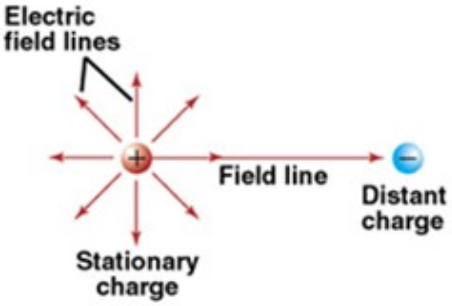
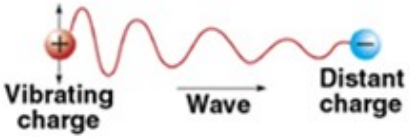
Light as a Wave
SPH4U



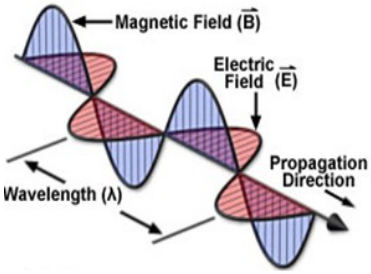
All _____ particles have an electric field.

When they _____, they _____ the electric field (and create a _____).



These field _____ through space as an _____ wave, aka _____.

The electric and magnetic field distortions are _____ to each other and to the direction of propagation.



The _____ is determined by the scale of the charged particle's _____.

- _____: Radio
- _____: Infrared
- _____: Visible Light
- _____: UV
- _____: X-rays
- _____: Gamma-Rays

(Note that there is _____ involved as you go to _____.)

Electromagnetic waves travel at _____ in a vacuum.

_____ is how many _____.

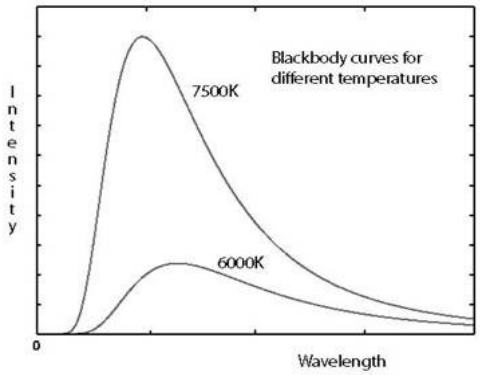
The Wave Equation:

Example: What is the frequency of a light wave with a wavelength of 420 nm?

Objects _____ (_____ from particle motion) at

_____ related to their _____:

Wien's Law:

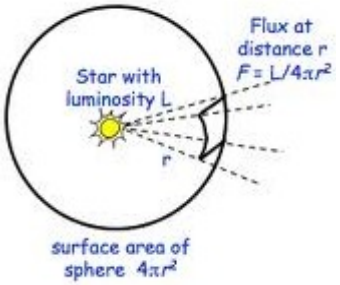


What is your peak wavelength?

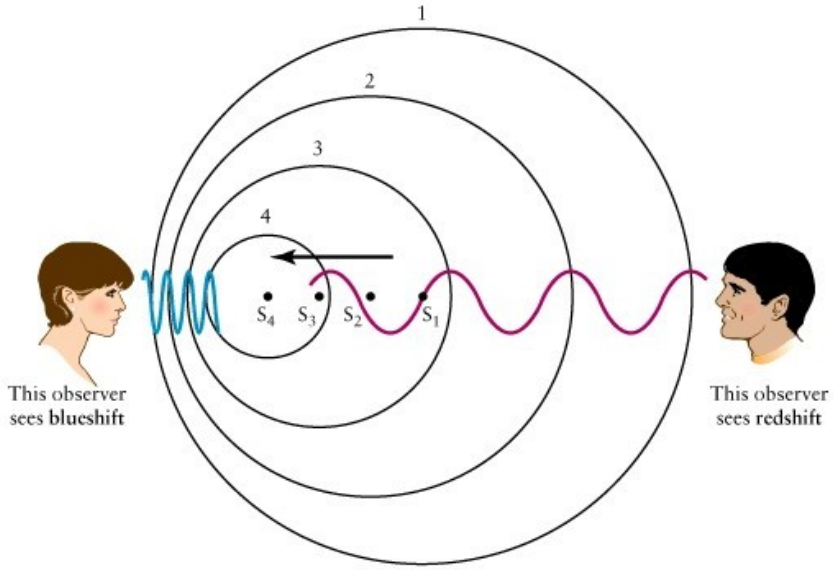
This light is emitted in all directions:

L (_____): total light _____/time (_____)

F (_____): light energy/time/unit area (_____)



Light also exhibits other wave behaviours, e.g., the Doppler Effect.



For a moving source of light the waves _____

– the wavelength gets _____!

_____ light is shorter wavelength: we call this a _____ shift.

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Equation (for a receding source):

λ wavelength of signal
f frequency of signal
v velocity of recession (away)
c speed of signal

Example: A source's blue hydrogen line is shifted from 486.1 nm to 537.4 nm. What is the speed of the source relative to us?