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EXPERIMENTAL PHYSICS DIVISION OF THE LOS ALAMOS PROJECT

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GROUP P1 -- SEMI-MONTHLY REPORT, R.R. Wilson, Group Leader -- September 1, 1943

JOB AND PERSONNEL

PROGRESS

1. Cyclotron	Outside beam up to 5 μ amp.
2. Delayed Neutrons	
a. Baker Method
Klema, Williams,
Snyder, Anderson	Data taken with unseparated material indicates good results can be expected with the enriched sample. Enriched sample now in the chamber.
b. Baker (Thorium)
Fowler	Counter tested. Experiment ready to be tried.
c. Coincidence Method
Woodward, DeWire, Wilson	Apparatus completed and being tested.
d. Recoil Scattering Method
Wilson	In limbo temporarily.
3. Fast Modulation
Sutton, Bridge, Allen
DeWire	No report
4. γ 49
DeWire, Woodward, Wilson	See Baker Experiment (Coincidence Method)
5. Slow Modulation
McDaniel, Lavatelli
Woodward, Fowler	Arc Control Circuit being developed. Gas Chamber in shop.

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GROUP P2 -- SEMI-MONTHLY REPORT, J.H. Williams, Group Leader -- September 1, 1943

JOB AND PERSONNEL

PROGRESS

3. $\sigma(49)/\sigma(25)$ as a function of energy
Williams Hanson Turner
and long tank operations crew.

Measurements concluded with observation at 1.5 Mev. This gave value relative to that of thermals as $.92 \pm .07$, the same as at 1.0 Mev. Calculations in progress report to be written.

6. $\sigma(B)/\sigma(25)$ to test $1/v$ law in low energy range.
Bailey Hanson and short tank operations crew.

Measurements with slowing down material concluded. Results calculated by Konopinski show that break in the cross-section of 25 occurs in the region of 25 to 40 volts and of magnitude from 3 to 4.

Further measurements at .2, .4, .6, .8, and 1.0 Mev are scheduled for long tank in near future. Preliminary measurements indicate no further break in the relative cross-section at these high energies.

9. Improvements in Existing Equipment.

- A. New Short Tank Design.
Krohn McKibben.

Work progressing in shop.

- C. New Pumping System.
Williams.

Pumps being tested.

- D. New Source in Long Tank.
Turner.

Source being tested.

- E. Electrostatic Analyser for short tank.
Hush.

Mechanical design in progress.

- F. Corona control for Short Tank
Frisch

Electrical tests indicate probable success.

10. Tests on coincidence proportional counters.
Thompson Nuckolls
Blair Koontz

Evaporator for making radiators completed. Tests on possible sublimation of radiators in vacuum being run.

Cross-fire apparatus indicates approximately 25 percent pickup between coincidence stages. Should not be bothersome but may need further development. Final counter now being finished in shop.

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JOB AND PERSONNEL

11. Neutron spectra by photographic technique
Richards Mrs. Perlman
Greisen
12. $\sigma(\text{Th})/\sigma(25)$ and $f(\text{En})$.
Greisen Taschek Turner.
13. $\sigma(25)$ as $f(\text{En})$.
Hanson Perry Greisen.
14. $\sigma(11)$ divided by σ of 25
as a function of energy.
Frisch Greisen Turner
15. $\sigma(10)$ divided by σ of 25
as function of energy.
Perry Taschek Blair

PROGRESS

Results of approximately 700 tracks from Minnesota plates now available. Graph of 450 of these tracks indicates spectrum similar to English results and very different from Stanford results. Average energy approximately 2 Mev. Plans to compare further measurements with early measurements in progress. Calibration of plates at .5, 1.0, and 1.5 Mev are being made.

Delay in shop necessitates scheduling of these measurements for first half of September.

Further progress awaits completion of CP counter.

Preliminary measurements with old Columbia sample indicate threshold at .4 Mev and cross-section same order of magnitude as 25. Possible contamination of alloy indicated by constant relative cross-section below .4 Mev. Plans to purify sample and obtain further pure samples for further work in progress.

Arrangements made to obtain approximately 30 percent sample from Segre. Measurements to be delayed until after Job 12, in order that contribution of thorium be known.

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GROUP P3 -- SEMI-MONTHLY REPORT, J.H. Manley, Group Leader -- September 1, 1943

Only those items on the list in the August 12 report on which there has been a significant change are included below.

