

# Lecture Notes for 10/05

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decay of electrons = origin of all visible light

Know For Test:

Lenses and Telescopes

2 types Reflectors P = mirror  
Refractors P = big lens

About telescopes

Primary and Secondary advantages and disadvantages  
Other telescopes other than optical  
radio  
gamma-ray  
X-ray

• Lenses and mirrors both have a focal length  
Focal length = The uniquely identifying characteristic

Radius of curvature = gives its focal length

Diameter = determines light gathering ability

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} = \text{thin lens equation}$$

inter-changeable  $\left\{ \begin{array}{l} p = \text{object distance} \\ q = \text{image distance} \\ f = \text{focal length} \end{array} \right.$  (all related)

$\frac{1}{p}$  as  $p$  gets bigger - quantity  $\frac{1}{p}$  gets really small

$p =$  gets smaller closer to 0 than  
 $q = f$

$$f_{\text{number}} = \frac{f}{\text{diameter}}$$

$$\text{Magnification} = \frac{f_{\text{objective}}}{f_{\text{eyepiece}}}$$

Why is there 2 types of telescopes?

Aberation - all telescopes are prone to this

- 2 types: 1. Spherical
- 2. Chromatic

Refracting telescope → has both spherical and chromatic

Reflecting telescope → has only spherical

Chromatic Aberation

white light goes into a lense; blur of colors; because dif. colors of light bend @ slightly dif. angles.

Spherical Aberation: (continuous radius)

don't all come into focus or cross @ the same place. make a parabolic lense → grind it.

Large Diameter Optics = <sup>→ get much better resolution (picture)</sup> gathers more light - (image larger) BRIGHTER  
Small " = gathers less light

Purpose of Telescopes = are light amplifiers

Light Pollution:

Should reflect the light back down