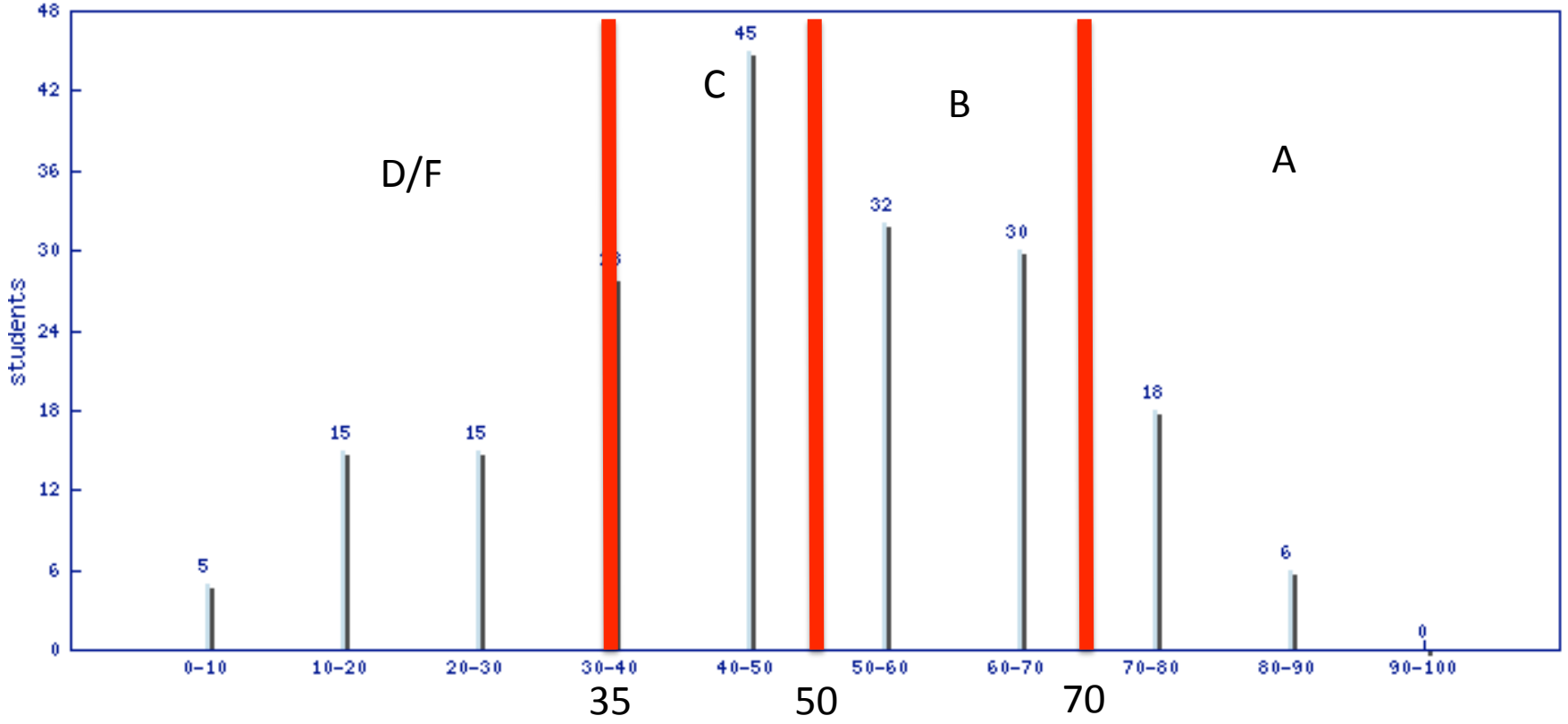
After clickers score distribution: lab and final exam are not included




Historical average means for the final (worth 30 % of the grade):
[these are final exam only: so if you are below A/B line you need to do better than 80, for example]
80 or above : A
65 or above : B
50 or above : C

**Final Exam Review:**

Monday, 12/5: Noon-2 pm, Pegasus Ballroom:

Masa will be leading this review session with help from Zach.

