CHM621A

CHEMICAL BINDING

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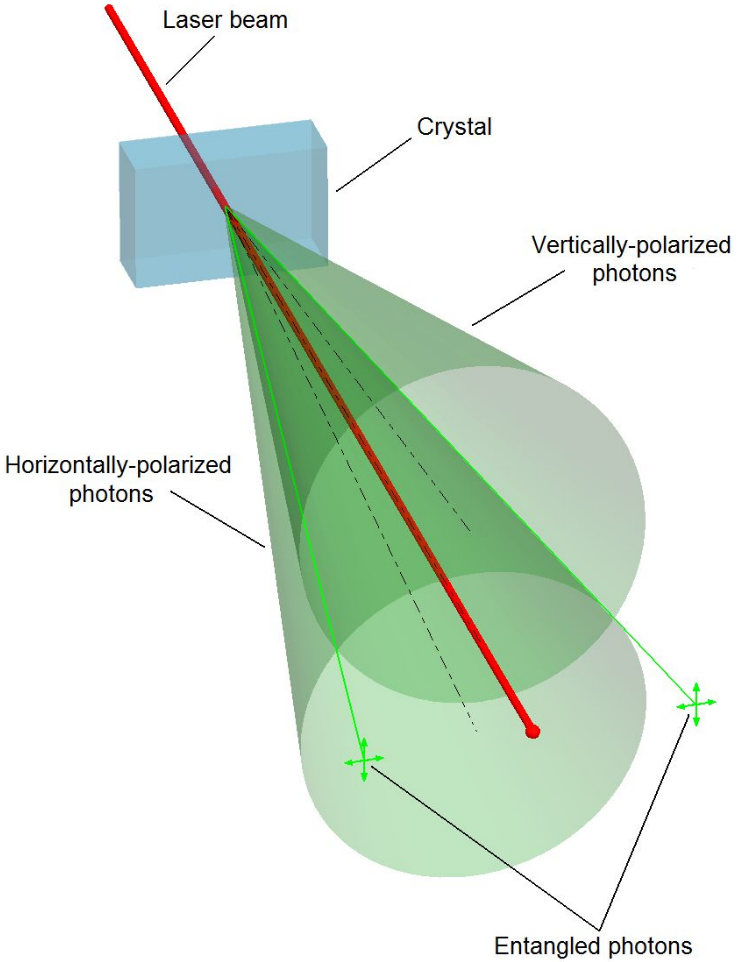
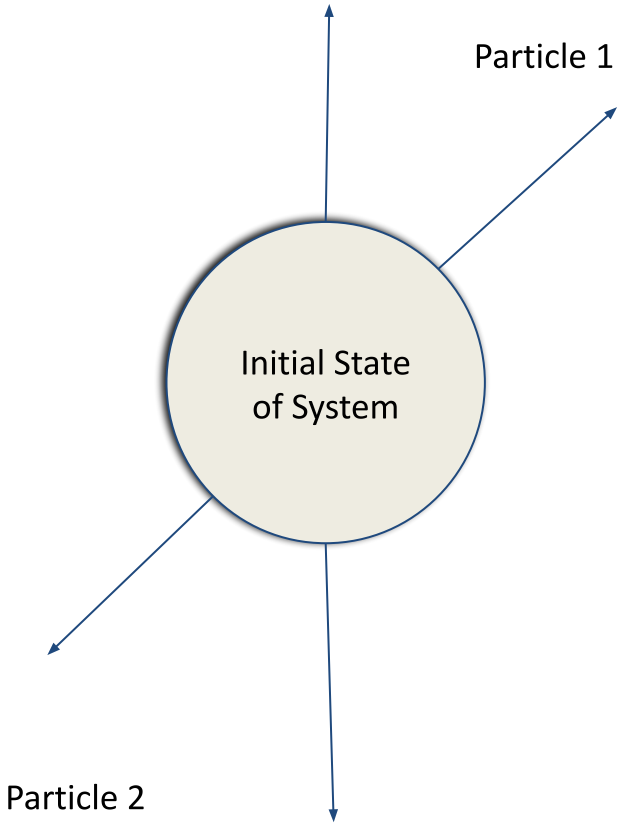
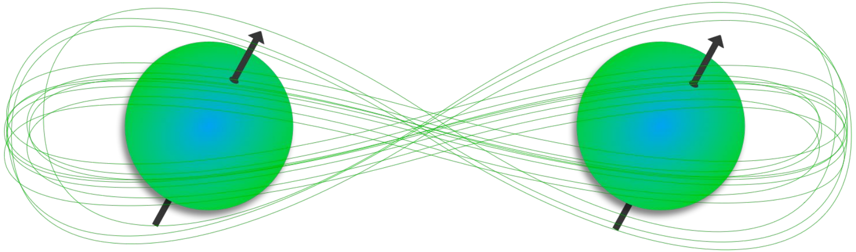


Welcome to the world of **quantum entanglement**! This mind-boggling phenomenon occurs when two or more particles become **inextricably linked**, regardless of the distance between them. Exploring the mysteries of quantum entanglement has revolutionized our understanding of the **fundamental nature of reality**. Join us on this fascinating journey as we delve into the intricacies of entangled particles and their potential applications in **quantum computing** and **secure communication**.



The EPR paradox challenges the principles of **local realism**. It suggests that either **quantum mechanics is incomplete** or that information can travel faster than light. According to EPR, if we measure one entangled particle, we can instantly determine the state of the other, regardless of the distance between them. This implies the existence of **hidden variables** or **spooky action at a distance**.



$$\Delta\chi\Delta\rho \geq \frac{\hbar}{2}$$

At the heart of quantum mechanics lies the **Heisenberg Uncertainty Principle**. Proposed by Werner Heisenberg in 1927, it states that the more precisely we try to measure the position of a particle, the less precisely we can know its momentum, and vice versa. This inherent uncertainty challenges the classical notion of determinism and imposes fundamental limits on our knowledge of the quantum world.