

Lawrence Berkeley National Laboratory

LBL Publications

Title

Development of a 500 kw, 50 mc RF System for Particle Acceleration

Permalink

<https://escholarship.org/uc/item/1qg0t7s3>

Author

Klein, W W

Publication Date

1955-03-01

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

0 0 1 0 1 3 0 5 0 2 1

UCRL 2887
abstract

UNIVERSITY OF
CALIFORNIA

*Radiation
Laboratory*

SEE FULL-SIZE PAPER COPY OF REPORT
FOR OVERSIZE GRAPHICS

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.

0 0 1 0 1 3 0 5 0 2 2

UNCLASSIFIED

UCRL-2887
Abstract

DEVELOPMENT OF A 500 kw, 50 mc RF SYSTEM
FOR PARTICLE ACCELERATION

W. W. Klein

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

March, 1955

ABSTRACT

Circuitry has been developed which produces 500 kw of radiofrequency power at 50 megacycles. This equipment was developed to power a linear accelerator. A detailed discussion of the schematic diagram is presented. Reasons are also given for the selection of critical components used.

Given orally March 8, 1955 at the meeting of American Institute of Electrical Engineers at Palo Alto, California.

FOOD STAR BOND

Talk - March 8, 1955 to American Institute of Electrical Engineers, Palo Alto, California

SUBJECT: Development of a 500 kw, 50 mc RF System for Particle Acceleration

I The Linear Accelerator

A. History of development

B. Problems associated with rf power source

1. Multipactoring and pre-excitation
2. High standing wave ratio lines
3. Multiple resonances in output circuit - long transmission lines because of shielding

II The RF System

(slide 1, 2) A. General description

(slide 3) B. Low level stages

1. Crystal input

a. Transient response of load to incorrect frequency.

2. Limiter input, termination, phasing, and gate

3. 2E26 Mixer

a. Common bias to effect amplitude selection

4. 4 - 250A output stage

a. Neutralization

b. Grid current protection

c. Pi network output circuit

d. Output monitor

(slides 4, 5, 6)

(slides 7, 8) C. A 2519A Driver

1. Development of A2519A from 6166

2. Input circuit

3. Neutralization

4. Output Circuit

5. Protective bias

(slide 8)

II The RF System (con't)

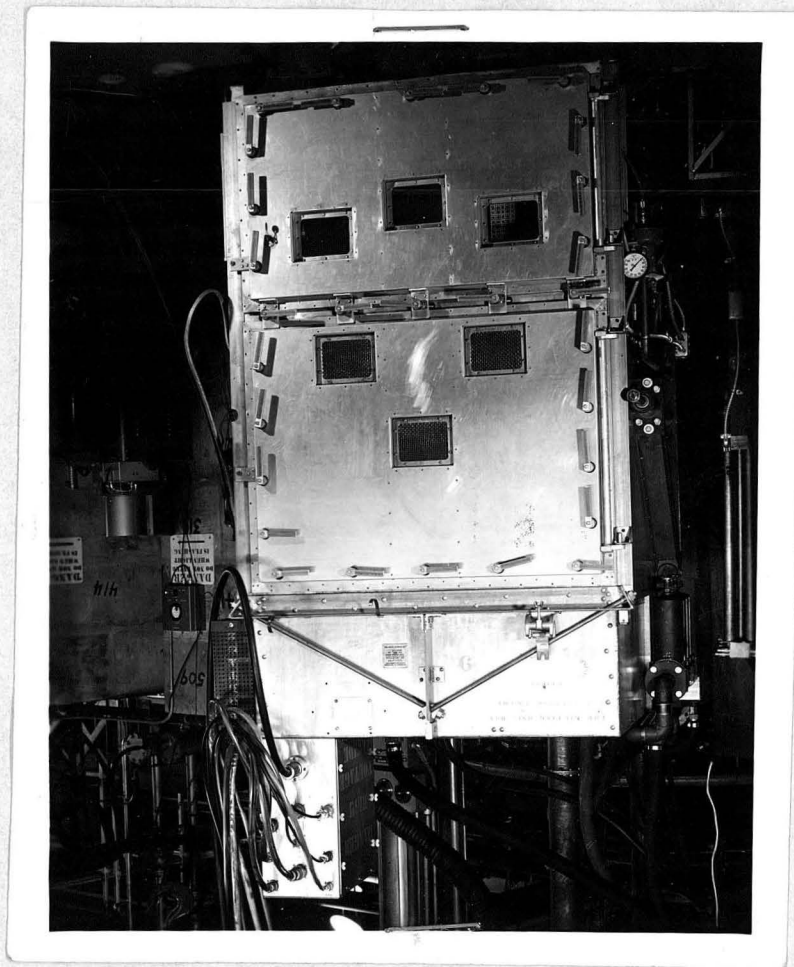
(slide 7) D. Final Amplifier

1. Development of A2332C from 5831
- (slide 10)
(slides 9, 12) 2. Input circuit
3. Neutralization
4. Output Circuit
 - a. Tuning
 - b. Water supply
 - c. Voltage supply
 - d. Output coupling capacitor and cooling
5. Protective Circuit
 - a. Overcurrent
 - b. Grid bias interlock
 - c. RF interlock

