

# PHYS 262

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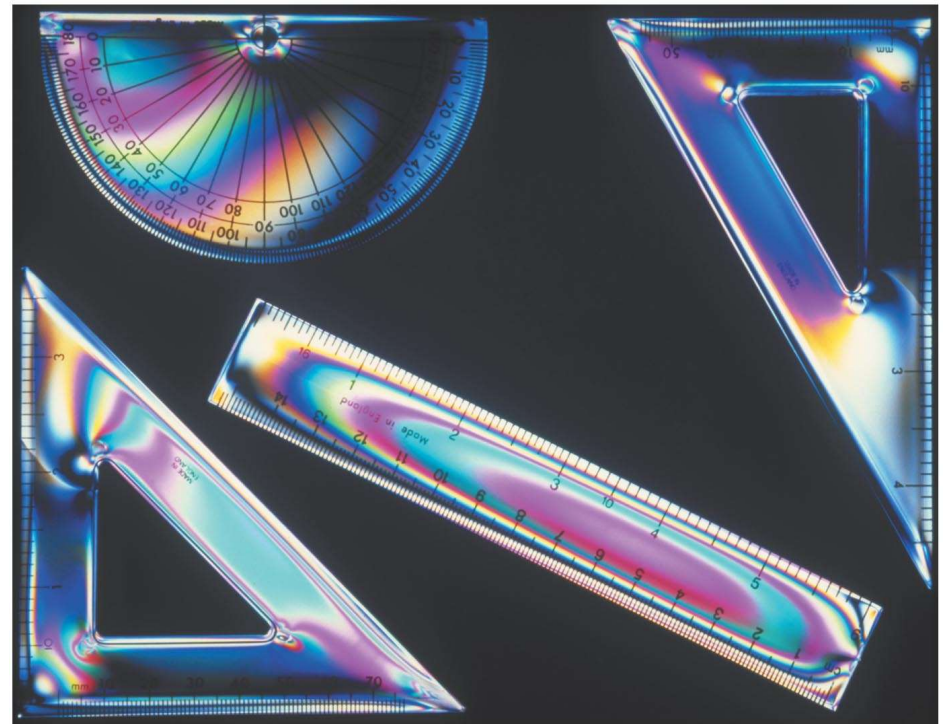
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# Chapter 33: The Nature and Propagation of Light

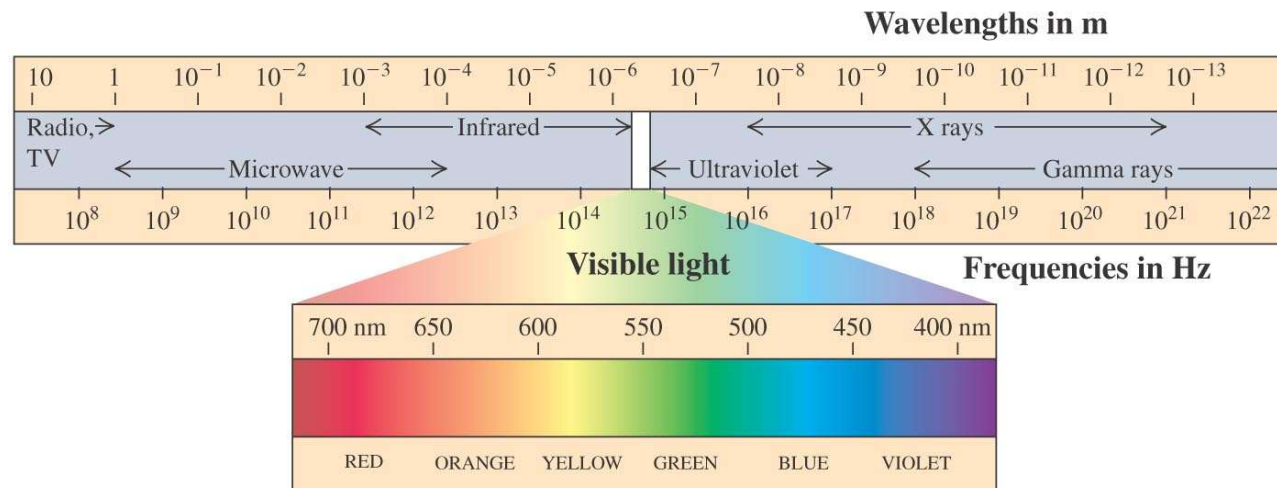
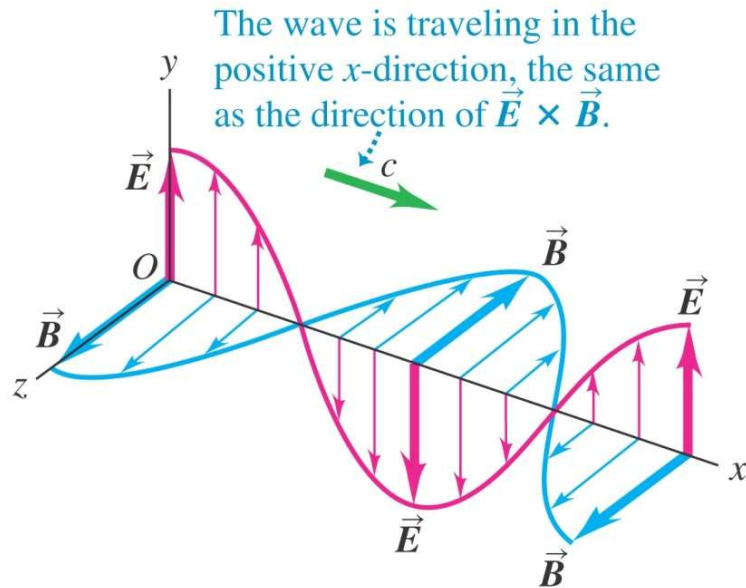
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- ❑ The nature of light
- ❑ Reflection and Refraction
- ❑ Total internal reflection
- ❑ Dispersion
- ❑ Polarization
- ❑ Huygens' principle



