The wavelength of a matter particle is given by $\lambda_{deBroglie} = \frac{h}{p}$ where Planck's constant is $h = 6.63 \cdot 10^{-34}$Js.

What is:

a. the wavelength of an electron traveling at 1.0% the speed of light. (The mass of an electron is $m_e = 9.11 * 10^{-31}$kg.)

b. my dog's wavelength (m=35kg) as he is running at 4.0m/s.

You shoot a beam of electrons at 1.0% the speed of light through a double slit where the slit-spacing is 5μm at a screen that is 1.0 meters away from the double slits.

a. Draw a picture of what you see on the screen.

b. How far is it from the central maximum to the next bright spot on the screen?

You trap an electron in a box of length L. Draw three pictures of its three lowest energy states.

Remembering that $KE = \frac{1}{2}mv^2$ and realizing that this can be rewritten as $KE = \frac{p^2}{2m}$ create a symbolic solution that would calculate the energy states for an electron in a box of length L.

Calculate the energy of an electron's ground energy state and first two excited states in a box 1.0μm big.