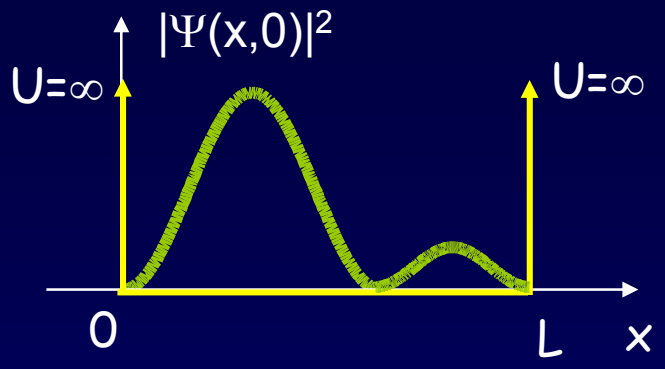
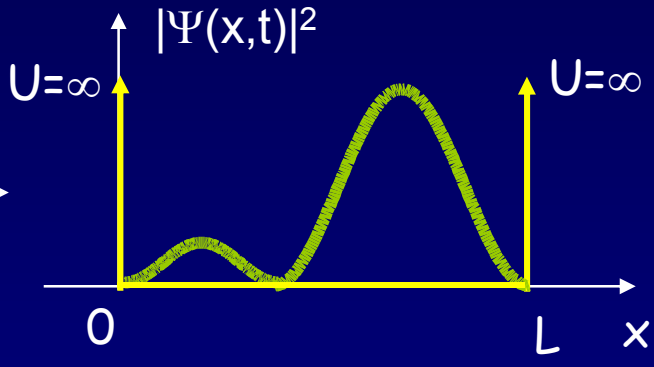
Solution

An electron in an infinite square well of width L = 0.5 nm is (at t=0) described by the following wave function:

$$\Psi(x,t=0) = A\sqrt{\frac{2}{L}}\left(\sin\left(\frac{\pi}{L}x\right) + \sin\left(\frac{2\pi}{L}x\right)\right)$$



Determine the time it takes for the particle to move to the right side of the well.



$$E_1 = \frac{1.505\ \text{eV}\cdot\text{nm}^2}{4L^2} = 1.505\ \text{eV}$$

$$E_2 = 4E_1 = 6.020\ \text{eV}$$

T = 1/f , where f = $(E_2-E_1)/h$

Half a period.

$$t = \frac{T}{2} = \frac{h}{2(E_2 - E_1)} = \frac{4.136\times10^{-15}\ \text{eV}\cdot\text{sec}}{2(4.515\ \text{eV})} = 4.6\times10^{-16}\ \text{sec}$$