

Main ideas discussed in the class on 12 Jan.

- Wavefunctions and its properties
- Operators and Schrödinger equation
- Postulates

Wavefunction (ψ) and its properties

- $|\psi|^2 dx$ gives the probability of finding the system between x and $x + dx$ at time t
- Normalization of ψ , $c = \frac{1}{\sqrt{\int \psi^* \psi dx}}$
- ψ and $\frac{d\psi}{dx}$ should be finite, single-valued, and continuous

Operators and Schrödinger equation

- $\hat{O}pf = g$ is an operator equation
- An eigenvalue equation is one where $\hat{O}pf = cf$ with c a constant
- Schrödinger equation is an eigenvalue equation
- The SE is a linear differential equation - superposition

- System completely characterized by its wavefunction Ψ
- Classical observables represented by operators in QM
- Measurement of an observable yields one of its eigenvalues
- The expectation value is defined as $\int \Psi \hat{O} \Psi d\tau$.
- The wavefunction is the solution of $i\hbar \frac{\partial \Psi}{\partial t} = \left(-\frac{\hbar^2}{2m} \nabla^2 + V \right) \Psi$.