JOB AND PERSONNEL

PROGRESS

<p>I. Accelerator</p> <p>e. Voltmeter
Agnew</p>	Installed and in operation
<p>II. Experimental preparation and results</p> <p>a. Detecting equipment for scattering experiment.
Koontz, Agnew, Waldman, Bright, Coon   b. Geometrical arrangement
Bright, Hoogterp, Coon, Waldman   c. Modulation
Bright   e. Scattering results
All personnel</p>	Spherical recoil chamber improved - directionality factor 18, Amplifiers calibrated - further work on absolute calibration in progress. Two additional types of recoil chambers ready for test. Additional amplifiers and discriminators being conditioned and tested. Fission chamber and amplifier set up. Scatterers of U, BeO, SiC being prepared. Dropped Bias curves for 120-180° back scattering for Pb, Fe, Pt, Au obtained. Per unit volume Pb is almost twice as effective as Fe, 2.5 to 3 times Au and Pt which are about equal.
<p>III. Slow neutron standards
A.C.Graves, Walker, Davis</p>	Sigma pile measurement of diffusion length complete. Result: L=44.68 cm for U.S. graphite Previous Chicago result on same material: L=44.79 cm. Calibrating pile constructed.

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GROUP F4 -- SEMI MONTHLY REPORT, D.K. Froman, Group Leader -- September 1, 1943

The following outline shows in some detail the work done by the individuals in the group, and indicates by means of an initial the supervisor of the jobs done by technicians. Crouch, Froman, Hane and Nuckolls have each spent appreciable time in consultation with individuals of other groups. Each has spent a large fraction of his time making minor repairs or adjustments of electronic apparatus, as well as adjusting and testing equipment newly built, both in the shop and throughout the laboratory. Apart from these items, some specific work is indicated below.

<u>JOB AND PERSONNEL</u>	<u>PROGRESS</u>
Repair 3 oscilloscopes Crouch	Complete
Design of wide-band amplifier Crouch	Complete
Study of various types of pulse discriminating circuits Froman	Discriminators with an uncertainty of about 0.2 volts operating from pulses greater than 2 or 3 volts can be made. This would seem satisfactory, since noise level at the discriminator level is usually at least 1 volt, but it does not meet indicated specifications.
Design and study of current integrator Froman	Precision of instrument seriously limited by effect of line voltage fluctuations affecting heater current. "Constant voltage" transformer supply worse than line, presumably due to frequency fluctuation. Battery heating may be the only solution with this type of circuit.
Design and study of electronic high voltage stabilizer not requiring any tube to withstand more than a small fraction of the output voltage. Froman	Bread-board tests indicate circuit is satisfactory.
Design and study of voltage integrator for very small voltages Hane	Some difficult power supply problems have been solved by ingenious circuit. Tests of a complete circuit have been begun.
Design and study of a twin-channel preamplifier Nuckolls	Complete

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JOB AND PERSONNEL

PROGRESS

Construction of two preamplifiers. Complete. Four days.
J. Clements.

Construction of twin-channel preamplifier Complete. Three days.
J. Clements

Repair of the P.A. system. Complete. Three days.
Troubles caused by:
1. Someone breaking and shorting wire.
2. Someone getting 110 A/C on line, ruining coils on two speakers.
J. Clements

Complete check and labeling of amplifier connections for W. Complete. Three days.
(N) J. Clements

General stock-room work and taking partial inventory. Thirteen half-days.
(F) J. McDaniels

Construction, adjustment, and some testing of current integrator. Construction complete. Seven and one-half days.
(F) E. Moonan

Repair and remodel pulse generator. Complete. One-half day.
(F) E. Moonan

Construction of wide-band amplifier. Incomplete. Five days.
(C) E. Moonan

Construction of seven linear amplifiers. All complete except for a few parts not in stock. Eight days.
(N) J. Moonan (mainly)

Construction of two linear recording meter circuits. Practically complete but not tested. Five days.
(F) J. Moonan

Construction of regulated high voltage supply. Three-quarters built.
(F) J. Moonan

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JOB AND PERSONNEL

PROGRESS

Construction of two regulated power supplies.

(F) W. Schafer

Complete. Two days.

Assisting and instructing Mrs. Bremer in making and filling G.M. counters.

(F) W. Schafer

Mrs. Bremer is learning. One and one-half days.

Five or six small jobs such as installation of ground wires in annex.

W. Schafer

One and one-half days.

On loan to Rossi's Group.

W. Schafer

Eight days.

Construction of Video amplifier.

(F) H. Schulze

Complete. Two and one-half days.

Adjustment and repair of ion gauge.

(N) H. Schulze

Further work required in order to reduce leakage so that pressures of 5×10^{-8} mm can be measured.

