

REPORT FOR MONTH ENDING JUNE 15, 1943

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Nuclear Physics - Experimental

The main concern of our group, during the past month, has been with the completion of measurements of "inelastic scattering to below the 28 fission threshold" for a number of elements. In these experiments, the decrease in counting rate of a fast-fission chamber is measured when the source of fast neutrons is surrounded by a sphere of the element in question. This has been done by Mr. Bernstein for three elements - Bi, Pb and Fe - using, for each, three different size spheres.

The results are now being evaluated and compared. Preliminary calculations, neglecting elastic scattering, for the intermediate size spheres yield the following values of cross-section for inelastic scattering:

	<u>σ_{in} (Ra-Be neutrons)</u>	<u>σ_{in} (Ra-B neutrons)</u>
Fe	0.98	0.87
Pb	1.25	0.90
Bi	1.51	1.23

The corrections for the geometry and for elastic scattering are now being computed and more reliable values of the cross-sections should soon be available.

In the meantime, we are repeating the measurement of the fast neutron multiplication factor of ν for Ra-B neutrons. The Ra-B source is being further studied by comparing its activation of various fast neutron reactions with the activation due to Ra-Be neutrons and due to fission neutrons (from the Argonne pile). This comparison is being made by the method of CP-412. The comparison of the relative effectiveness of equal numbers of Ra-Be neutrons and Ra-B neutrons has to-date yielded the following (preliminary) results:

	<u>28 Fission</u>	<u>P(n, p)</u>	<u>Al(n, p)</u>	<u>Al(n, α)</u>	<u>In(n, n)</u>	<u>In(n, α)</u>	<u>I(n, α)</u>
<u>Ra-Be</u>	1.04	1.07	4.7	12	0.8	1.04	1.6
<u>Ra-B</u>							

In the past week, Mr. Richard Scalettar arrived from Wisconsin to join our group - replacing Mr. Julius Ashkin.