Physics 113-Lecture 9
Black Body Radiation
What light is emitted by a body in thermal equilibrium?

Shape depends only on $T$!

Stephan-Boltzman Eqn

$$\frac{\Delta Q}{\Delta T} = e\sigma AT^4$$

$$\sigma = 5.67 \times 10^{-8} \frac{W}{m^2K^4}$$

Wein’s Law

$$\lambda_{peak} T = 2.90 \times 10^{-3} \text{ mK}$$

EM Cannot Explain Spectrum!
Max Planck can explain Spectrum!

Energy of Oscillating Charges Quantized

$$E = n\hbar f \quad n=1,2,3,...$$

$$h = 6.626 \times 10^{-34} \text{ Js}$$

smallest energy is $\hbar f$!
Light is a Particle!

Einstein rocks physics foundations again!

Light acts like a particle photon:

\[ E = hf \]

\[ p = \frac{hc}{\lambda} \]

This explains many experimental results

photoelectric effect

\[ hf = KE - W \]