

1 Wave Motion

Definition 1.1: Wave

1.1 Transverse and Longitudinal Waves

Definition 1.2: Transverse Wave

Transverse Waves involve particles oscillating in a direction perpendicular to the direction of energy transfer.

Definition 1.3: Longitudinal Wave

Longitudinal Waves involve particles oscillating in a direction parallel to the direction of motion of energy transfer.

1.2 Intensity of Waves

Definition 1.4: Intensity

Intensity is the quantization of how much energy is transferred to a surface area by a wave per unit time, measured in W m^{-2}

Equation 1.1: Intensity

For power P spread across surface area S , or a proportionality constant k , frequency f and amplitude of wave A , intensity I is defined as

$$I = \frac{P}{S} = kf^2A^2$$

As wave energy dissipates across a larger surface area and its total power remains the same, its intensity decreases. Cylindrically radiating waves have $S = 2\pi r$ and follow an inverse rule while spherically radiating waves have $S = 4\pi r^2$ and follow an inverse square rule.

1.3 Polarization

Equation 1.2: Polarization

asd

$$A' = A \cos \theta$$

$$I' = I \cos^2 \theta$$