

Lawrence Berkeley National Laboratory

Recent Work

Title

SUMMARY OF THE RESEARCH PROGRESS MEETING OF APRIL 20, 1950

Permalink

<https://escholarship.org/uc/item/2fz2v05g>

Author

Kramer, Henry P.

Publication Date

1950-08-17

UNIVERSITY OF
CALIFORNIA

*Radiation
Laboratory*

BERKELEY, CALIFORNIA

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.

UNIVERSITY OF CALIFORNIA
Radiation Laboratory

Contract No. W-7405-eng-48

UNCLASSIFIED

Summary of the Research Progress Meeting of April 20, 1950

Henry P. Kramer

August 17, 1950

Some of the results reported in this document may be of a preliminary or incomplete nature. It is the request of the Radiation Laboratory that the document not be circulated off the project nor the results quoted without permission.

-2-

<u>INSTALLATION:</u>	<u>No. of Copies</u>
Argonne National Laboratory	8
Armed Forces Special Weapons Project	1
Atomic Energy Commission, Washington	2
Battelle Memorial Institute	1
Brush Beryllium Company	1
Brookhaven National Laboratory	4
Bureau of Medicine and Surgery	1
Bureau of Ships	1
Carbide and Carbon Chemicals Division (K-25 Plant)	4
Carbide and Carbon Chemicals Division (Y-12 Plant)	4
Chicago Operations Office	1
Columbia University (J. R. Dunning)	1
Columbia University (G. Failla)	1
Dow Chemical Company	1
H. K. Ferguson Company	1
General Electric, Richland	3
Harshaw Chemical Corporation	1
Idaho Operations Office	1
Iowa State College	2
Kansas City Operations Branch	1
Kellex Corporation	2
Knolls Atomic Power Laboratory	4
Los Alamos Scientific Laboratory	3
Mallinckrodt Chemical Works	1
Massachusetts Institute of Technology (A. Gaudin)	1
Massachusetts Institute of Technology (A. R. Kaufmann)	1
Mound Laboratory	3
National Advisory Committee for Aeronautics	1
National Bureau of Standards	3
Naval Radiological Defense Laboratory	2
New Brunswick Laboratory	1
New York Operations Office	3
North American Aviation, Inc.	1
Oak Ridge National Laboratory	8
Patent Branch, Washington	1
Rand Corporation	1
Sandia Corporation	1
Santa Fe Operations Office	2
Sylvania Electric Products, Inc.	1
Technical Information Division (Oak Ridge)	15
USAF, Air Surgeon (Lt. Col. R. H. Blount)	1
USAF, Director of Armament (Captain C. I. Browne)	1
USAF, Director of Research and Development (Col. R. J. Mason, Fred W. Bruner)	2
USAF, Eglin Air Force Base (Major A. C. Field)	1
USAF, Kirtland Air Force Base (Col. Marcus F. Cooper)	1
USAF, Maxwell Air Force Base (Col. F. N. Moyers)	1
USAF, NEPA Office	2
USAF, Office of Atomic Energy (Col. H. C. Donnelly, A. A. Fickel)	2
USAF, Offutt Air Force Base (Col. H. R. Sullivan, Jr.)	1
USAF, Wright-Patterson Air Force Base (Rodney Nudenberg)	1

