

This homework problem is on matter waves which comes from Chapter 25 in the 2nd edition of the text book. If you have a 3rd or 4th edition of the textbook, copies of Chapter 25 material have been handed out in class.

You want to trap an electron in a thin open-closed box such that when an electron falls from the 3rd energy level to the 1st energy level, a green ($\lambda = 515\text{nm}$) photon is emitted.

What length of open-closed box do you need?

Main concepts of this chapter:

- Photons are “pieces” of light that travel a $c = 3.00 \cdot 10^8 \text{m/s}$
- Each photon has an energy of $E = hf$ where $h = 6.63 \cdot 10^{-34} \text{J}\cdot\text{s}$. h is called **Planck’s Constant**.
- Electrons and protons have wave aspects (and all types of known matter) have wave characteristics associated with them. The wavelength of a piece of mass is called the deBroglie wavelength and is described by the equation $\lambda = h/p$.