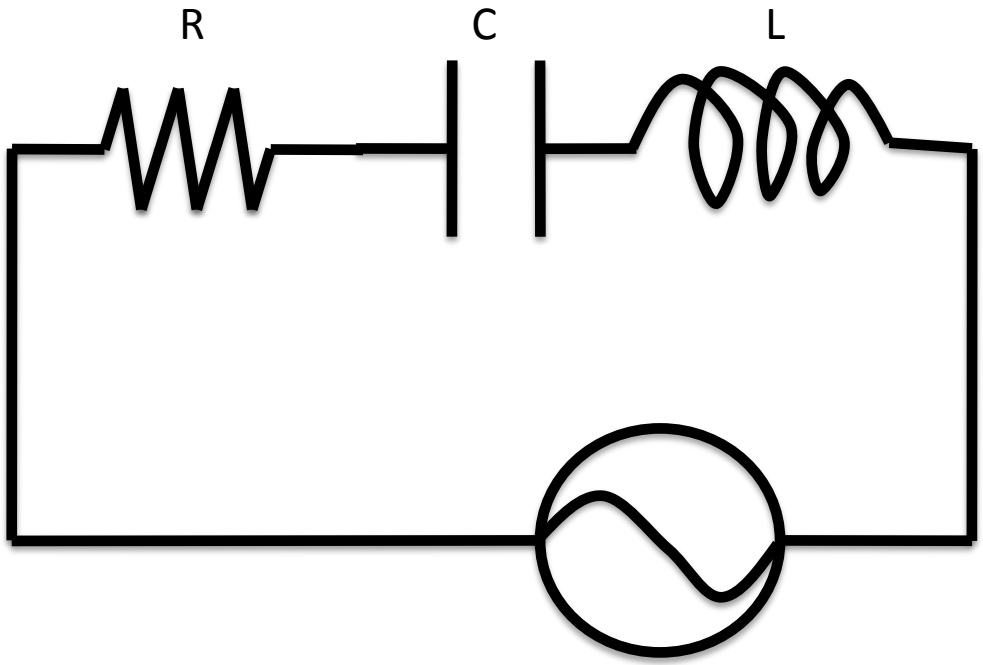
Notes from the review session will be posted on the website by Monday evening

