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SUMMARY OF THE RESEARCH PROGRESS MEETING

December 2, 1948

Henry P. Kramer

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Radiation Laboratory
University of California
Berkeley, California

SUMMARY OF THE RESEARCH PROGRESS MEETING

December 2, 1948

Henry P. Kramer

Proton Conversion. J. Vale.

The 184" cyclotron was shut down about two weeks ago so that the proton conversion dee and oscillators might be installed. The work is proceeding on schedule and it is expected that operations with the new equipment will be resumed on December 20.

The transmission line which formerly was of $1/4$ wave length is being replaced with a $1/2$ wave length line open at one end and containing a variable condenser at about the half way point. It should be possible with this arrangement to realize a 3:1 shift in frequencies. The top frequency which is needed for operation with protons is 22.9 mc and the bottom frequency for operation with deuterons is 9.8 mc. This needed frequency range can be accommodated in the design frequency range of 9.55 mc - 23.4 mc.

The rotary condenser will be run at 1000 rpm by a 10 h.p. motor. It will be supported on ball bearings that are lubricated with silicone grease.

The oscillator will be pulsed. It will be possible to change very easily from proton to deuteron operation.

The voltage will be about 25 kv., the recurrence rate, 100 cycles.

See Fig. 1 for a schematic representation of the new equipment.

Details of the design will be found in "Three Quarter Wave[®] RF System for Frequency Modulated Cyclotrons," BP-140, by Kenneth MacKenzie.

Progress on the Synchrotron. E. McMillan.

An elaborate program of smoothing the magnetic field has just been completed. It was not possible to find a beam until operation was tried with an extremely low magnet voltage (200 v out of 16,000 v). However, with this low voltage and

four contractor coils, one for each quadrant, it was possible to find a betatron beam. The beam cleared the injector and registered a pulse 10 μ sec. after the injection pulse appeared. After an improvement of the contractor coil arrangement was instituted a beam was seen 100 μ sec. after injection. In all cases, the pulse was registered by means of an anthracene counter situated opposite the injector on the inside of the doughnut.

After the beam was located at low magnet voltage, work was started to increase the voltage. The quadrant coils were adjusted. It was found that for voltages in excess of 14,000 v the contractor coils became unnecessary. The beam has now been found at 1000 μ sec. after injection.

Fig. 2 shows a plot of the rate of change of flux through the flux bars for various voltages. It is seen that with increasing voltage the time between the injection pulse and the beam pulse decreases. Therefore, it will be necessary to shift the flux bars for operation at higher voltages.

The rf cavities are ready to be installed on Monday. After the assembly is completed, synchrotron operation will be attempted. In this, octant coils will be used in place of the previously employed quadrant coils. It is expected that these will improve operation at high voltage.

There has been some trouble with transients during the first cycle of operation. This has been partly eliminated by installing a large resistance in the connection to ground. It is contemplated to use a d.c. bias to overcome the low frequency transients.

Photographic Emulsions Sensitive to Electrons. C. M. G. Lattes.

Four photographs of tracks were shown which were obtained at Bristol with the new electron sensitive plates. One electron track was 1000 μ in length. The photographs showed electrons produced in the decay of μ -mesons.

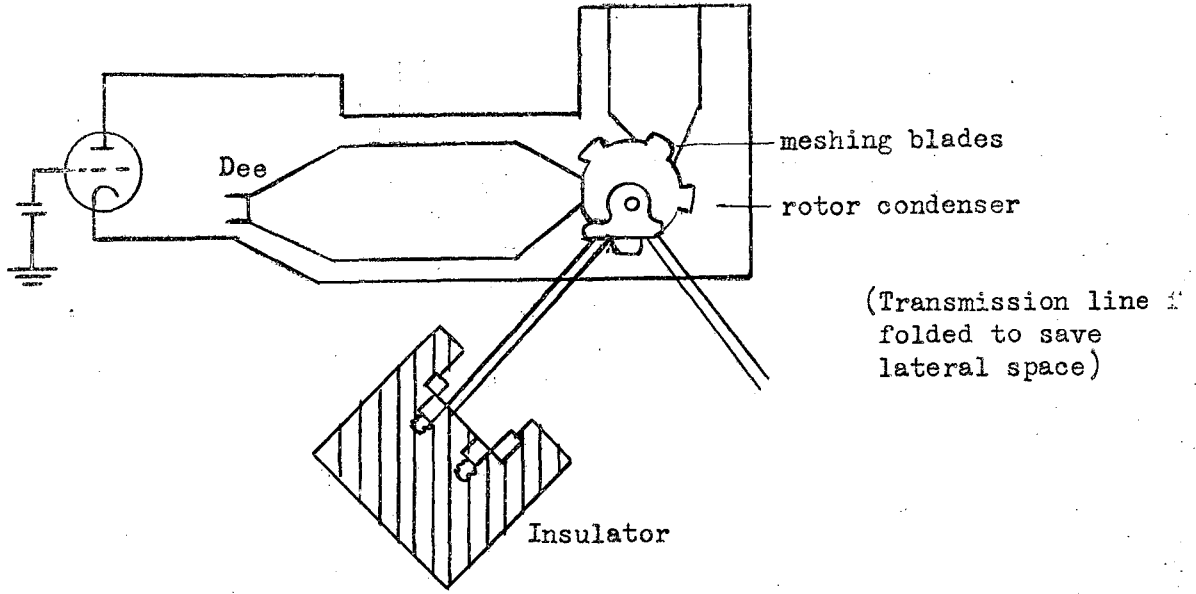


Figure 1

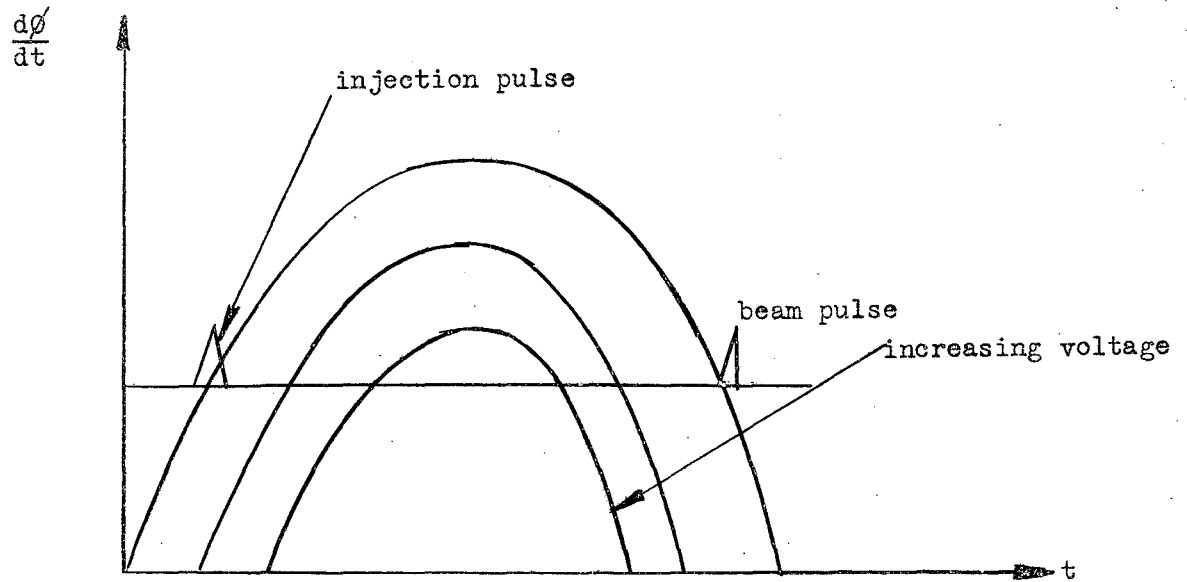
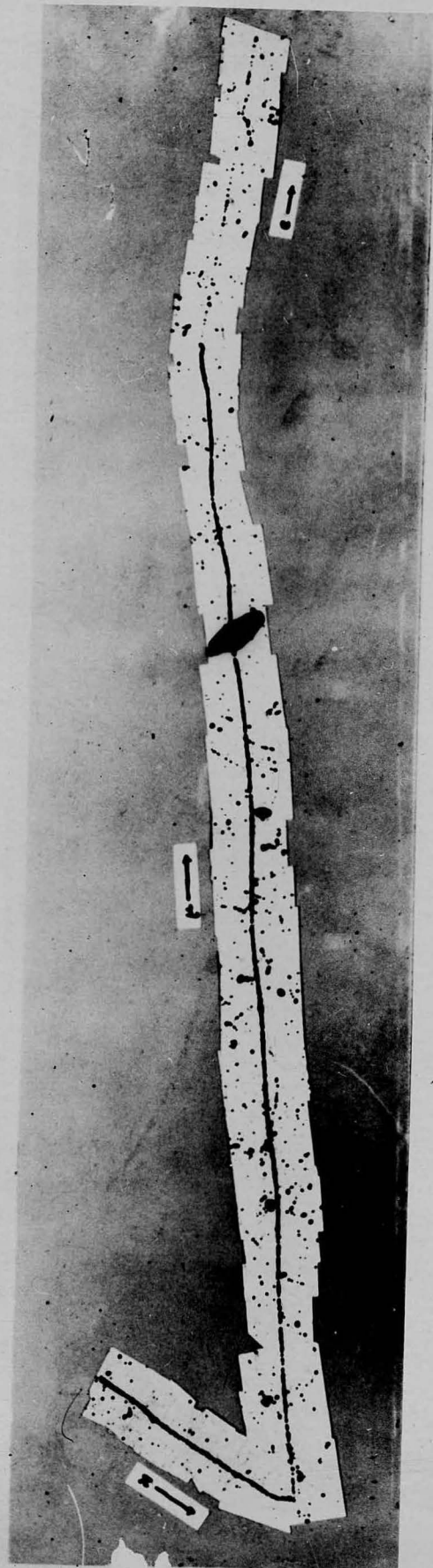


