

Fermat's Principle

Optical path. Corresponds to the distance in vacuum equivalent to the distance traversed in the medium of index n . An optical path from point S to point P is defined as

$$OPL = \int_S^P n(s) ds$$

Fermat's principle. State that light will travel the route such that OPL in minimum

Law of Reflection

State that the angle-of-incidence equals the angle-of-reflection

$$\theta_i = \theta_r$$

Derivation. 404 not found.

Snell's Law

Also called law of refraction

$$n_i \sin \theta_i = n_r \sin \theta_r$$

Derivation. 404 not found.

Total internal reflection. In the case of $n_i > n_r$, when the incidence angel θ_i is equal or greater than the critical angle θ_c , total internal reflection occur. Snell's law state

$$\sin \theta_i = \frac{n_r}{n_i} \sin \theta_r$$

The critical angel occur when the reflected angle is perpendicular to normal, then said incidence angle is defined as critical angle

$$\sin \theta_i = \frac{n_r}{n_i} \implies \theta_c = \arcsin \frac{n_r}{n_i}$$

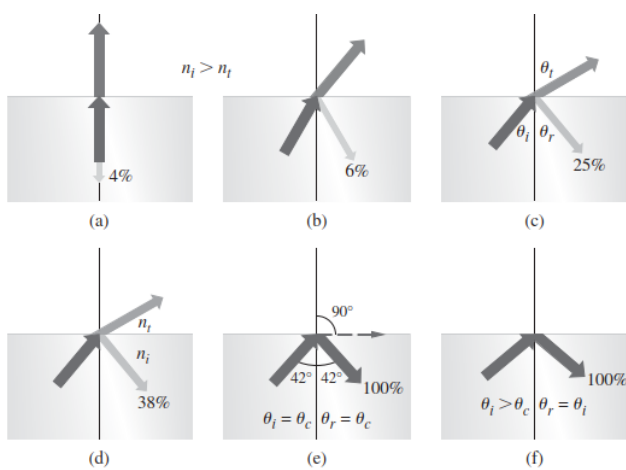


Figure: total internal reflection