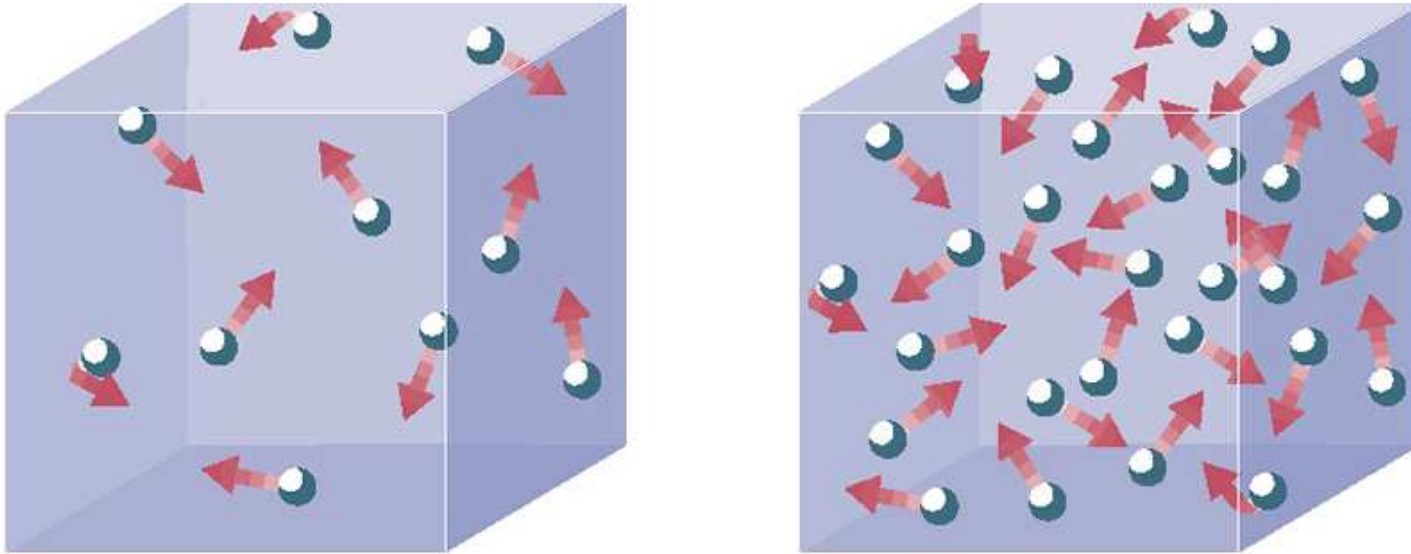


Announcements L12

- <http://www.as.utexas.edu/~sj/a301-sp05.html>
- Selected notes from lectures 11 online
- Homework assignment due Monday by noon
No late HW accepted.
- Help available during office hours
Nick Sterling out of town. Contact Nairn Baliber or myself

Thermal Energy



Thermal Energy of each particle depends on temperature T

Total thermal energy of 2 blocks of matter having same volume is larger for block having more particles à higher density

