distribution. However, it is often unnecessary to have this detailed knowledge of the energy spectrum and it is sufficient to have the mean energy. This is particularly useful when the form of the spectrum is known. The mean energy can be simply determined by the method now suggested. The passage of electrons and gamma rays through matter is accompanied by the production of showers. The cascade parameters describing these showers are uniquely connected with the

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Measurement of the Energy of Electrons and Gamma Quanta With a Low Efficiency Counter

energy of the primary particle incident on the absorber. It follows that the primary energy may be determined if one of the cascade curve parameters is measured. When the incident energy is greater than about 1 Gev the cascade curves can be computed in the usual way, eg. as in Ref 3, while for lower energies one can use either experimental data (Ref 4) or the Monte Carlo calculations due to Wilson (Ref 5). Fig 2 shows the number of electrons in a shower as a function of the primary electron energy for different depths in the absorber. As can be seen, there is a value of this depth t for which this dependence is linear to a high degree of accuracy. This means the primary energy may be determined by measuring the number of electrons in the shower at only one point. The requirement of linearity is introduced so that the mean energy can be directly calculated even in the case of a wide energy spectrum. The quantity n_{t_0} for various energies was measured by the apparatus shown schematically in Fig 3. A collimated

Measurement of the Energy of Electrons and Gamma Quanta With a low Efficiency Counter

beam of high energy gamma rays is incident on a 1 mm thick lead converter. The positrons formed in the converter are deflected by a magnetic field through 20° and pass through a counter telescope a, a lead collimator, and a counter array б. By changing the intensity of the magnetic field, the energy of the positrons could be varied between 50 and 500 Mev. The energy spread was 2 - 3%. The counter array б which was 15 x 15 cm^2 in size, was made up of identical halogen counters. When the particle passes through the telescope a, a high voltage pulse is produced and is applied to the cathode of the counter array. A lead absorber, having a thickness giving the linear curve mentioned above, is placed between the counters and the telescope and the counting rate is determined with and without this absorber. The ratio of the two counts gives the quantity n_{t_0} directly. The apparatus used in the case of gamma rays is shown in Fig 4. Here a thin (2 mm) lead converter is placed in front of the telescope a. Another counter, in anticoincidence with the telescope,

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Measurement of the Energy of Electrons and Gamma Quanta With a low Efficiency Counter

is placed in front of the converter. The quantity nt_0 is determined as above, ie by counting with and without the absorber. The difference between the two arrangements lies in the fact that in the absence of the absorber m electrons produced in the converter pass through the counter array, and not just one. Fig 5 shows that the dependence of nt on the gamma ray energy is quite linear in a wide energy range. There are 5 figures, 2 tables and 8 references, 4 of which are Soviet, 1 Chinese and 3 English.

ASSOCIATION: Ob"yedinennyy Institut yadernykh issledovaniy (Joint Institute for Nuclear Studies)

SUBMITTED: March 28, 1958

Card 4/4

21(9) SOV/89-7-3-4/29

AUTHORS: Vasilevskiy, I. M., Prokoshkin, Yu. D.

TITLE: Investigation of the Energy Characteristics of the Deflected Proton Beam of the 6 Meter Synchro-cyclotron

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 3, pp 225-230 (USSR)

ABSTRACT: The proton beam (150-670 Mev) coming from the 6-meter synchro-cyclotron of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) is collimated by brass diaphragms (width 0.1 to 0.7 cm; height 2 cm). In this way it arrives between the poles (100 cm) of a magnet (field strength 16 koe), where it may be deflected up to 20°. At the outlet of the spectrometer there is a plastic scintillator as proton detector, which is coupled with a multiplier FEU-19M. The electric pulses of the multiplier are integrated by an RC-chain, and the current is measured by the self-recording potentiometer EPPV-51. By means of a synchronous motor the detector may be moved perpendicular to the proton flux. The variation of coordinates could be reconstructed with an accuracy of up to 0.02 cm. The dependence of proton flux strength upon the variation of coordinates J(X) is represented graphically and

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Investigation of the Energy Characteristics of the Deflected Proton Beam of the 6 Meter Synchro-cyclotron

shows that here a Gaussian distribution exists. The energy spectrum of the protons $\phi(E)$ was obtained by determining $J(X)$ once with and once without the magnet being connected, and by being able to determine the course of the energy spectrum by means of integration. The deflected proton beam may be represented symmetrically as well as by the Gaussian function

$$\phi(E) \simeq \exp\left\{-(E - \bar{E}^2)/2\,\Delta_E^2\right\}$$

where the dispersion Δ_E at $\bar{E} = 665$ Mev amounts to (2.8 ± 0.3) Mev (measurements with helium). The dispersions determined for other $\bar{E}$-values coincide well with the theoretical curve given in reference 4. The average energy of the protons was determined with an accuracy of 0.1% by the method described in reference 5 (current-carrying wire), this accuracy being attainable only in the case of energy measurements ($E > 250$ Mev). The radiation energies are not constant quantities, but they fluctuate in dependence on the various conditions of acceleration as well as on the conditions for beam deflection. It was possible to show by means of measurements carried out between

Investigation of the Energy Characteristics of the Deflected Proton Beam of the 6 Meter Synchro-cyclotron

July 5, 1957 and October 12, 1958 that the fluctuations e.g. for $\bar{E}$ = 665 Mev vary between 671.0 $\pm$ 1.5 Mev and 658.8 $\pm$ 1.0Mev. By employing the method described also the average energies of d and α-particles were determined which were accelerated in the synchro-cyclotron. At a deuteron energy of 405.3 $\pm$ 0.5 Mev the dispersion amounts to 1.7 $\pm$ 0.5 Mev, whereas in the case of α-particles of an energy of 811.3 $\pm$ 1.0 Mev it is 3.5 $\pm$ 1.5 Mev. Results obtained were discussed with Tan Syao-vey and A. A. Tyapkin. There are 6 figures and 5 references, 2 of which are Soviet.

SUBMITTED: December 7, 1958

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24(5)

AUTHORS: Prokoshkin, Yu. D., [illegible] SOV/56-36-1-2/52

TITLE: Showers Produced by Positrons With Energies of 100 to 400 MeV (Livni, obrazovannyye pozitronami s energiyey ot 100 do 400 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 1, pp 10-16 (USSR)

ABSTRACT: In the introduction some theoretical and experimental works dealing with this subject are discussed, as e.g. those by Skobel'tsyn (Ref 1), Belen'kiy and Ivanenko (Ref 3). The authors of this paper used a monoenergetic positron beam for their investigations. A high-energy γ-beam (originating from π^0-decay) impinged, coming from the phasotron of the Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research), upon a lead converter located in the magnetic field. The positrons produced in the converter were collimated by means of telescope counters and a lead diaphragm. By varying of the magnetic field strength positron energy was controlled within the range of 50 to 500 MeV with an accuracy of 2-3 %. This positron beam impinged upon the 20.20 cm^2 lead- or copper absorber with

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different thickness t. The shower electrons n(t) therein formed are counted in the "cover" (kover) located at the back of the absorber. The cover consists of a number of STS-8 type counters of similar construction and has a size of 15.15 cm^2. A scheme of this device is given (Fig 1). The cascade curves are plotted for the following positron energies: 101±2 MeV, 294±10 MeV, and 407±10 MeV. For these values the probabilities w(n) in % of 8 t - values are between 0 and 30, 0 and 35, and in the last case for 10 t - values between 0 and 50 mm lead, and are given together in a table. Figure 3 shows the cascade curves n(t) for the first two energy values according to measurements carried out by the authors, and, for purposes of comparison, the curve calculated by Wilson (Vil'son)(Ref 5) according to the Monte-Carlo method. Good agreement was found. The conversion of Wilson's radiation units (in which the absorber thickness is given) in g/cm^2 is carried out according to the equation 1 r.u. Pb = 5.6±0.2 g/cm^2 and for copper 1 r.u. Cu = 11.5 g/cm^2. For positron energies of 407±10 MeV figure 4 shows the cascade curve n(t) for lead- and copper absorbers; again

Showers Produced by Positrons With Energies of 100 to 400 MeV

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measured values are compared with those calculated by Wilson. Agreement is good. From the measuring results obtained the following approximated cascade curves are calculated (see figure 5); they too are compared with Wilson's results. For the connection between particle number and energy it holds for the maximum that $n_{max}(E_o)_\gamma = 3(\alpha/e)^{0.6\alpha+1} \approx$ $\approx 0.008\ E_o$ and $t_{max}(E_o)_\gamma = \alpha$ (see figure 6). There are 6 figures, 1 table, and 10 references, 4 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research)

SUBMITTED: April 23, 1958

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21(7) SOV/56-36-6-6/66

AUTHORS: Dunaytsev, A. F., Prokoshkin, Yu. D.

