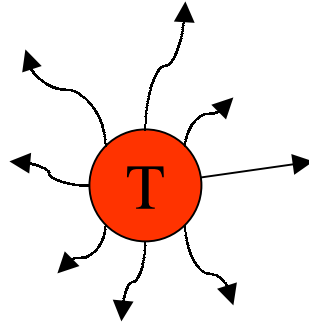


Physics 113-Lecture 9

Black Body Radiation

What light is emitted by a body in thermal equilibrium?



Shape depends only on T!

Stephan-Boltzman Eqn

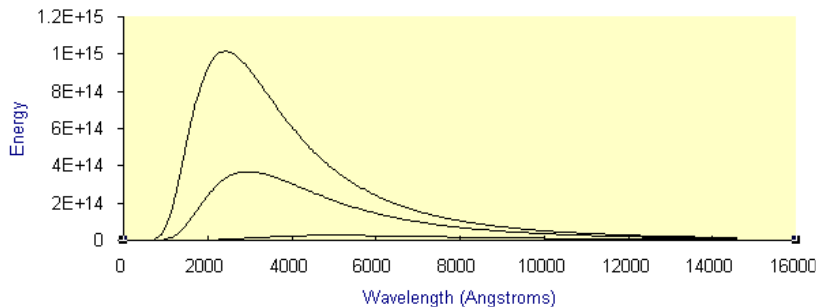
$$\frac{\Delta Q}{\Delta T} = e\sigma AT^4$$

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

Wein's Law

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

Wavelength vs Energy Distributions



EM Cannot Explain Spectrum!

Max Planck can explain Spectrum!

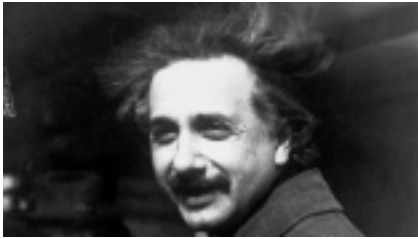
Energy of Oscillating Charges Quantized

$$E = nhf \quad n = 1, 2, 3, \dots$$

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

smallest energy is hf !

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

$$hf = KE - W$$

