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Radiation Laboratory

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SUMMARY OF THE RESEARCH PROGRESS MEETING of October 27, 1949

Henry P. Kramer

January 25, 1950

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Excitation Functions of Arsenic and Manganese. H. Sharma.

Subordinate to the long range program of determining all possible reactions with high energy protons, excitation curves were measured for a number of reactions initiated by protons on arsenic and manganese.

Since arsenic occurs in crystalline form it was not possible to roll it into foils. Instead, the crystal was powdered, suspended in a slurry, and then deposited on aluminum foils. The arsenic plated foils were then covered with clean aluminum foils and series of such foils were sandwiched between copper absorbers and exposed to proton bombardment. Encasing the arsenic completely in aluminum foil was necessary to prevent the contamination of the target by copper recoils since it was desired to measure the excitation curve of the reaction $As^{75}(p;4Z, 11A)Cu^{64}$. The bombardment of As may be expected to give particularly unambiguous results since only one stable isotope of arsenic exists.

The excitation curves measured for reactions with arsenic are sketched in the graphs of Figs. 1, 2, 3 and 4. Each one of these curves represents the results of 5-6 bombardments.

One of the difficulties of the experiment was caused by the high flux of neutrons present in the proton beam as indicated by the yield of Mn^{56} from the bombardment of Mn^{55} which points to a (n,γ) reaction.

Irradiation of Micro-organisms with Deuterons and Alphas. C. A. Tobias.

High energy deuterons and alpha particles from the Berkeley cyclotrons have been used to investigate the mechanism of damage by radiation of yeast cells.

Haploid and diploid cells from the same original strain of yeast were bombarded by mounting the containers on a rotating target holder so that uniform exposure was assured. The exposure was measured by collecting the beam current in a Faraday cup and the instantaneous effect was estimated by means of an ionization chamber.

After exposure the fraction of organisms that had survived the bombardment was determined as a function of exposure by transplanting the cells to fresh agar and observing the rate of growth of colonies.

It is hoped that on the basis of these experiments it will be possible to test the existing hypotheses regarding the mechansim of radiation damage to micro-organisms: the hit-theory and the ionization theory.

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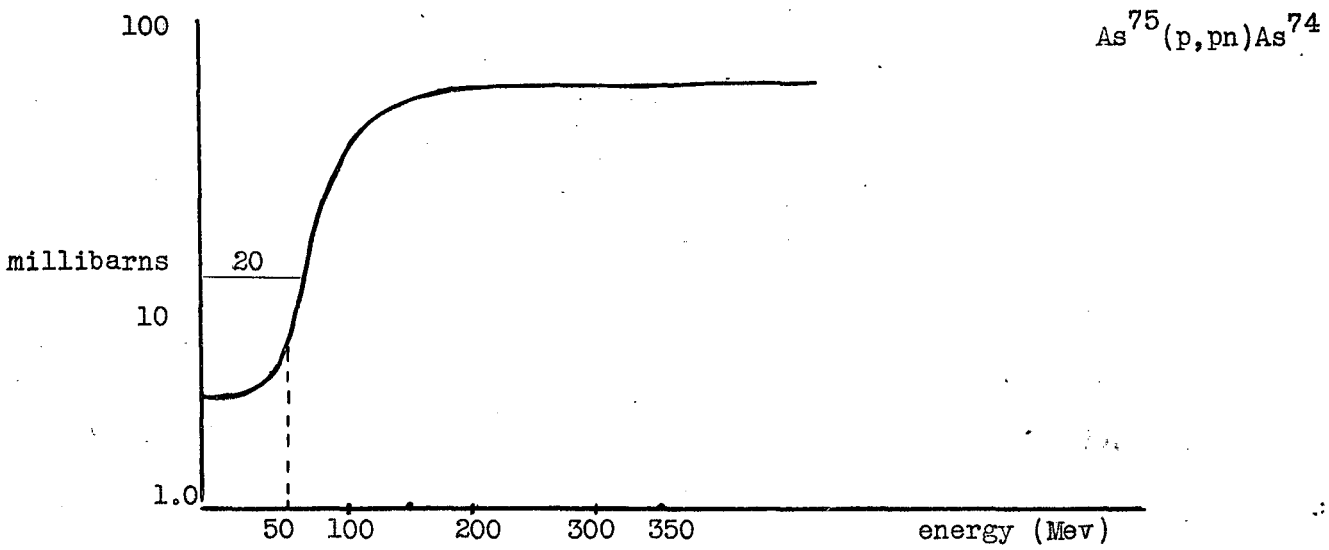
100
millibarns
20
10
1.0
50
100
200
300
350
energy (Mev)
As75(p,pn)As74