TITLE: The Reaction $p + p \rightarrow p + p + \pi^0$ Within the Energy Range From the Threshold to 665 Mev (Reaktsiya $p + p \rightarrow p + p + \pi^0$ v oblasti energiy ot poroga do 665 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1656 - 1671 (USSR)

ABSTRACT: The present paper investigates the angular distribution of neutral pions formed in proton-proton collisions within the range of 400-665 Mev. The paper goes into many details and first discusses the results mentioned in numerous publications dealing with this subject, and deals with the problems connected with the investigations described. Pion angular distribution is determined by means of the angular distribution of γ-quanta (decay $\pi^0 \rightarrow 2\gamma$); the latter is less anisotropic than the angular distribution of pions, and with decreasing pion velocity the anisotropy vanishes rapidly (exponential decrease, see figure 1). The investigations were carried out with an unpolarized proton beam on the six-meter phasotron of the OIYaI. The experimental arrangement is shown by figure 2; proton energy

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distribution in the beam corresponded to a Gaussian curve with a dispersion equal to (2.8±0.3)Mev at maximum proton energy (of Fig 3). In the following, the authors describe the recording apparatus in detail. Figure 4 shows a scheme of the γ-telescope system, the degree of efficiency of which is shown by figure 5 in dependence on the angle. Liquid hydrogen in a cylindrical container made from foam polystyrene as well as polyethylene and graphite (for cross section measurement) (diameter 8 cm, length 25 cm) was used as a target. The most favorable recording conditions were in the range of $45^\circ < \Theta < 145^\circ$. There follows a detailed description of target properties and control experiments. Measuring results are given by numerous diagrams and some tables, and are discussed in detail. Figure 6 shows the γ-angular distribution on carbon by 665 Mev protons and the distribution curve calculated according to the optical nuclear model (good agreement), and table 1 shows the relative cross sections σ'_{pp} in % for various angles and the energies of 665, 560, and 485 Mev, obtained by means of the difference method. Figure 7 shows the γ-angular distribution at 665 Mev measured by means of the difference method and calculated by

the method of the least squares (good agreement); figure 8 shows the same at E= 485 Mev. The following chapter of this paper deals with a reduction of the obtained γ-distribution to the π^o-meson distribution (Tables 2,3), and the following chapter supplies data concerning measurements of the total cross section, which were carried out within the energy range of 313-660 Mev. Figure 9 shows the dependence of the γ-production cross section upon proton energy. At $\theta = 33^o$ and E= 660 Mev the following was obtained:

$d\sigma^{\gamma}_{pC}/d\Omega = (7.6\pm0.4).10^{-27}$ cm/steradian,

$\sigma^{\pi^o}_{pp} = (3.22\pm0.17).10^{-27}$ cm^2, and in the case of a hydrogen target $(3.4\pm0.4).10^{-27}$ cm^2. A great number of further data is given by tables 4 and 5. The γ-yield decreases by more than the 500-fold within the range investigated with a decrease of proton energy. At E > 400 Mev the main contribution to the reaction cross section is given by the resonant transitions; at lower proton energies the non-resonant Ss-transition becomes essential, its

contribution to the total cross section being $0.032\eta_m^2 \cdot 10^{-27} cm^2$ (η_m is the maximum π^0-momentum in the c.m.s.) In conclusion, the authors discuss the results obtained and compare the measured cross sections of neutral and charged pion production with those calculated according to the resonance theory (Figs 10-13); the conclusion is drawn that transition with the total angular momentum J=2 is preferential. Finally, the authors thank L. I. Lapidus, S. L. Mandel'shtam, L. M. Soroko, A. A. Tyapkin, B. M. Antonov, Ye. L. Grigor'yev, G. P. Zorin, M. M. Kulyukin, N. A. Mitin, O. V. Savchenko and I. V. Tsymbulov for their discussion and assistance. There are 13 figures, 5 tables, and 27 references, 13 of which are Soviet.

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

SUBMITTED: December 25, 1958

PROKOSHKIN, YU. D., KHACHATURYAN, M. N., DUNAYTSEV, A. F., PANTUYEV, V. S.,

"Measurement of the Panofisky Ratio by the Mehtod of Gamma-Gamma Coincidents"

paper presented at the Intl Conference on High Energy Physics, Rochester, N. Y. and/or Berkly California, 25 Aug - 16 Sep 1960.

85364

S/120/60/000/005/038/051
E032/E314

24.6900

AUTHORS: Dunaytsev, A.F., Prokoshkin, Yu.D. and Tan Syao-Vey

TITLE: Measurement of the Energy of Negative π -mesons Using a Star Detector

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 5, p. 133

TEXT: In distinction to the majority of other particles, π^- -mesons produce high-energy stars with high probability towards the end of their range. This phenomenon was used by the present authors in a selective recording of π^- -mesons. The π^- -meson star detector is in the form of a telescope consisting of two scintillation counters in coincidence. The first of these is a usual 100% efficient detector of incident particles. The second counter is used with lower EHT and hence records only large light pulses which are produced in the scintillator when a π^- -meson produces a star in it. On the other hand, the efficiency of recording of π^- -mesons passing right through the scintillator of this counter is negligible. The photomultiplier of the second counter works under highly

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E032/E314

Measurement of the Energy of Negative π-mesons Using a Star Detector

stabilised conditions. The star detector can be used in the rapid measurement of the range and energy of π^--mesons (15 min when the intensity of the beam is $\sim 10^3$ sec^{-1}). A typical range-curve for 160 MeV π^--mesons is shown in Fig. 1. It is clear from this figure that the star detector does in fact detect stars and not just the stopping of particles, i.e. it selectively records π^--mesons. In fact, if the star detector simply detected the stopping of particles it would be equally efficient for π^-- and μ-mesons. If this were so, the range curve in the region of large thicknesses would be of the form shown by the dotted curve, which corresponds to the μ^--mesons in the beam (15%). The measured range-curve does not show a maximum in this region.

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Measurement of the Energy of Negative π^--mesons Using a Star Detector

As can be seen from the figure the sensitivity of the star detector to μ^--mesons is at least twenty times small r than the sensitivity to π^--mesons.
There is 1 figure.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute for Nuclear Research)

SUBMITTED: August 26, 1959

Card 3/3

PROKOSHKIN, Yu.D.

82021
S/056/60/038/02/22/061
B006/B011

24.6600
24.6520

AUTHOR: Prokoshkin, Yu. D.