**Exam week office hours:**

Tuesday: 10:30-11:30 am, 5:00-8:00 pm

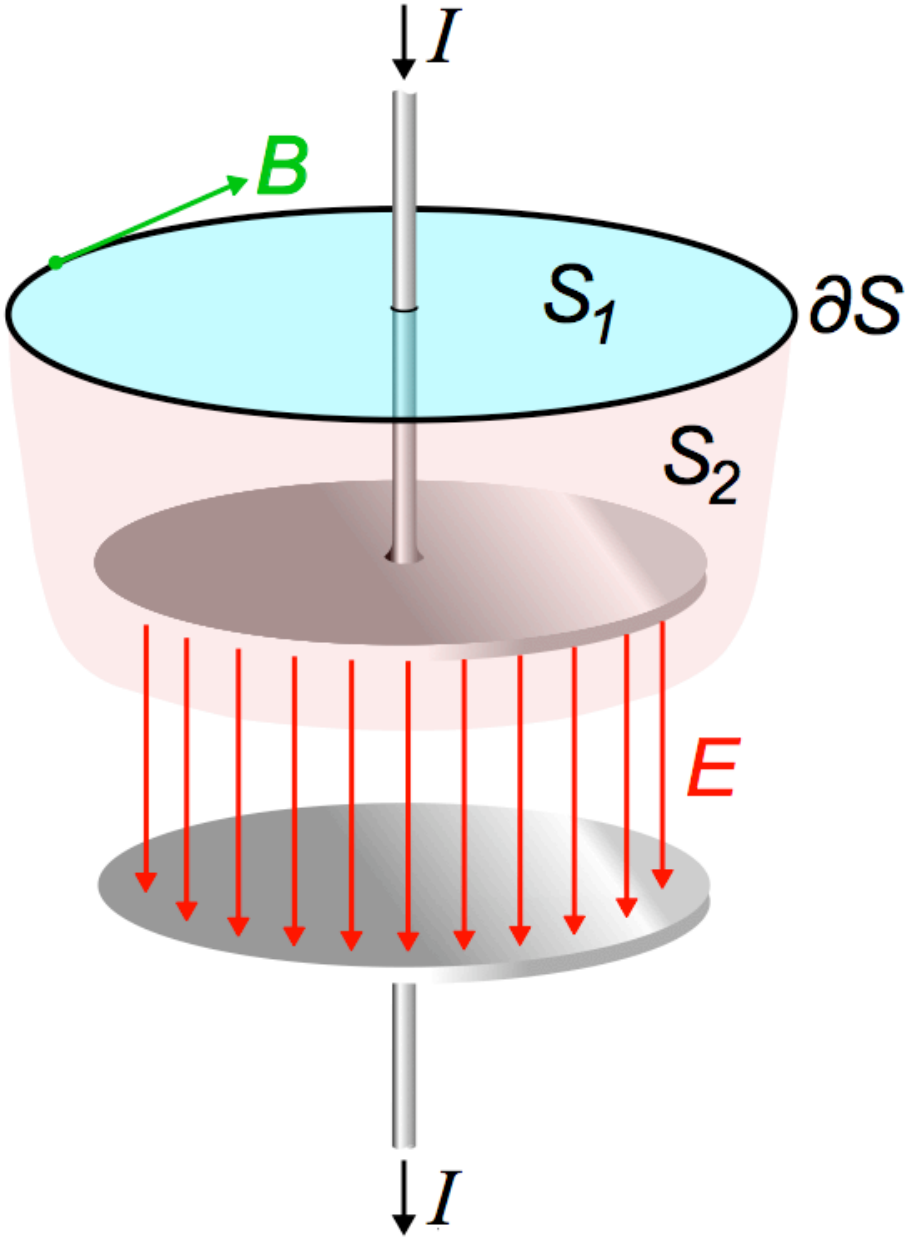
I am also available by email: ishigami@physics.ucf.edu, ishigami@ucf.edu

Brief comment on power dissipated in a RLC circuit




$$P_{\max} = I_{\max}^2 R$$

# What happens to the Ampere's law at the capacitor?



$$\oint E \cdot dA = \frac{Q_{enc}}{\varepsilon_0}$$ Gauss's Law

$$\oint B \cdot dA = 0$$

$$\oint E \cdot dS = -\frac{d\Phi_B}{dt}$$ Faraday's Law

$$\oint B \cdot dS = \mu_0 I + \mu_0 \varepsilon_0 \frac{d\Phi_E}{dt}$$ Ampere's law (with modifications)

Use Divergence and Stoke's theorems to simplify

$$\oint E \cdot dA = \int (\nabla \cdot E)\, dV = \frac{Q_{enc}}{\varepsilon_0} = \frac{\int \rho\, dV}{\varepsilon_0}$$

