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SUMMARY OF THE RESEARCH PROGRESS MEETING OF SEPT. 21, 1950

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Publication Date

1950-10-03

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Radiation Laboratory

Contract No. W-7405-eng-48

SUMMARY OF THE RESEARCH PROGRESS MEETING

OF SEPTEMBER 21, 1950

Henry P. Kramer

October 3, 1950

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600-inch Radar Telescope. W. W. Salisbury.

The construction of a giant 600-inch cast aluminum dish for a radar telescope by the Collins Radio Corporation under contract to the Naval Research Laboratory was described. The dish will weigh about 15 tons, will consist of 30 cast sections, will be machined within a tolerance of 0.001 inch in the shape of a paraboloid, and will ultimately be mounted on the roof of the Naval Research Laboratory building on a 5 inch gun turret. Azimuthal setting will be obtained with the gun turret. The altitude setting will be built into the machine. An analogue computer will receive settings in polar coordinates and convert them to altitude-azimuth settings for the machine. The device will be capable of emitting electromagnetic waves in the approximate range of wave-lengths between 1 and 10 cm. It is hoped that with it measurements on the departure of the sun's surface temperature from normal during sun spot activity can be carried out.

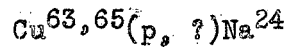
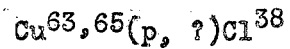
Snouting the beam. Kenneth Relf.

A magnetic deflector of 5 percent efficiency has been constructed to deliver a $1/2 \mu$ amp. beam of molecular hydrogen outside the water shield of the 60-inch cyclotron. Fig. 1 shows a top view schematic of the snout arrangement and Fig. 2 a side view of the snout. The cross section of the snout was designed by W. Powell and is shown in Fig. 3.

Fission of the Medium Weight Elements. Roger Batzel.

The excitation function of the two reactions

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was measured in the energy interval from 0 to 350 Mev. The results are sketched in the diagram of Fig. 4.

The hypothesis that the reactions proceed by the successive emission of α -particles was tested and found to be untenable since the threshold for such a reaction in the case of the transmutation from copper to chlorine is $114 \text{ Mev} = 59 \text{ Mev}$ (binding energy) + 55 Mev (Coulomb barrier) and for the transmutation from copper to sodium $171 \text{ Mev} = 101 \text{ Mev}$ (binding energy) + 70 Mev (Coulomb barrier), and these values exceed the observed threshold by considerable margins. The inescapable conclusion, therefore, is that larger units than α -particles are emitted, that is, that "fission" occurs.

The threshold calculated for the reaction $\text{Cu}^{63}(\text{p}; \text{Al}^{25}, \text{n})\text{Cl}^{38}$ is very close to the observed one. The possibility has been envisaged that combinations of helium, lithium, carbon, and oxygen nuclei may be emitted.

The possibility that the observed transmutation products might have come not from copper but from some impurities contained in the material that was bombarded was ruled out on the basis that the observed activities were too large to be attributable to transmutations on the 0.001-percent of impurity contained in the copper samples.

It is conceivable that at different energies of the incident protons the pattern of the reaction may be different.

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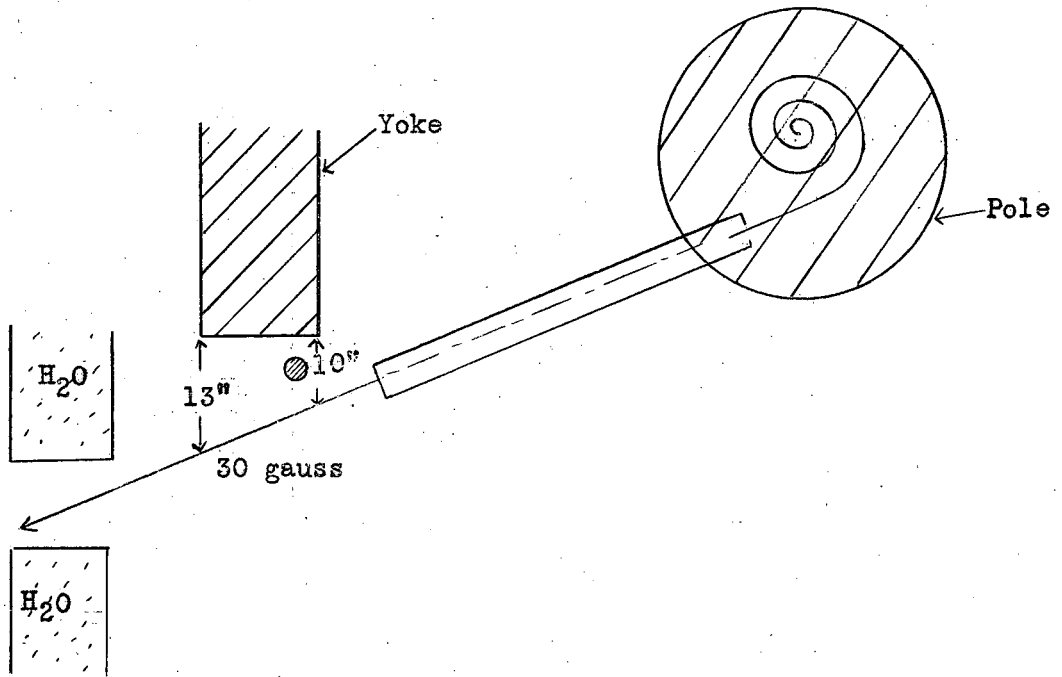
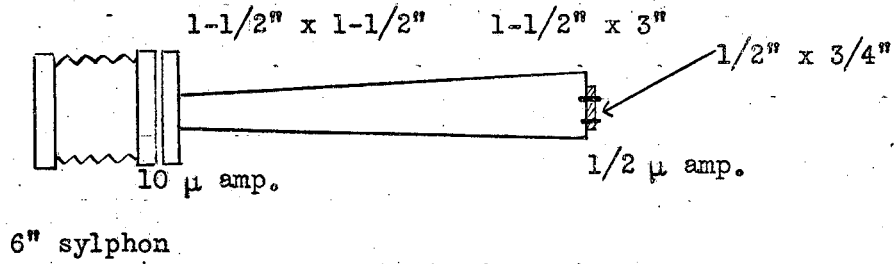
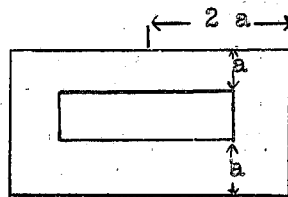


