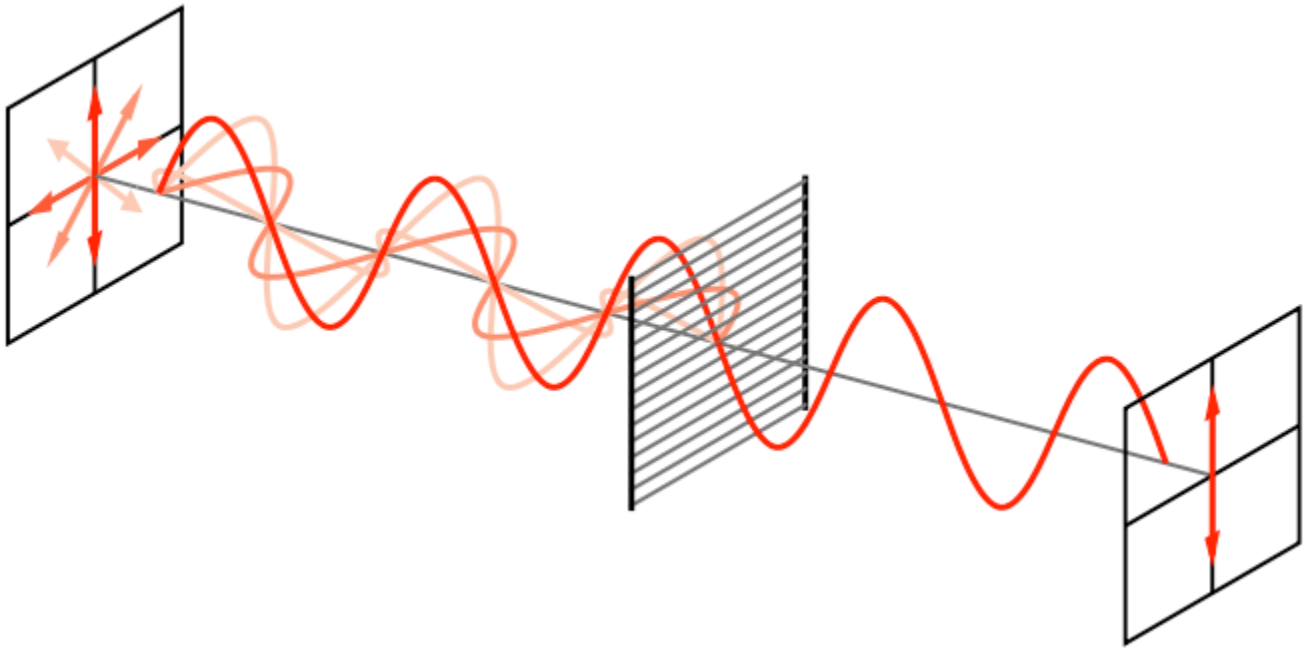
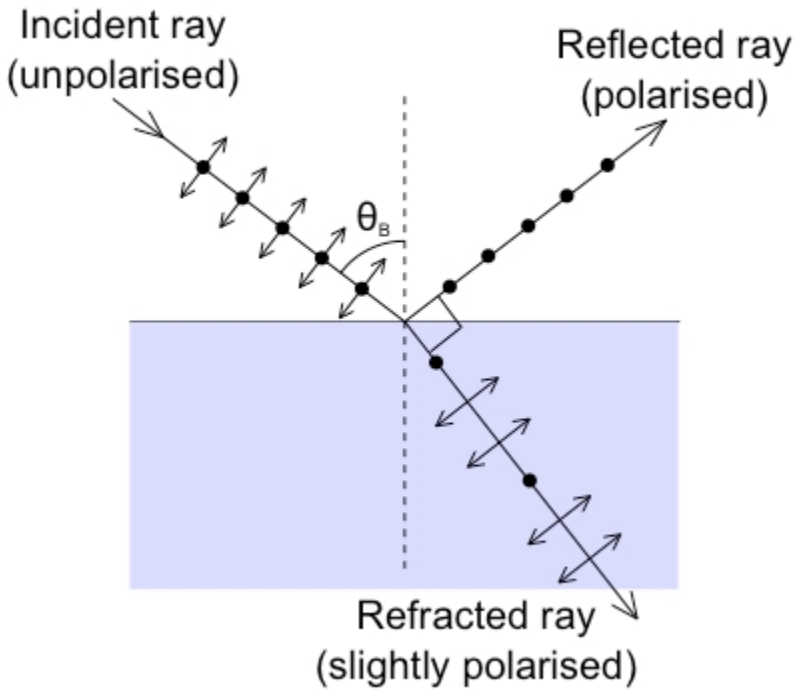
Polarizers



Wire Grid Polarizer

Chem 243
R. Corn

Brewster's Angle



With simple trigonometry this condition can be expressed as:

$$\theta_1 + \theta_2 = 90^\circ,$$

where θ_1 is the angle of incidence and θ_2 is the angle of refraction.