TITLE: Production of π-Mesons in pd-Collisions and Internuclear Motion of Nucleons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 2, pp. 455-461

TEXT: The author wanted to show that the energy dependence of pion production cross sections in nucleon-deuteron collisions and the energy spectra of pions can be calculated with fairly good accuracy on the strength of data concerning free nucleon-nucleon collisions. The problem is treated in momentum approximation by means of the π^0-meson production in pd-collisions: $p + d \rightarrow \pi^0 +$ nucleons, which had already been studied in a previous paper (Ref. 5). The momentum distribution of nucleons in the deuteron is investigated first. The deuteron is regarded as consisting of two nucleons moving relatively to each other. By neglecting interference, formula (1) is written down for the pion production cross section σ_{pd}, which, after integration according to the unit vector $\vec{p}_2/p_2$, reads:

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Production of π-Mesons in pd-Collisions and Internuclear Motion of Nucleons

$\sigma_{pd} = \int k\left\{\sigma_{pn}(p_1,p_2) + \sigma_{pp}(p_1,p_2)\right\} F(p_2)p_2^2\, dp_2$ (3); $F(\vec{p}_2)$ is the momentum distribution of nucleons in the deuteron, $\vec{p}_2$ their momenta in the center-of-mass system, and p_1 the momentum of the incident proton; $\sigma_{pn}(p_1,p_2)$ and $\sigma_{pp}(p_1,p_2)$ are the cross sections of the reactions $pn \rightarrow pn\pi^o$ and $pp \rightarrow pp\pi^o$, respectively. Fig. 1 shows the momentum distribution a) according to Salpeter-Goldstein for Yukawa, exponential and Gauss' potentials, b) according to Chew-Goldberger, c) and with Gauss' potential for the dispersions $\sqrt{\overline{p_2^2}}/m = 0.11$ and 0.06, where m is the nucleon mass. The calculations were carried out by using expression (3) for σ_{pd} on integrating with the electronic computer "Ural", where $F(p_2)$ were selected according to the abovementioned authors. The dependence of σ_{pd} on the energy of the incident proton is shown for different momentum distribution functions in

Fig. 2. For comparison, this diagram contains also the experimental data taken from Ref. 5. The curves 1-3, that were calculated according to Salpeter and Goldstein, show the best agreement. In the range of small momentum, this distribution can be represented approximately by $F(p_2) \sim (\gamma^2 + p_2^2)^2$, where $\gamma = 46$ Mev/c. The reduction of the total cross section for pn-interactions is briefly discussed. Formula (3) can be expressed by (9): $\sigma_{pd} = k(g_{pn}\sigma_{pn} + g_{pp}\sigma_{pp})$, where g_{pn} and g_{pp} denote the cross section changes due to intranuclear motion, and $\sigma_{pn} = \sigma_{pn}(p_1,0)$, $\sigma_{pp} = \sigma_{pp}(p_1,0)$. Fig. 3 shows the course of $\sigma_{pn}^{(1)}(p_1,p_2)$ calculated in first approximation as a function of p_2/m for different values of kinetic energy. The σ_{pp}-curves have a similar course. The energy dependence of the coefficients g_{pn} and g_{pp} is illustrated in Fig. 4. k in (9) can be determined only empirically, namely, only for 380 Mev, at which energy the cross sections of the pion-production reactions involved are known. $k(380) = 0.72 \pm 0.16$. The final part of the present paper offers results of pion-

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spectrum calculations. Calculations were made only for π^+-production, for the reactions $pp \rightarrow d\pi^+$ and $pp \rightarrow pn\pi^+$ (Fig. 5 shows the energy dependence of $d^2\sigma/dEd\Omega$). Fig. 6 shows calculated π^+-spectra and, for comparison, experimental data. The shape of spectrum for pd-collisions can be easily predicted on the basis of data on free pp-collisions. The author finally thanks A. I. Baz', B. M. Golovin, M. G. Meshcheryakov, and Yu. A. Shcherbakov for discussions, as well as L. A. Kulyukina for her aid given in the calculations. There are 6 figures and 13 references: 4 Soviet, 1 British, 6 American, and 1 Polish.

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

SUBMITTED: September 18, 1959

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S/056/60/038/03/11/033
B006/B014

24.6600

AUTHORS: Dunaytsev, A. F., Prokoshkin, Yu. D.

TITLE: The Reaction $pn \rightarrow pn\pi^0$ at Energies From the Threshold up to 665 Mev

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 3, pp. 747-757

TEXT: Of the two nucleon reactions leading to the pion production, $p + p \rightarrow \pi^0 + p + p$ (1), and $p + n \rightarrow \pi^0 + \begin{cases} p + n \\ d \end{cases}$ (2) the investigation of the latter meets with considerable difficulties. It can be either investigated by having hydrogen nuclei bombarded with neutrons or by experimentally comparing the cross sections of reaction (3) $p + d \rightarrow \pi^0 +$ nucleons, with those of reaction (1). The authors chose the latter way. Experimental setup and method of measurement had already been discussed in a previous paper (Ref. 11). Bombarding was made with an unpolarized proton beam of the six-meter synchrocyclotron of the OIYaI. The arrangement included targets with heavy and

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ordinary water in thin-walled containers, as well as plates made of light graphite and polyethylene $(CH_2)_n$. The angular dependence of the cross section $\sigma'_{pd} = (d\sigma^{\gamma}_{pd}/d\Omega)/(d\sigma^{\gamma}_{pC}/d\Omega)$ and of the differential cross section of reaction (2) was investigated at proton energies of 665, 560, and 485 Mev; results are compiled in Table 1. ϑ denotes the angle of departure of γ-quanta in the laboratory system. For other energies the cross section values obtained are given in Table 2, and the total cross sections $\sigma^{\pi^0}_{pd}$ in Table 3. The values obtained for the total cross section of reaction (2) are compiled in Table 4 for 17 energy values between 290 and 665 Mev. They were found to range from (0.011 ± 0.003) to $(6.3 \pm 0.4) \cdot 10^{-27}$ cm^2. The angular distributions of γ-quanta from the π^0 decay (Reaction (3)) were investigated in the energy range 400 - 665 Mev. Fig. 1 shows the angular distribution obtained at 665 Mev. The broken curve was calculated by the method of least squares (Ref. 17). The angular distribution $f^{\gamma}_{pd}(\vartheta)$ shown here is not symmetric around the angle of 90° in the center-of-gravity system, whereas the angular distribution should

The Reaction $pn \rightarrow pn\pi^0$ at Energies From the Threshold up to 665 Mev

S/056/60/038/03/11/033
B006/B014

be symmetric for reactions (1) and (2). Asymmetry is explained as being a consequence of pion absorption and of the incident proton. Angular distribution $f^{\vartheta}_{pn+pp}(\vartheta)$ obtained from $f^{\vartheta}_{pd}(\vartheta)$ is well described by $f^{\vartheta}_{pn+pp}(\vartheta) \sim \frac{1}{3} + (0.07 \pm 0.02)\cos^2\vartheta$. $f^{\vartheta}_{pn}(\vartheta) \sim \frac{1}{3} + (0.08 \pm 0.02)\cos^2\vartheta$ further holds for 665 Mev. $f^{\vartheta}_{pn}(\vartheta) \sim \frac{1}{3} + b_\vartheta \cos^2\vartheta$ generally holds, b_ϑ are given in Table 5 for nine energy values. These results are discussed in great detail. The investigation of π^0-meson production in pd- and pn collisions made at the same time permits determination of the total cross sections of the reaction $pn \rightarrow pn\pi^0$; a comparison of these cross sections with those of other reactions shows that the condition imposed upon the relation between the total cross sections of various meson-producing reactions by the hypothesis of isotopic invariance is fulfilled with a 10% error. The total cross sections of reaction (2) obtained are in good agreement with those obtained on the strength of the phenomenological theory of resonance by Mandel'shtam. The production of pions in a state with an isotopic spin T = 1 is about twice as intense as it is in states with T = 0. The angular distribution of π^0-mesons produced in

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nucleon-nucleon collisions at an energy of about 650 Mev was almost isotropic in contrast with that of charged pions, which is strongly anisotropic (Ref. 18). Fig. 5 shows the angular distribution of π^0-mesons from pn collisions. This difference between uncharged and charged pions contradicts the hypothesis of isotopic invariance. The authors finally thank B. Pontekorvo and B. S. Neganov for a discussion, and I. V. Tsymbulov for his assistance. O. V. Savchenko, A. G. Meshkovskiy, Ya. Ya. Shalamov, and V. A. Shebanov are mentioned. There are 6 figures, 7 tables, and 26 references, 16 of which are Soviet.

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

SUBMITTED: September 18, 1959

Card 4/4

MAL'TSEV, V.M.; PROKOSHKIN, Yu.D.