-2a-

INSTALLATION:No. of Copies

U. S. Army, Atomic Energy Branch (Lt. Col. A. W. Betts)	1
U. S. Army, Army Field Forces (Captain James Kerr)	1
U. S. Army, Commanding General, Chemical Corps	
Technical Command (Col. John A. MacLaughlin thru	
Mrs. Georgia S. Benjamin)	1
U. S. Army, Chief of Ordnance (Lt. Col. A. R. Del Campo)	1
U. S. Army, Commanding Officer, Watertown Arsenal (Col. C. H. Deitrick)	1
U. S. Army, Director of Operations Research (Dr. Ellis Johnson)	1
U. S. Army, Office of Engineers (Allen O'Leary)	1
U. S. Army, Office of the Chief Signal Officer	
(Curtis T. Clayton thru Maj. George C. Hunt)	1
U. S. Army, Office of the Surgeon General (Col. W. S. Stone)	1
U. S. Geological Survey (T. B. Nolan)	2
USAF, Director of Plans and Operations (Col. R. L. Applegate)	1
U. S. Public Health Service	1
University of California at Los Angeles	1
University of California Radiation Laboratory	5
University of Rochester	2
University of Washington	1
Western Reserve University	2
Westinghouse Electric Company	4
Naval Medical Research Institute	1
California Institute of Technology (R. F. Bacher)	1
TOTAL	138

Information Division
Radiation Laboratory
University of California
Berkeley, California

Summary of the Research Progress Meeting of April 20, 1950

Henry P. Kramer

Department of Physics, Radiation Laboratory
University of California, Berkeley, California

August 17, 1950

Production of Mesons by Protons on Protons at 0° to the Beam. W. Cartwright.

Two basic techniques have been used in the production of mesons in the external beam of the 184-inch cyclotron by the group of Richman and Wilcox. One method was based on the identification of mesons without the use of a magnetic field merely by the tracks traced by the mesons in nuclear emulsion. This method proved to be quite satisfactory except at small angles since in the forward direction the background of protons scattered from the beam made the plates illegible. The present technique employs a 12,000 gauss magnetic field for the separation of positive from negative mesons and is particularly suited to supplement the other method for the detection of mesons emitted at small angles to the beam. The schematic of the apparatus in Fig. 1 shows that mesons produced in the target are bent into channels in a copper block and are received near the end of their trajectories by stacks of nuclear plates. Proton background is no problem on the negative side. Protons that may have the correct energy and initial scatter angle to be deflected by the magnetic field into the positive meson channel are prevented from being recorded on the nuclear emulsion by means of a metal foil which permits the more energetic mesons to pass but stops the protons. In evaluating the nuclear plates the convention is followed that only tracks ending in the emulsion are included in the data. Fig. 2 shows the results that have been obtained for hydrogen at 0° . The curve for hydrogen was found by subtracting the cross section measured with a carbon target from that

obtained with a CH₂ target. It is planned to investigate the fine structure of the peak indicated by the hydrogen curve.

Proton-Proton Scattering as a Function of Energy. B. Cork.

Since the differential cross section for proton-proton scattering at 90° in the center of mass system had not been previously studied in the interval from 14 to 32 Mev it was decided to perform an experiment to supplement existing information. The apparatus that was used is sketched in Fig. 3. Protons of the desired energy, 18.8 Mev, were obtained by adjusting the energy of the Van de Graaff injector and the field strength of the drift tubes. Protons of the appropriate energy were selected from the beam by means of a magnet. Figs. 4 and 5 show the results of the present experiment and a summary of the work done over the entire energy interval that has been investigated by different authors.

Photoproduction of Mesons from Liquid Hydrogen. A.S. Bishop.

By means of the apparatus and delayed coincidence circuit pictured in Fig. 6 the photoproduction of π^+ -mesons from liquid hydrogen is being measured. In order to detect the mesons by means of a telescope of crystal counters one takes advantage of the decay of the π^+ -meson into a μ^+ -meson which in turn decays into a positron. If a meson is stopped in the second crystal and decays there, it is counted. Two consecutive pulses announce such an event on an oscilloscope screen. Because of the short half-life of the π^+ -meson the pulses produced by the π^+ - and μ^+ -mesons appear as one. Approximately two microseconds later a pulse due to the resulting positron appears on the screen. Background produced by stray γ -rays was found to be negligible. An energy distribution was obtained by placing various thicknesses of absorber between the hydrogen target and the counting apparatus.