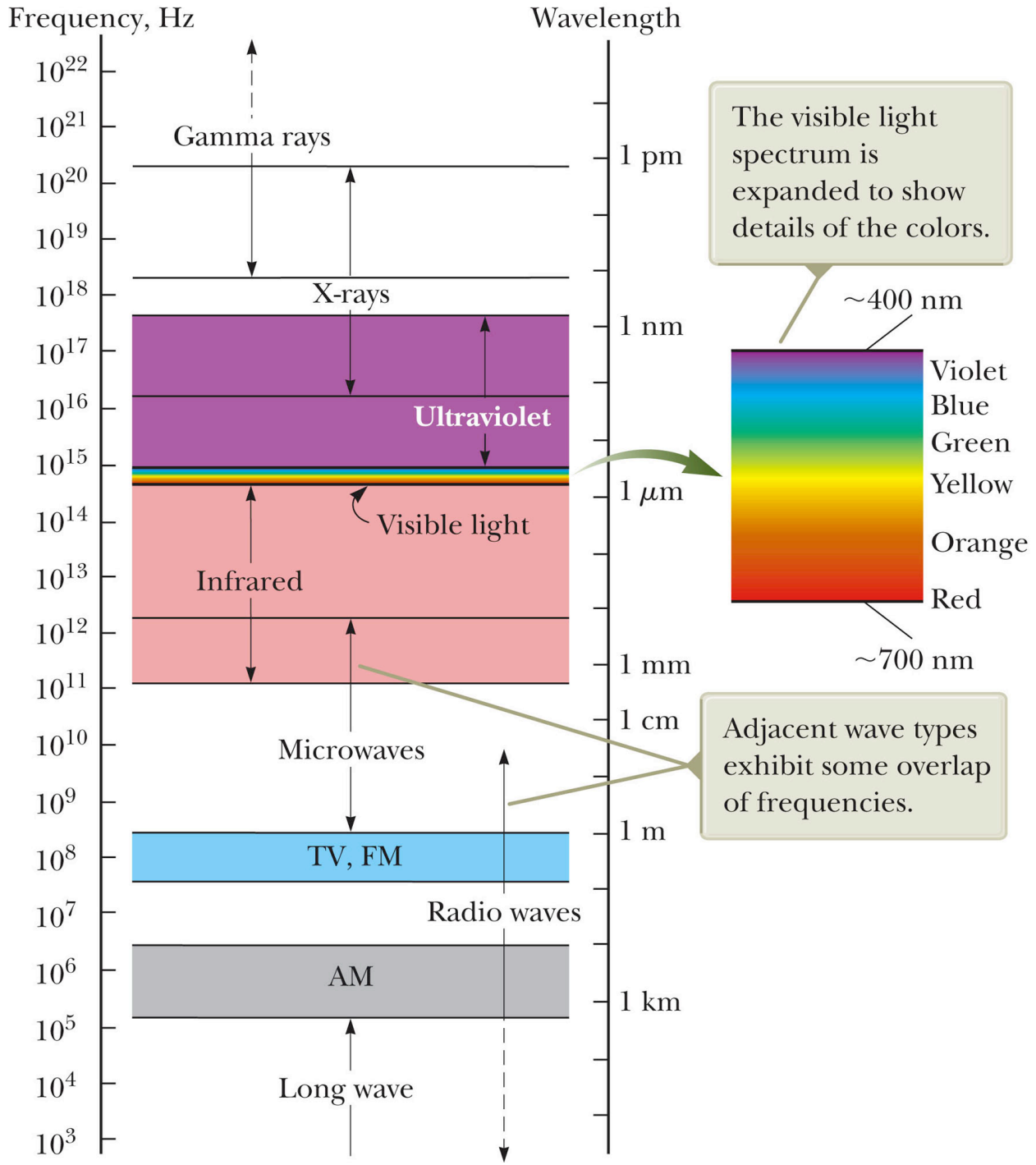
$$\oint E \cdot dS = \int (\nabla \times E)\, dA = -\frac{d\Phi_B}{dt} = -\frac{d}{dt}\int B\, dA$$