Secondary processes in the production of $\bar{\Lambda}$-mesons from nuclei.
Zhur. eksp. i teor. fiz. 39 no. 6:1625-1629 D '60. (MIRA 14:1)

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

PROKOSHKIN, Yu. D., Cand Phys-Math Sci -- "Study of the reaction $R+R \rightarrow R+R+P^0$. Dubna, 1961. (Joint Inst of Nuclear ~~Investigations~~ Studies. Lab of High Energies) (KL, 8-61, 228)

DUNAITSEV, A.F.; PETRUKHIN, V.I.; PROKOSHKIN, Yu.D.; RYKALIN, V.I.

Experimental evaluation of the $\pi^+ \rightarrow \pi^0 + e^+ + \nu$ decay probability. Dubna, Ob"edinennyi in-t iadernykh issl. 1961. 10 p.
(No subject heading)

VASILEVSKIY, I.M.; PROKOSHKIN, Yu.D.; RYKALIN, V.I.

Search for near-threshold anomalies in the energy dependence of the total cross section of proton interaction. Zhur. eksp. i teor. fiz. 40 no.5:1524-1525 My '61. (MIRA 14:7)

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

PROKOSHKIN, Yu. D.; RYKALIN, V. I.; VASILYEVSKIY, I. M.

"On the Threshold Anomalies in pp-Scattering"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research, Laboratory of Nuclear Physics

PROKOSHKIN, Yu. D.

DUNAYTSEV, A.F., PETRUKHIN, V.I., PROKOSHKIN, Yu. D., RUDALIN, V.I.

"Investigation of Pion Beta Decay"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research
Laboratory of Nuclear Problems

PROKOSHKIN, Yu. D.

DURAYTSEV, A. F., PETRUKHIN, V. I., Yu. D. PROKOSHKIN, and RYKALIN, V. I.

"Charge Exchange of Stopping π^- Mesons on Bound Hydrogen Nuclei"

report presented at Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Inst. for Nuclear Research
Lab. of Nuclear Problems

PROKOSHKIN, Yu. D.

LUI, Ming, PROKOSHKIN, Yu. D.

"The Isotopic Invariance Hypothesis and the Angular Distributions of Pions Produced in Nucleon-Nucleon Collissions at about 600 MEV"

report presented at the 11th Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research, Laboratory of Nuclear Problems

DUNAYTSEV, A.F.; PETRUKHIN, V.I.; PROKOSHKIN, Yu.D.; RYKALIN, V.I.; SARANTSEVA, V.R., tekhn. red.

[Testing the conservation of vector current] Proverka sokhraneniia vektornogo toka. Dubna, Ob"edenennyi in-t iadernykh issl., 1962. 6 p. (MIRA 15:4)

(Mesons--Decay)

DUNAYTSEV, A.F.; PETRUKIN, V.I.; PROKOSHKIN, Yu.D.; RYKALIN, V.I.; SARANTSEVA, V.R., tekhn. red.

[Probability of the decays $\pi^+ \to \pi^0 + e^+ + \nu$ and $\pi^+ \to \gamma + e^+ + \nu$] O veroiatnosti raspadov $\pi^+ \to \pi^0 + e^+ + \nu$ i $\pi^+ \to \gamma + e^+ + \nu$. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 6 p. (MIRA 15:4)

(Mesons—Decay)

DUNAYTSEV, A.F.; PETRUKHIN, V.I.; PROKOSHKIN, Yu.D.; NYKALIN, V.I.; SARANTSEVA, V.R., tekhn. red.

[Detection of charge-exchange in stopped π^--mesons on nuclei of bound hydrogen] Obnaruzhenie perezariadki ostanovivshchikshia π^--mezonov na iadrakh sviazannogo vodoroda. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 4 p. (MIRA 15:4)

(Mesons) (Nuclear reactions) (Hydrogen)

LYUY MIN' [Lü Min]; PROKOSHKIN, Yu.D.; SARANTSEVA, V.R., tekhn. red.

[Angular distribution of π^0-mesons generated in collisions of nucleons, and the isotopic invariance hypothesis] Uglovye raspredeleniia π-mezonov, obrazovannykh v nuklonnykh soudareniiakh, i gipoteza izotopicheskoi invariantnosti. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 9 p. (MIRA 15:6)
(Mesons) (Collisions (Nuclear Physics))

C/026/62/018/004/007/009
F050/F003

AUTHOR: Dunaitsev, A. F., Pantuyev, V. S., Prokoshkin, Yu. D., Tang, Hsiao-wei (0781/1321/1218), and Khachaturyan, M. N.

TITLE: Measurement of the Panofsky ratio by the method of gamma-gamma coincidences

PERIODICAL: Wu Li Hsüeh Pao, v. 18, no. 4, 1962, 218-219

TEXT: There are two capture processes of stopped π^- mesons in hydrogen

$$\pi^- + p \longrightarrow \pi^0 + n \longrightarrow \gamma' + \gamma'' + n \qquad (1)$$

$$\pi^- + p \longrightarrow \gamma + n \qquad (2)$$

where p is proton and n is neutron. The ratio of probability of these two processes is called the Panofsky ratio P. A new method was devised by the authors for measuring the Panofsky ratio by means of γ - γ coincidences. Procedures follow (see

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Measurement of the Panofsky ...

Fig. 1): The injected π^- mesons are stopped in the target of liquid hydrogen. The γ-photons and γ'-photons produced respectively in reaction (2) and reaction (1) are measured by counter (A). The γ''-photons produced in reaction (1) are measured by counter (B). The ratio of reaction (2) and reaction (1) can be determined. In this experiment the energy of π^- meson beams was 6.5 Mev. The experimental P result was found to be 1.40 ± 0.08. This value agrees with the data in photoproduction and scattering of π^- mesons. Author Tang Hsiao-wei thanks Professor Wang Ka n-ch'ang (3769/3227/2490) in particular for his interest and discussions. There are 3 figures.

SUBMITTED: January 15, 1962

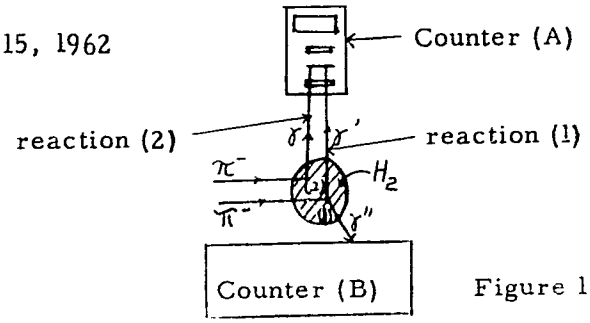

Figure 1

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S/056/62/042/002/049/055
B108/B138

AUTHORS: Dunaytsev, A. F., Petrukhin, V. I., Prokoshkin, Yu. D., Rykalin, V. I.

TITLE: Experimental estimate of β-decay probability of a π^+ meson

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 2, 1962, 632 - 635

TEXT: The rare decay mode $\pi^{\pm} \rightarrow \pi^0 + e^{\pm} + \nu$ is termed β-decay of the pion. Theoretical treatment similar to the Fermi treatment of nuclei has shown that the β-decay probability of a pion is only about 10^{-8} of the probability of the usual muon decay $\pi^{\pm} \rightarrow \mu^{\pm} + \nu$ (Ya. B. Zel'dovich. DAN SSSR, 97, 421, 1954). One can calculate exactly the probability of that β-decay without regard to strongly interacting particles if the hypothesis of the conservation of the vector current in the theory of universal weak interaction is rigth:

$w(\pi^{\pm} \rightarrow \pi^0 + e^{\pm} + \nu) = G^2 \Delta^5 / 30 \pi^3$ ($\hbar = c = 1$). G is the constant of weak vector interaction, Δ is the difference between the masses of charged

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Experimental estimate of β-decay ...

