

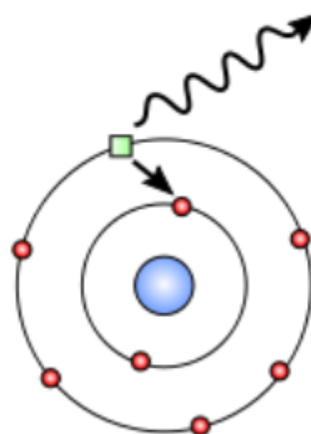
Photons

Objectives

Define photon.

Calculate the energy of a photon from frequency and wavelength.

Observe and analyze the line spectra of several elements.

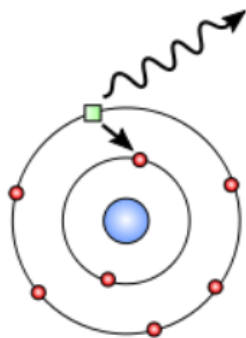


Light

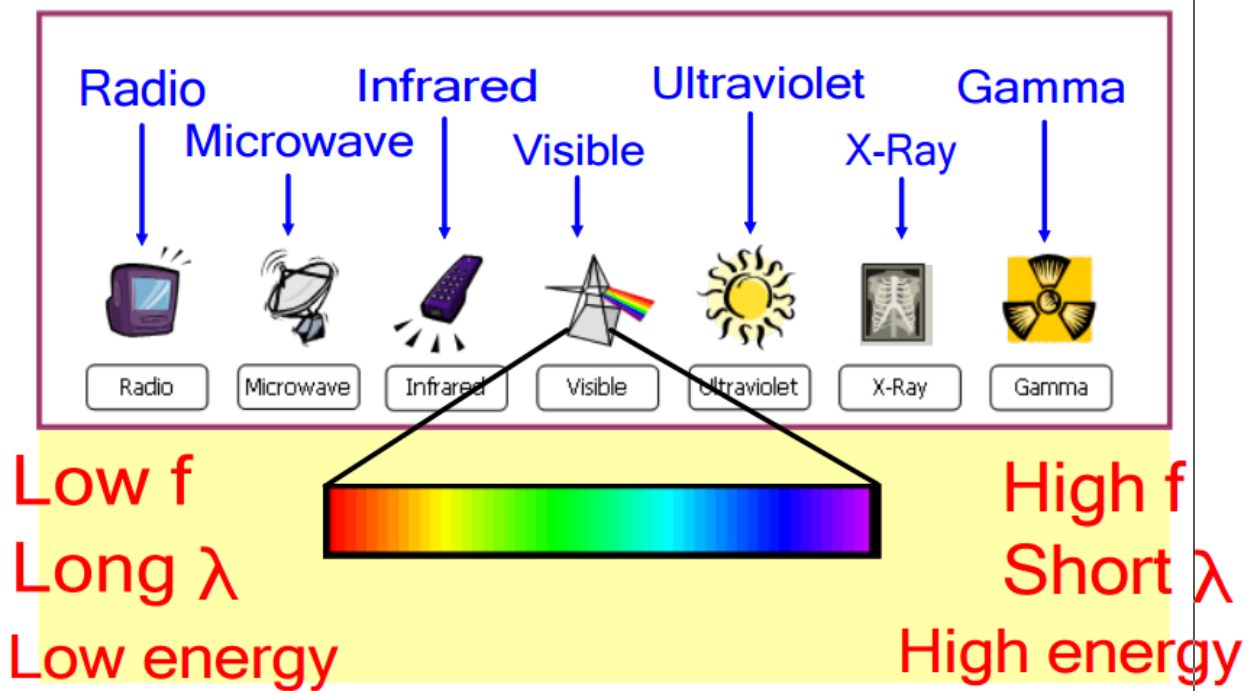
Atom is the source of all forms of light

– electrons absorb energy – move to energy level – falls back releasing energy.

