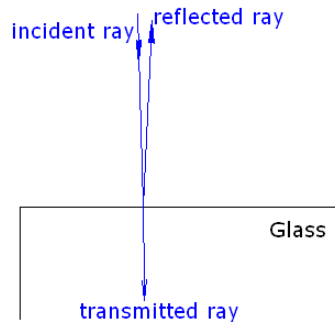


Physics II

Fresnel Equations

Problem 1.- One important application of Fresnel equations is in the calculation of reflected intensity. Consider the following: A light ray of intensity $I=1\text{W/m}^2$ is incident normal ($\theta_i=0$) on glass that has an index of refraction $n= 1.48\dots 1.7$

Calculate how much intensity is reflected.



Note: For your calculation notice that the intensity of the reflected ray is proportional to the electric field squared, so:

$$\frac{I_{\text{reflected}}}{I_{\text{Incident}}} = \left(\frac{E_{\text{reflected}}}{E_{\text{Incident}}} \right)^2$$

Also notice that since the incident angle is $\theta_i=0$ it doesn't matter if you use the TE or TM mode equations, they will give you the same value.

Problem 2.- What fraction of the incident light intensity (irradiance) will be reflected in the TE mode when the angle of incidence is 45° on an air-water interface?

$n_{\text{water}} = 1.33$