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ABSTRACT I-C

INTERACTION OF NEUTRONS WITH ELECTRONS IN BISMUTH

by

L. J. Rainwater, I. I. Rabi and W. W. Havens, Jr.

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The neutron-electron interaction (non-magnetic) can be determined from the dependence on neutron wave length of the slow neutron cross section of liquid lead or bismuth. Preliminary investigations using molten lead were previously reported⁽¹⁾. These studies have been continued using molten bismuth which has an unusually small absorption cross section and no observed resonances. One main possible source of systematic error has been eliminated by the use of a standard filter comparison technique (described by Melkonian in a previous abstract on the free neutron-proton cross section). The neutron-electron cross section can be expressed in terms of the Born formula by specifying an equivalent interaction potential, V , acting over a volume τ . Choosing $\tau = 4/3 \pi a^3 = 9.3 \times 10^{-38} \text{ cm}^3$, where $a = 2.8 \times 10^{-13} \text{ cm}$ (for simplicity), the value of V was previously given⁽¹⁾ as 2500 e.v. with considerable uncertainty. The present measurements give a somewhat larger value which is several times the experimental uncertainty. The measurements are being continued and the best result will be announced.

(1) W. W. Havens, Jr., I. I. Rabi and L. J. Rainwater, Phys. Rev. 72, 634, (1947).

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Charles W. Dunning

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