Using Snell's law,

$$n_1 \sin(\theta_1) = n_2 \sin(\theta_2),$$

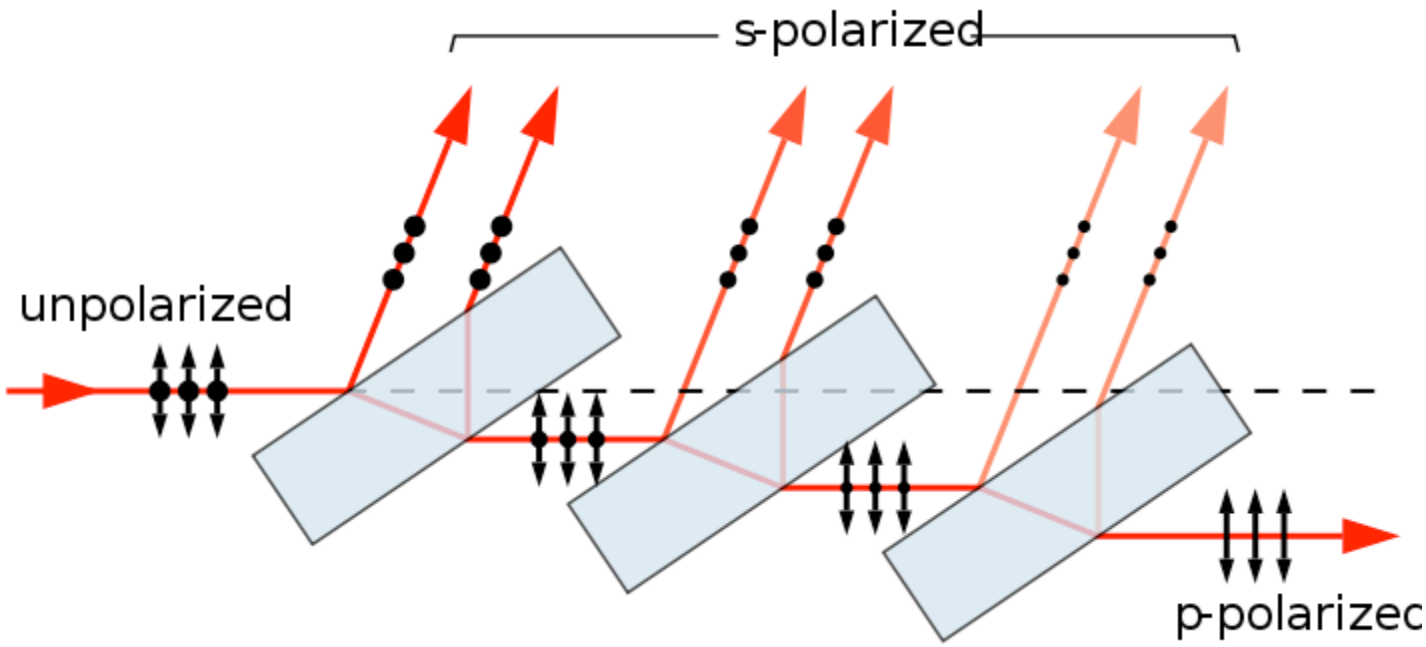
we can calculate the incident angle $\theta_1 = \theta_B$ at which no light is reflected:

$$n_1 \sin(\theta_B) = n_2 \sin(90 - \theta_B) = n_2 \cos(\theta_B).$$

Rearranging, we get:

