

Homework 15 for September 23 2008

Due 8AM on September 24 2008

Physics 221 with Professor Jeff Terry

1. An ion accelerated through a potential difference of 115V experiences an increase in kinetic energy of 7.37×10^{-17} J. Calculate the charge on the ion.

$$\Delta K = q|\Delta V| \qquad 7.37 \times 10^{-17} = q(115)$$

$$q = 6.41 \times 10^{-19} \text{ C}$$

2. An electron is released from rest in a uniform electric field of 5.90×10^5 V/m. How fast will the electron be moving after it has traveled 1.00cm?

$$|\Delta V| = Ed = (5.90 \times 10^5 \text{ V/m})(0.0100 \text{ m}) = 59.0 \text{ V}$$

$$\frac{1}{2}mv_f^2 = |q\Delta V|: \qquad \frac{1}{2}(9.11 \times 10^{-31})v_f^2 = (1.60 \times 10^{-19})(59.0)$$

$$v_f = 4.55 \times 10^6 \text{ m/s}$$