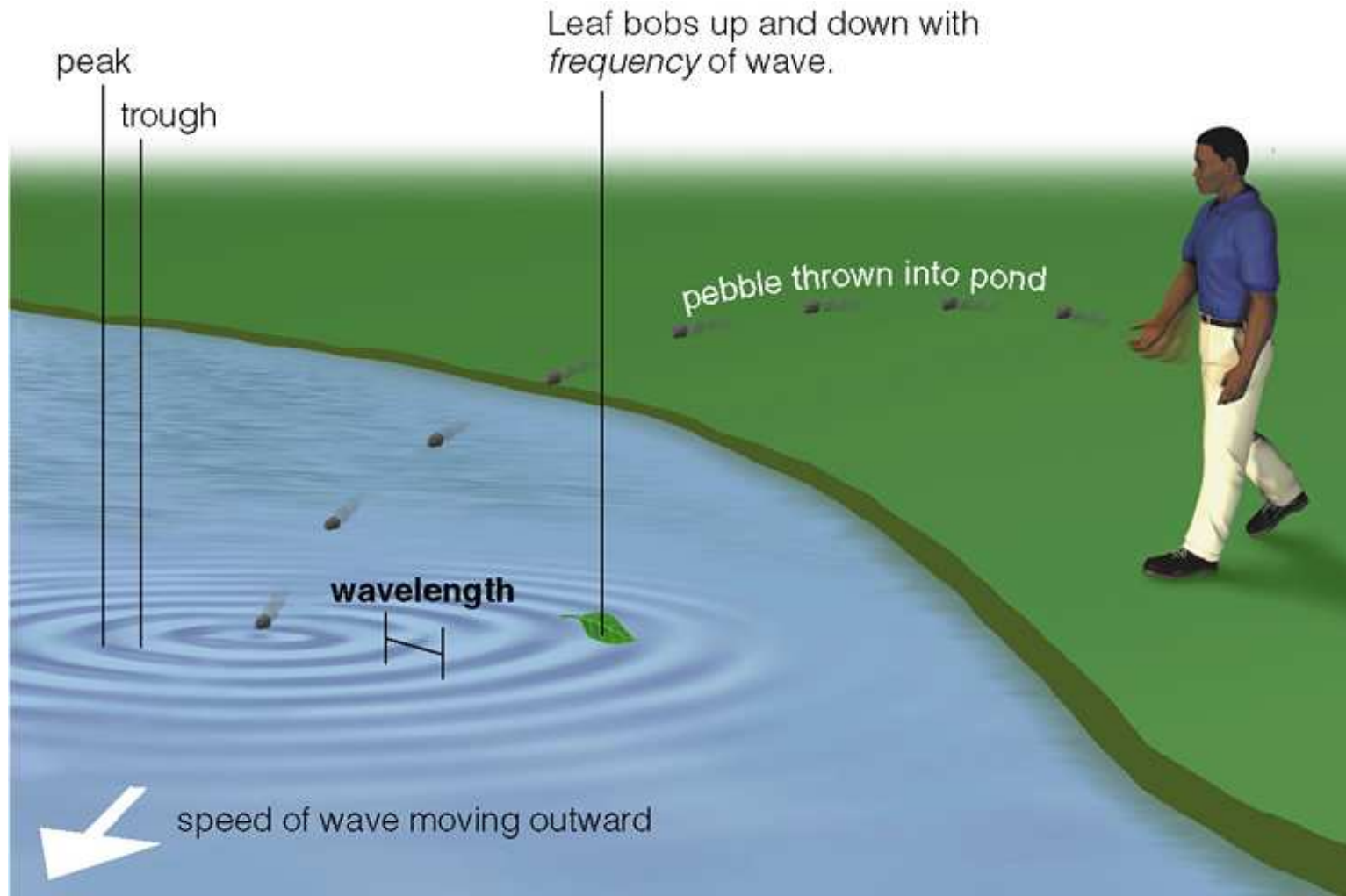
Equivalence of Mass and Energy; $E=Mc^2$



- Energy E stored in Mass $M = Mc^2$
(Einstein)
- $E < 0.007 Mc^2$ from fission of Ura. or Plu.
 - à Hiroshima bomb (1945): fission of 1 g of Uranium. E released equivalent to that of 20 kilo-tons of TNT
- $E = 0.007 Mc^2$ from Hydrogen fusion
 - à Hydrogen bomb in 1952
- $E = 0.1 Mc^2 =$ energy released (X rays, etc) as mass M falls onto the accretion disk of a black hole

