

Solution

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

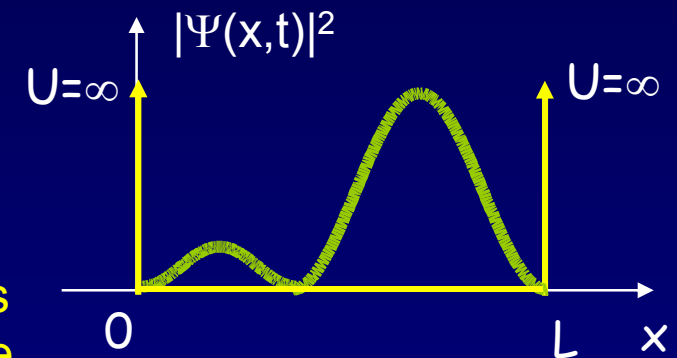
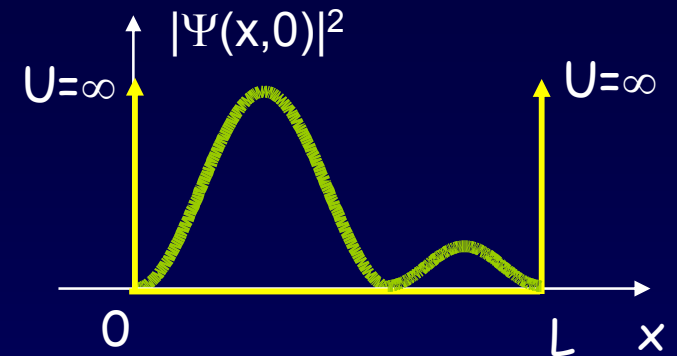
$$\Psi(x, t = 0) = A \sqrt{\frac{2}{L}} \left(\sin \left(\frac{\pi}{L} x \right) + \sin \left(\frac{2\pi}{L} x \right) \right)$$

1) Suppose we measure the energy.

What results might we obtain?

- a) E_1 b) E_2 c) E_3 d) Any result between E_1 and E_2

We will only obtain results that correspond to the terms appearing in Ψ . Therefore, only E_1 and E_2 are possible.



2) How do the probabilities of the various results depend on time?

- a) They oscillate with $f = (E_2 - E_1)/h$
b) They vary in an unpredictable manner.
c) They alternate between E_1 and E_2 .
(i.e., it's always either E_1 or E_2).
d) They don't vary with time.