Physics 114 - April 6, 2010

- EXAM 3 Takes place No fooling!
  1 week from Thursday - April 15
  Hoyt Auditorium
  During normal lecture time

- covers

Subjects:	Solenoids	$\longrightarrow$	Polarization
lectures:	March 16	$\longrightarrow$	April 1
Workshops:	8	$\longrightarrow$	10
Prob Sets:	8	$\longrightarrow$	10

From here to end of course

Optics

+

Modern Physics

Will Move Faster

Will pick + choose topics (with some thought)

Geometric Optics

$$c = \frac{1}{\sqrt{\epsilon_0 \mu_0}}$$ in vacuum

in a material $V < C$

$n \equiv$ index of refraction $\quad n > 1$

$$n \equiv \frac{c}{V_{\text{in material}}}$$

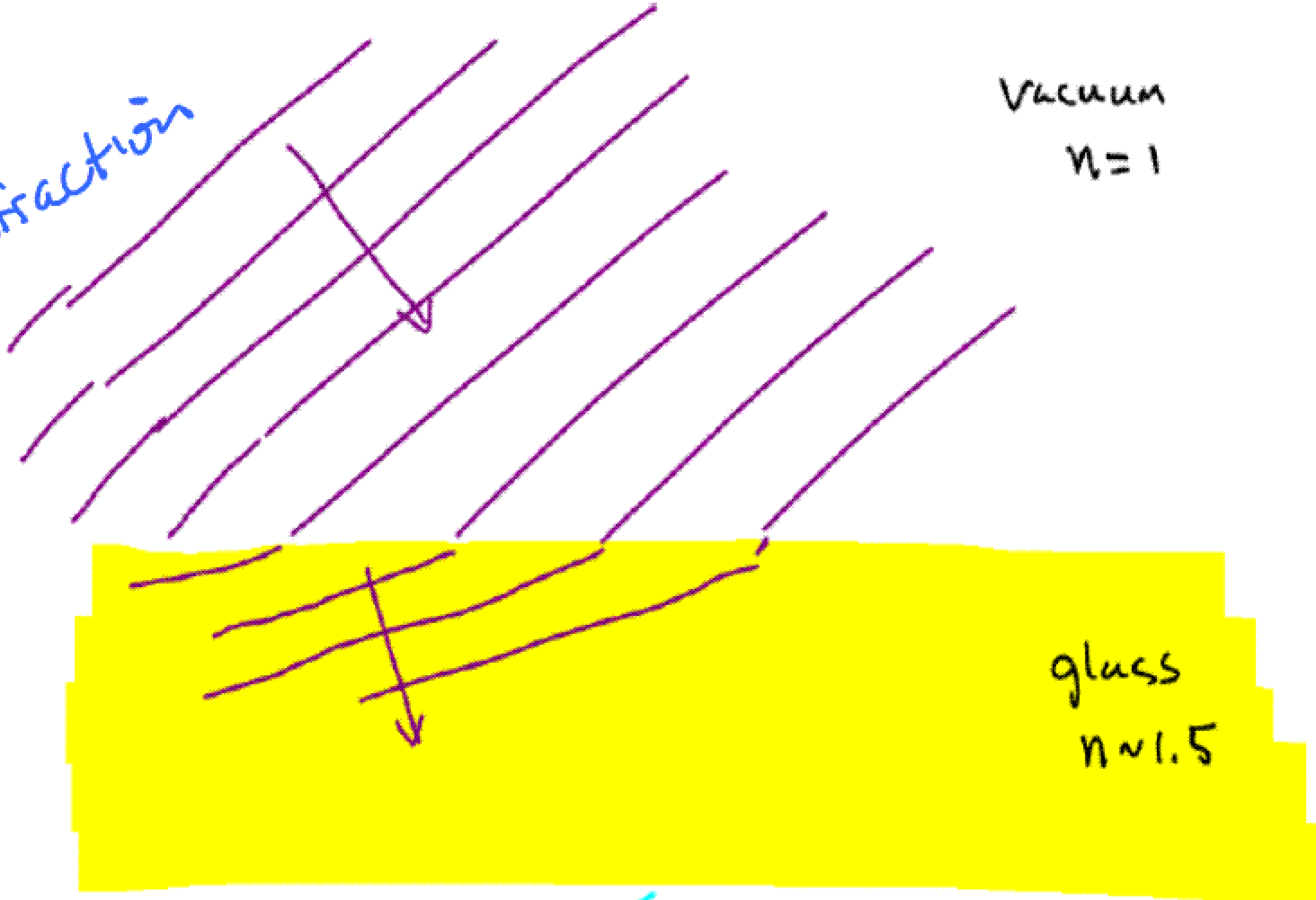
λ_0 in vacuum

$$\lambda_0 \nu = c$$

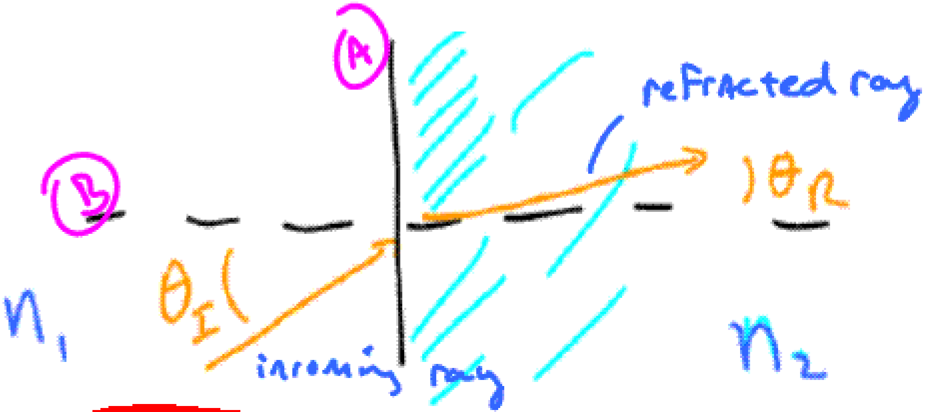
$$\lambda \nu = v = \frac{c}{n}$$

$$\lambda n = \frac{c}{\nu} = \lambda_0$$

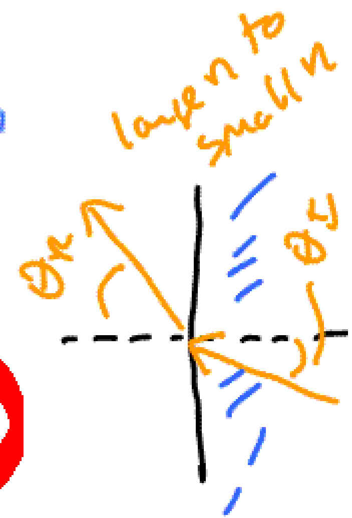
Refraction



$n_2 > n_1$
light Bent Toward Normal

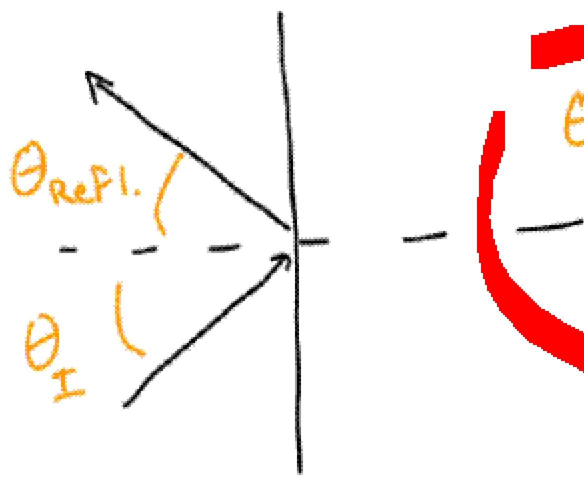


$n_2 > n_1$



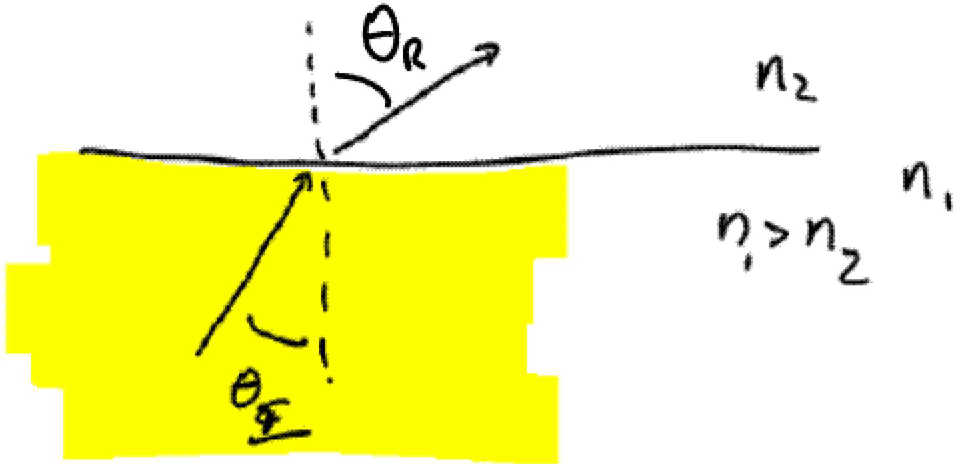
Snell's law $\quad n_1 \sin\theta_I = n_2 \sin\theta_R$

