

A particle is moving 4 times as fast as electron. If ratio of wavelength of particle to electron is 2/1. What is ratio of their masses?

Solution:

$$\frac{\lambda_p}{\lambda_e} = \frac{\frac{h}{m_p v_p}}{\frac{h}{m_e v_e}}$$

$$\frac{\lambda_p}{\lambda_e} = \frac{m_e v_e}{m_p v_p}$$

$$\frac{m_p}{m_e} = \frac{v_e \lambda_e}{v_p \lambda_p} = \frac{v_e}{4 v_e} \cdot \frac{1}{2} = \frac{1}{8}$$