E. Output Power Monitor

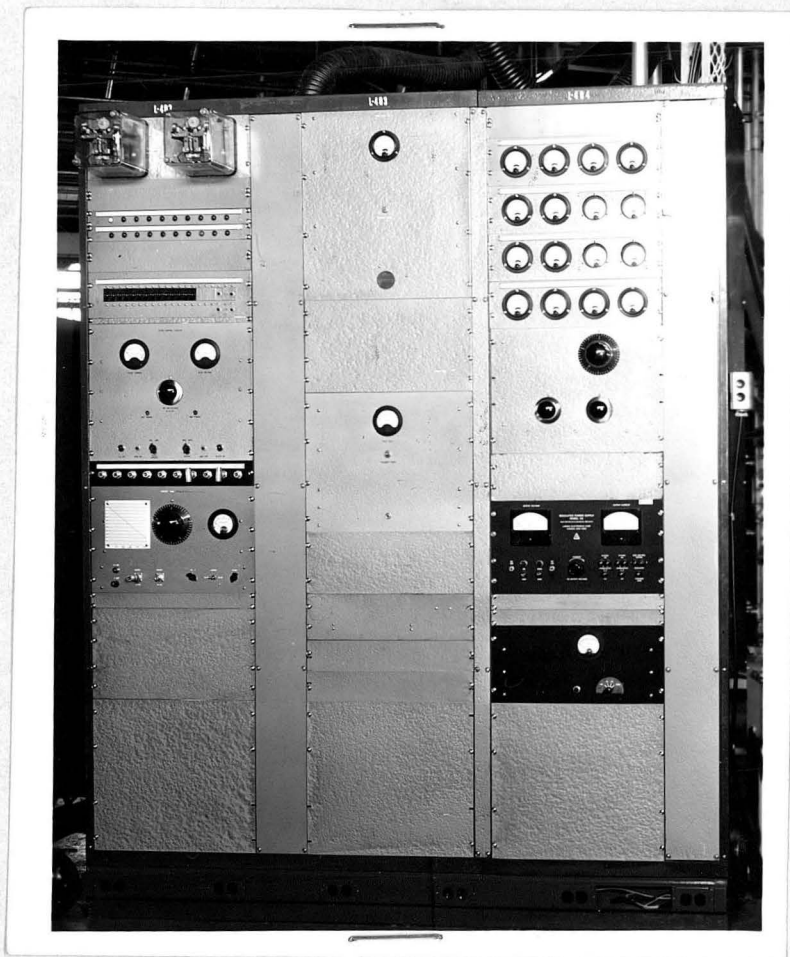
1. The directional coupler
- (slide 14) 2. Power sampler
- (slide 15) 3. Power meter chassis

0 0 1 0 1 3 0 5 0 2 6



SLIDE 1

0 0 1 0 1 3 0 5 0 2 7



SLIDE 2

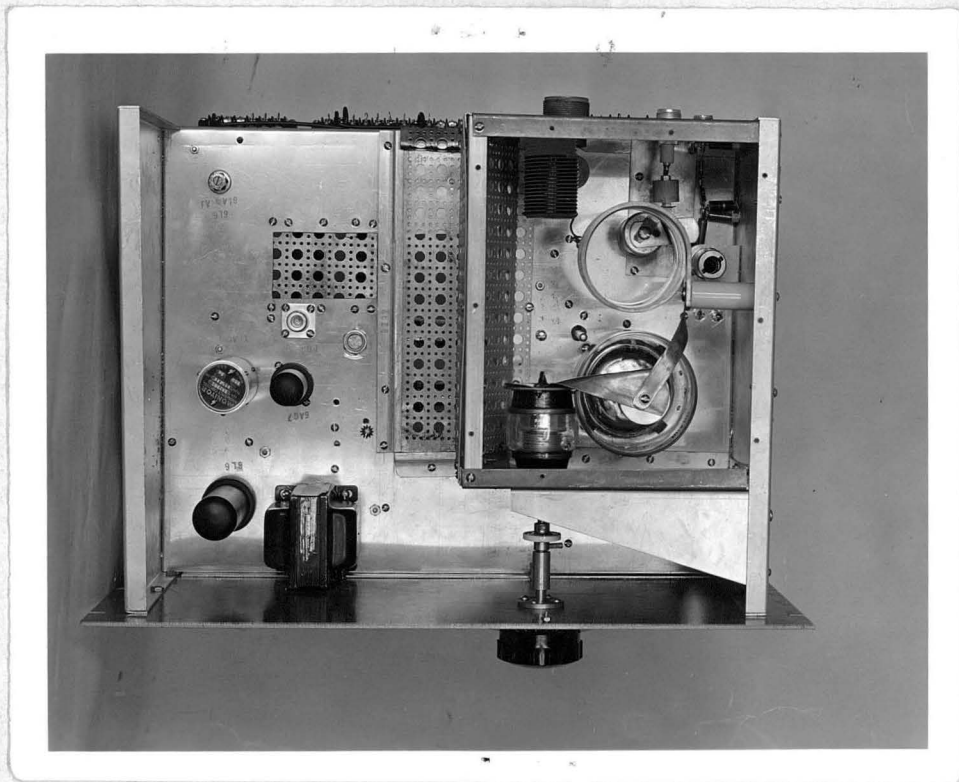
For Slide 3 see last page.

0 0 1 0 1 3 0 5 0 2 8



SLIDE 4

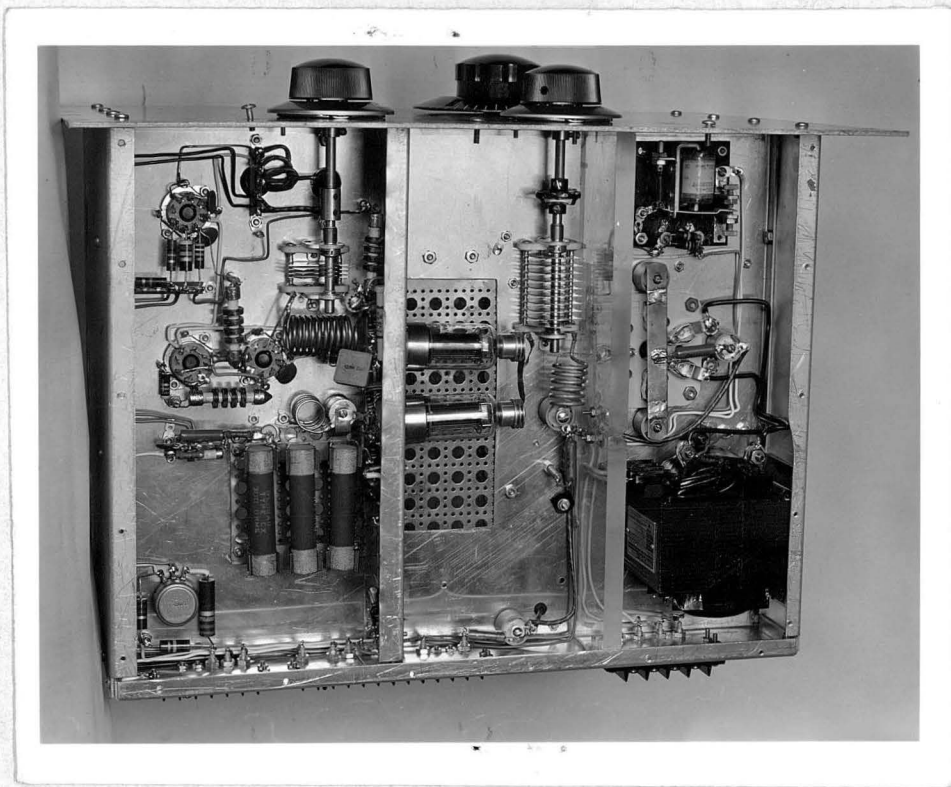
0 0 1 0 1 3 0 5 0 2 9



SLIDE 5

SCIENCE CENTER

0 0 1 0 1 3 0 5 0 3 0



SLIDE 6

0 0 1 0 1 3 0 5 0 3 1



SLIDE 7

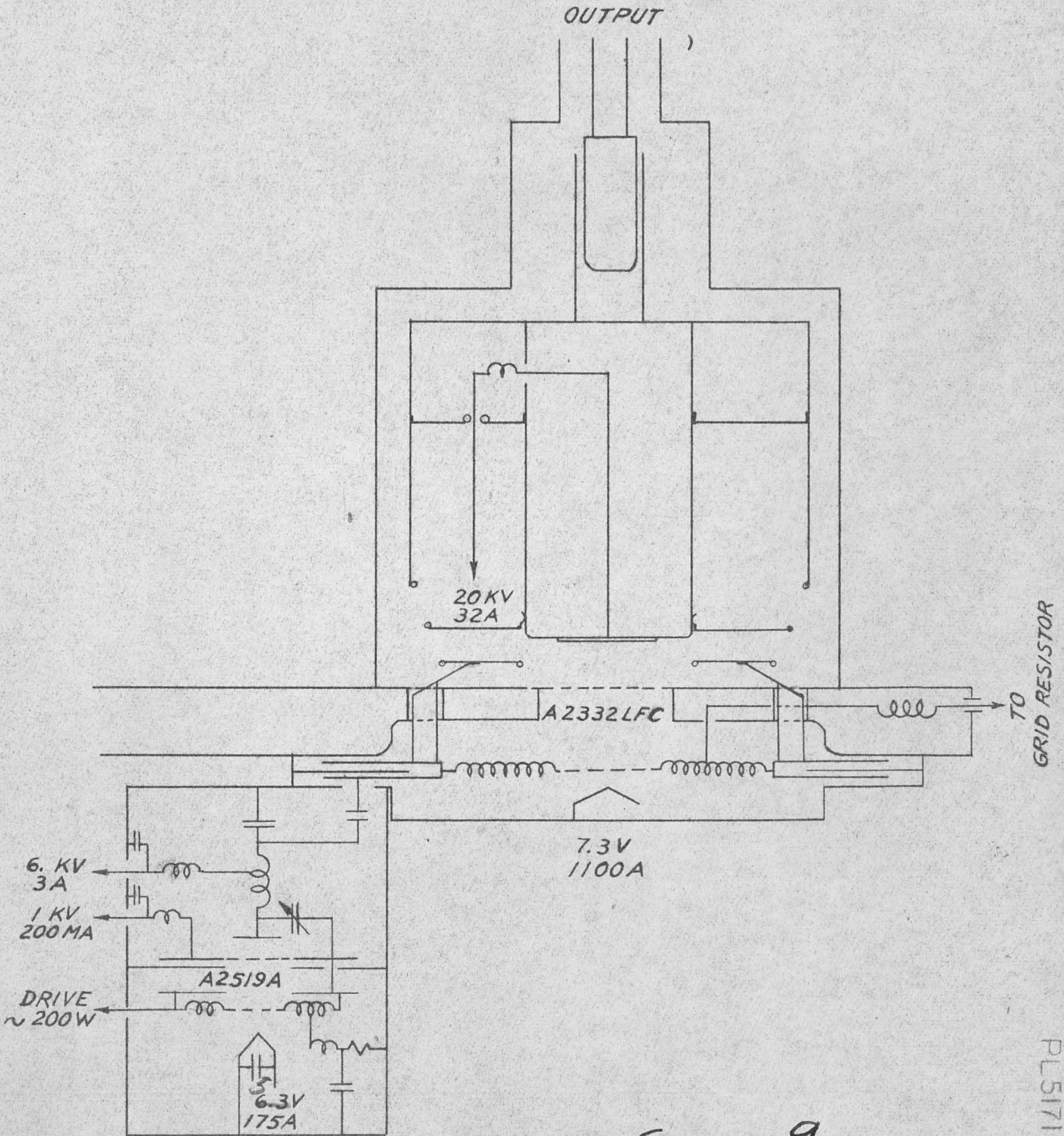
0 0 1 0 1 3 0 5 0 3 2



SLIDE 8

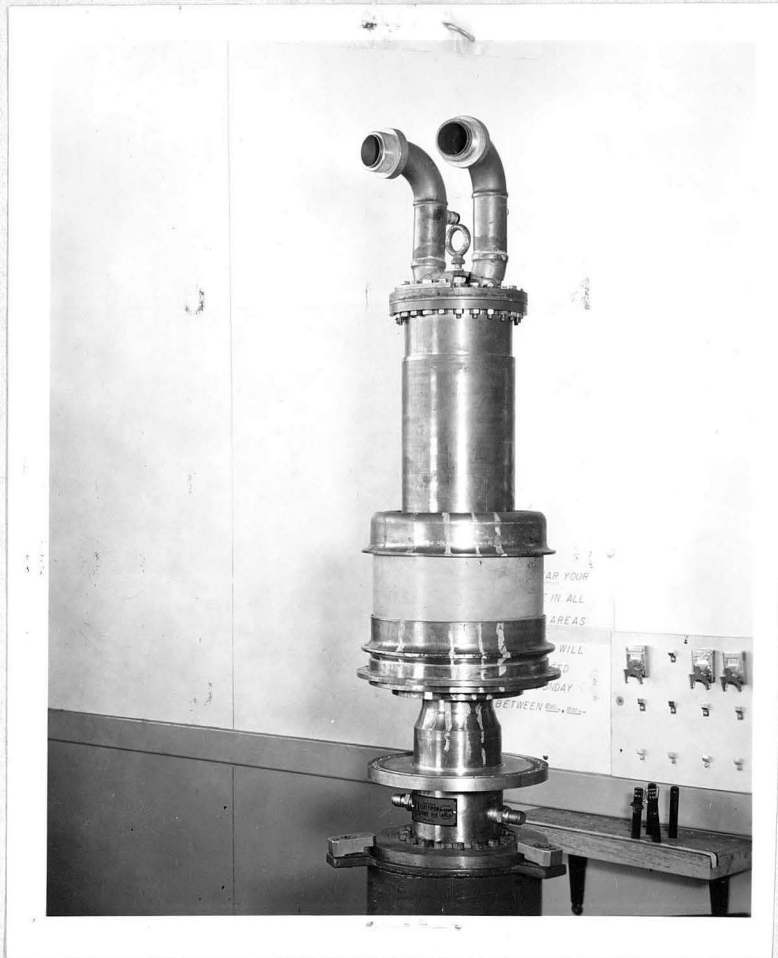
00101305033