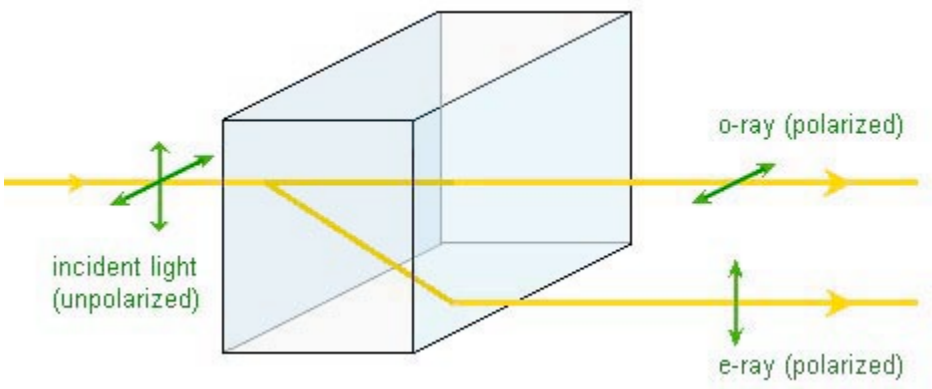
$$\theta_B = \arctan\left(\frac{n_2}{n_1}\right),$$

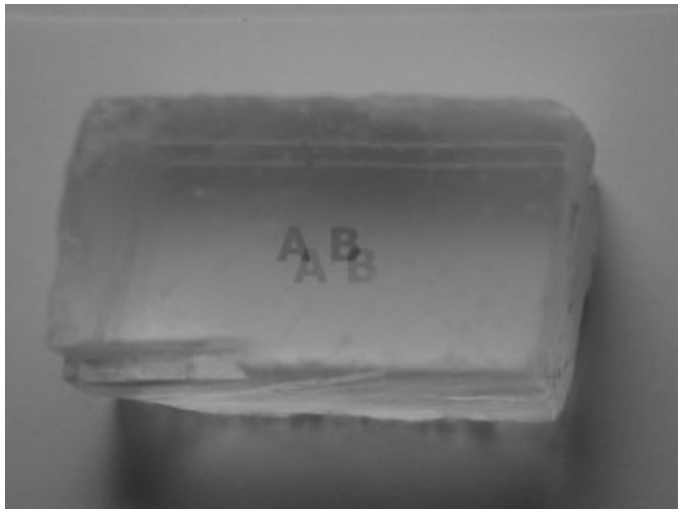
where n_1 and n_2 are the refractive indices of the two media. This equation is known as **Brewster's law**.



