



MAXWELL-BOLTZMANN DISTRIBUTION BADGE

Forming the basis of the kinetic theory of gases, the Maxwell-Boltzmann equation solves for the velocity distribution of gas molecules at different temperatures. Students learn more about the kinetics of gases in physical chemistry. The badge is represented by the four distribution profiles.

Is it a wave? Is it a particle? It's the wave-particle duality conundrum that physical chemistry students will have to wrap their head around. One of the more head-scratching exercises in quantum mechanics, this badge is represented by a dot sliding in the shape of a sinusoidal wave.

WAVE-PARTICLE DUALITY BADGE



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ATOMIC EMISSION BADGE

The classic non-classical experiment. Each element yields a unique spectrum in which each line is associated with an electronic transition. Classical theory was unable to describe the observation, which drove the need for a quantum model of the atom. This badge shows the hydrogen emission spectrum.

Just relax... what goes up, must come down (but not always the way you expected)! The Jablonski diagram shows the movement of electrons as they go through various electronic states. Those that don't come straight down undergo nonradiative transitions and slowly relax.

JABLONSKI DIAGRAM BADGE

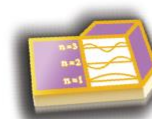


PHASE DIAGRAM BADGE

We all go through phases, and molecules are no exception. They can have rock-solid composure or be ethereal like a gas. The phase diagram is deeply studied in physical chemistry, emphasizing concepts such as the critical and triple points. This badge is represented by a phase diagram of water.

I like to move it, move it. The vibrational motion of molecules can be described by the harmonic oscillator model. It allows for solutions of the Schrödinger equation resulting in probability distributions that change with energy levels. Students might need to sit down to really get the "spring" of things.

HARMONIC OSCILLATOR BADGE



PARTICLE-IN-A-BOX BADGE

The particle-in-a-box model illustrates the quantum effects of how energy is quantized for atoms and molecules. Perhaps the quintessential problem in quantum mechanics that a physical chemistry student will learn to solve is a particle-in-a-box. This badge displays wavefunctions inside a 3-D box.

Einstein won the Nobel Prize in 1921 for his theoretical description of the photoelectric effect. The effect describes the quantum interaction of photons with matter, such that the energy of the wave packet must match to cause the emission of an electron. This badge shows an electron being hit with a photon.

PHOTOELECTRIC EFFECT BADGE