and neutral pions. Consequently this decay may be a criterion for the correctness of the theory. An experimental arrangement for the determination of the relative probability $\lambda = w(\pi^{\pm} \rightarrow \pi^{0} + e^{\pm} + \nu)/w(\pi^{\pm} \rightarrow \mu^{\pm} + \nu)$ is shown in Fig. 1. Experiments are made with positive pions. The greatest difficulty is the charge exchange of the pions on entering the scintillating material of counter 4. The probability of charge exchange, however, decreases rapidly with energy but its intensity is still higher than that of the sought β-decay by almost three orders of magnitude. One count was recorded during an operating time of about 30 hrs which corresponds to a λ of about $5 \cdot 10^{-8}$. But this one count could belong to a β-decay as well as to a charge exchange process. Estimates showed that $\lambda < 7 \cdot 10^{-8}$. Calculation of the constant G, which determines the intensity of β-decay of pions, yielded $G < 2.5 G_{\beta}$. Consequently G is essentially not greater than the constant of vector interaction $G_{\beta} = 1.4 \cdot 10^{-49}$ erg $\cdot$ cm^3 as determined from the decay $O^{14} \rightarrow N^{14*}$. D. I. Blokhintsev, V. N. Sergiyenko, V. P. Dzhelepov, A. A. Tyapkin, A. A. Logunov,

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Ya. B. Zel'dovich, S. S. Gershteyn, B. Pontekorvo, and L. I. Lapidus are thanked for help and discussions. There are 3 figures and 8 references: 4 Soviet and 4 non-Soviet. The 4 references to English-language publications read as follows: H. L. Anderson et al. Phys. Rev., 119, 2050, 1960; R. P. Feynman, M. Gell-Mann. Phys. Rev., 109, 193, 1958; E. C. G. Sudarshan, R. E. Marshak. Proc. of Padua conf., 1957; G. Impeduglia et al. Phys. Rev. Lett., 1, 249, 1958.

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

SUBMITTED: December 9, 1961

Legend to Fig. 1: M - magnetic focusing lens; 1, 2 - scintillation counters of π^+ - meson monitor (with FEU-33 (FEU-33) photomultipliers), 3 - scintillation counter (with 56 AVP photomultiplier), 4 - "stopping detector" counter (FEU-33); 5, 6 - Cerenkov spectrometer (58 AVP); CH_2 - polyethylene filter for slowing down pion beam; Pb - lead shield.

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37896
S/056/62/042/005/048/050
B108/B138

24.6610

AUTHORS: Dunaytsev, A. F., Petrukhin, V. I., Prokoshkin, Yu. D., Rykalin, V. I.

TITLE: The probability of $\pi^+ \to \pi^0 + e^+ + \nu$ and $\pi^+ \to \gamma + e^+ + \nu$ decays

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 5, 1962, 1421-1424

TEXT: Earlier work (ZhETF, 42, 632, 1962; Nuovo Cim., 22, 5, 1962) showed that, as predicted by theory, the relative beta decay probability of the π^+-meson is indeed very small ($\sim 10^{-8}$). This paper presents more results on the radiative beta decay as observed by a system of scintillation counters and moderation filters. The meson beam varies with time at a period of $76 \cdot 10^{-9}$ sec. The data obtained are in agreement with theory and confirm the assumption of the conservation of the vectorial current. Exact measurements yielded the relative beta decay probability $\lambda = (1.1^{+1.0}_{-0.5}) \cdot 10^{-8}$ and the constant of the beta decay intensity $G = (1.14 \pm 0.37) G_\beta$ where

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The probability of...

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B108/B138

$G_\beta = 1.40 \cdot 10^{-49}$ erg·cm^3 is the vectorial constant of nuclear beta decay (R. P. Feynman, M. Gell-Mann. Phys. Rev., 109, 193, 1958). There are 3 figures.

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

SUBMITTED: March 31, 1962 (initially)
April 13, 1962 (after revision)

Card 2/2

S/056/62/042/006/044/047
B104/B112

AUTHORS: Dunaytsev, A. F., Petrukhin, V. I., Prokoshkin, Yu. D., Rykalin, V. I.

TITLE: Evidence of the charge exchange of stopped π^- mesons on nuclei of bound hydrogen

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 6, 1962, 1680-1682

TEXT: The charge exchange of π^- mesons stopped in polyethylene was investigated using a device with high time resolution (A. F. Dunaytsev et al., ZhETF, 42, 632, 1962). The device allowed π^0 mesons to be recorded more efficiently than had been possible in previous investigations. A 75-Mev π^- meson beam (Fig.) passes through a set of scintillation counters and moderating filters and is stopped in a target (polyethylene, liquid hydrogen). The γ-quanta produced during the decay of π^0 mesons emitted by the stop of π^- mesons are recorded by Cherenkov spectrometers. After preliminary experiments with a target of liquid hydrogen the H target was replaced by a polyethylene target. The

Evidence of the charge exchange ...

coincidence counting rate remained two orders of magnitude above the background level. When the target was taken out of the beam, the count rate dropped to 1/300. The γ-quanta recorded possessed an energy of 70 Mev. In both spectrometers, the γ-quanta were produced simultaneously. The effect observed was caused by the stop of π^- mesons. When the energy of the π^- mesons was reduced to 65 Mev, the count rate dropped to 1/15. With the use of a graphite target, the count rate reached only 1/50 of that obtained with a polyethylene target. There is 1 figure.

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

SUBMITTED: April 4, 1962

Fig. Experimental arrangement. (1)-(3) scintillation counters; (5)-(6) Cherenkov spectrometers; (7) scintillation counter in anti-coincidence connection; (8) focusing magnetic lens; (9) polyethylene filter for the moderation of π^- mesons; (M) target; (Pb) lead shield.

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S/056/62/043/004/013/061
B102/B180

AUTHORS: Li Min, Prokoshkin, Yu. D.

TITLE: Angular distributions of pions produced in nucleon collisions, and the hypothesis of isotopic invariance

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 4(10), 1962, 1202 - 1207

TEXT: A 660-Mev neutron beam from the proton synchrotron of the Laboratoriya yadernykh problem OIYaI (Laboratory of Nuclear Problems of the OIYaI) was used to obtain exact data on the pion angular distribution of $n+p \to \pi^0 + \begin{cases} n+p \\ d \end{cases}$ reactions. It was obtained by recording the pion -decay gamma-quanta in a telescope arrangement of scintillation and Cerenkov counters with a lead converter. The gamma-quantum yield from np-collisions was calculated by the difference method from neutron-irradiated polyethylene and graphite: $\sigma'_{np}(\theta) = (d\sigma^{\Gamma}_{np}/d\Omega)/(d\sigma^{\Gamma}_{nC}/d\Omega)^{-1}$. The angular distribution $f^{\Gamma}_{np}(\theta)$ was in fact symmetrical with respect to 90° c.m.s. as required

Card 1/2

S/056/62/043/004/ 013/061
B102/B180

Angular distributions of ...

by isotopic-spin conservation. It can be described by $f^{-}_{np}(\theta) \sim 1/3 + (0.12 \pm 0.02)\cos^2\theta$. If the pion energy spectrum is taken into account, $f^{-}_{np}(\theta) \sim 1/3 + (0.10 \pm 0.07)\cos^2\theta$. For the average neutral-pion angular distribution $\overline{\pi^0_{pp+np}}(\theta) \sim 1/3 + (0.32 \pm 0.06)\cos^2\theta$. This agrees with the $f^{\pi^\pm}_{pp+pn}(\theta)$ distribution obtained by Neganov and Savchenko (ZhETF, 32, 1265, 1957) and by Meshkovskiy et al. (ZhETF, 35, 64, 1958), but not with those obtained by Pondrom (Phys. Rev. 114, 1623, 1959) or Rosenfeld (Phys. Rev. 96, 139, 1954) at about 650 Mev. This could be due to violation of the isotopic invariance at high energies. There are 5 figures and 1 table.

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

SUBMITTED: May 10, 1962

Card 2/2

PETRUKHIN, V.I.; PROKOSHKIN, Yu.D.; ZROLOVA, N.N., tekhn.red.

[Charge exchange of stopped π^--mesons on complex nuclei] O perezariadke ostanovivshikhsia π^--mezonov na slozhnykh iadrakh. Dubna, Ob"edinennyi in-t iadernykh issledovanii, 1963. 5 p. (MIRA 17:1)

S/120/63/000/001/043/072
E032/E314

AUTHORS: Dunaytsev, A.F., Petrukhin, V.I., Prokoshkin, Yu.D. and Rykalin, V.I.

