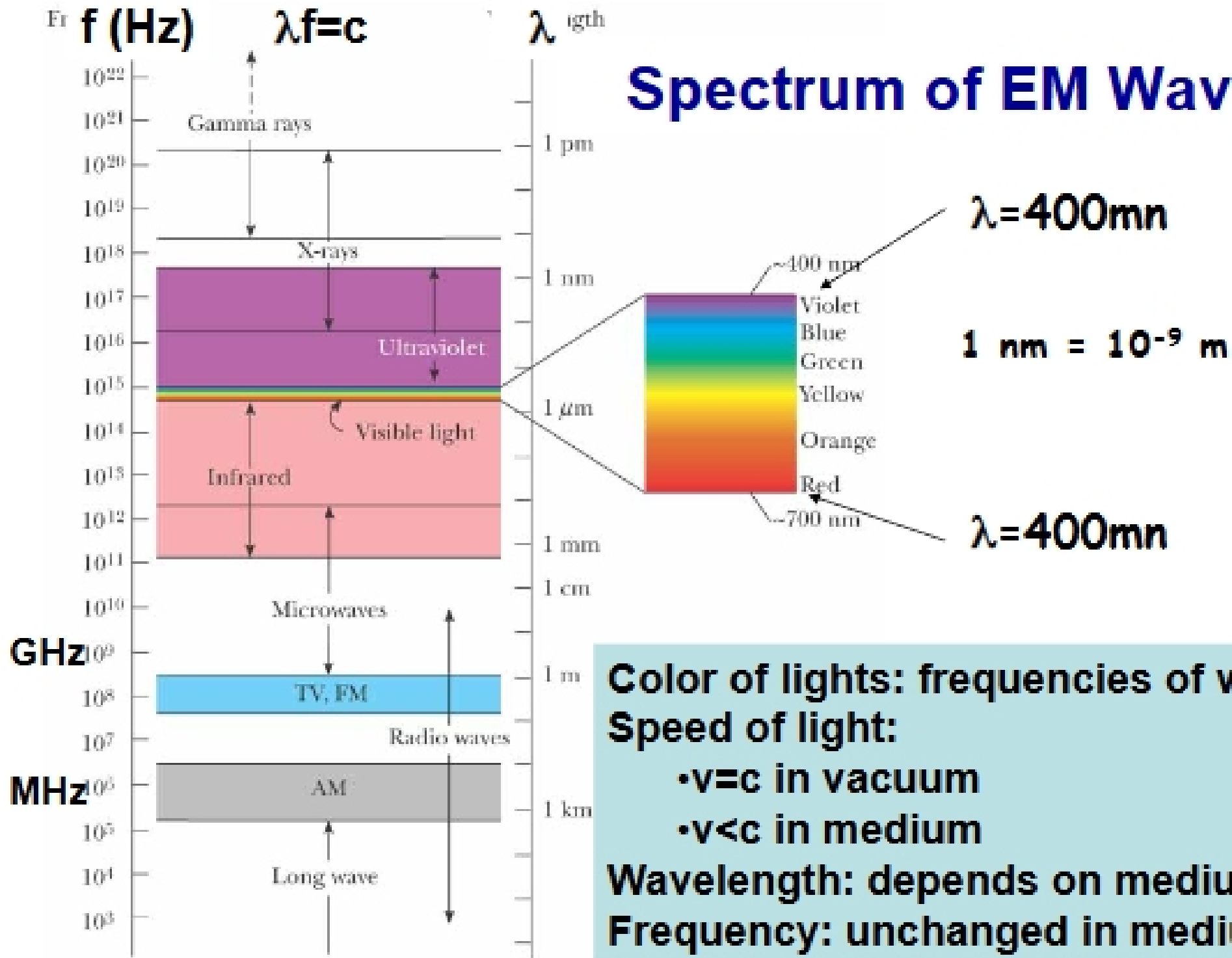


# Physics 202, Lecture 23

## Today's Topics

- **Lights and Laws of Geometric Optics**
  - **Nature of Lights**
  - **Reflection and Refraction**
  - **Law of Reflection**
  - **Law of Refraction**
  - **Index of Reflection, Snell's Law**
  - **Total Internal Reflection**
  - **Dispersion and Prisms**

# Spectrum of EM Waves



**Color of lights: frequencies of waves**  
**Speed of light:**

- $v=c$  in vacuum
- $v < c$  in medium

**Wavelength: depends on medium**  
**Frequency: unchanged in medium**

# Light And Optics

## □ Nature of Lights

- Lights as rays
- Lights as EM waves:  $f$ ,  $\lambda$ ,  $\phi$ ,  $v$ ,  $A$ , interference ...
- Lights as group of photons (Quantum Theory)

## □ Optics: Physics of lights

- Geometric Optics: Treat light as rays. (Ch. 35,36)  
→ Ray approximation.
- Wave Optics: Wave properties becomes important  
Interferences, diffraction...(Ch. 37,38.)