Waves

Periodic

in time (oscillation)

in space (travels, propagates)

Properties

1. **Period**, \( T (s) \) - time of 1 cycle
2. **Frequency**, \( f = \frac{1}{T} \) \((1/s = \text{Hz})\) - cycles per second
3. **Wavelength**, \( \lambda (m) \) - distance from peak to peak
4. **Speed**, \( v (m/s) \)
   \[ v = \frac{\lambda}{T} = 2f \]
5. **Amplitude**, \( A (?) \)
Electromagnetic waves / light

- Electric field ($E$)
- Magnetic field ($B$)

$E \perp$ propag.
$B \perp$ propag.

Transversal wave
Electromagnetic Spectrum

\[ \lambda \uparrow \]

- radio waves
- microwaves
- infrared (IR)
- visible light
- ultraviolet (UV)
- x-rays
- gamma-rays

\[ \downarrow f, E \]

red, 700 nm
violet, 400 nm
WAVE PHENOMENA OF LIGHT

1) Diffraction

no diffraction  diffraction

\[ d \gg \lambda \]

\[ d \approx \lambda \]
2) Interference

- optical grid
  - dense lines ~ 500 lines/mm
- bright
- dark
Polarized light

Light is a transversal wave.

Monochromatic light

Polarized light

Polarizer

Perpendicular propagation

No light