

Interactions of Light with Material.

purpose of all astronomical telescopes =
intensity - light amplifying systems

reflection = reflecting telescope (depend upon the mirrors) important!
• angle of incidence = angle of reflection
• all things that reflect visible light is metal
- metals = good conductors of heat/electricity/
very highly reflectant

How reflection

works = electromagnetic waves → impacts surface that moves around
(creates dipoles) → creates radiation (oscillates back and forth) → creates more light
(electric fields to charge particles - experiences force)

Surface re-emits that light → how reflection works

* whenever ray of light and angle of incidence =
angle of reflection = REFLECTION

refraction =

- ray of light bends - goes into one medium to another
air to water → refraction
- optical illusions can occur
- come into play w/ telescopes - bands going through the lens.

Diffraction

- send through a narrow opening or around a sharp corner
(want) bending rays of light.
- All objects diffract light -
- limits an optical system to resolve (make it clear) all telescopes.
- Diffraction limited objects (in camera lenses - best one can get).

← Diffraction (cont.)

- how small an opening or how narrow a corner?
 - depends upon the ratio of the width of the narrow opening or the corner

important → • all telescopes diffract light - limits our ability - lens helps

Interference:

• 2 beams of light add together that resulting wave is
Constructive = TWICE as big (troughs are same as well as crests)

- Brighter beam of light

Destructive = 2 waves of light added together - get nothing

- Completely DARK

important: • combining of light waves

- works for every thing (sound, light, electromagnetic waves)

→ telescopes known as interferometers - exploit this effect

Scattering (most complex)

• reflection that doesn't obey the law of reflection

ray of light interacts w/ any surface - bounces off = scattering

important → responsible for color, the visual appearance that we see.