TITLE: A detector for stopping mesons

PERIODICAL: Pribory i tekhnika eksperimenta, no. 1, 1963, 159 - 161

TEXT: The detector is illustrated schematically in Fig. 1. Its properties were investigated with a 75 MeV π^+-beam. The π-mesons pass through the scintillation counters of the beam-intensity monitor (1, 2) and are then retarded by the polythene filter 3. They come to rest in the phosphor of the last counter (5). The system incorporates fast photomultipliers (56AVP). The mesons are recorded by the fast coincidence circuit C_I, whose resolution was somewhat higher than reported previously by Dunaitzev et al (Nucl. Instrum., 1960, 8, 11) who have similar apparatus. In order to determine the optimum working conditions an assessment was made of the efficiency of recording of stopping and transmitted π^+-mesons (in the latter case the filter 3 was removed) as a function of the voltage V on each of the

Card 1/4

photomultipliers. Thus, the amplitude discrimination was carried out not only in the counter 5 , as was done previously but also in the counter 4 . In this way, the voltage region, in which the sensitivity of the detector to transmitted mesons decreases rapidly with decreasing V, while the efficiency of recording of stopping mesons was still very nearly 100%, was determined. The meson-counting rate was then found as a function of the delay Δt of the pulse from counter 5 relative to counter 4 for a number of values of V in the above region. The form of the resolution curves was found to be quite different for stopping and transmitting π^+-mesons. Hence, the selection coefficient was very sensitive to the delay Δt . Fig. 3 shows the selection coefficient K (2) and the efficiency of recording of stopping mesons ε (1) as functions of the delay time Δt . The arrow indicates the working value of the delay. As can be seen, a selection coefficient of the order of 50 may be obtained with an efficiency practically equal to 100%. This compares with K = 8 as reported by Dunaitsev et al. The detector is suitable for the selection of stopping particles in the presence of a large

A detector for ....

background of transmitted particles. It has been successfully used for the effective recording of rare decay modes of stopping π^{+}-mesons (Dunaytsev et al - Zh.eksperim. i teor. fiz., 1962, 42, 1421; Phys. Letters, 1962, 1, 138). There are 4 figures.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute for Nuclear Research)

SUBMITTED: April 13, 1962

A detector for ....

S/120/63/000/001/043/072
E032/E314

Fig. 1:

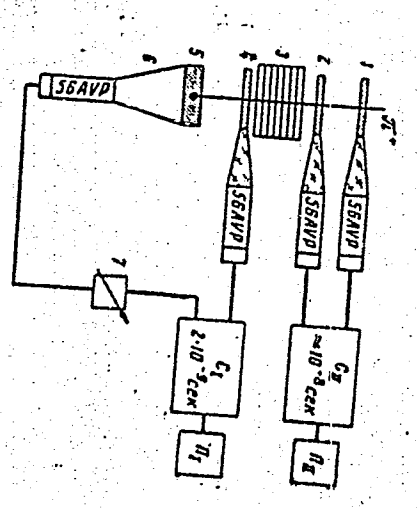
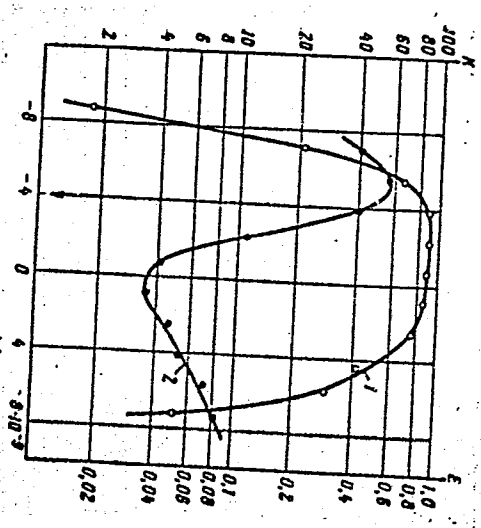


Рис. 1. Схема экспериментальной установки монитора пучка π^+-мезонов: 3 — поляризационный фильтр; 4, 5 — счетчики детектора остановок; 6 — полый световод; 7 — переменная задержка Δt; C_I, C_{II} — схемы совпадений; $П_I$, $П_{II}$ — пересчетные устройства

Рис. 3. Зависимость коэффициента отбора K (2) и эффективности регистрации остановок ε (1) от задержки Δt. Стрелкой указано рабочее положение задержки

Fig. 3:



attached here to

Card 4/4

ACCESSION NR: AP4009089 S/0056/63/045/006/1737/1742

AUTHORS: Petrukhin, V. I.; Prokoshkin, Yu. D.

TITLE: Measurement of the mass difference of charged and neutral pions

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 1737-1742

TOPIC TAGS: pion, charged pion, neutral pion, pion mass difference, neutral pion decay, negative pion capture, capture by protons, pion capture by protons, gamma ray angular correlation

ABSTRACT: In view of the importance of employing different methods and reducing the experimental error, a method is developed for measuring the pion mass difference by determining the angular correlation of the gamma rays from the decay of neutral pions produced upon capture of negative pions by protons. The accuracy of this method is

Card 1/2

ACCESSION NR: AP4009089

claimed to be almost as good as that obtained by Hillman et al (Nuovo Cim. v. 14, 887, 1959) and Haddock et al (Phys. Rev. Lett. v. 3, 478, 1959). A value 4.59 ± 0.03 MeV/c^2 is obtained for the pion mass difference, in good agreement with the results by others. The method is free of systematic errors associated with the determination of the angular resolution and geometric corrections. "In conclusion, we take the opportunity to thank A. F. Dunaytsev and V. I. Ry*kalin for help with the work, I. V. Puzy*nin for performing the laborious computations, and A. A. Tyapkin for a discussion of the results." Orig. art. has: 5 figures, 7 formulas, and 1 table.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 01Jun63 DATE ACQ: 02Feb64 ENCL: 01

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

Card 2/2

DUNAYTSEV, A.F.; PETRUKHIN, V.I.; PROKOSHKIN, Yu.D.; RYKALIN, V.I.

Pion beta-decay. Zhur. eksp. i teor. fiz. 47 no.1:84-91 Jl '64. (MIRA 17:9)

1. Ob"yedinennyy institut yadernykh issledovaniy.

L 26933-65 ENT(m) DIAAP S/0020/65/160/001/0071/0072
ACCESSION NR: AP5004193

AUTHORS: Petrukhin, V. I.; Prokoshkin, Yu. D.

TITLE: On Pi-mesic atom processes in hydrogen-containing substances

SOURCE: AN SSSR. Doklady, v. 160, no. 1, 1965, 71-72

TOPIC TAGS: pion, mesic atom, pion transfer, hydrogen containing substance

ABSTRACT: The purpose of the investigation was to determine the mechanism of the transfer of pions from hydrogen atoms to heavier substances such as styrene. The ex-

and stopped in the target.

Card 1/3

L 26933-65
ACCESSION NR: AP5004193

by Cerenkov total-absorption spectrometers. Various gases and solutions were used as the targets. The results have shown that a proba-
[illegible] of pions by nuclei of bound hydrogen does not de-
[illegible] Similar re-

and 1 table.

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

Card 2/3

L 26933-65
ACCESSION NR: AP5004193

SUBMITTED: 18Jul64 ENCL: 00 SUB CODE: NP

NR REF SOV: 002 OTHER: 001

Card 3/3

DUNAYTSEV, A.F.; PROKOSHKIN, Yu.D.

Multichannel scheme of coincidences and anticoincidences with low resolving time. Prib. i tekh. eksp. 9 no.5:93-99 S-O '64. (MIRA 17:12)

1. Ob"yedinennyy institut yadernykh issledovaniy.

KUTIN, V.M.; PETRUSHIN, V.I.; PROKOSHKIN, Yu.D.

