Single-Positive-Pion Photoproduction on Hydrogen in the Energy Range \((500 \div 800)\) MeV.

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(ricievuto il 19 Ottobre 1967)

Summary. — Cross-sections for the photoproduction of positive pions in hydrogen have been measured at the 1.1 GeV Frascati electron synchrotron for photon energies \(E_\gamma\) between 500 and 800 MeV and for \(\pi^+\) c.m. angles of \(\theta = 30^\circ, 90^\circ\). The cross-sections exhibit a smooth behavior as a function of energy for \(E_\gamma = (500 \div 600)\) MeV. No immediate evidence is found of a contribution of the \(P_{11}\) resonance.

We report measurements of the differential cross-section of the single-
\(\pi^+\) photoproduction

\[ \gamma + p \rightarrow n + \pi^+, \]

for \(\theta = 30^\circ, 90^\circ\) (c.m. production angle of the pion) in the range of energy \(E_\gamma = (500 \div 800)\) MeV.

Preliminary results have been reported at the Meeting of the Italian Physical Society (Trieste, November 1966).

The experiment has been designed in order to add data in the rather poor region between the «1st» and «2nd» resonance (1).

As is also known the contributions of the $P_{11}$ resonance (1) could appear in this region.

1. – The experimental set-up is shown in Fig. 1. Charged positive particles, produced in a liquid hydrogen target ($d = 6$ cm) by the bremsstrahlung beam of the Frascati electronsynchrotron, have been analysed by the strong focusing magnet ($M$) (3) with an angle and momentum acceptance given, respectively, by $\Delta \theta = \pm 2^\circ$ and $\Delta p/p = \pm 8\%$ (corresponding to $\pm 2\%$ for each channel; see later). The $\pi^+$-momentum and angle determine the kinematics of the reaction (1).

The Čerenkov counters $G$ (CO$_2$, 10 atm) and $C$ (H$_2$O, $d = 10$ cm) discriminate against the electrons and the protons, respectively.

The rejection factor against these particles was 0.03 (protons), 0.01 (electrons), with a variation over the momentum band accepted certainly less than 0.01.

Simultaneous measurements have been carried out on a large momentum band $\Delta p/p = \pm 8\%$, subdivided in four intervals by means of the multichannel logic described in (4). To each of these channels correspond a momentum acceptance and separation of $\Delta p/p = \pm 2\%$ and 3.1\%, respectively. The electronic block diagram is shown in Fig. 2.

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