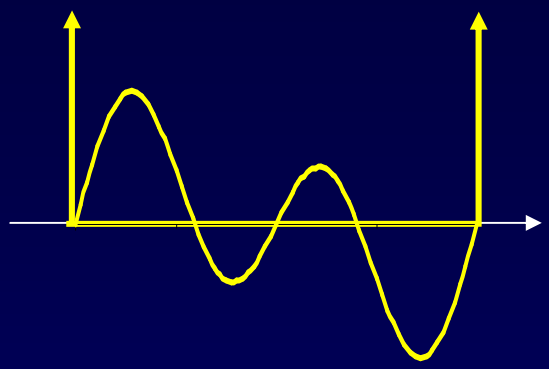
Solution



Consider a particle in an infinite well.
It is in the state:

$$\Psi(x,t) = 0.5\Psi_2(x,t) + 0.866\Psi_4(x,t)$$

with ψ_2 and ψ_4 both normalized.

We now measure the energy of the particle. What value is obtained?

a. E_2 b. E_4 c. 0.25 E_2 + 0.75 E_4 d. It depends on when we measure the energy.

We can only get one of the eigenvalues, E_2 or E_4. (not answer c)
The probability of measuring E_2 is 25%.
The probability of measuring E_4 is 75%.
Note: Ψ depends on time, but 0.5 and 0.866 don't. So, d is not correct.

The average energy (if we were to measure a large number of similar particles) is the weighted sum of the energies: 0.25 E_2 + 0.75 E_4.

Not part of this act, but an important question, nevertheless:

If E_2 is observed, what is the state of the particle after the measurement?