

# The Schrödinger Equation

**Time-dependent Schrödinger Equation:**

$$i\hbar \frac{\partial}{\partial t} \Psi(\mathbf{r}, t) = \hat{H} \Psi(\mathbf{r}, t) \quad (1)$$

where  $\hat{H}$  is the Hamiltonian operator:

$$\hat{H} = -\frac{\hbar^2}{2m} \nabla^2 + V(\mathbf{r}, t) \quad (2)$$

**Time-independent Schrödinger Equation:**

$$\hat{H} \Psi(\mathbf{r}) = E \Psi(\mathbf{r}) \quad (3)$$

where  $E$  is the energy eigenvalue.

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*Quantum mechanics holds the key to understanding the microscopic universe.*