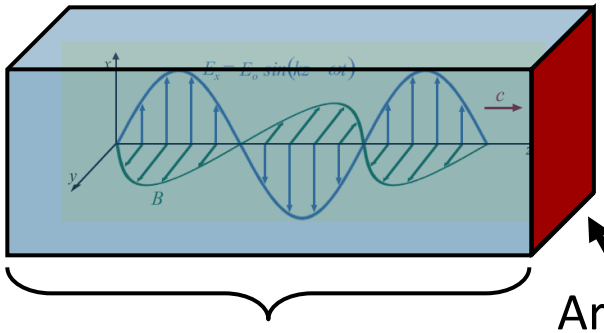
Intensity

Intensity = Average energy delivered per unit time, per unit area



$$\rightarrow \quad I \equiv \frac{1}{A}\left\langle \frac{dU}{dt} \right\rangle$$

$$\rightarrow \quad \langle dU \rangle = \langle u \rangle \cdot volume = \langle u \rangle Acdt$$

Total Energy Density

$$u = \varepsilon_o E^2$$

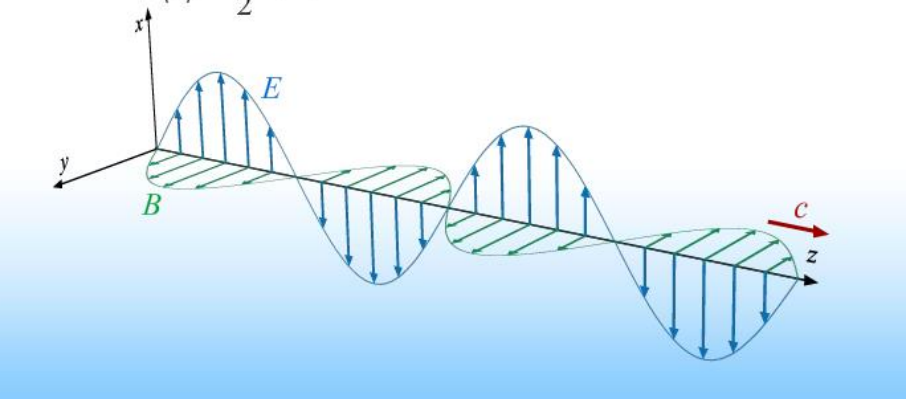
Average Energy Density

$$\langle u \rangle = \frac{1}{2}\varepsilon_o E_o^{\,2}$$

Intensity

$$I = \frac{1}{2} c \varepsilon_o E_o^{\,2} = c \langle u \rangle$$

$$\rightarrow \quad I = c\langle u \rangle$$



Sunlight on Earth:

$I \sim 1000 J/s/m^2$

$\sim 1\ kW/m^2$