

Postulates of Quantum Mechanics

- * Any state of a dynamical system of N particles is described as fully as possible by a function $\Psi(q_1, q_2, \dots, q_{3N}, t)$ such that the quantity $\Psi^*\Psi dt$ is proportional to the probability of finding q_1 between q_1 and $q_1 + dq_1$, and so on, at a specific time t .
- * For every observable property of a system, there exists a corresponding linear Hermitian operator, and the physical properties of the observable can be inferred from the mathematical properties of its associated operator.
- * For an energy measurement (for example) on a series of identical systems to be reproducible, the state of the system must be described by a function Ψ that is an eigenfunction of the operator corresponding to the total energy, the Hamiltonian.
- * The average value of an observed property with operator \hat{a} is given as in probability theory by

$$\langle \hat{a} \rangle = \frac{\Psi_s | \hat{a} | \Psi_s}{\Psi_s | \Psi_s}$$

- * The change in a state vector with time is given by $i\hbar \frac{\partial \Psi}{\partial t} = \hat{\mathcal{H}}\Psi$