Fig. 1

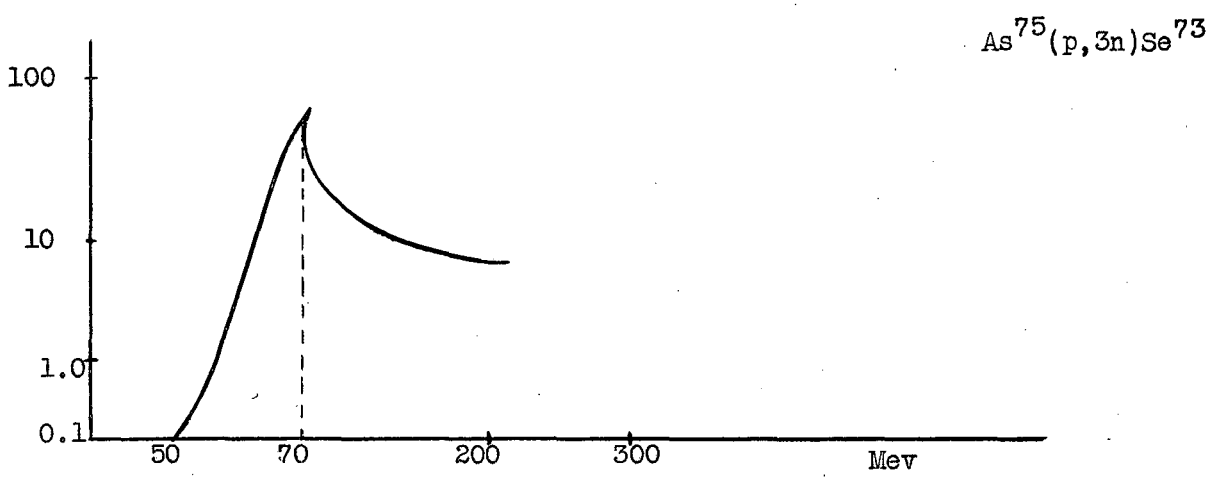
100
10
1.0
0.1
50
70
200
300
Mev
As75(p,3n)Se73