# The Nature of Light

Light is a propagating **electromagnetic waves**

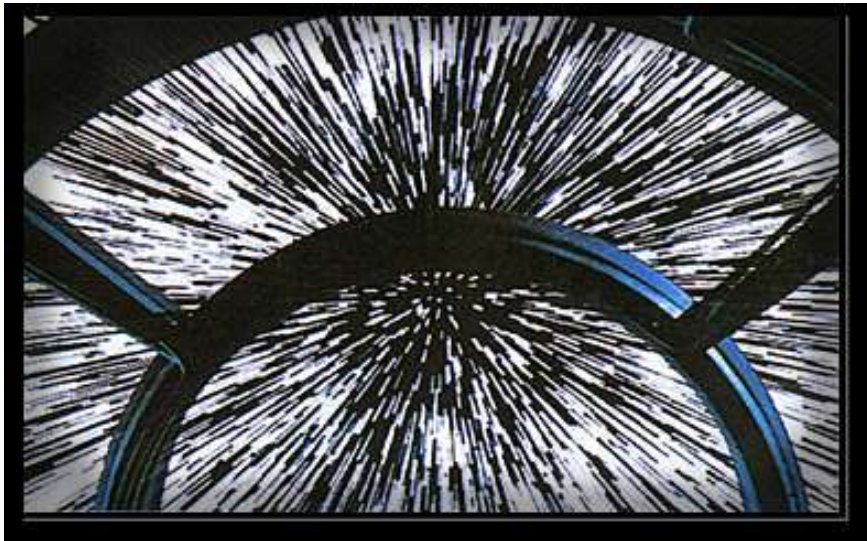


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# The Nature of Light

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But, as we will learn (later), light can also be characterized as *discrete* packets of energy called **photons**.



Also, as we will learn (later), light travels in *vacuum* at the *same* speed:

$$c = 2.99792458 \times 10^8 \text{ m / s}$$

and it is the *universal speed limit* for all physical processes.

# Sources of Light

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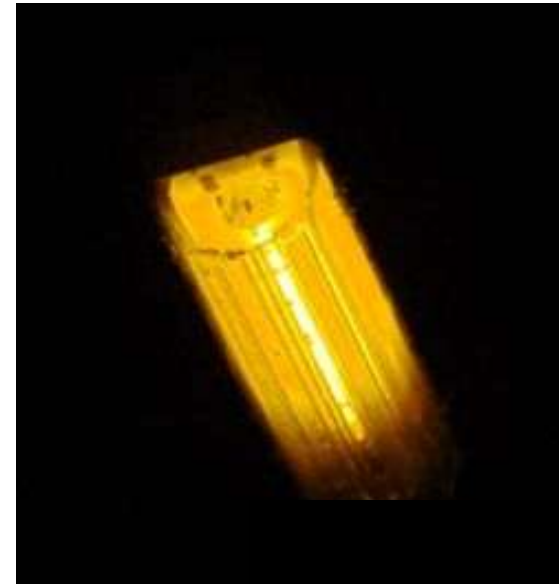
- Thermal Radiation:  
E&M radiation from  
accelerating charges  
due to thermal motion.
  - Mixture of many  $\lambda$ 's
  - Bluer with higher  $T$



# Sources of Light

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- Electrical Discharges thru diluted Ionized Gases (will study this later)
  - Lights are in a selected set of wavelengths
  - e.g. sodium vapor lamps (street lamps), neon signs, fluorescent lamps





# Sources of Light

- Lasers
  - Coherent
  - Monochromatic (single frequency)
- Light Emitting Diodes (LEDs)
  - Semiconductor device
  - Electroluminescence
  - Narrow range of frequencies
  - Very low power consumption