From conservation of energy and momentum one sees that at a given angle of emission with respect to the x-ray beam, the energy of the π^+ -meson is a function of the photon energy. By observing the energy distribution of the continuous $1/E$ synchrotron beam as well as the energy distribution of the π^+ -mesons produced one can deduce an excitation function. The raw data for 90° are shown in Fig. 7. The derived excitation function is pictured in Fig. 8. At present, the experimental results seem to fit the scalar theory better than the pseudo-scalar although no conclusions can be drawn. In order to make a sounder judgment in this matter it will be necessary to investigate the production at angles other than 90° .

The Tumor-Host Relationship. K. G. Scott.

By administering I^{131} -labeled thyroxin to rats and determining the residue of this radioactive material in the organs of animals with tumors of various sizes, it was found that the uptake of thyroxin in the thyroid, which is the organ that normally accumulates most of the thyroxin, decreases with increasing size of tumor. Similarly a quantitative difference was found between the thyroxin content of the intestinal tract of tumorous rats and that of normal animals.

Tumors were broken into their biochemical constituents and were administered to normal rats. It was found that none of the fractions with the exception of the proteose group produced an upset metabolism. Proteose, an extremely toxic material which has the function of dilating capillaries, however, disturbed the thyroid metabolism.

This work was performed under the auspices of the Atomic Energy Commission.