Photon – tiny packet, or bundle of energy. Amount of energy in a photon, determines kind of light wave produced.



Electromagnetic Spectrum



Photon Energy (Einstein)

photons represent "chunks" of energy within the light wave.

$$E = h \cdot f \quad \text{or} \quad E = \frac{h \cdot c}{\lambda}$$

$$h = 6.63 \times 10^{-34} \text{ Js}$$

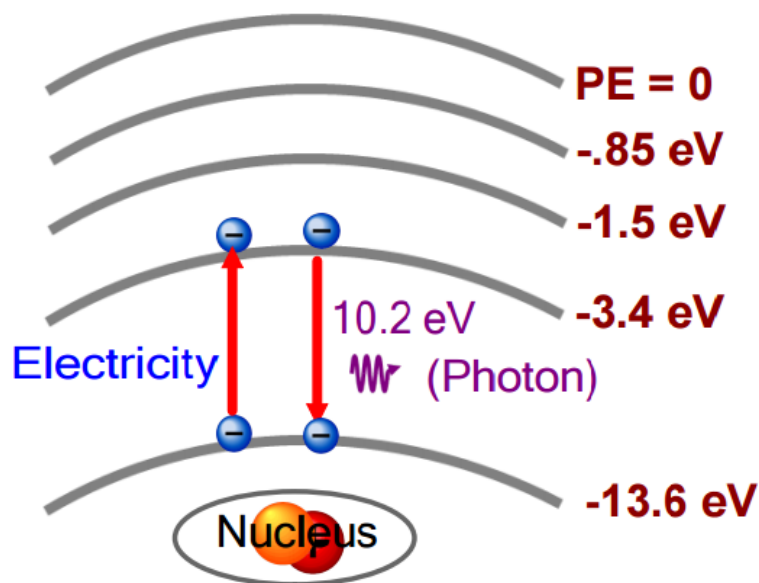
(Planck's constant)

Photoelectric Effect



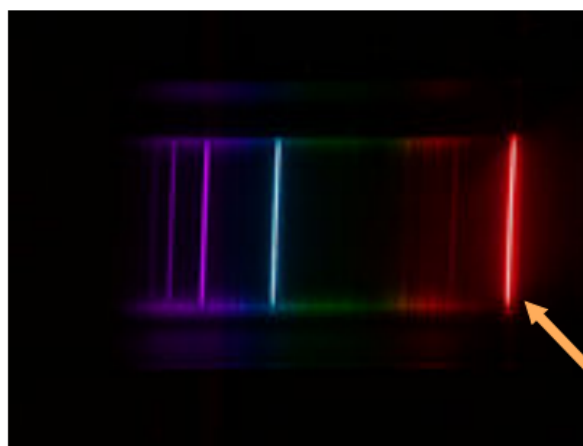
Energy Level Diagram - Hydrogen

When an element produces light, the energy of light emitted depends on the electron configuration of that element.



Hydrogen Line Spectrum

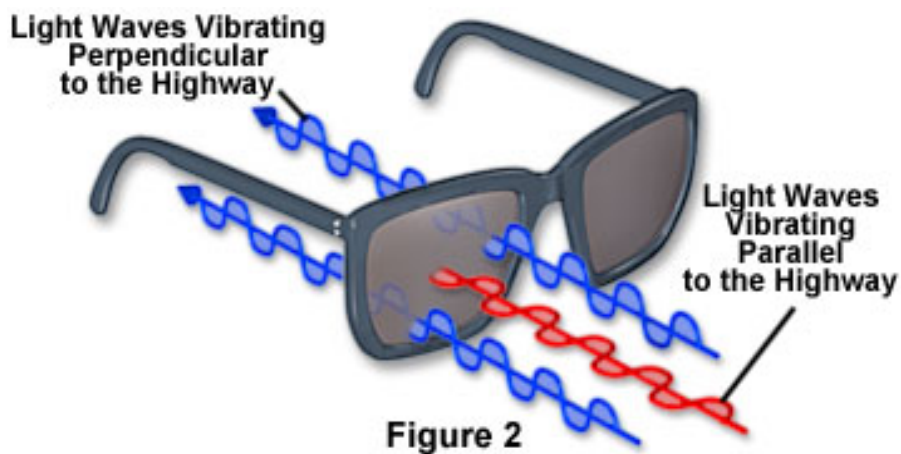
A line spectrum is a graph showing the wavelenths of specific photons of light emitted for a particular element.