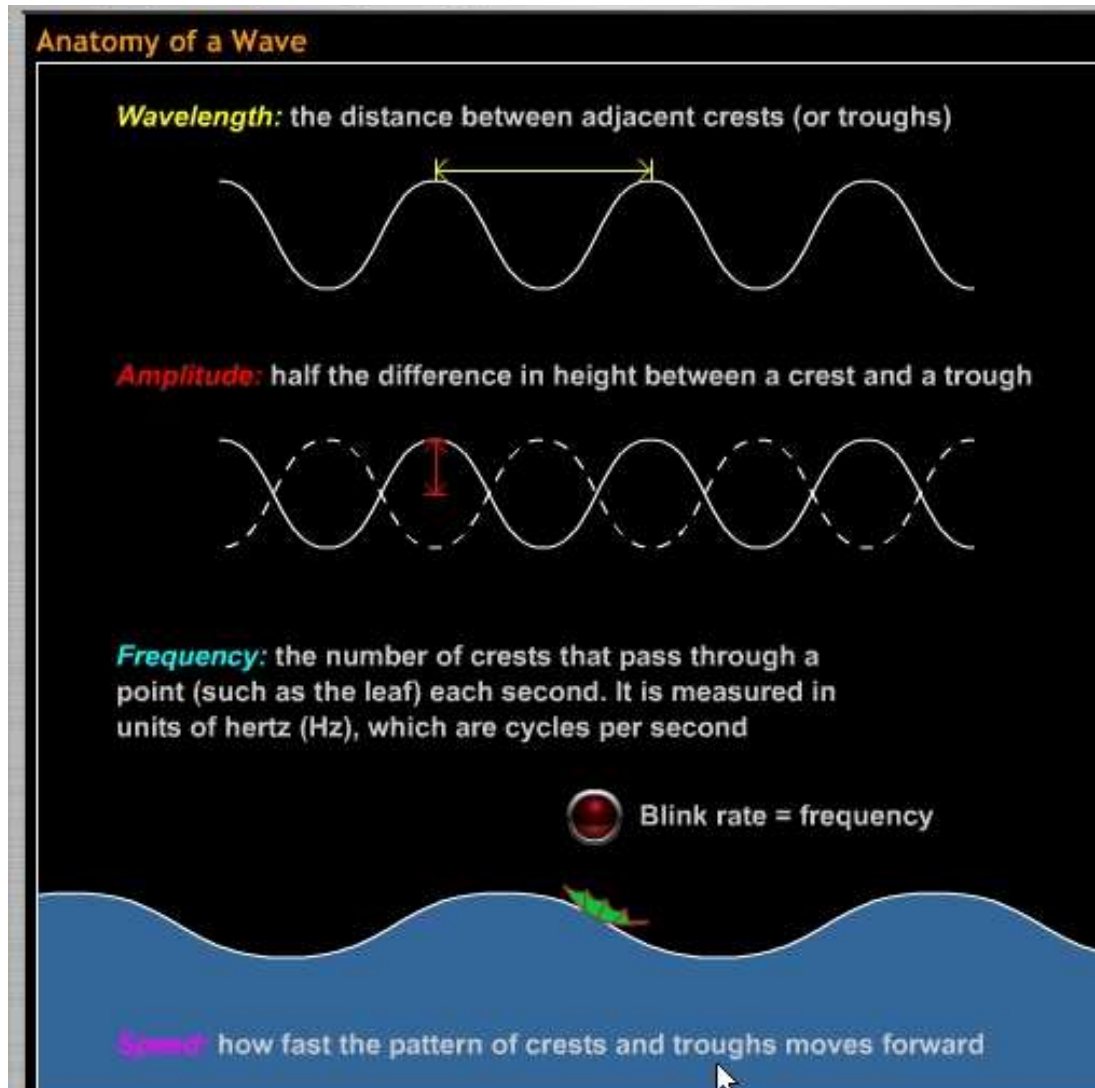
Nature of Light

Waves



Different types of waves: surface waves, sound waves, EM or light waves, gravitational waves

