

University of Virginia

Department of Physics

Physics 606: How Things Work II

Lecture #28 Slides:

Sunlight II

Refraction

- Polarization of matter delays light's passage
- Light slows as it passes through matter
- As sunlight slows, it bends – refraction
 - On slowing, bend is toward normal line
- As sunlight speeds up, it also refracts
 - On speeding up, bend is away from normal line
- Index of refraction
 - factor by which light's speed is reduced

Reflection

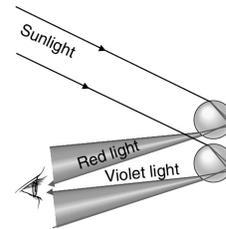
- Light polarizes different materials differently
- In different materials, light has different
 - speeds of travel
 - relationships between electric & magnetic fields
- These changes lead to reflections
 - As sunlight slows, some of it reflects
 - As sunlight speeds up, some of it reflects

Dispersion

- Light's speed in a material depends on color
- Violet light usually moves slower than red
- Refraction (bending) depends speed change
- Violet light usually bends more than red

Rainbows

- Refraction, reflection, and dispersion



Interference

- Light from different paths can interfere
 - Constructive – fields are in same direction
 - Destructive – fields are in opposite directions
- The two reflections from a film interfere
- Different colors may interfere differently

