Since $E$ and $B$ vary with time (most times rapidly), it's convenient to talk about time averages over one or more cycles.

$$I = \bar{E} = \frac{1}{\mu_0 c} \overline{E^2} = \frac{1}{\mu_0 c} \overline{E_{\text{rms}}^2} \sin^2(kx - \omega t)$$

Intensity

$$= \frac{1}{2\mu_0 c} \overline{E_{\text{rms}}^2} = \frac{1}{2\mu_0} E_{\text{rms}} B_{\text{rms}} = \frac{e}{2\mu_0} B_{\text{rms}}^2$$

$$= \frac{P}{A}$$

**Momentum:**

Waves carry linear momentum as well:

\[ \vec{E} = E_{\text{rms}} \sin \omega t \quad \vec{B} = -B_{\text{rms}} \sin \omega t \]

Recall: electrons in sheet achieve drift speed (as long as resistivity is large enough):

\[ \vec{V}_d = -\frac{e}{b} \vec{E} \]

- Resistively damping coefficient

\[ b = \frac{E}{m_e} = \frac{E}{ne} \quad \Rightarrow \quad m_e \vec{V}_d = \sigma \vec{E} \]

Work done:

\[ \frac{dW_e}{dt} = eE V_d = \frac{e^2}{b} E^2 \]