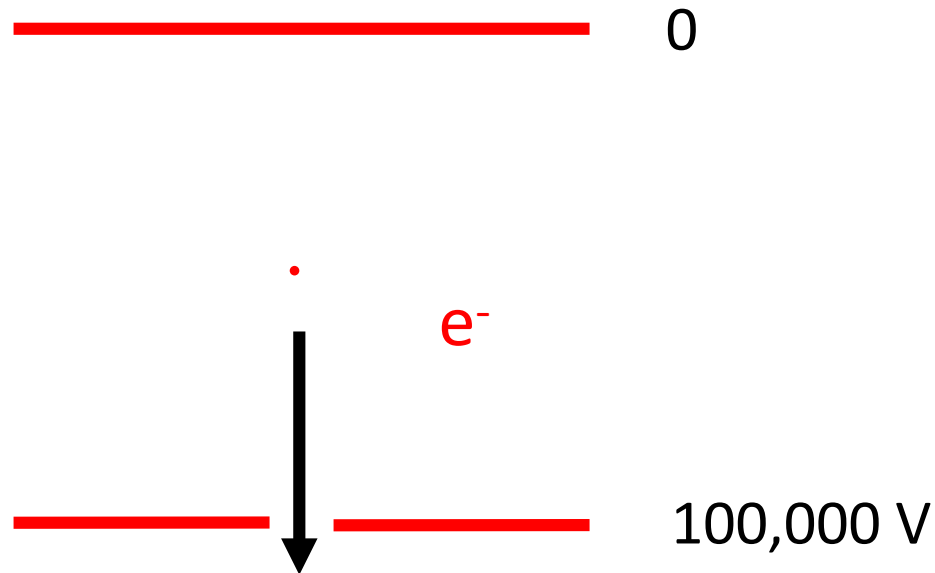


# Electron acceleration

We can use the DeBroglie relation to calculate the angle of deflection of an electron in an electron microscope. First we need to calculate the velocity of the electron from its acceleration. In a 100 kV electron microscope the electron is accelerated by application of 100,000 volts as shown below.



# Calculate the wave length

To calculate the velocity recall that the energy can be obtained from the voltage, 1 Joule = 1 Coulomb x 1 Volt. You need to use the charge on the electron since it is an electron that is being accelerated.

Once you have calculated the velocity of the electron you can calculate the wavelength using the DeBroglie relation. You will simply rearrange it to solve for wavelength.

Finally, if you are given that the electron will strike a crystal with a lattice spacing of 3.9 Å you may calculate the deflection angle of the electron using Bragg's law. Here we can assume that  $n = 1$ .

$$n\lambda = 2d \sin\theta$$