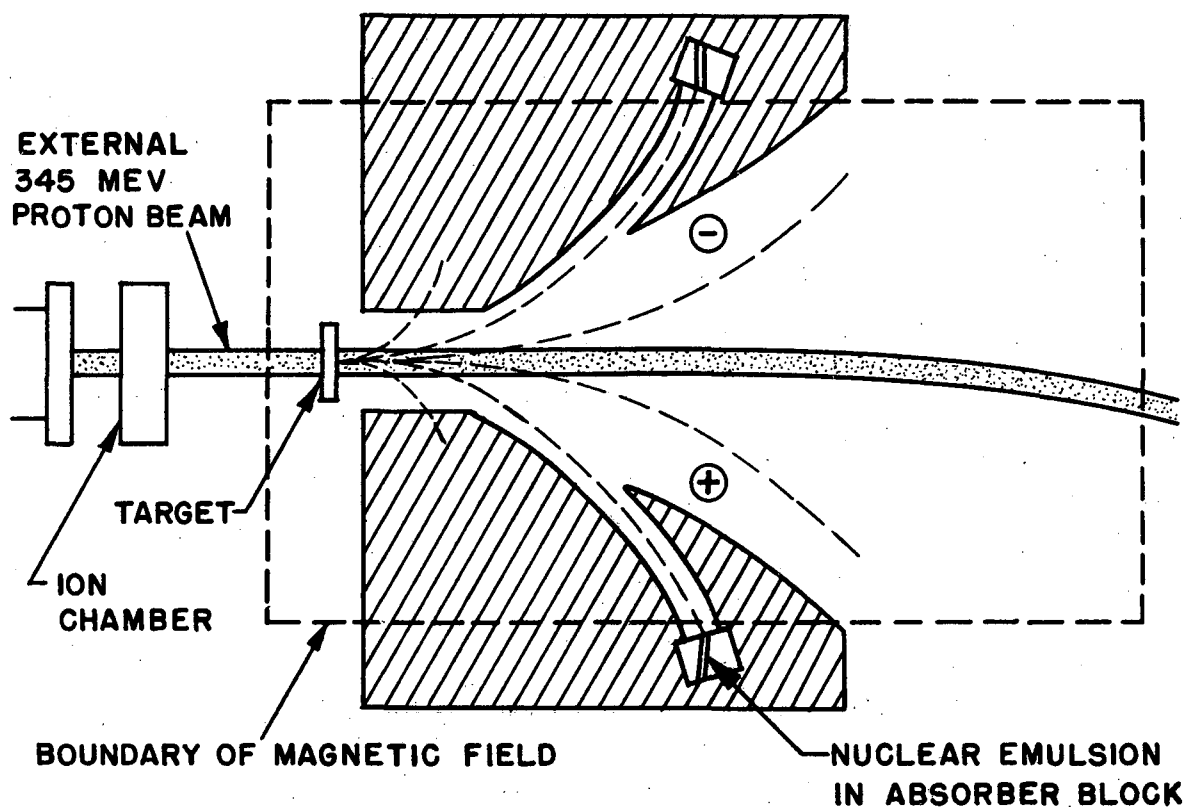


FIG. 1

Mu 132