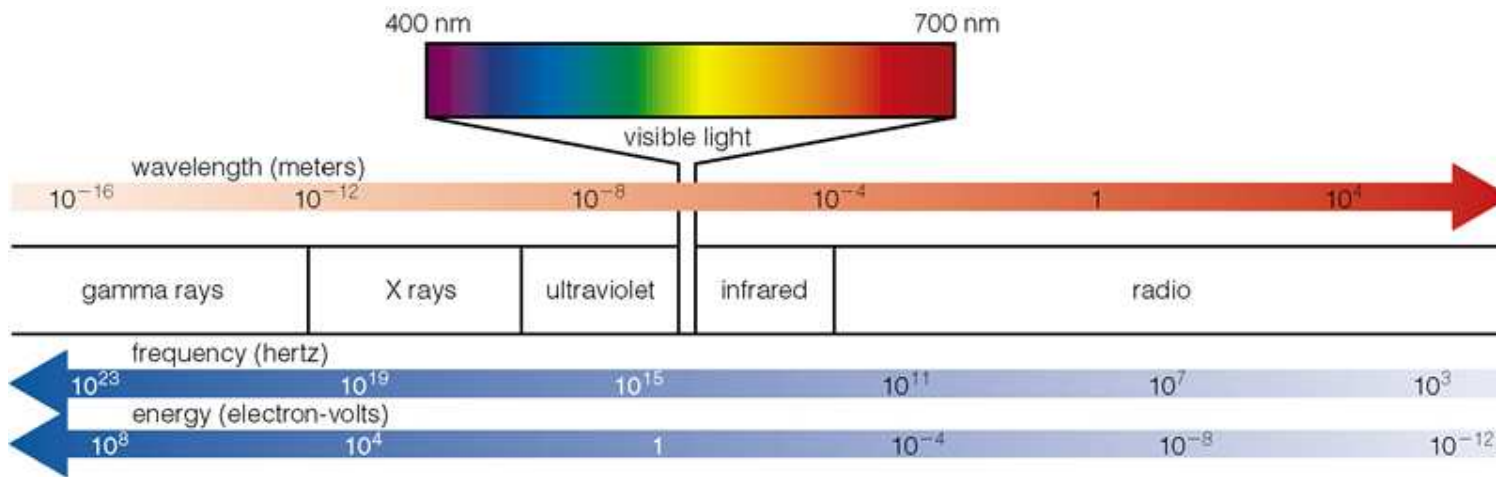
Waves: Wavelength, Frequency, Speed, Energy



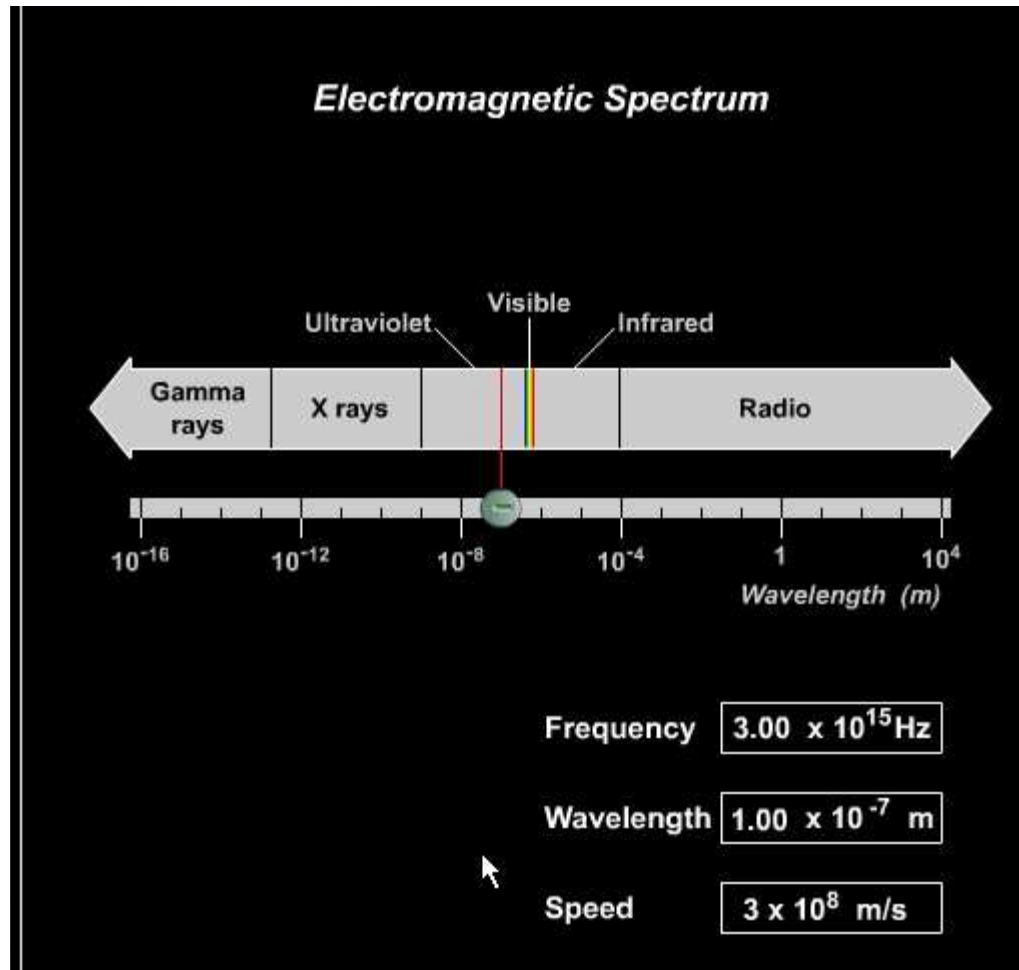
In-class animation : Anatomy of wave

Electromagnetic Waves (Light Waves)

