

amplitude, probability
and intensity

www.hyperfinecourse.org

system

measurement on a quantum system

$$|\Psi\rangle \quad \hat{P}$$

measurement on a quantum system

$$|\Psi\rangle \quad \hat{I}_z$$

measurement on a quantum system

$$\hat{I}_z |+\rangle = +\frac{1}{2}\hbar |+\rangle$$

$$\hat{I}_z |-\rangle = -\frac{1}{2}\hbar |-\rangle$$

measurement on a quantum system

$$|\Psi\rangle = |+\rangle$$

$$|\Psi\rangle = |-\rangle$$

$$|\Psi\rangle = a |+\rangle + b |-\rangle$$

measurement on a quantum system

$$a^*a + b^*b = 1$$

$$|a|^2 + |b|^2 = 1$$

$$|\Psi\rangle = a |+\rangle + b |-\rangle$$

measurement on a quantum system

$$|\langle + | \Psi \rangle|^2 = |a|^2$$

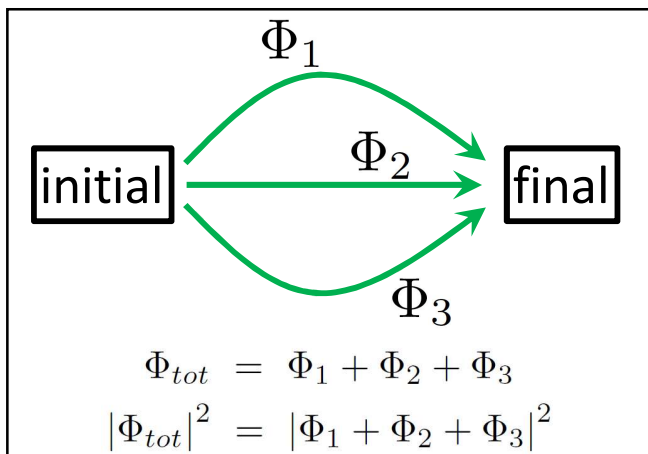
$$|\langle - | \Psi \rangle|^2 = |b|^2$$

measurement on a quantum system

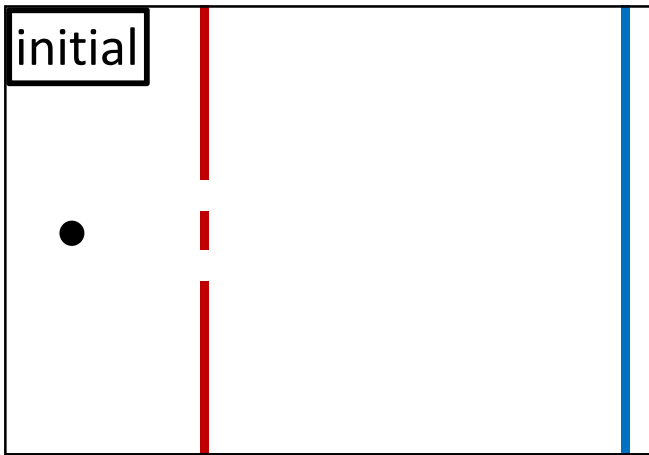
$$|\langle + | \Psi \rangle|^2 = |a|^2$$

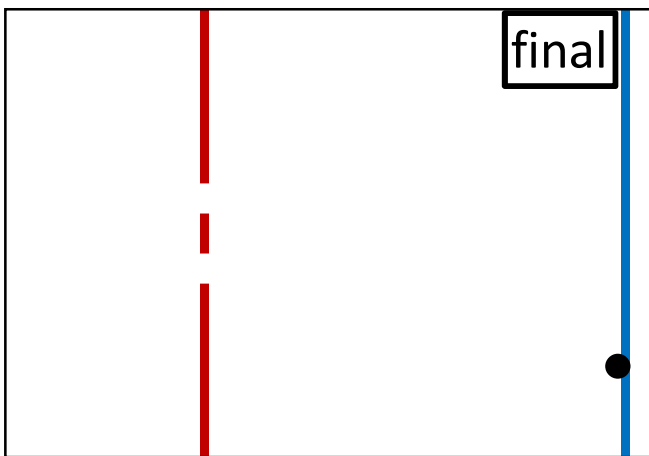
$$|\langle - | \Psi \rangle|^2 = |b|^2$$

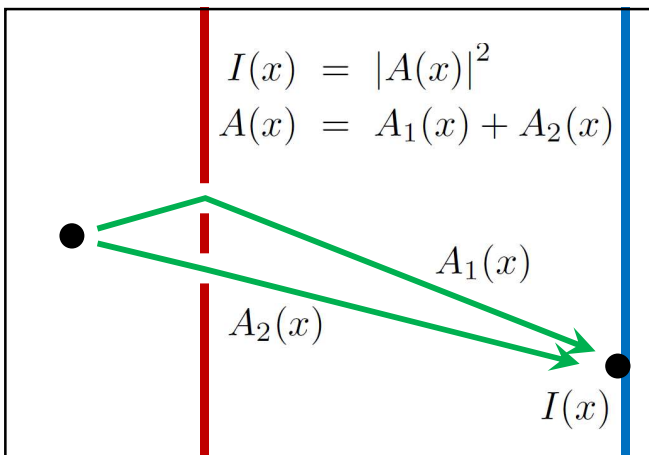
process

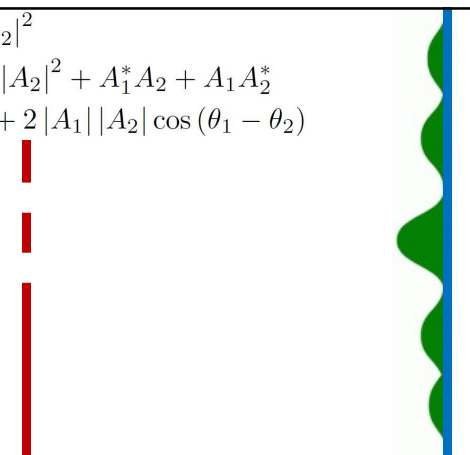


example: two slits







$$\begin{aligned} I &= |A_1 + A_2|^2 \\ &= |A_1|^2 + |A_2|^2 + A_1^* A_2 + A_1 A_2^* \\ &= I_1 + I_2 + 2 |A_1| |A_2| \cos(\theta_1 - \theta_2) \end{aligned}$$
A diagram illustrating wave interference. On the left, a vertical red dashed line represents a wave source. To its right, a vertical blue line represents a barrier. A green wavy line represents a wave passing through the barrier. The diagram is enclosed in a black rectangular frame.