Brewster Plate Polarizer

Calcite:
A birefringent material

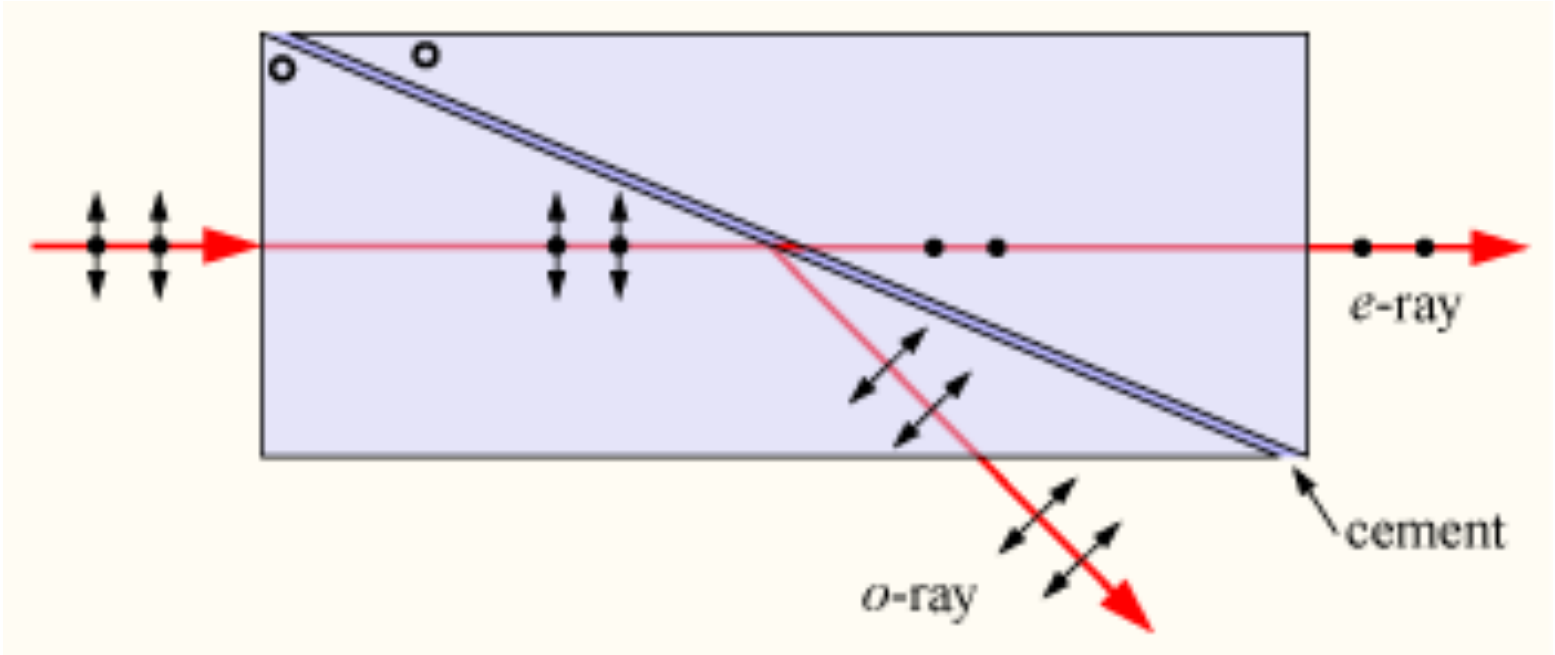




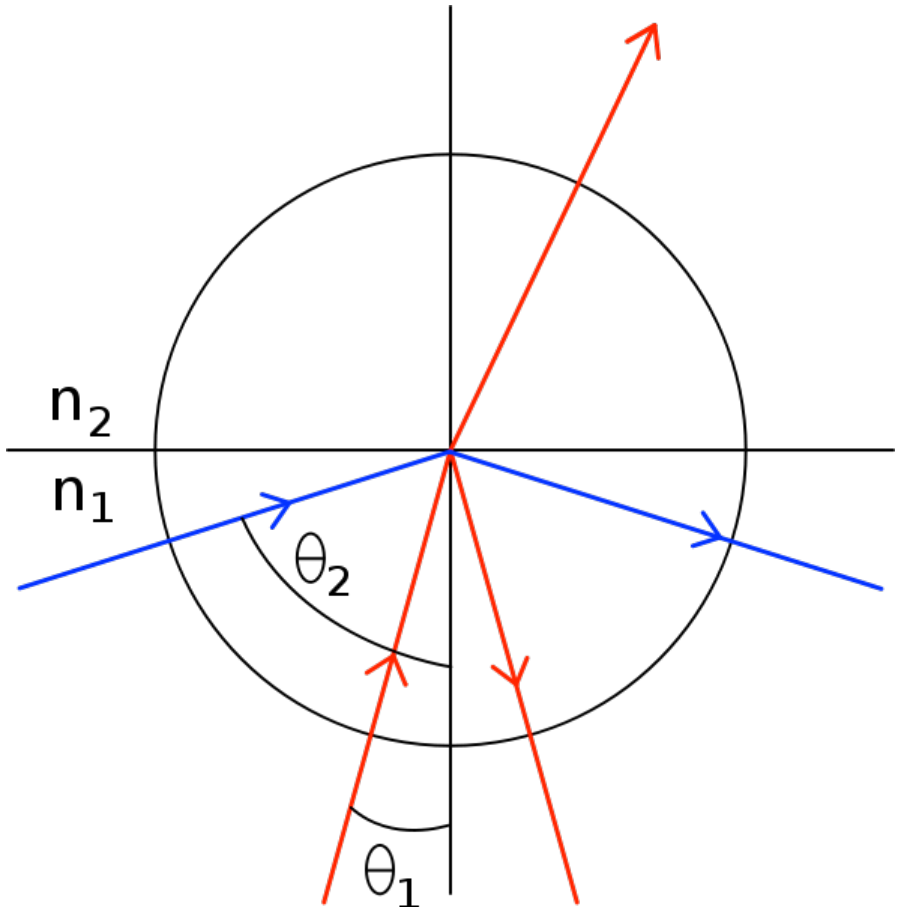
At 590 nm:

