Phys 5B:

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Date March 3, 2017

I. Optical instruments: Magnifier, Telescope, Microscope

Lenses set up object for the eye to focus

i. Magnifer:

Bring image of object from near point (N) to ∞

$\frac{h}{d_0} = \tan\Theta \approx \Theta \quad d_0 \geq N$

Object ('virtual object = image') at ∞

$\frac{h_i}{d_i} = \frac{h_0}{d_0} = \Theta'$

If $d_0 \approx f$, then $d_i \approx \infty \quad \Theta' = \frac{h}{f}$

Angular Magnification: $M = \frac{\Theta'}{\Theta}$

ii. Telescope:

Instead of object $d_0 < N$, we have $d_0 \approx \infty$

Two lenses: objective and eyepiece

Image from objective put at focal point of eyepiece

$\Theta = \frac{h}{d_i} \Rightarrow$ of objective image measured from objective!

but $d_i = f_0$

$\Theta' = \frac{h}{f_{\text{eyepiece}}}$ of eyepiece object over eyepiece

$M = \frac{\Theta'}{\Theta} = \frac{\frac{h}{f_{\text{eyepiece}}}}{\frac{h}{f_0}} = -\frac{f_0}{f_e}$

iii. Microscope: