

# THE PHOTOELECTRIC EFFECT

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## Abstract

**Understanding The Photoelectric Effect:** *In this module, we will learn about the photoelectric effect, which was a groundbreaking discovery that expanded our understanding of the nature of light, specifically whether it behaves as a particle or a wave. The photoelectric effect describes the particle-like nature of light: when light strikes a metal surface, it causes the emission of electrons. The number of electrons emitted depends on the intensity of the light, while the emission itself requires the light to have a frequency above a certain threshold.*

*Einstein's explanation provided a deeper understanding of this phenomenon. We will explore both the philosophical implications and the mathematical formulation of the photoelectric effect. Additionally, we will derive the equation for the kinetic energy of the emitted electrons,  $E_{kin} = hf - W$ , where  $hf$  is the energy of the photons and  $W$  is the work function of the material.*

## App for Description

- The app allows users to visualize two materials (Sodium and Cesium) as the cathode.
- Users can select light of different wavelengths to illuminate the cathode, including yellow (578 nm), green (546 nm), violet (436 nm), and ultraviolet (365 nm or 254 nm).
- Users can also apply a retarding potential to observe the kinetic energy of emitted electrons or ions.

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