Refraction

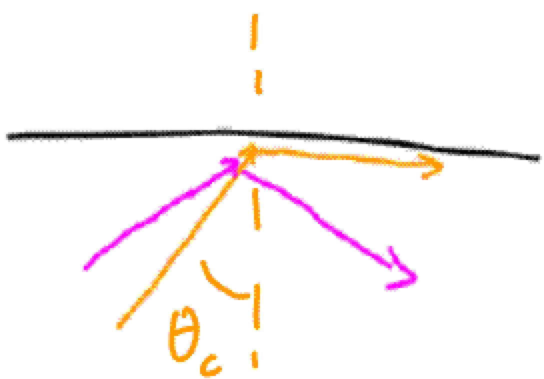


$\theta_I = \theta_{Refl}$

Law of Reflection



$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$



$$n_1 \sin \theta_c = n_2 \sin 90$$

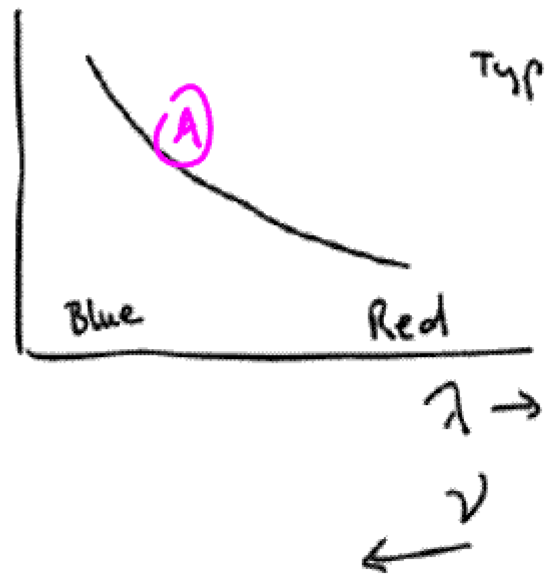
θ_c = critical Angle

If $\theta_I > \theta_c$ Total internal reflection

Dispersion

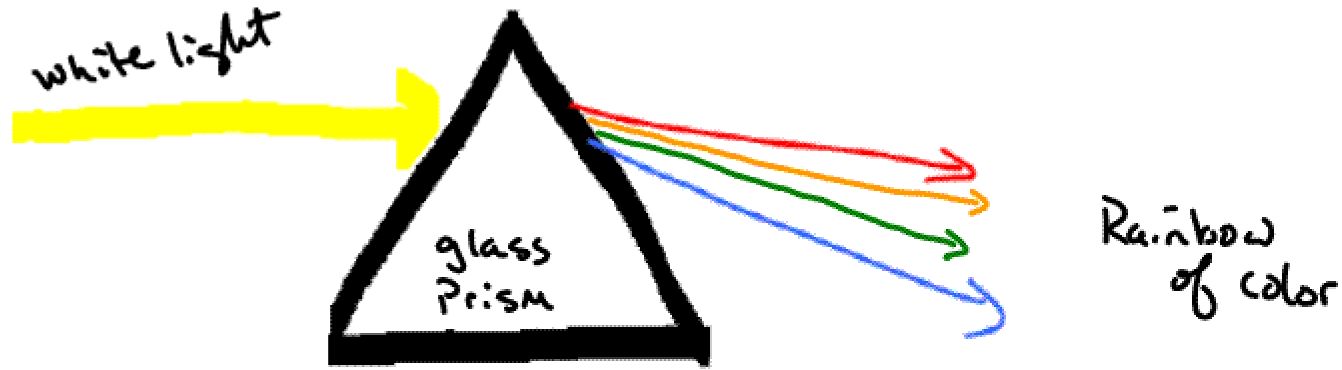
n depends on λ (ν)

$\frac{c}{v} = n$



Typically $n(\text{red}) < n(\text{blue})$

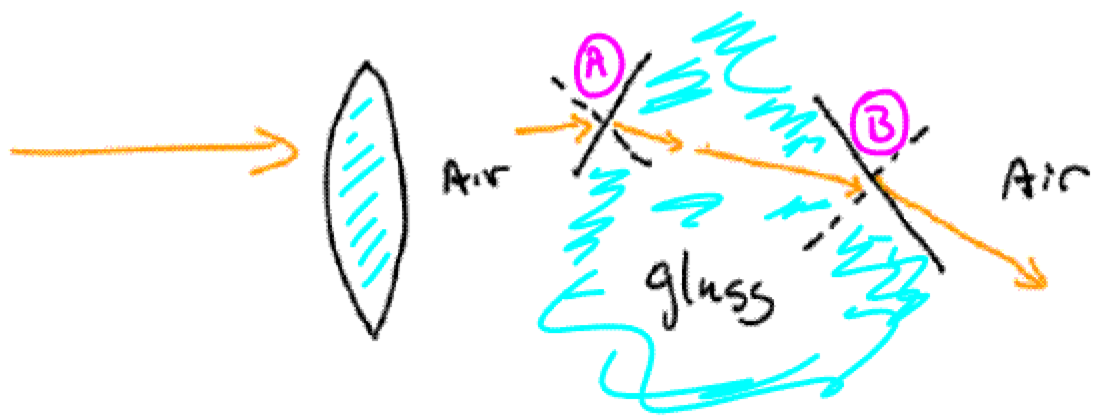
red light typically faster

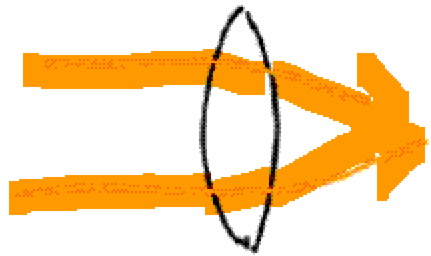


because $n_{red} < n_{blue}$

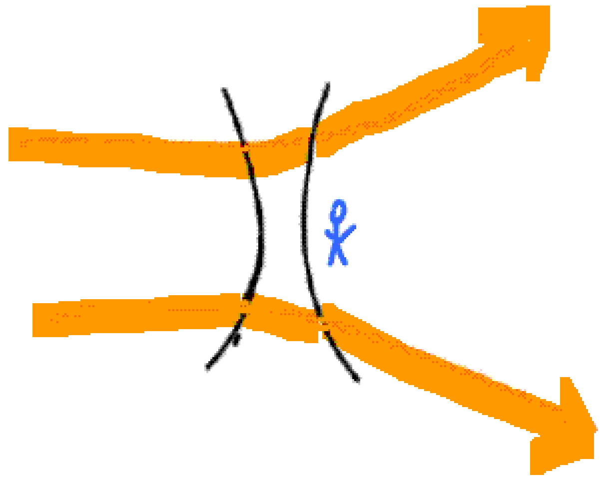
red bent less

operation of a thin convex lens





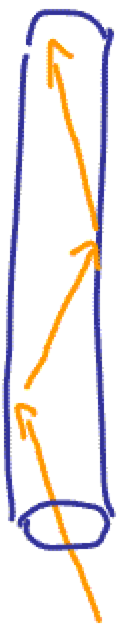
Converging lens (convex)

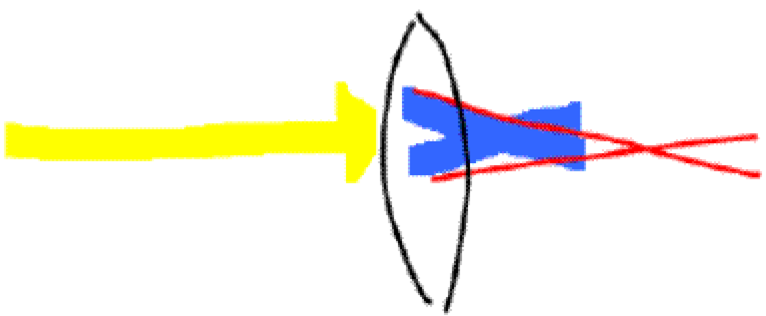


Diverging lens (concave)

common abberation

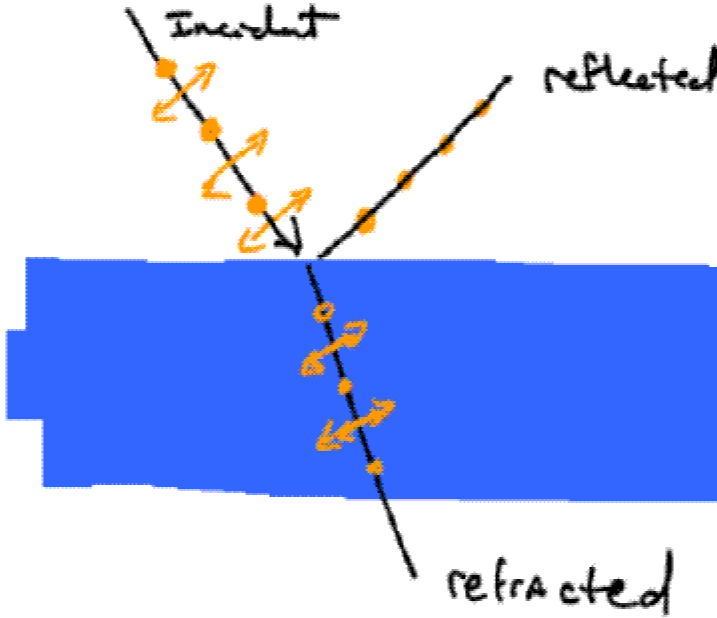
Chromatic dispersion



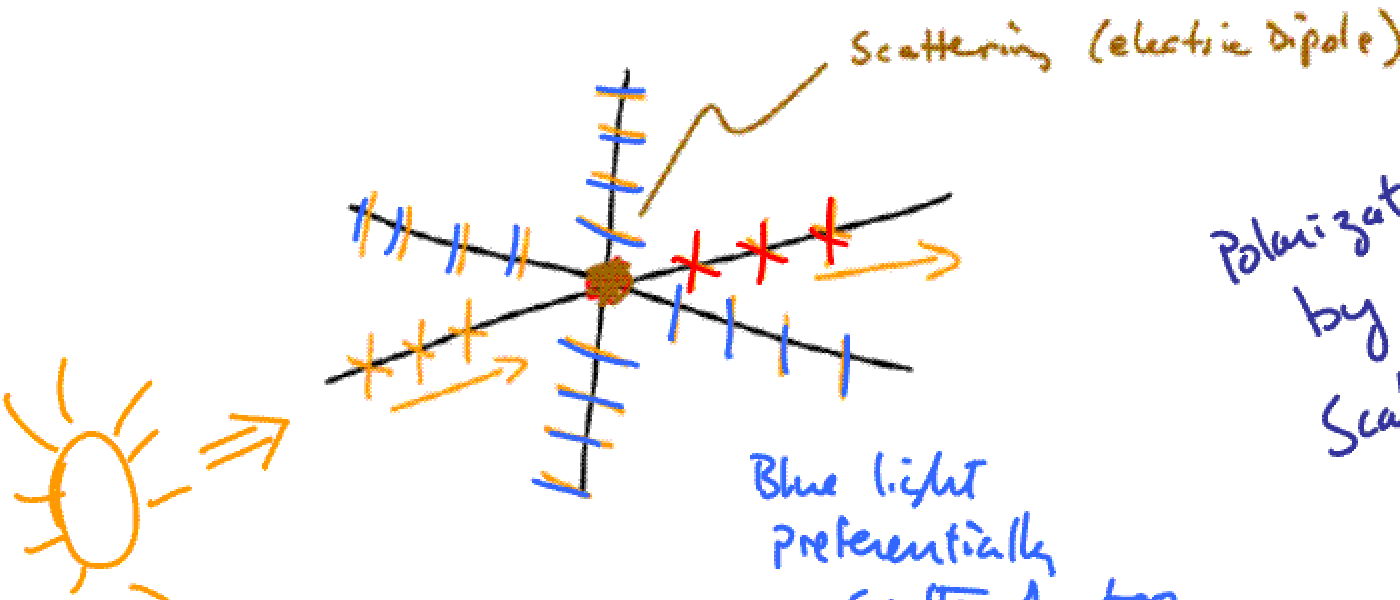


Pulse broadening in optical fibers

Polarization by Reflection



Polarization by Scattering



Blue light preferentially scattered too