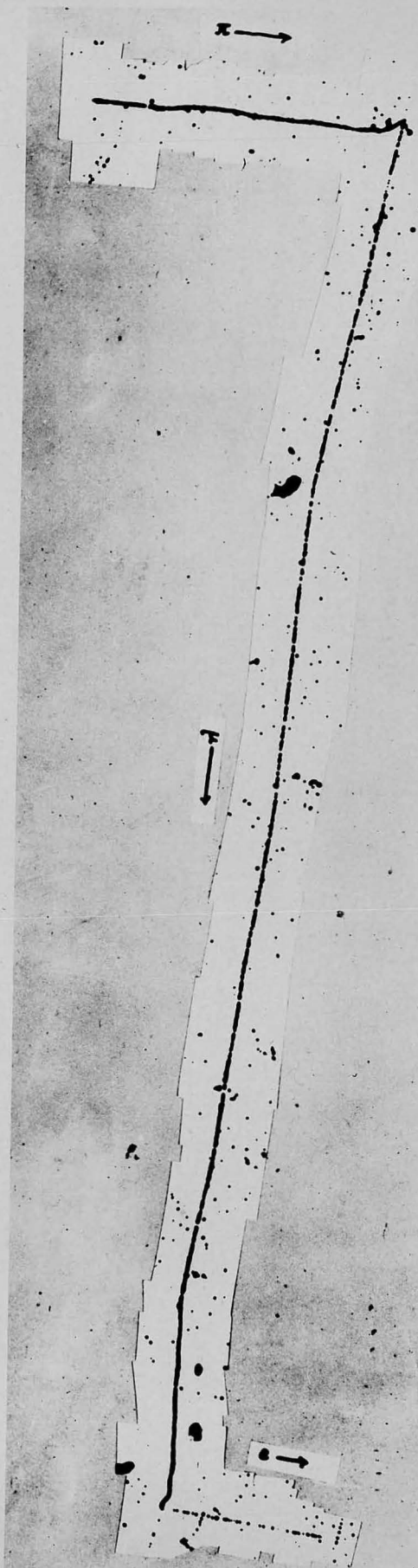
Figure 2

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Successive Days $\pi \rightarrow \mu \rightarrow e$ Bristol Oct



Successive Decay $\pi \rightarrow \mu \rightarrow e$. Bristol Oct '4



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