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Summary of the Research Progress Meeting

July 8, 1948

Margaret Foss Folden

Berkeley, California

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Kerst's Work on the 70 mv Betatron. W. Powell.

The 70 mv betatron was described by Dr. Powell, who has just returned from a visit to Illinois. A diagram as shown in Figure 1, illustrating the betatron, showed that in order to supply the betatron flux the magnet is surrounded by coils. From this was obtained a ϕ^{o} which gives the betatron flux. During the process of acceleration the energy goes to 16,000 gauss. A C-shaped magnet is used with coils at the opening.

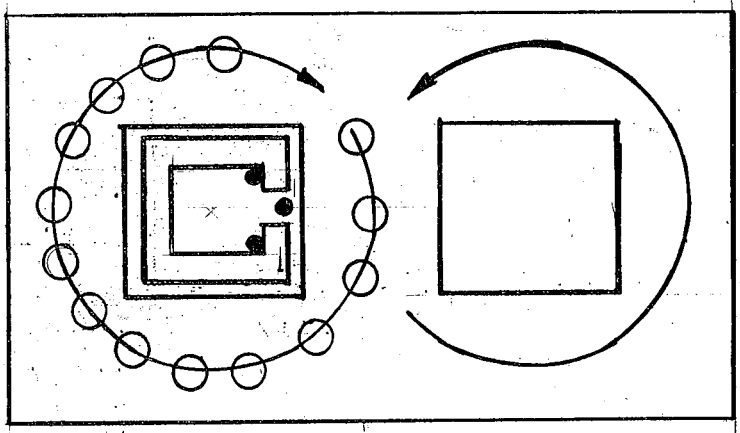

Figure 1

The length of the magnetic path is the same for all laminations, which is accomplished by the arrangement shown in Figure 2.

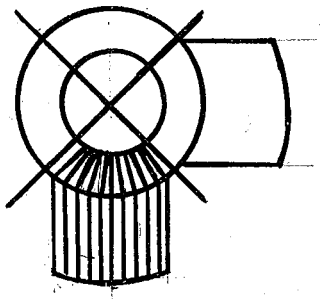

Figure 2

If the coils are not properly spaced, the flux leaks out. Experiments have been carried out to measure the field around the magnets. A number of the difficulties were described.

Experiments on injecting ordinary betatrons with the use of contactor coils were explained. It was found that the best effect was obtained when contactor coils were placed in the middle. In one revolution the effect of the contactor coils is strong enough to pull the beam into a well-defined orbit as seen in Figure 3. When two sets of coils were set in opposition, no effect at all resulted.

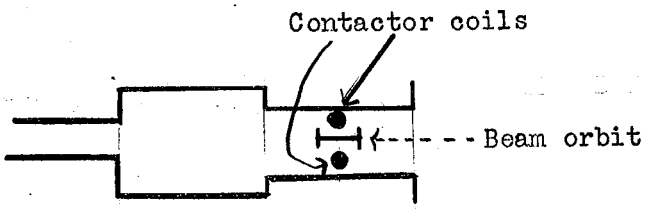

Figure 3

Experiments to determine the effect of differences in length of laminations were then recounted.

New Collateral Radioactive Series. W. Meinke.

A new collateral radioactive series grew out of the bombardment done on thorium metal. From

$$Th^{232} + 40 \text{ Mev } D_2,$$

Pa^{230} and Pa^{229} (1.5 day) were obtained.

Targets were prepared and inserted in the pulse analyzer. One predominant peak was found looking somewhat like U^{232}. A slight difference was noted, however, and it was later determined that it was the Pa^{227} series.

$$Pa^{227} \xrightarrow[38\ m]{6.46\ Mev\ \alpha} Ac^{223} \xrightarrow[2\ m]{6.64\ Mev\ \alpha} Fr^{219} \xrightarrow[10^{-4}\ sec]{7.30\ Mev} At^{215} \xrightarrow[10^{-4}\ sec]{8.00\ Mev}$$

$$Bi^{211}\ (AcC)\ \underset{2m}{\longrightarrow}\ Tl^{207}\ (AcC'')\ \underset{5m\beta^-}{}$$

Pa^{227} has a branching ratio of $K/\alpha = 0.2$.

After this series dies out, another series remains:

$$Pa^{228} \xrightarrow[22\ hrs]{6.09\ Mev\ \alpha} Ac^{224} \xrightarrow[2.5\ hrs]{6.17\ Mev\ \alpha} Fr^{220} \xrightarrow[30\ sec]{6.69\ Mev} At^{216} \xrightarrow[\sim 10^{-3}\ sec]{7.79\ Mev} Bi^{212}\ (ThC)$$

Efforts have been made to combine the thorium with alphas, and it is believed that the following results: Th^{232} $(\alpha, 7n)$ U^{229}. Further experiments are planned in this regard.