Date 17/02/25
Seam IV

Fresnel law of reflection

FEBRUARY '24
SATURDAY 10
WK 06 DAY 041-325

THINGS TO DO

When a light beam reaches an interface between two different transparent media, It is partly transmitted into the other medium and partly reflected ~~bat~~ back into the original medium.

Complete transmission with out any reflection would requier impedance matching. Essentially all optical materials (except for some photonic metamaterials) have the relative permeablety $\mu_r = 1$ and in that case the impedance depends only on the refractive index. Therefore, the optical reflectivity at such an

NOTES

THINGS TO DO

interface depends only on the refractive indices of the material and vanishes if these indices are identical.

The reflectivity and transmissivity at such an interface are calculated with fresenal equation for an ~~arbitrary~~ Arbitrary angle of incidence. The reflections themselves are called fresnel reflections.

For the simplest case with normal incidence on the interface, the fresnal reflectivity be cacutated

with the equation.

$$R = \left(\frac{n_1 - n_2}{n_1 + n_2}\right)^2$$

Examples of fresnel reflections →

1) Fresnel ~~reflection~~ reflections are essential for the operation ~~of~~ principle of birefrigent tuners.

2) Fresnel reflection also occur at the ends of optical fibers. When the ends of two fibers are fitted together, but with a small air gap in the ~~between~~ between, there are fresnel reflections from both sides of the gap. etc.