

L 17620-63

8/056/63/044/003/018/053 /

Near threshold photoproduction...

ASSOCIATION: Fizicheskii Institut im. P. N. Lebedeva Akademii nauk SSSR (Physics
Institute im. P. N. Lebedev of the Academy of Sciences USSR)

DATE: October 25, 1962

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100-41
AUTHOR: Govorohov, S. B.; Denisov, S. P.; Lebedev, A. I.; Kinarik, Ye. V. 60
ACCESSION NO: AFJ000035 54
a/0056/63/044/005/1463/1469

TITLE: High partial waves in the photoproduction of neutral pions on protons

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 44, no. 5, 1963, 1463-1469

TOPIC TAGS: Neutral pion photoproduction, threshold reactions, partial waves

ABSTRACT: The angular distribution of neutral pions produced on protons by photons of 181 MeV energy was measured with an aim at comparing directly the experimental results with the exact dispersion-relation calculations, which hitherto has met with some difficulties. An increase in the experimental accuracy and a determination of experimental quantities that can be calculated without the need for taking the dispersion integrals into account can help account for the remaining disparity. The authors describe an accurate measurement of the angular distributions of the neutral-pion photoproduction on protons near threshold, and give an analysis of the results from the point of view of reconciliation of experiment with dispersion-relation calculations. The

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ACCESSION NO: AP3000035

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neutral pions were registered by simultaneously counting the two decay photons by scintillation-counter telescopes. The net results were more accurate angular distributions for neutral-pion photoproduction near threshold, better agreement with the one-dimensional dispersion-relation calculation, and detection of some disparity between the experimental data and the dispersion-relation calculations if no account is taken of the resonant meson states. This may indicate that the resonance meson states make some contribution to the investigated process. The authors thank P. A. Cherenkov for interest in this work, A. N. Baldin for valuable advice, A. Ya. Kutsenko for help in the work with the computer, I. A. Yegorov for numerical estimates, A. G. Gerasimova for help in carrying out the experiments, and the whole synchrotron crew of the Physics Institute of the Academy of Sciences." There are five figures and three tables.

ASSOCIATION: Fizicheskii Institut im. P. N. Lebedeva, Akademii nauk SSSR
 (Physics Institute, Academy of Sciences)

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DMT(m)/BOS AFPTC/ASD

ACCESSION NR: AF3003098

S/0056/63/044/006/1780/1786

59
52

AUTHOR: Goverkov, B. D.; Denisov, S. P.; Kinarik, Ye. V.

TITLE: Determination of nuclear dimensions from differential cross sections for neutral pion photoproduction

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1780-1786

TOPIC TAGS: nuclear dimension, neutral pion photoproduction, angular distribution, cross section, amplitude

ABSTRACT: The results of neutral pion photoproduction are presented for a mean primary photon energy of 182 MeV. These data, along with the angular distributions of neutral pions obtained in earlier experiments for 154 MeV energy, are analysed in order to obtain some parameters of the nucleon distribution in Be, C, Al, Cu, Cd, Ta, and Pb nuclei. The experimental apparatus and the setup of the experiments will be described elsewhere (ZhETF, in press). The results agree satisfactorily with the uniform model in the case of Cu, Cd, and Ta, which in the case of these metals coincide with the results of the trapezoidal model. The values obtained for the amplitudes can also be reconciled with the calcula-

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tions. "In conclusion the authors thank P. A. Cherenkov and A. M. Baldin for interest in their work, S. N. Sokolov and L. N. Shtarkov for helpful consultations on the analysis of the experimental data by the least-squares method, and also the cyclotron crew of the Physics Institute. We would also like to thank A. V. Kutsenko, P. N. Kozolov, and the staff of the computing department of the Physics Institute for help with the calculations on the electronic computers." Orig. art. has: 11 figures, 5 formulas, and 2 tables.

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

SUBMITTED: 25Feb63date scq/ 23Jul63

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OTHER: 006

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1321-45
SECRETION NR: AP4047884
DWT(a)/MI(a)-2
SD(1)

S/0056/64/047/004/1199/1201

AUTHORS: GOTOVKOV, B. B.; Denisov, S. P.; Lebedev, A. I.; Minarik, S. P.; KUZNETSOV, S. P.

TITLE: Photoproduction of neutral pion by protons at 210 MeV

B

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 4, 1961, 1199-1201

TOPIC TAGS: photoproduction, neutral pion, gamma proton interaction, dispersion relation, photoproduction cross section

ABSTRACT: In view of its significance to a complete phase shift analysis and the information it can yield on the applicability of dispersion theory, the process $\gamma + p \rightarrow p + \pi^0$ was investigated and the differential cross section was measured for 6 meson emission angles at photon energy 210 ± 14 MeV in the laboratory system. The investigations were carried out in the bremsstrahlung beam of the

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FIAN 265-MeV synchrotron. The neutral pions were observed by detecting the two decay γ quanta in coincidence. The apparatus used was described by the authors previously (ZhETF v. 44, 1463, 1963, except that a liquid hydrogen target was used in an ordinary glass Dewar with wall thickness 1 mm. The hydrogen capacity of the Dewar was 4 liters, so that continuous measurements could be made for 12 hours. The differential cross sections for the production of π^0 mesons from protons were calculated from the measured yield by the method described by Govorkov et al. (ZhETF v. 44, 878, 1963). Comparison of the results with those by others showed good agreement. In comparing the data with the cross sections calculated on the basis of the dispersion relation it is concluded that the data presented can be described within the framework of the bipion model without introduction of a subtraction constant in the $\gamma + \pi \rightarrow \pi + \pi \rightarrow \pi + \pi$ channel. The authors are grateful to A. M. Baldin for helpful discussions and R. S. Uvarov for assistance with the numerical calculations." Orig. art. has: 1 figure.

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ASSOCIATION: Fizicheskii Institut im. P. N. Lebedeva Akademii nauk
SSSR (Physics Institute, Academy of Sciences SSSR)

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