Search for $\pi^{o} \rightarrow 3\gamma$ decay. Prib. i tekhn. eksper. 1 teoret. fiz. 2 no.8:387-391 O '65. (MIRA 18:12)

1. Ob"yedinennyy institut yadernykh issledovaniy. Submitted September 1, 1965.

GUZHAVIN, V.M.; KLIGER, G.K.; KOLGANOV, V.Z.; LEBEDEV, A.V.; MARISH, K.S.; MUSIN, M.A.; PROKOSHKIN, Yu.D.; SMOLYANKIN, V.T.; SOKOLOV, A.P.; SOROKO, L.M.; TSUY VA-CHUAN [Ts'ui Wa-ch'uang]

Elastic scattering of 650 Mev. protons. Zhur. eksp. i teor. fiz. 47 no.4:1228-1231 O '64. (MIRA 18:1)

1. Ob"yedinennyy institut yadernykh issledovaniy.

L 56656-65 EWT(l)/EEC(m)/EEC(k)-2/EWA(h) Po-4/Pq-4/Pg-4/Peb/Pi-4/Pl-4

ACCESSION NR: AP5011881 UR/0120/65/000/002/0114/0118
539.1.075:621.317.75

38
B

AUTHOR: Dunaytsev, A. F.; Petrukhin, V. I.; Prokoshkin, Yu. D.; Rykalin, V. I.

TITLE: High-speed five-beam oscillograph 25

SOURCE: Pribory i tekhnika eksperimenta, no. 2, 1965, 114-118

TOPIC TAGS: cathode ray oscillograph, high speed oscillograph, five beam oscillograph

ABSTRACT: The development is reported of a 5-beam oscillograph with a sensitivity of 60 mv/cm and a rise time of its 150-Mc-passband vertical-deflection amplifiers of 4 nsec. The oscillograph was developed in 1962 and was intended for studying beta decay of π^+-meson. The nonlinearity of sweep is 2—4%; sweep speeds: 5, 10, 20, 50, 100, 200 nsec/cm; sweep delay behind the starting pulse, 70 nsec; when the signal is applied directly to the vertical plates, the rise time is

Card 1/2

L 56656-65
ACCESSION NR: AP5011881

6

2 nsec and the sensitivity, 30 v/cm. About 500,000 photo pictures were taken with this oscillograph; processing of these pictures has shown that the intervals between pulses can be measured with an error of 2×10^{-10} sec and heights, with an error of 3%. "The authors wish to thank G. P. Zorin, A. V. Revenko, and N. N. Khovanskiy for their help in the development and operation of the oscillograph, L. N. Andrianova and her co-workers for the development of the electron-beam tube with an aluminized screen, and N. B. Yedovina for selecting the conditions of film development." Orig. art. has: 7 figures.

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

SUBMITTED: 11Mar64 ENCL: 00 SUB CODE: EC

NO REF SOV: 002 OTHER: 004

Card 2/2

PETRUKHIN, V.I.; PROKOSHKIN, Yu.D.

On π^--mesic atom processes in hydrogen-bearing substances. Dokl. AN SSSR 160 no.1:71-72 Ja '65. (MIRA 18:2)

1. Ob"yedinennyy institut yadernykh issledovaniy. Submitted August 4, 1964.

ACCESSION NR: AP4047883 S/0056/64/047/004/1228/1231

AUTHORS: Guzhavin, V. M.; Kliger, G. K.; Kolganov, V. Z.; [illegible]; A. V.; Marish, K. S.; Musin, M. A.; Proko[illegible]; Sh. D.; Smolyanin[illegible]; V. T.; Sokolov, A. P.; Soroko, L. M.; Ts'u[illegible]

TITLE: Elastic proton scattering at 650 MeV

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 4, 1964, 1228-1231

TOPIC TAGS: proton proton scattering, elastic scattering, angular dependence, scattering cross section, differential cross section

ABSTRACT: A total of 1767 events of elastic p-p scattering at 650 MeV was registered with the liquid-bubble chamber of the ITEF, placed in the beam of protons with energy 650 ± 5 MeV. The equipment and procedure were described by the authors elsewhere (ZhETF v. 46, 1245, 1964); the proton scattering angles were measured with

[illegible] issledovaniy

[illegible] results."

Card 1/2

REF SOV: 006

ENCL: 00

OTHER: 001

Card 2/2

L 10598-65

ACCESSION NR: AP4047465 S/0120/64/000/005/0093/0099

AUTHOR: Dunaytsev, A. F.; Prokoshkin, Yu. D.

B

TITLE: Multichannel coincidence and anticoincidence circuit with a short resolution time

SOURCE: Pribory* i tekhnika eksperimenta, no. 5, 1964, 93-99

TOPIC TAGS: coincidence circuit, anticoincidence circuit, multichannel coincidence circuit, multichannel anticoincidence circuit

ABSTRACT: Based on an earlier double-coincidence circuit with a resolut time of 10 nsec, the present circuit uses a bridge as an element for isolating both coincidence and anticoincidence and has a resolution time of 1 nsec; the bridge has n inputs (see Enclosure 1). The circuit characteristics measured by a 70-Mev pi-meson beam are: the plateau, over 600 v; resolution for the narrowest curve, 0.8 nsec; half-width of the resolution curves at 10^{-4} is

Card 1/3

L 10598-65
ACCESSION NR: AP4047465

3--6 nsec; for triple coincidence, the narrowest curve has a resolution of 0.8 nsec and an efficiency of 70%; with a 100% efficiency, the resolution is 1.5 nsec; the resolution curves fall off at a rate of 1--1.5 orders per nsec. Data for quintuple coincidence is also supplied. The above circuit has been used for five years in experiments with the OIYaI synchrocyclotron. "We are taking this opportunity to thank G. P. Zorin for his high-quality wiring work." Orig. art. has: 8 figures.

ASSOCIATION: Ob"yedinennyy institut yaderny*kh issledovaniy (Joint Institute for Nuclear Research)

SUBMITTED: 03Oct63 ENCL: 01

SUB CODE: NP, NP NO REF SOV: 001 OTHER: 002

L 10598-65
ACCESSION NR: AP4047465

ENCLOSURE: 1

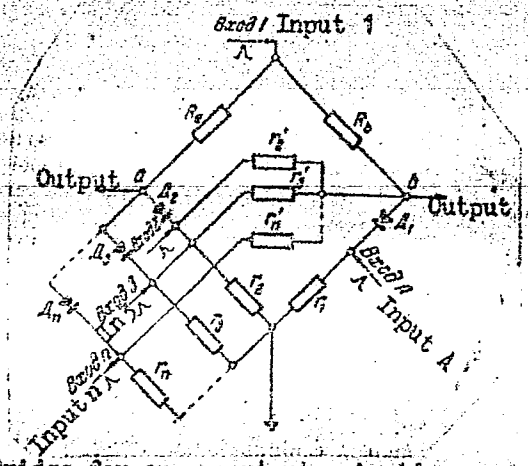


Fig. 1. Bridge for an n-output coincidence circuit with one anticoincidence channel

Card 3/3

ACCESSION NR: AP4033099 S/0120/64/000/002/0022/0023

AUTHOR: Petrukhin, V. I.; Prokoshkin, Yu. D.; Soroko, V. M.

TITLE: Foam-polystyrene liquid-hydrogen target

SOURCE: Pribory* i tekhnika eksperimenta, no. 2, 1964, 22-23

TOPIC TAGS: nuclear target, liquid hydrogen target, foam polystyrene target

ABSTRACT: A new two-chamber foam-polystyrene liquid-hydrogen-filled target is described (see Fig. 1 of the Enclosure). The liquid hydrogen is stored in a tank(3) surrounded by a liquid-nitrogen screen(5). The tank is connected with the targets (1) and (2); one of them can be placed into a beam of particles. The targets and the tank are surrounded by foam-polystyrene jackets which are cooled by the ambient evaporating hydrogen. The 13-liter nitrogen jacket(4) is made from stainless steel. Provision is made for the rapid

Card 1/3

ACCESSION NR: AP4033099

removal of the hydrogen from the targets (1) and (2). The hydrogen capacity is 33 liters; cooling nitrogen consumption is 6 lit/hr; time of hold of the hydrogen (ortho plus para in 3:1 ratio) is 30 hr. "We take this opportunity to thank V. Vlasov and V. N. Dmitriyevskaya for their help in preparing and testing the target." Orig. art. has: 1 figure.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Nuclear Research Institute)

