

get your clicker and headphones

brief intro to photons and the photoelectric effect

then, listen to online lesson

then lecture: What is a quantum?



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PHOTON

- NO MASS
- HAS MOMENTUM (LATER)
- HAS ENERGY

$$E = hf$$

E	PHOTON ENERGY	J or eV*
h	PLANCK'S CONSTANT 6.63 x 10 ⁻³⁴ J·s 4.14 x 10 ⁻¹⁵ eV·s	(SEE ED'S SHEET) 2 VERSIONS J·s or eV·s
f	PHOTON FREQUENCY	Hz (1/s)

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RED LIGHT HAS $\lambda = 632\text{nm}$

$$E = ?$$

$$E = \frac{hc}{\lambda}$$

alt. version

$$v = \lambda f$$

$$f = \frac{v}{\lambda}$$

$$f = \frac{c}{\lambda}$$

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PHOTOELECTRIC EFFECT



SURFACE (METAL USUALLY)
ENERGY IN = ENERGY OUT

$$\text{PHOTON ENERGY} = K_{\text{ELECTRON}} + \text{ENERGY REQ'D TO BREAKOUT THE } e^{-}$$

$$K_{\text{max}} = hf + \phi$$

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