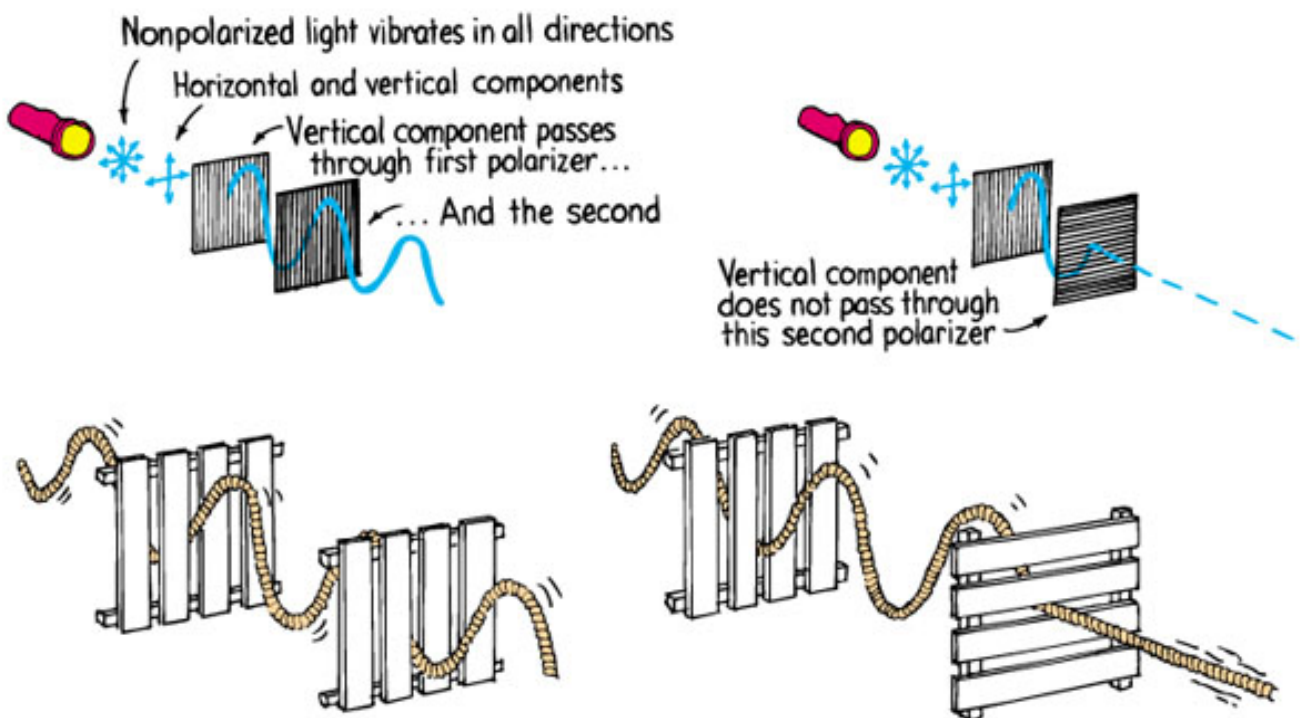
656 nm

Polarized Light

Polarized light waves are light waves in which the vibrations occur in a single plane. The process of transforming unpolarized light into polarized light is known as **polarization**.



Polarized Light



Hewitt, *Conceptual Physics*, Ninth Edition.
 Copyright © 2002 Pearson Education, Inc., publishing as Addison Wesley. All rights reserved.