SUBMITTED: 21May 63 DATE ACQ: 11May64 ENCL: 01

SUB CODE: NP NO REF SOV: 000 OTHER: 002

ATD PRESS: 3043

Card 2/3

ACCESSION NR: AP4033099

ENCLOSURE: 01

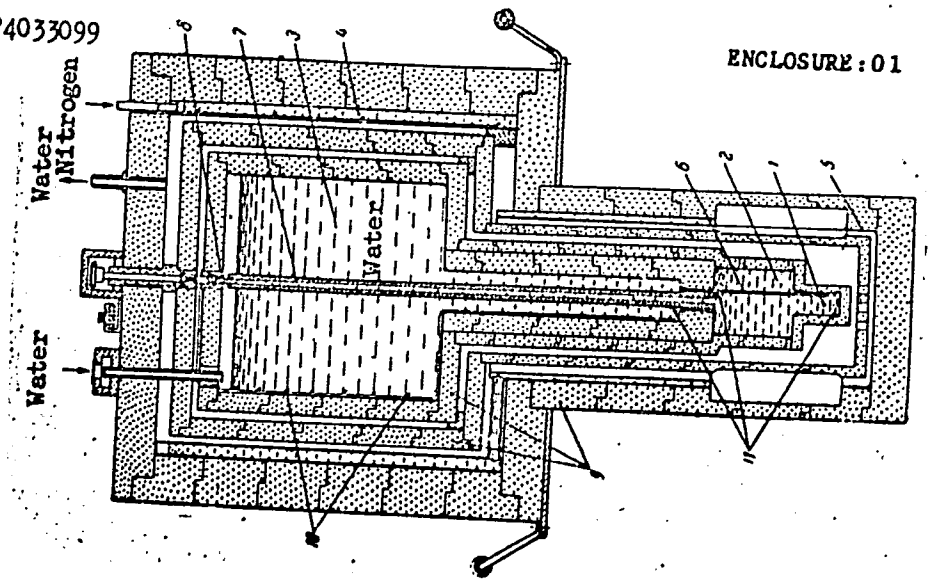


Fig. 1. New design of a foam-polystyrene liquid-hydrogen target

Card 3/3

ACCESSION NR: AP4042373 S/0056/64/047/001/0084/0091

AUTHORS: Dunaytsev, A. F.; Petrukin, V. I.; Prokoshkin, Yu. D.; Ry*kalin, V. I.

TITLE: Pion beta decay

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 1, 1964, 84-91

TOPIC TAGS: pion, beta decay, Cerenkov counter, nucleon, positron

ABSTRACT: Continuing earlier investigations (Intern. Conf. on Fundamental Aspects of Weak Interactions, Brookhaven, USA, 1963) the authors registered 43 cases of pion beta decay with the aid of Cerenkov spectrometers. The relative probability of this decay was found to be $\lambda = (1.1 \pm 0.2 \times 10^{-8})$, which confirms the hypothesis of vector current conservation. The installation used for the measurement was described elsewhere (PTE, no. 1, 159, 1963) and consisted of four Cerenkov total-absorption spectrometers. The experi-

ments were made with the synchrocyclotron of the laboratory of nuclear problems OIYaI at the end of 1962. The experimental setup and the adjustment of the apparatus are described. The measurements lasted 500 hours and involved the passage of 4×10^{10} pions. The apparatus was recalibrated by means of pulsed light sources every two hours. The values obtained for the constants G and $G\beta$, which characterized the beta decay of the pion and the nucleon, were found to be approximately the same, $G = (1.03 \pm 0.11)\ G\beta$, which is also in agreement with the data obtained at CERN (P. Depommier et al., Phys. Lett. v. 5, 61, 1963). The energy spectrum of the positrons produced in pion beta decay agrees with that calculated on the basis of the vector-current conservation hypothesis. "In conclusion we thank G. P. Zorin, V. I. Orekhov, A. V. Revenko, N. N. Khovanskiy, V. A. Cherny*kh, L. N. Andrianova and her co-workers, N. B. Yedovina, N. M. Kovalev, and K. A. Baycher and his co-workers for help in producing the apparatus and with the investigation. We are grateful to Kim Ge Fa, E. V. Nyagu, Z. F. Prokoshkina, and M. Sgonova for

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001343220015-0"

ACCESSION NR: AP4042373

scanning and processing the photographs." Orig. art. has: 8 figures and 3 formulas.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

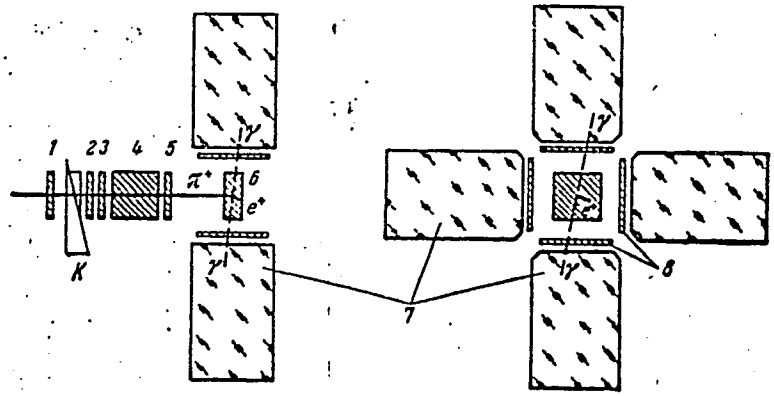
SUBMITTED: 14Feb64 ENCL: 02

SUB CODE: NP NR REF SOV: 008 OTHER: 010

3/5

ACCESSION NR: AP4042373

ENCLOSURE: 01



Experimental setup. 1 - 6) scintillation counters, 7)Cerenkov total absorption spectrometers, 8) anticoincidence scintillation counters, K - decelerating filter,

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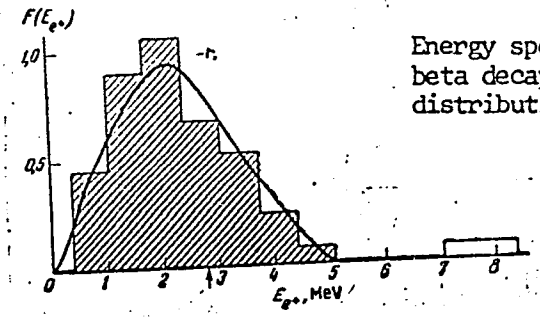
ACCESSION NR: AP4042373

ENCLOSURE: 02



Energy spectrum of positrons produced in pion beta decay. Arrow - position of positive muon distribution maximum

Card 5/5

PROKSIK, Josef, inz.

Some problems of ensuring the product quality in the general machine industry. Podn org 16 no.11:483-485 N '64.

1. Ministry of General Machine Industry, Prague.

PROKOTT, E.

Electrical Engineering Abstracts
June 1954
Electrical Engineering

2573. A simple method of estimating u.s.w. propagation within the visual range. E. PROKOTT. *Telefunken Ztg*, 26, 346–52 (*Dec.*, 1953) *In German.*

621.396.11.08 : 621.396.61

The effective service area of an u.s.w. broadcasting transmitter is determined by means of a relief map of the particular district, taking account of the curvature of the earth's surface. A point source of light is mounted over such a relief map at a height and location corresponding to those proposed for a transmitting aerial. From photographs showing the intensity of illumination of the district round the proposed transmitting site, a good estimate can be made of the effective service area. The use of the method is illustrated by results obtained with a relief map of the Harz Mountains district, transmitting aerials at heights of 50 m and 200 m being assumed on the Torfhaus and on the Bocksberg and at a height of 100 m near Braunschweig. The results obtained are discussed with reference to diffraction theory. The horizontal scale of the relief map used was 1 : 100 000, the vertical scale being 1 : 5000.

A. WILKINSON

10-4-54 RP

RYABOVA, T.S.; GLEBOV, R.N.; SHABAROVA, Z.A.; PROKOV'YEV, M.A.

Synthesis of methyl ether of N-adenyl-5-phenylalanine by the carbodiimide method. Dokl. AN SSSR 153 no.2:363-365 N '63. (MIRA 16:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom A.N.Belozerskim.