Repair of transformer and meter.

H. Schulze

Complete. One-half day.

Construction of regulated high voltage supply.

(F) H. Schulze

Complete. Four days.

Construction of constant voltage pulse generator.

(F) H. Schulze

Half-constructed. One and one-half days.

Sorting and marking unboxed stock such as transformers, assisting in inventory, and numbering instruments.

(F) J. Waiter

Seven and one-half days.

Repairs to ion gauge.

(N) J. Waiter

Complete. One-half day.

Assisting in construction of linear amplifiers.

(N) J. Waiter

Five days.

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JOB AND PERSONNEL

PROGRESS

Construction of battery
charger.

(H) E. Woodward

One day.

Construction and testing of
special cathode-follower
circuit.

(H) E. Woodward

Four days.

Construction and testing of
special regulated 5000 volt
supply.

(H) E. Woodward

Three-fourths complete. Six and one-half
days.

Construction of power supply

(H) G. Young

Complete. Two days.

Wiring amplifier and power
supply. Adjustment of same.

(H) G. Young

Complete. Three days.

Wiring amplifier.

(H) G. Young

Some parts not in stock. One day.

Arrangement of stock on shelves.

(F) G. Young

One day.

Construction of two power
supplies and tests.

(H) G. Young

Complete. Four and one-half days.

Five or six small jobs such as
repair of shorted choke, etc.

(H) G. Young

One and one-half days.

Repairing and refilling G.M.
counters.

(F) Mrs. Brewer

Five half-days. (Mrs. Brewer is working in
Electronics while Mr. Rossi is away)

Sorting and checking radio tubes.

(F) Mrs. Brewer

Three half-days.

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JOB AND PERSONNEL

PROGRESS

Secretarial work typing
purchase requests, setting up
card index system for systematic
inventory-ordering scheme, and
checking old purchase requests.

Thirteen days.

(F) Mrs. Wallace

Assisting Mrs. Wallace
(F) E. Fredericks

Four days

Taking readings
(F) E. Fredericks

One half-day.

Assisting in amplifier
construction
(N) E. Fredericks

Seven days

Dismantling and salvaging
obsolete equipment.
E. Fredericks

One day.

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GROUP P5 -- SEMI MONTHLY REPORT, E. Segre, Group Leader -- September 1, 1943

JOB AND PERSONNEL

PROGRESS

1. Spontaneous decay constants.
Miskolc, Segre

Satisfactory samples of about 40 mg total mass of natural uranium and enriched 25 have been prepared, mounted and calibrated.

Wiegand, Farwell,
Segre

The construction of the chambers handling the samples mentioned above has been changed, because the previous type of chamber did not give a satisfactory plateau. One of the new type of chamber is operating and 3 more are being assembled.

Wiegand

An improved battery operated amplifier is being developed. One apparatus has been tested, 3 more are being built in the electronics shop.

Chamberlain

At present 94 and a Po blank are regularly counted. Other samples g (28, 25, 24) are in the process of being started, but we still have occasional trouble with the apparatus.

Wiegand, Segre

A N_2 coincidence chamber which should be able to handle our existing 30 mg sample of 49 has been designed and is under construction, with its special amplifiers.

2. 220 Kev and Ra + Be neutron
Measurement
Wiegand, Segre

The fission measurements on 49, 25, 28, 24 have been finished and a report written and given to Inglis.

3. 220 Kev capture cross-
sections
Linenberger

More elements are being investigated at Bethe's suggestion. Among others Bi, W.

Provisional results for indium give $\sigma_{\text{In}}/\sigma_{25} = 0.21$ and for Br $\sigma_{\text{Br}}/\sigma_{25} < 0.02$.

4. Po ionisation chamber
Linenberger, Farwell

The special Po chamber for Prestwood's work has been calibrated.

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GROUP P6 -- SEMI MONTHLY REPORT, Hans Staub, Group Leader -- September 1, 1943

JOB AND PERSONNEL

PROGRESS

1. Amplifier
Staub and Electronics
Group	Delivered by electronics group August 10th.
Had to be returned for various defects.
Received back August 19th.
2. Preamplifier
Staub and Nicodemus	Completed and tested. Linear up to 60 V
output. Frequency response up to 10^5 sec^{-1} .
Noise level $15 \mu\text{V}$ at $10 \mu\text{F}$ input
capacity.
3. Differential Selector
Staub	
4. H.V. Tubevoltmeter
Diven	Completed and calibrated.
5. Pumping and filling setup
for chamber
Diven, Nicodemus	Completed.

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