Physical intrepation of wave function ⇒

As wave function $\psi(x,y,z,t)$ is related to probability, and it should be real and positive.

For this, take complex conjugate of ψ, denoted by ψ^*

Therefore, the product of $\psi\psi^*$ becomes real and positive if $\psi \neq 0$

$|\psi|^2 = \psi\psi^*$ is a measure of probability of finding the particle at the point (x,y,z) in space at an instant 't'

The quantity $|\psi|^2$ is called as probability density.

$|\psi|^2 dV$ represent the probability that the particle must be found at given point at given instant of time t in a small volume element dV.

Larger the value of $|\psi|^2$, greater is the chance of finding the particle.

As $|\psi|^2 \neq 0$, there is definite chance of finding the particle at the given point at time t.

This interpretation was given by Max Born

Thus, Max Born condition is

$$\int_{-\infty}^{+\infty} \psi\psi^* dV = 1$$

This condition for ψ is called as normalization conditi[on]

It shows, the particle must be found somewhere, the total probability is always equal to one.

conditions of wave function

As $\psi(r, t)$ is related to probability, it satisfies the following conditions as -

① ψ should be finite everywhere.

② ψ should be single valued over entire space.

③ ψ should be continuous for all value of 'r'

④ Total probability is always equal to unity. i.e probability integral is unity such a function is normalized.

⑤ ψ must tends to zero, at infinity. i.e $\psi \to 0$ as $r \to \infty$

⑥ Partial derivative of ψ must be finite, single valued and continuous for all values of 'r'.

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