SIMPLIFIED SCHEMATIC
50 MC - 500 KW POWER UNIT
(PL5171)



SLIDE 9.

00101305034



SLIDE 10

0 0 1 0 1 3 0 5 0 3 5

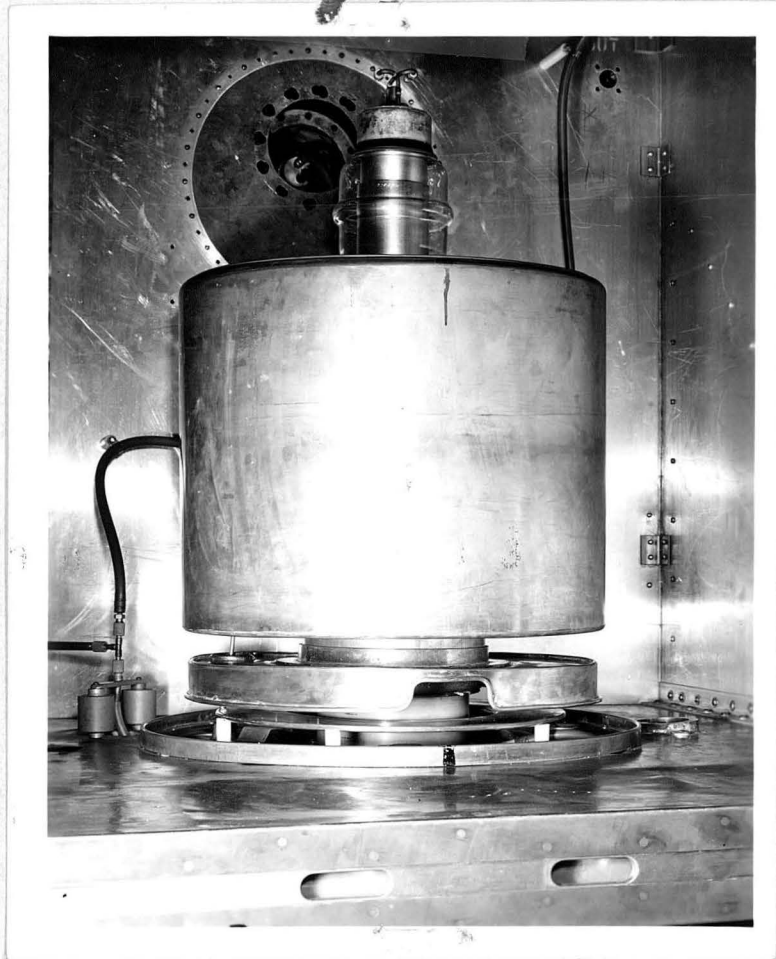
SLIDE 11 deleted by author
not used in talk.

00101305036



SLIDE 12

0 0 1 0 1 3 0 5 0 3 7



SLIDE 13

0 0 1 0 1 3 0 5 0 3 8



0 0 1 0 1 3 0 5 0 3 9



SLIDE 15

