

what is the meaning of the product of ψ^* and ψ ?

A wave function or wavefunction (most common symbols used are ψ or Ψ) is a probability amplitude in quantum mechanics describing the quantum state of a particle and how it behaves. Typically, its values are complex numbers and, for a single particle, it is a function of space and time. Although ψ is a complex number

$$\psi\psi^* = |\psi|^2$$

(where ψ^* - the complex conjugate of the ψ)

is real, and corresponds to the probability density of finding a particle in a given place at a given time, if the particle's position is measured.