Experimental verification of de-Broglie's equation

Verification of wave nature of the electron has been obtained by Davison and Germer's experiments. They succeeded in diffracting a beam of electrons by means of a nickel surface. The pattern of electron diffraction obtained by them was found to be similar to that of x-ray diffraction. Not only this, the wavelength of the electrons was found to be identical with that calculated by de-Broglie's equation.

* Calculate the de Broglie wavelength associated with a thermal neutron of energy 0.025 ev

* Calculate the de Broglie wavelength of an electron accelerated through a potential of 150 volts.

① $\lambda = \frac{h}{\sqrt{2mE}}$ Mass of neutron $= 1.675 \times 10^{-27}$ kg

$= \frac{6.623 \times 10^{-34}}{\sqrt{2 \times 1.675 \times 0.025 \times 1.602 \times 10^{-19}}}$

$1 erg = 6.2419 \times 10^{11}$ ev

$1 J = 6.2419 \times 10^{18}$ ev

$1 ev = 0.1602 \times 10^{-18} J$

$= 1.602 \times 10^{-19} J$

$= \frac{6.623 \times 10^{-34}}{\sqrt{2 \times 1.675 \times 0.025 \times 1.602 \times 10^{-19}}}$

$= \frac{6.623 \times 10^{-34}}{\sqrt{0.1341675 \times 10^{-19}}}$

$= \frac{6.623 \times 10^{-34}}{\sqrt{1341675 \times 10^{-20}}} = \frac{6.623 \times 10^{-34}}{1.158 \times 10^{-10}} = 5.72 \times 10^{-24}$ m