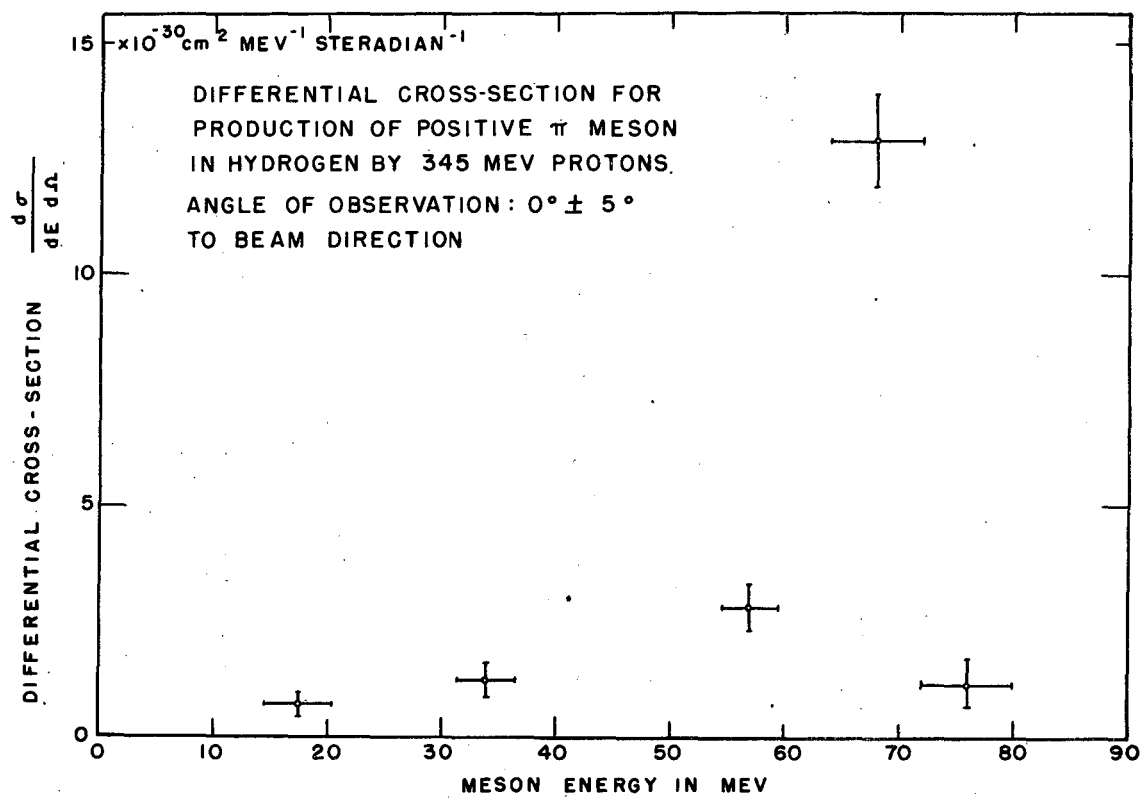
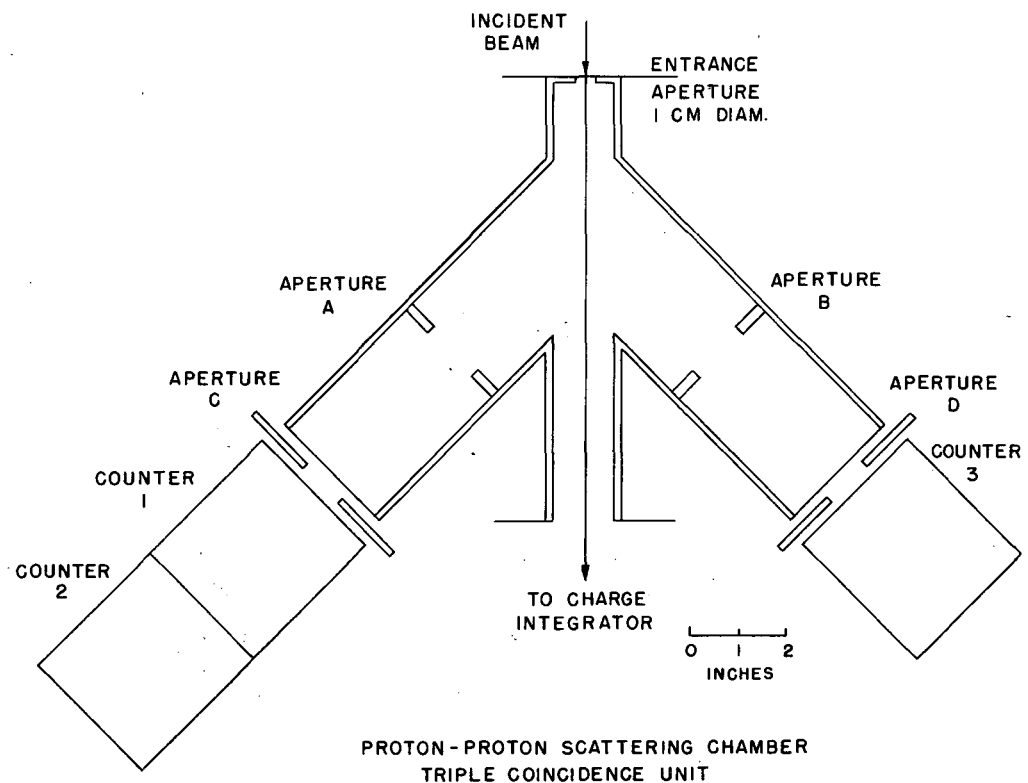


