

KSCP (2004/05) : Quantum Theory

Q, (d) electron & neutron travel with the same velocity, u

Using de Broglie wavelength :

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

$$\text{For an electron : } \lambda_{\text{electron}} = \frac{h}{m_e \cdot u}$$

$$\text{For a neutron : } \lambda_{\text{neutron}} = \frac{h}{m_n \cdot u}$$

} Comparing
 $\lambda \propto \frac{1}{m}$
(same velocity, v)

$$\lambda_{\text{electron}} \propto \frac{1}{m_e} \quad \because m_e \ll m_n$$

$$\lambda_{\text{neutron}} \propto \frac{1}{m_n}$$

$$\therefore \lambda_{\text{neutron}} \ll \lambda_{\text{electron}}$$

λ (wavelength) for electron is very long compared to
 λ for neutron.

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