ordinary refractive index $n_o = 1.658$

extraordinary refractive index $n_e = 1.486$

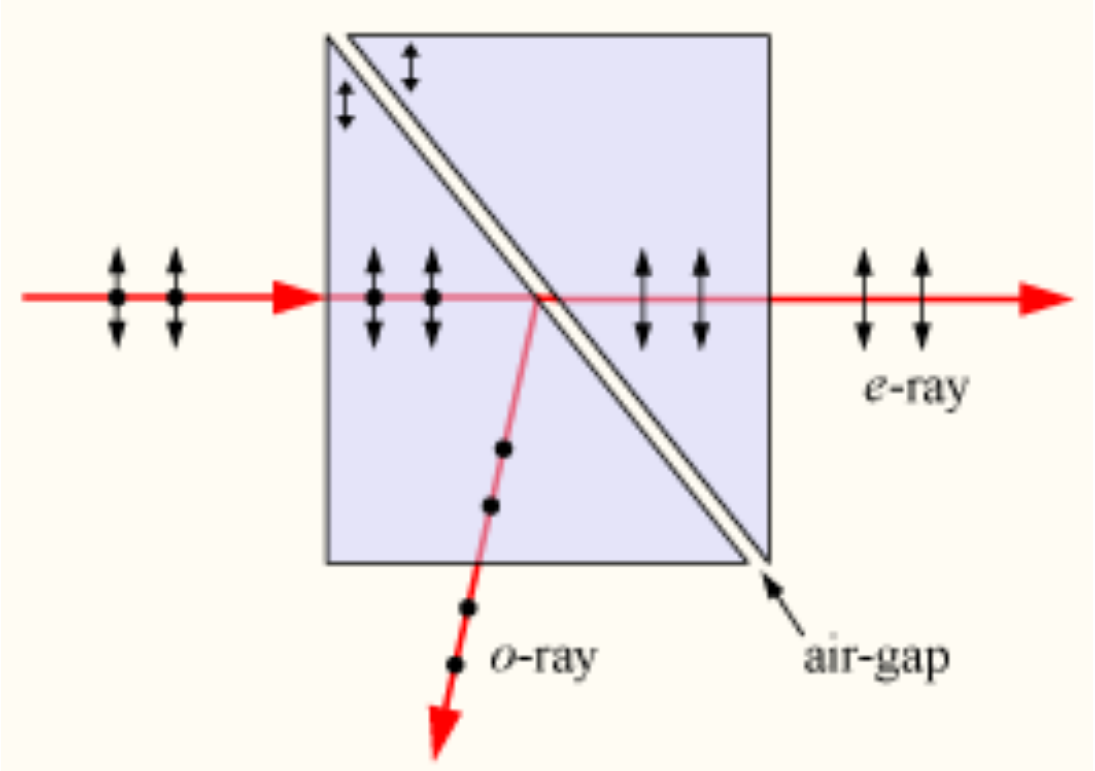


Glan-Thompson Polarizer

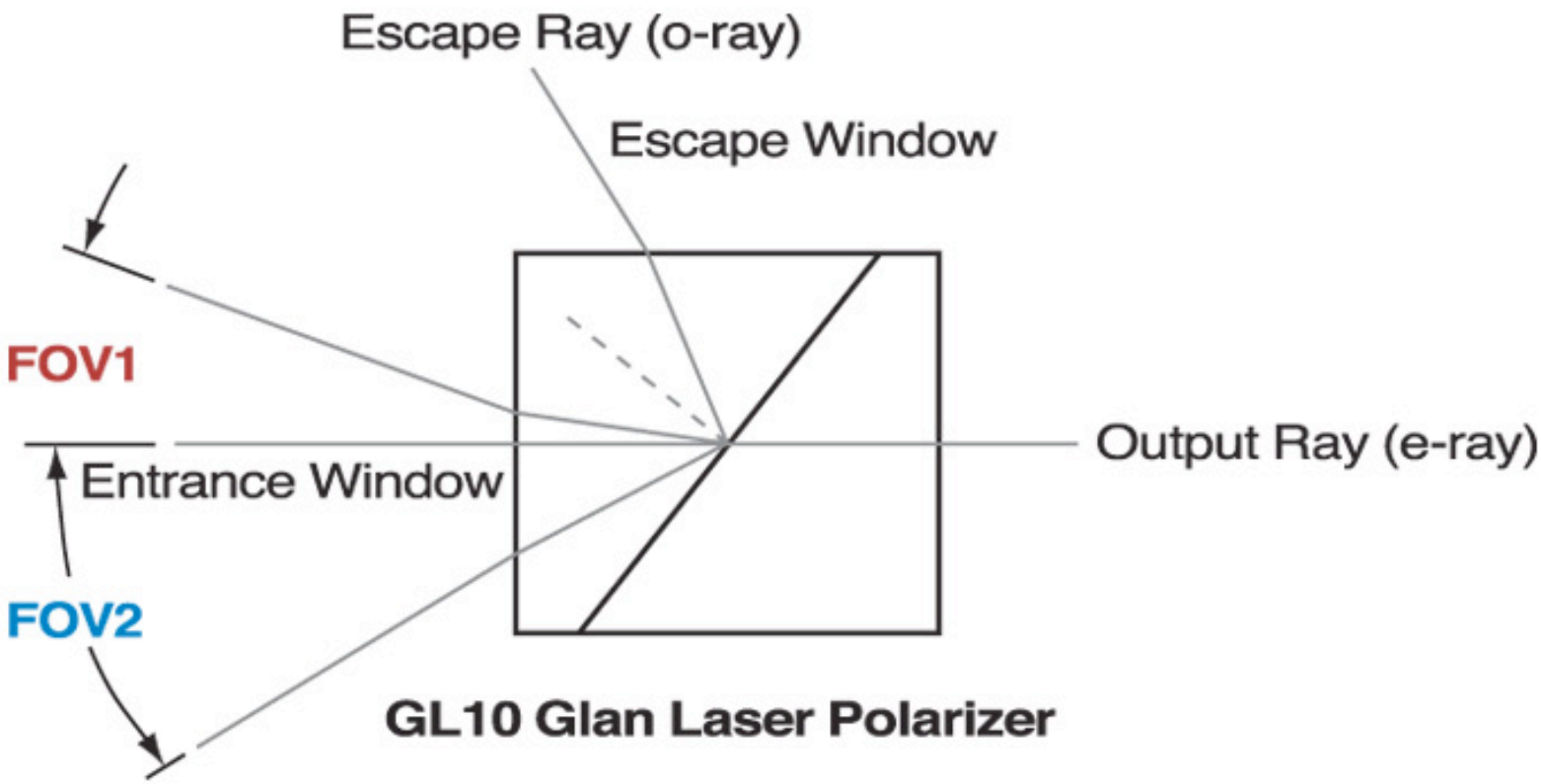


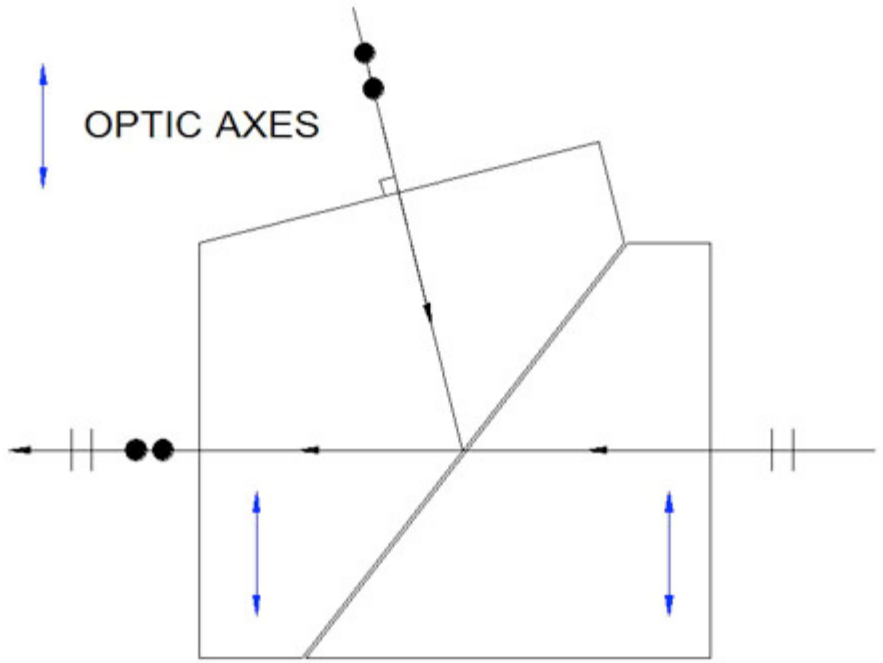
$\theta_{crit} = \arcsin(n2/n1)$

Critical Angle



Glan-Taylor Polarizer


Escape Ray (o-ray)
Escape Window
FOV1
Output Ray (e-ray)
Entrance Window
FOV2
GL10 Glan Laser Polarizer



Glan-Laser Recombining Polarizer