Digital Computer Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts

SUBJECT: GROUP 63 SEMINAR ON MAGNETISM, APPENDIX III

To: Group 63

From: Arthur Loeb and Norman Menyuk

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De Broglie postulated that any particle in motion has a wave motion associated with it of wavelength

$$\lambda = \frac{h}{mv}$$

where h = Planck's constant = 6.624×10^{-27} erg sec

m = mass of particles

v = velocity of particle

For an electron,

$$\lambda = \sqrt{\frac{150}{V}}\ \text{Å}$$

where V = electron energy in volts ($\frac{V}{300} = \frac{1}{2}\frac{m}{e}v^2$) and e is charge of electron in esu.

As an example, for an electron of 100 volts energy, the De Broglie wavelength is 1.2 Angstrom Units. This is in the X-ray region.

De Broglie's postulate was confirmed by Davisson and Germer.* They sent a beam of electrons of known velocity impinging upon a nickel crystal, and they studied the angular distribution of the electrons reflected from the crystal. They found definite maxima and minima, which could be explained in terms of diffraction of the electron waves. The wavelengths of these waves were found to be in excellent agreement with those predicted by the De Broglie hypothesis.

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* Richtmeyer and Kennard, "Introduction to Modern Physics", McGraw - Hill Co., New York, 1947, P. 248

Signed Norman Menyuk

Signed Arthur D. Loeb

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