FIG. 2

Mu 133



MU 242

14766-1

Fig. 3

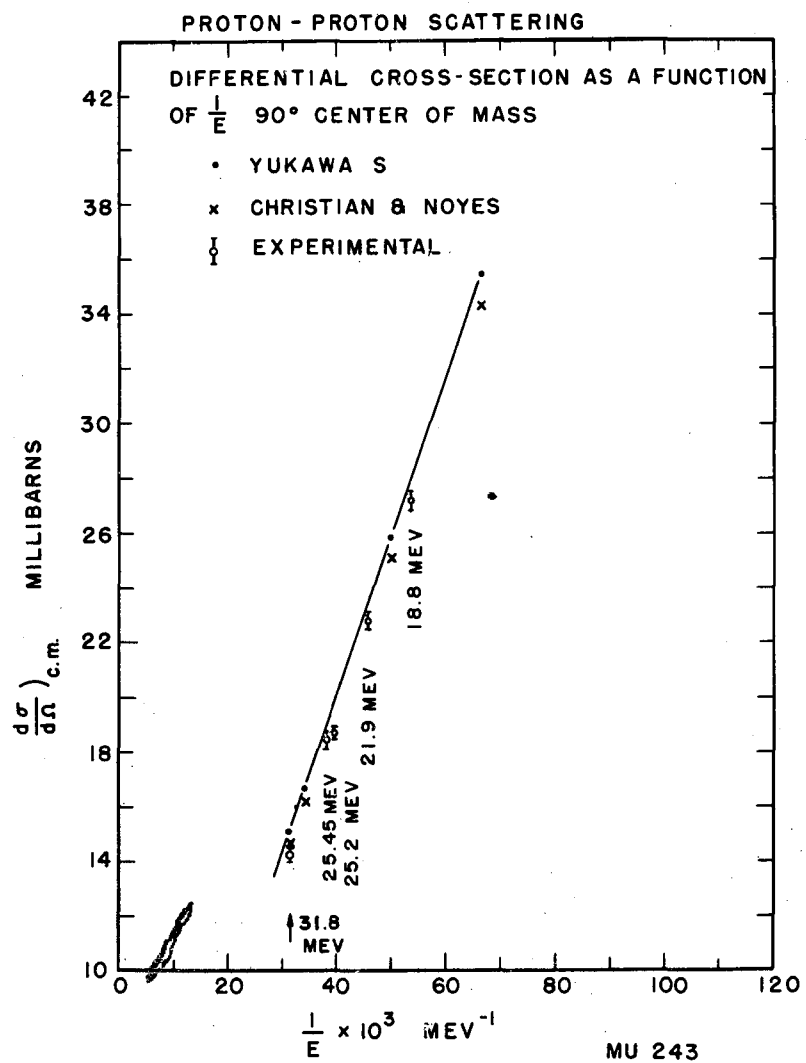


Fig. 4

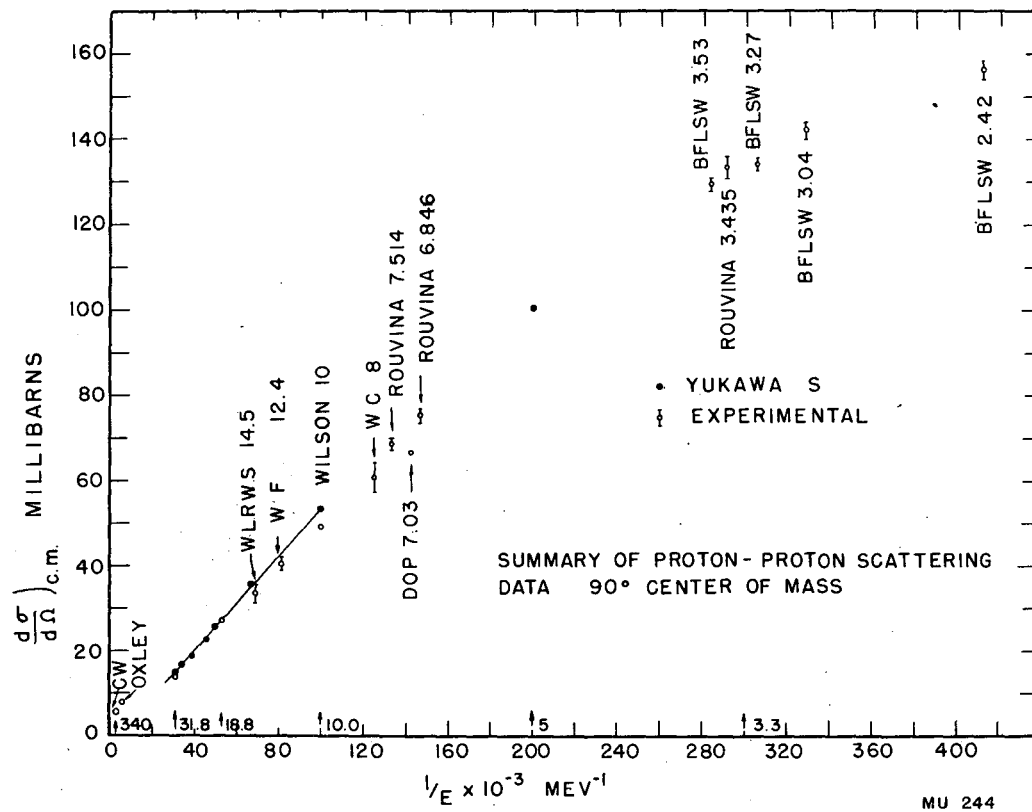
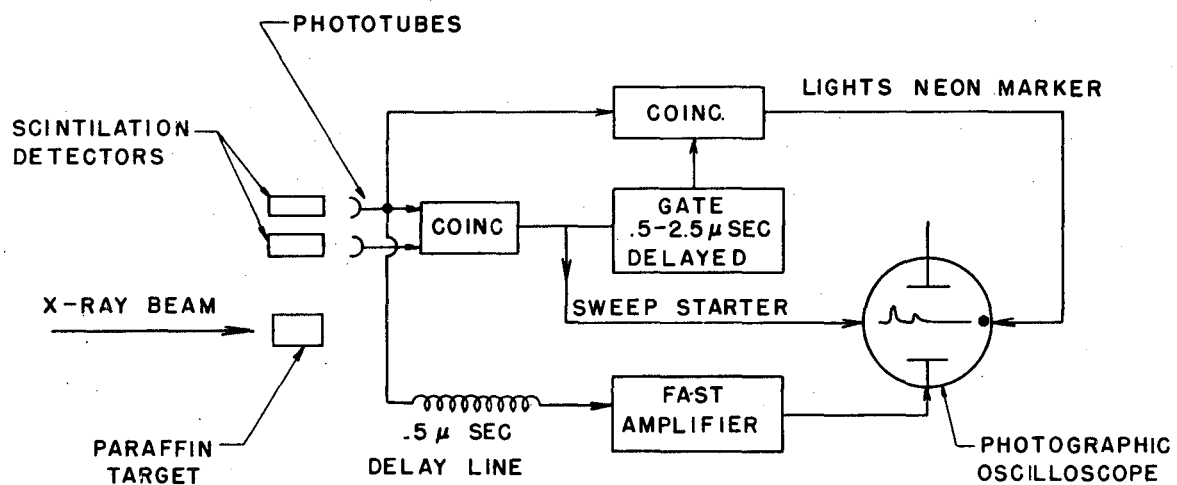


