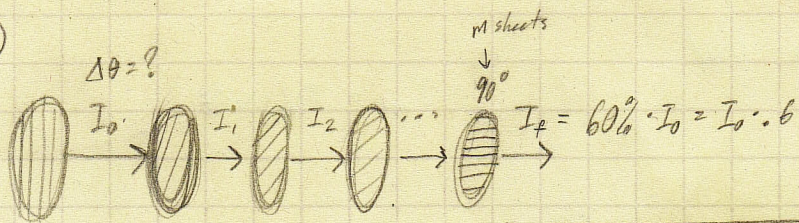


3)



$$I_1 = I_0 (\cos^2 \theta)^2$$

$$I_p = I_0 \cdot 0.6$$

$$I_p = I_0 \cdot (\cos^2 \theta)^m$$

$$\theta \cdot m = 90^\circ \rightarrow m = \frac{90^\circ}{\theta} \rightarrow \theta = \frac{90^\circ}{m}$$

$$0.6 = (\cos^2 \theta)^m$$

$$0.6 = (\cos^2(\frac{90^\circ}{m}))^m$$

guess &amp; check

$$m = 10$$

$$.78 = (\cos^2(\frac{90^\circ}{10}))^{10}$$

$$m = 6$$

$$.66 = (\cos^2(\frac{90^\circ}{6}))^6$$

$$m = 9$$

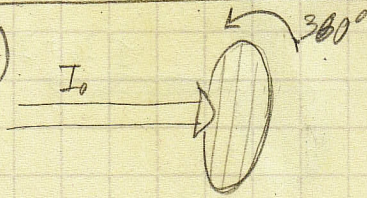
$$.76 = (\cos^2(\frac{90^\circ}{9}))^9$$

$$m = 5$$

$$.605 = (\cos^2(\frac{90^\circ}{5}))^5$$

5 sheets are needed  
at  $18^\circ$  intervals

4)



brightest = 5 - lowest

? % of  $I_0$  is polarized

$$I_h = 5 \cdot I_l$$

% polarized = y

% non-polarized = x

if 100% polarized

$$I_h = 100\% I_0 = I_0 \cdot 1$$

$$I_l = 0\% I_0 = I_0 \cdot 0$$

if 50% polarized

$$I_h = .5 I_0 + (.5)(.5) I_0$$

$$I_h = .75 I_0$$

$$I_l = (.5)(.5) I_0$$

$$I_l = .25 I_0$$

$$I_h = \% \text{ polarized} \cdot I_0 + .5 (\% \text{ non-polarized}) I_0$$

$$I_l = .5 (\% \text{ non-polarized}) I_0$$

$$I_h = 5 \cdot I_l$$

$$[y \cdot I_0 + .5x \cdot I_0] = 5[.5x \cdot I_0]$$

$$y + .5x = 2.5x$$

$$y = 2x$$

Twice as much of the light is polarized as  
is unpolarized.

$$\text{Polarized} = 66\%$$

$$\text{Non-polarized} = 33\%$$