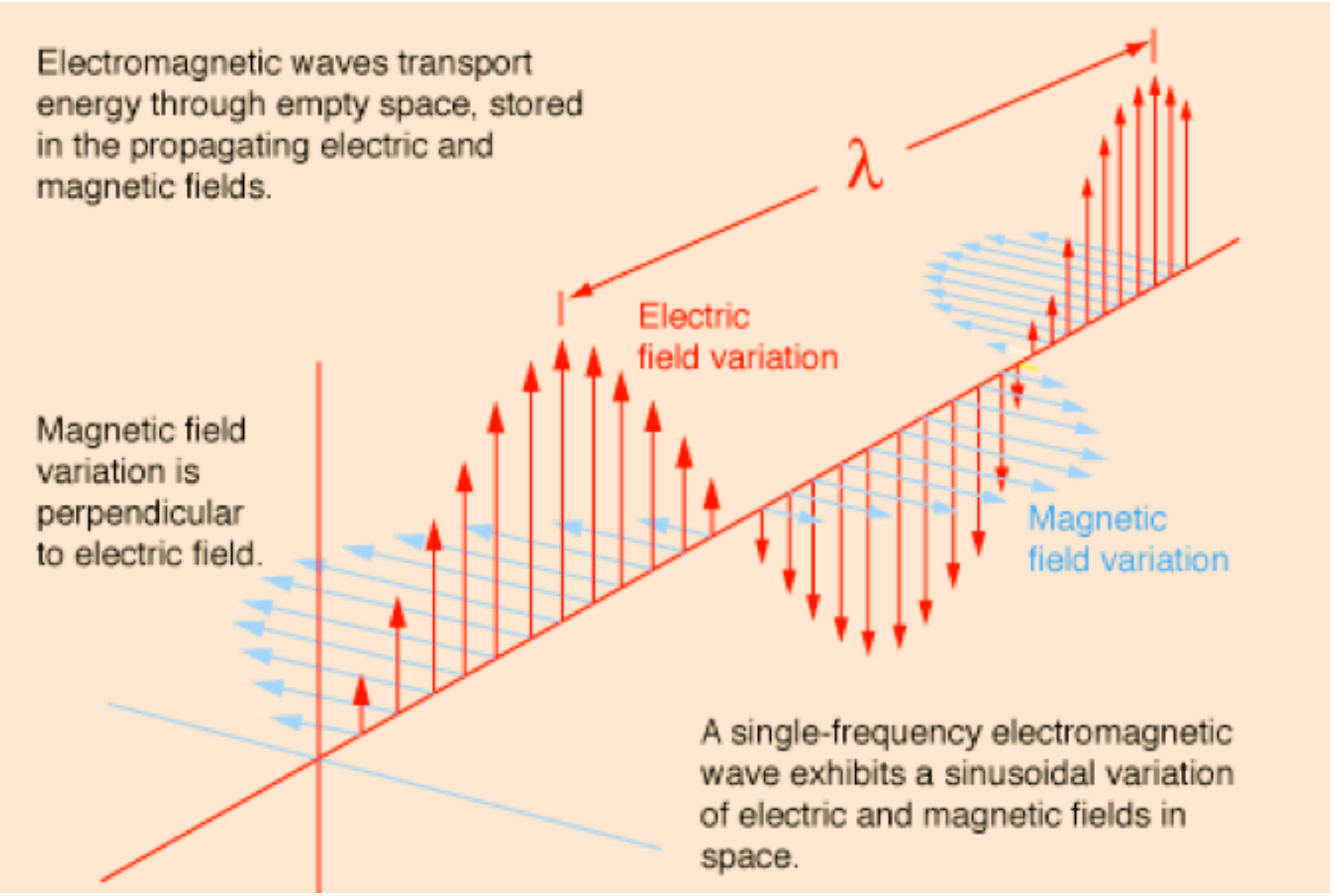
$$\nabla \cdot E = \frac{\rho}{\varepsilon_0}$$

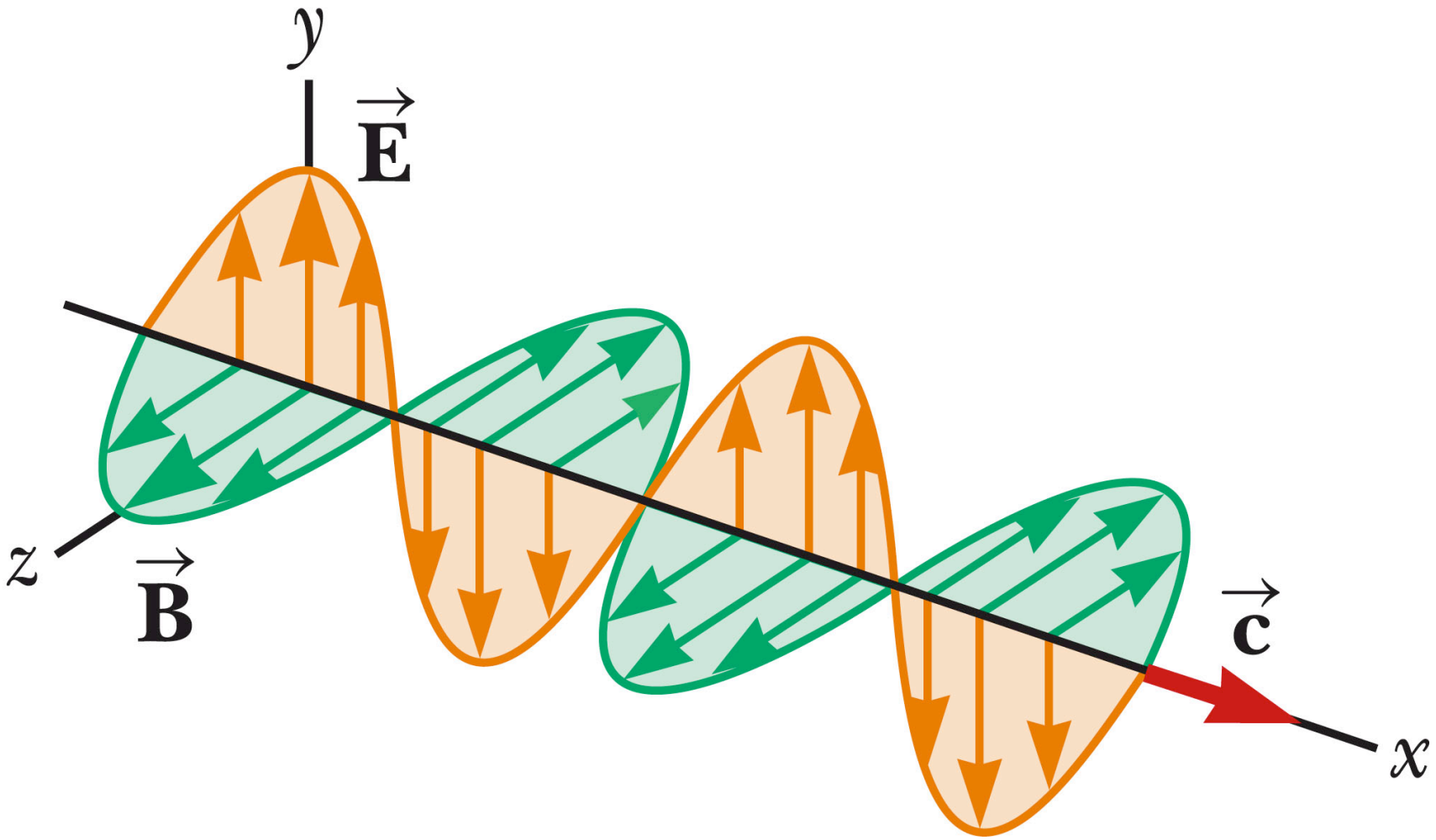
$$\nabla \cdot B = 0$$

$$\nabla \times E = -\frac{dB}{dt}$$

$$\nabla \times B = \mu_0 J + \mu_0 \varepsilon_0 \frac{dE}{dt}$$


Frequency, Hz
Wavelength
$10^{22}$
$10^{21}$
$10^{20}$
$10^{19}$
$10^{18}$
$10^{17}$
$10^{16}$
$10^{15}$
$10^{14}$
$10^{13}$
$10^{12}$
$10^{11}$
$10^{10}$
$10^{9}$
$10^{8}$
$10^{7}$
$10^{6}$
$10^{5}$
$10^{4}$
$10^{3}$
Gamma rays
X-rays
Ultraviolet
Visible light
Infrared
Microwaves
TV, FM
Radio waves
AM
Long wave
1 pm
1 nm
1 μm
1 mm
1 cm
1 m
1 km
The visible light spectrum is expanded to show details of the colors.
~400 nm
Violet
Blue
Green
Yellow
Orange
Red
~700 nm
Adjacent wave types exhibit some overlap of frequencies.


Electromagnetic waves transport energy through empty space, stored in the propagating electric and magnetic fields.
λ
Electric field variation
Magnetic field variation is perpendicular to electric field.
Magnetic field variation
A single-frequency electromagnetic wave exhibits a sinusoidal variation of electric and magnetic fields in space.


y
E
z
B
c
x