

4. We can use the mc^2 value for an electron from Table 38-3 ($511 \times 10^3 \text{ eV}$) and the hc value developed in problem 3 of Chapter 39 by writing Eq. 40-4 as

$$E_n = \frac{n^2 h^2}{8mL^2} = \frac{n^2 (hc)^2}{8(mc^2)L^2} .$$

For $n = 3$, we set this expression equal to 4.7 eV and solve for L :

$$L = \frac{n(hc)}{\sqrt{8(mc^2)E_n}} = \frac{3(1240 \text{ eV} \cdot \text{nm})}{\sqrt{8(511 \times 10^3 \text{ eV})(4.7 \text{ eV})}} = 0.85 \text{ nm} .$$