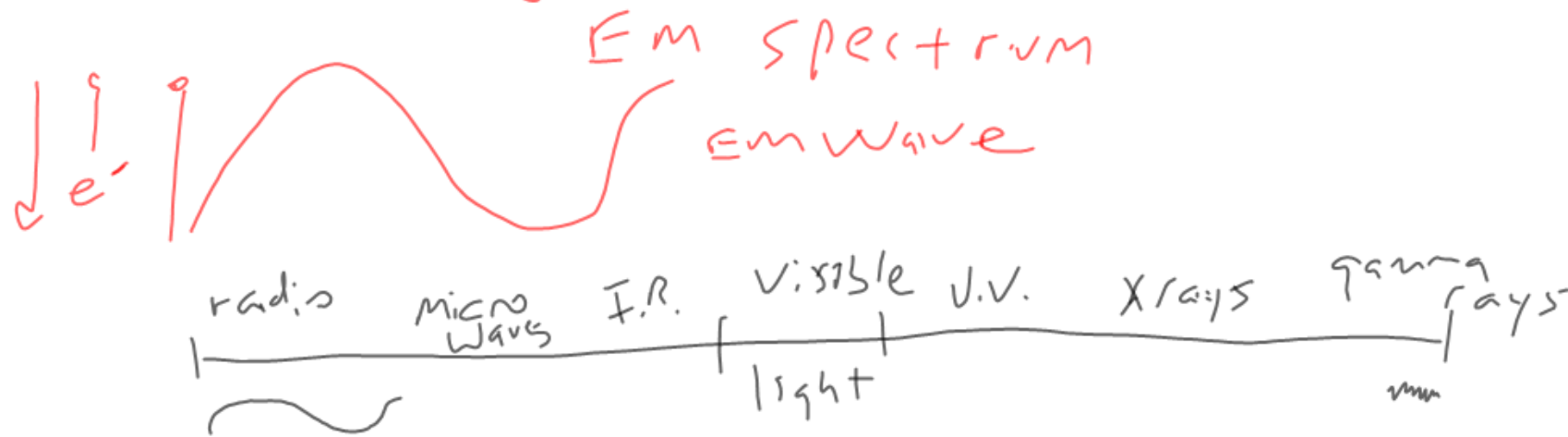


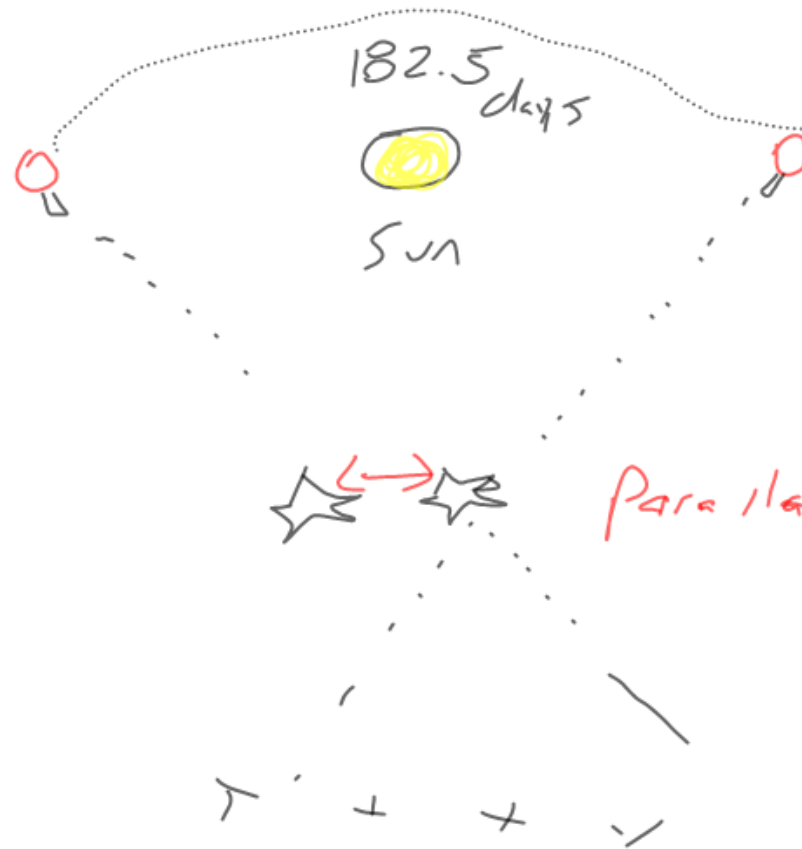
Telescope → 1st one 1608

Hans Lippershey *
year after - Galileo *

refracting - lenses *
reflecting - mirrors



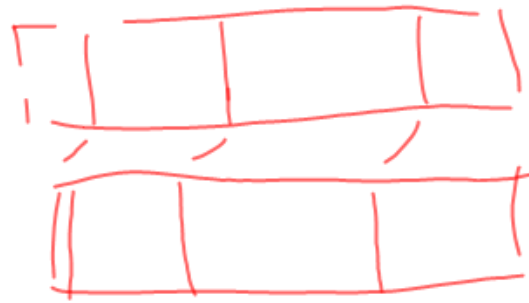
P. 757 Parallax



Parallax out to
200 ly. away!

Red Shift -

Same
Spectral lines
Shift down in spectrum, the
further in space that stars are.

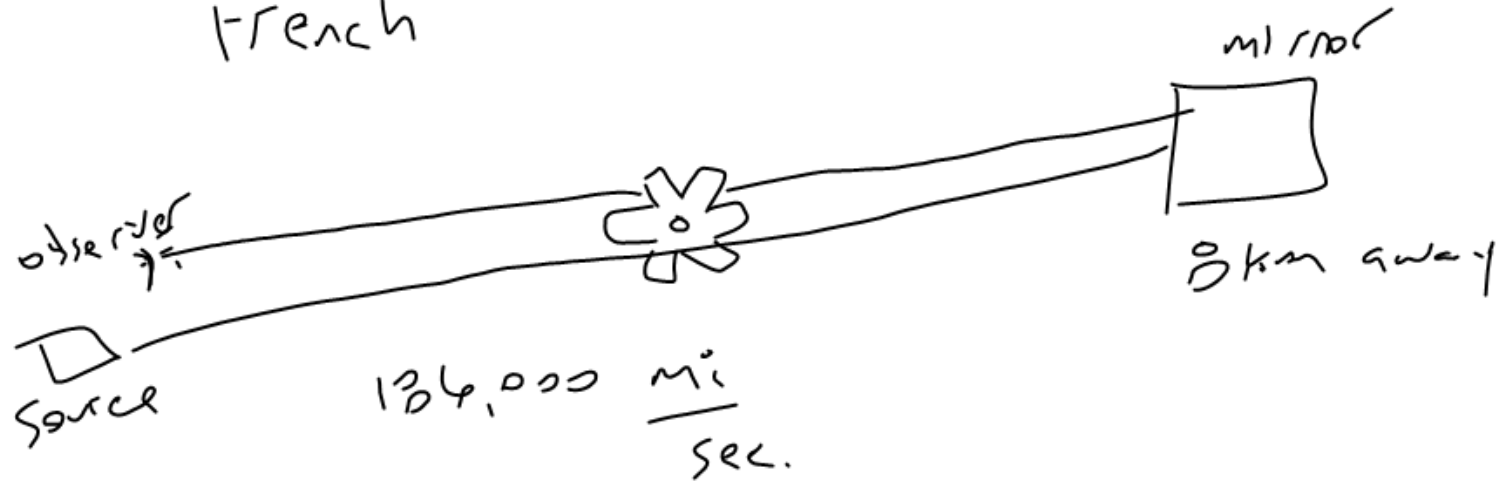


Wollaston - 1800
British
gunpowder



Spectral lines
Finger Prints of the elements

- Fizeau & Foucault Speed of light 1840s
French



Dimensional Analysis

$$300,000 \frac{\text{km}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{24 \text{ hr}}{1 \text{ day}} \cdot \frac{365 \text{ days}}{1 \text{ yr.}} = \frac{\text{km.}}{9.4 \text{ trillion}}$$

Furthest space object 13 billion ly. $\times \overline{9.4 \text{ trillion}}$
 $= 122.2 \times 10^{21} \text{ km}$