Fig. 2

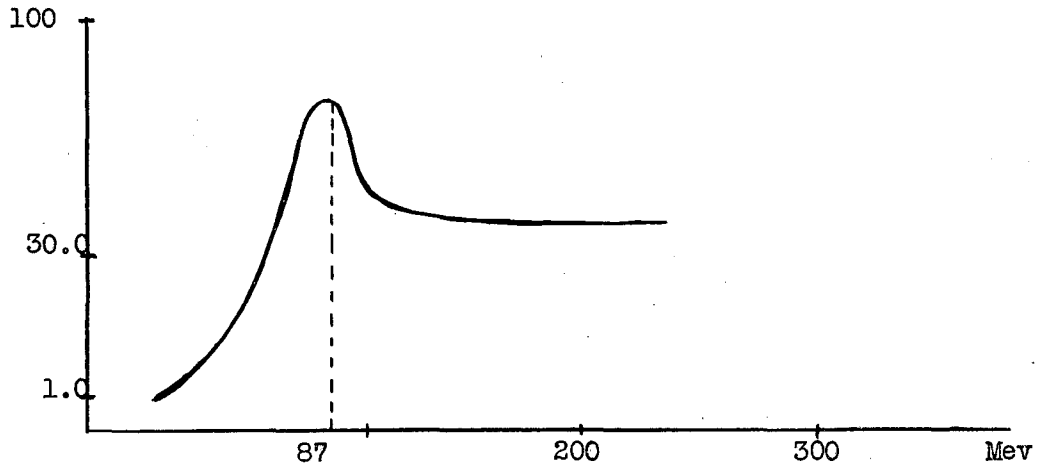
100
30.0
1.0
87
200
300
Mev

Fig. 3

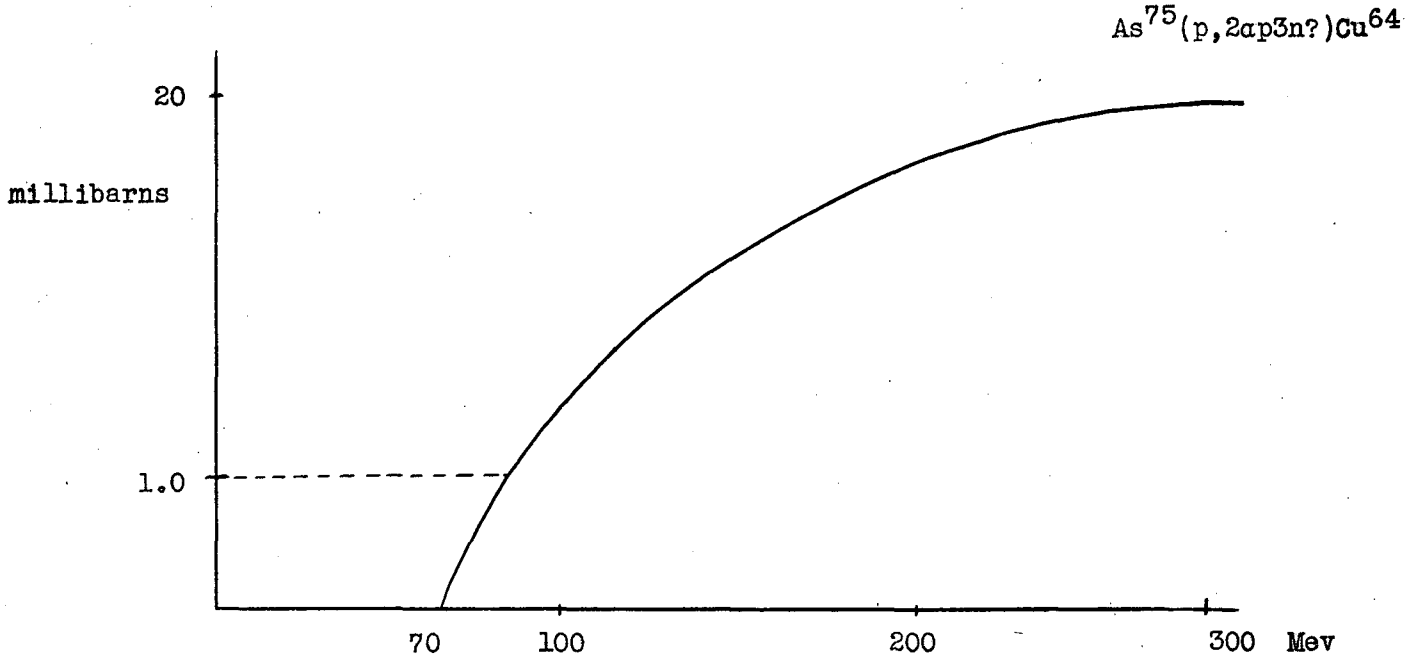
As75(p,2αp3n?)Cu64
20
millibarns
1.0
70
100
200
300
Mev

Fig. 4