TYPE	TYPICAL WAVELENGTH
Gamma rays	10^{-16} m
X rays	10^{-12} m
Ultraviolet	3×10^{-7} m
Visible	4 to 9×10^{-7} m = Blue to Yellow to Green to Red
Infrared	10^{-6} m to 10^{-4} m
Radio	10^{-3} m to m

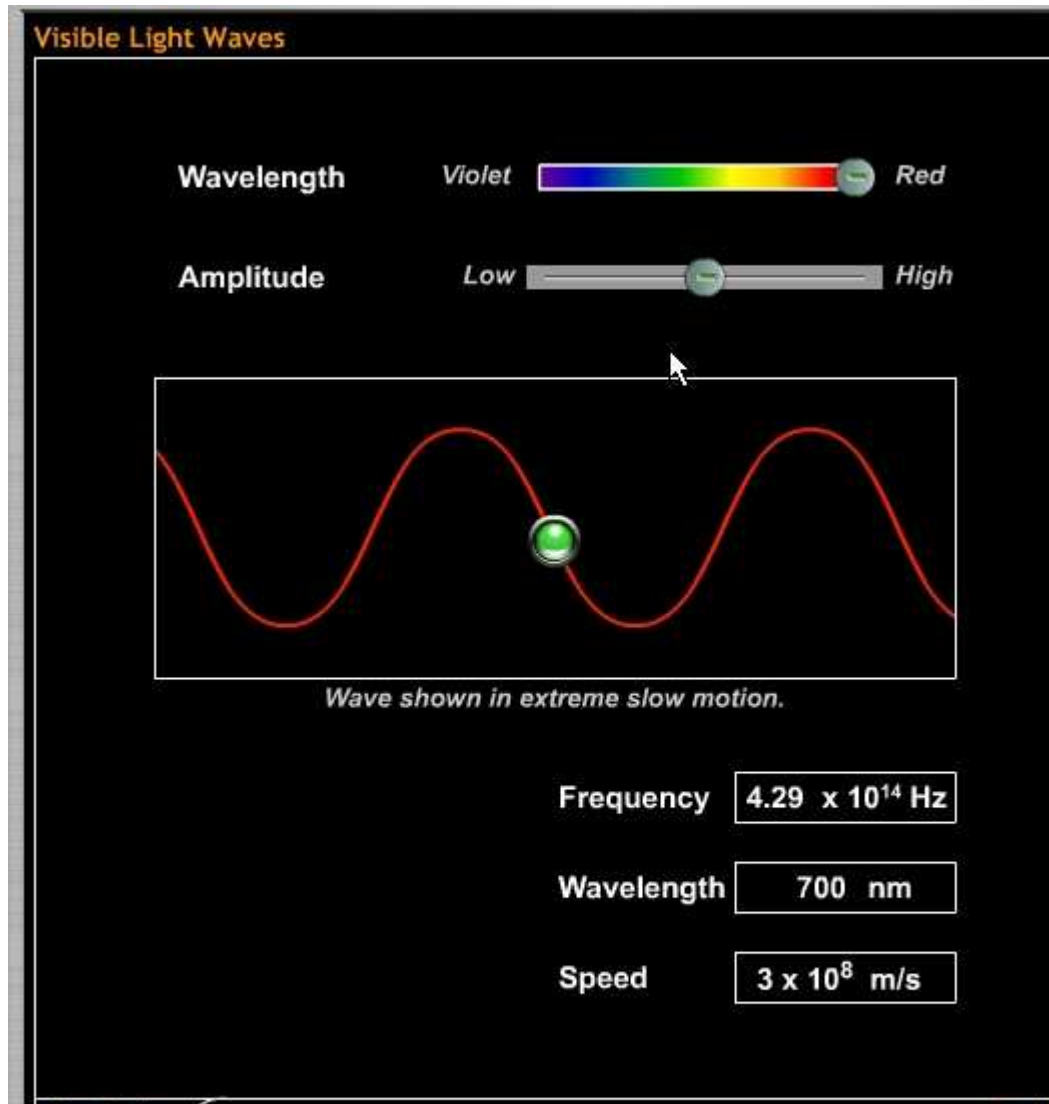


Electromagnetic Spectrum



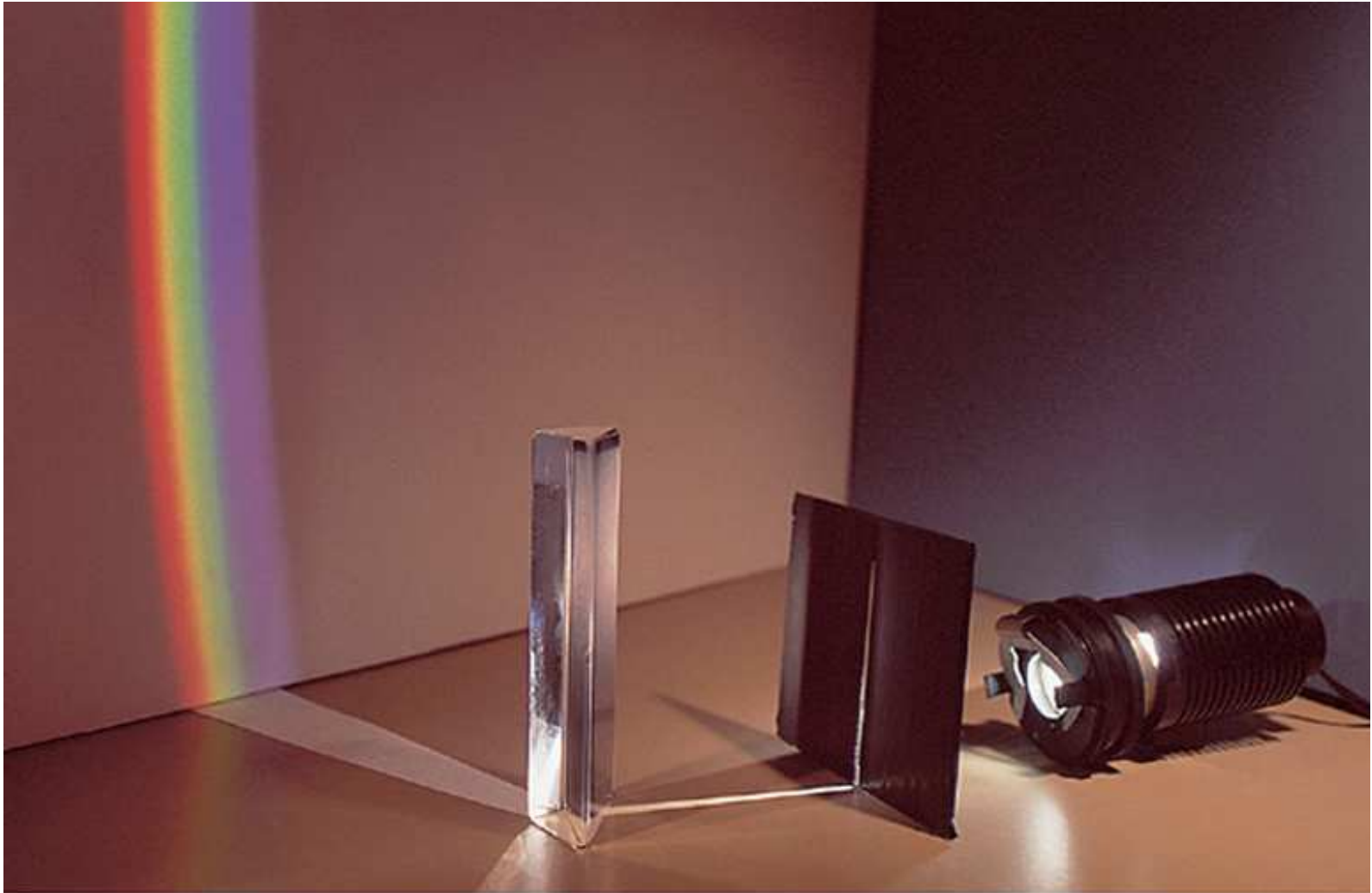
- à Light is made up of electromagnetic waves
- à In-class animation : Electromagnetic Spectrum