Fig. 1



Side View of the Snout

Fig. 2



End View of Snout

Fig. 3

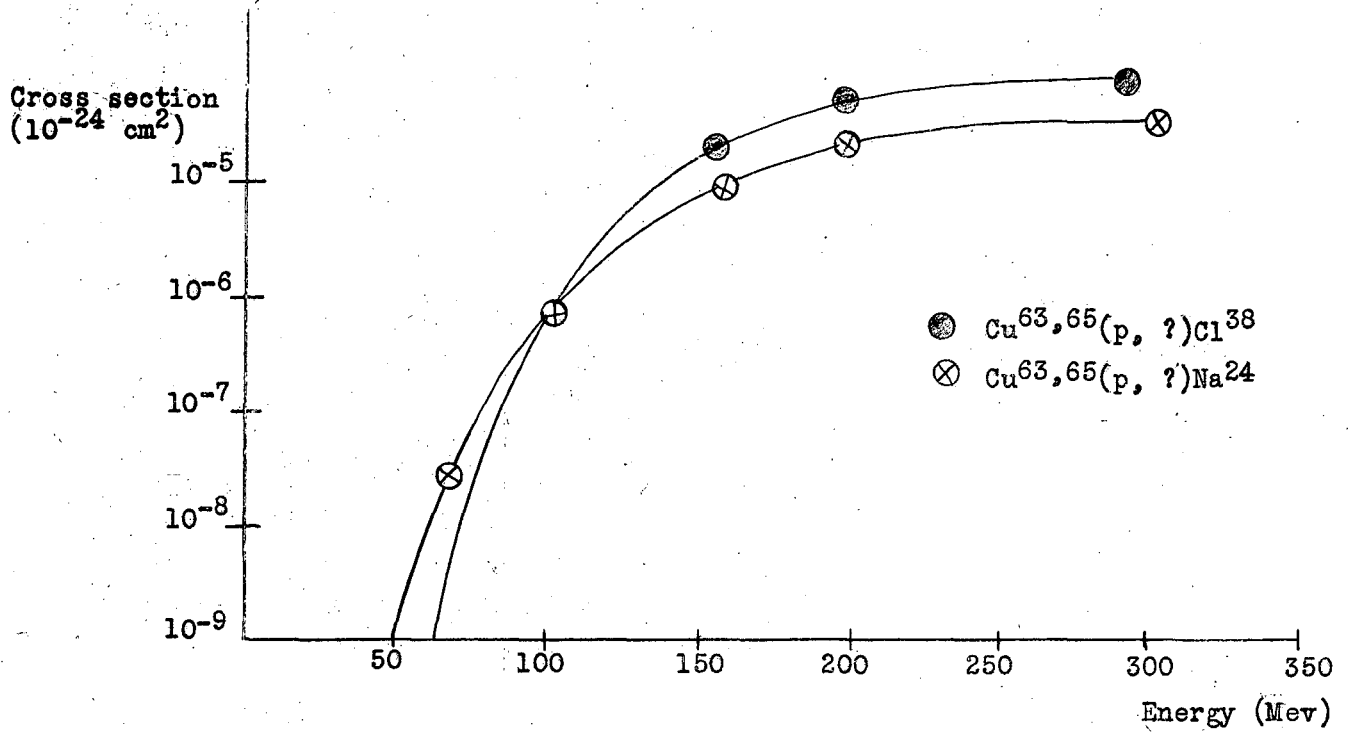


Fig. 4