Fig. 5



MU 232

Fig. 6

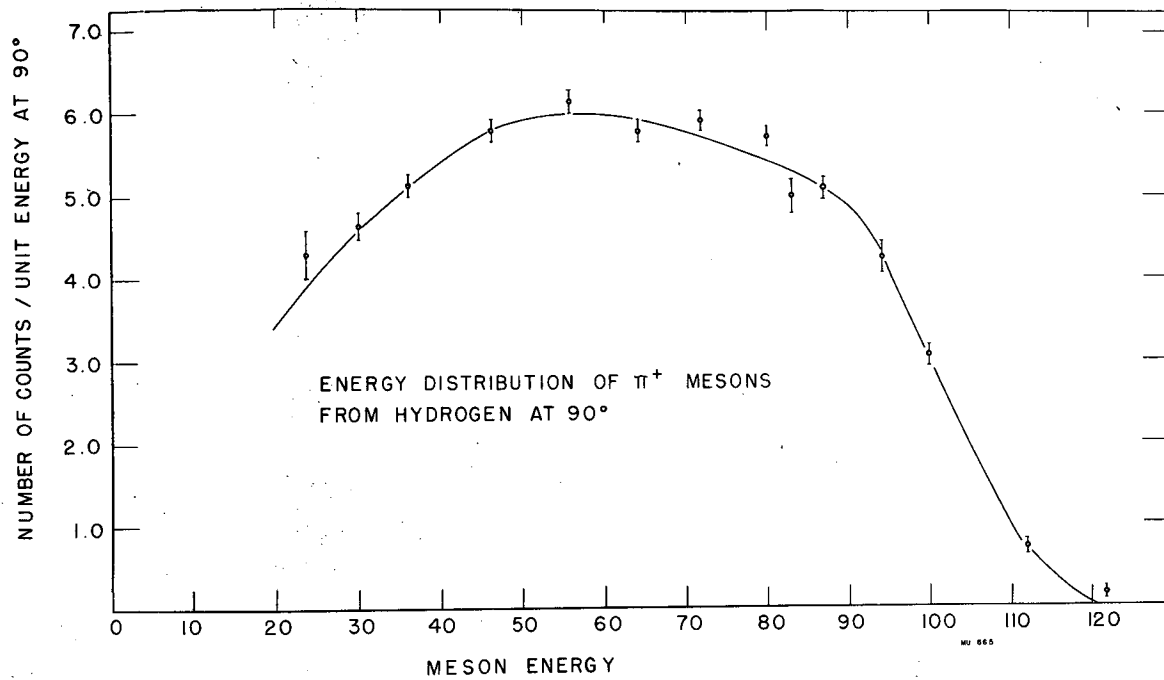


FIG. 7

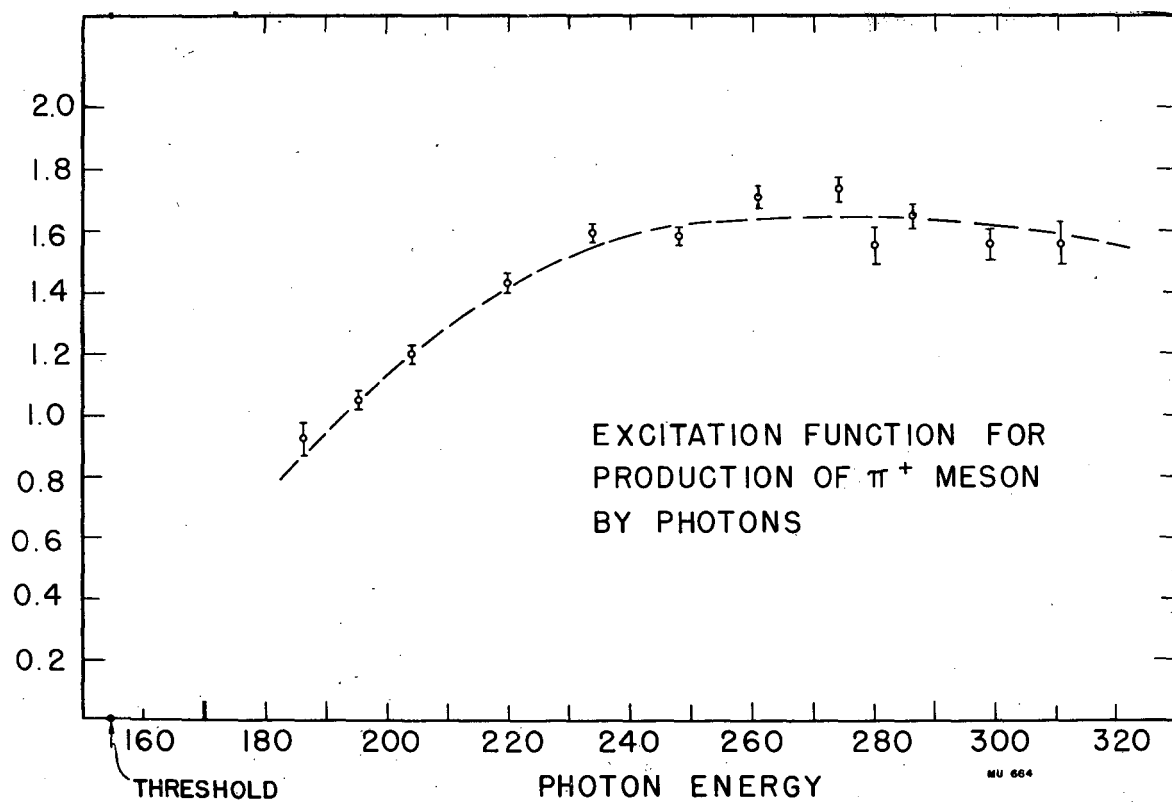


FIG. 8