Visible Part of Electromagnetic Spectrum



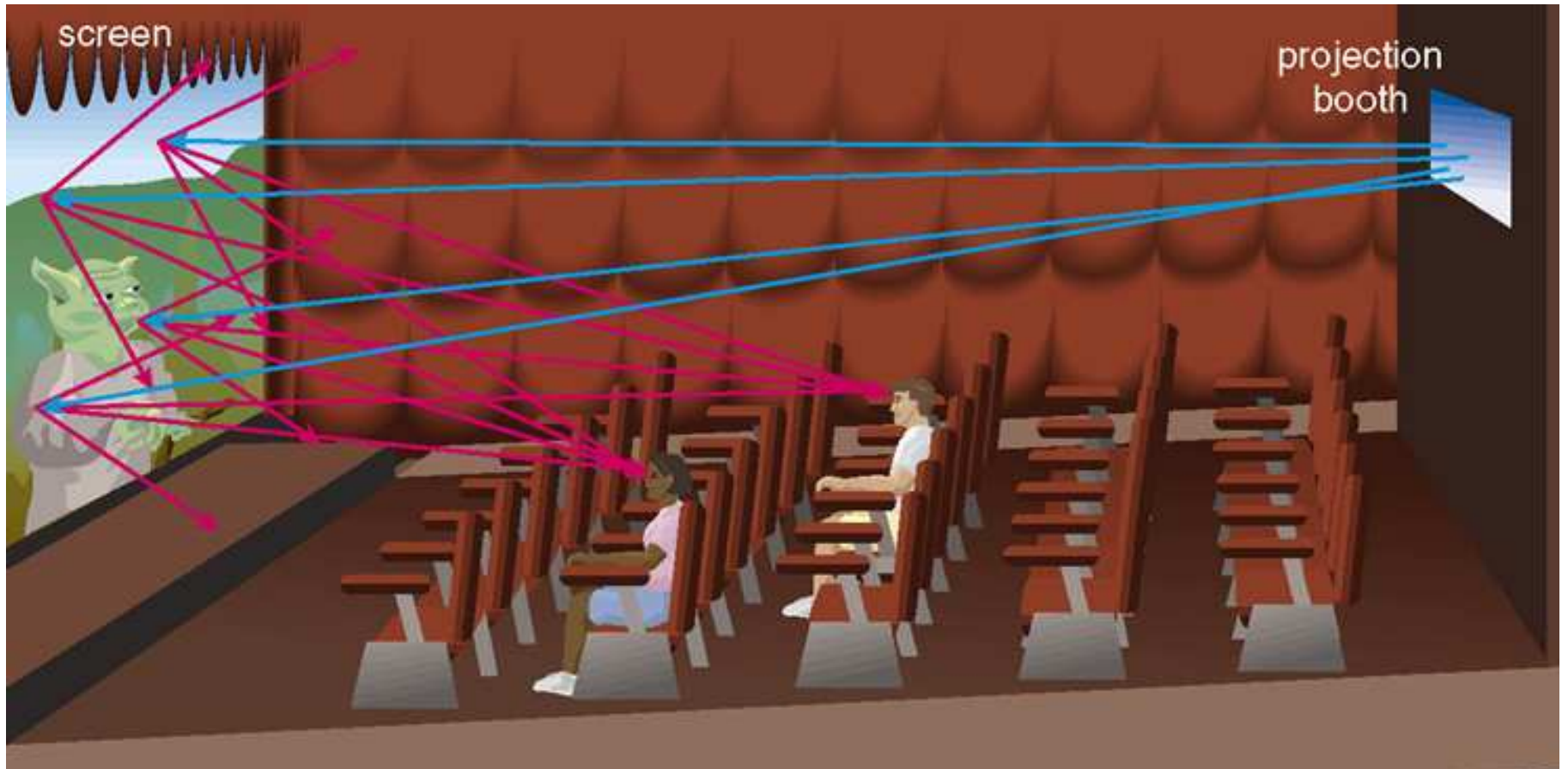
à In-class animation : Visible light

Processing Electromagnetic Waves



Dispersing white light into its basic colors

Processing Electromagnetic Waves



Processing Electromagnetic Waves

