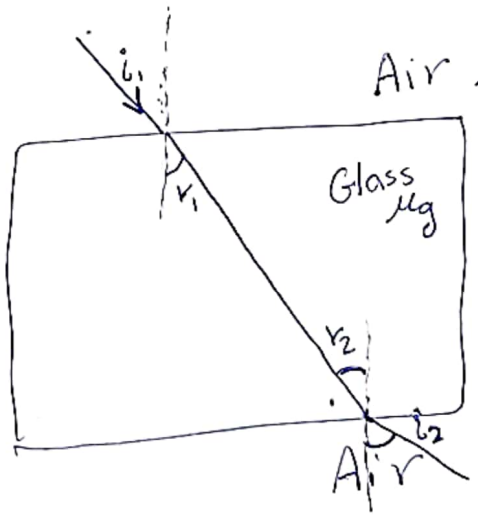
Exp 6 : Index of refraction

The aim : To find the index of refraction for unknown medium when light passes through to another.

Theory :

- when light passes from one medium to another its path bends.
- The bending of light is called refraction



i = angle of incidence
r = angle of refraction

$$\text{index of refraction} = \frac{\text{speed of light in vacuum}}{\text{speed of light in medium}}$$

$$\boxed{\mu = \frac{c}{v}}$$

Snell's Law :- relate the incidence angle i with refraction angle r, through the index of refraction for the diffrent mediums.

in our Case :-

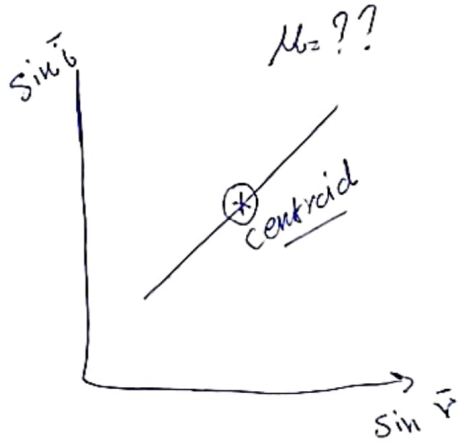
$$\mu_a \sin(i) = \mu_g \sin(r)$$

μ_a = index of refraction of air

μ_g = " " " " glass

$$\boxed{\mu_a = 1}$$

$$\boxed{\mu_g = \frac{\sin(i)}{\sin(r)}}$$



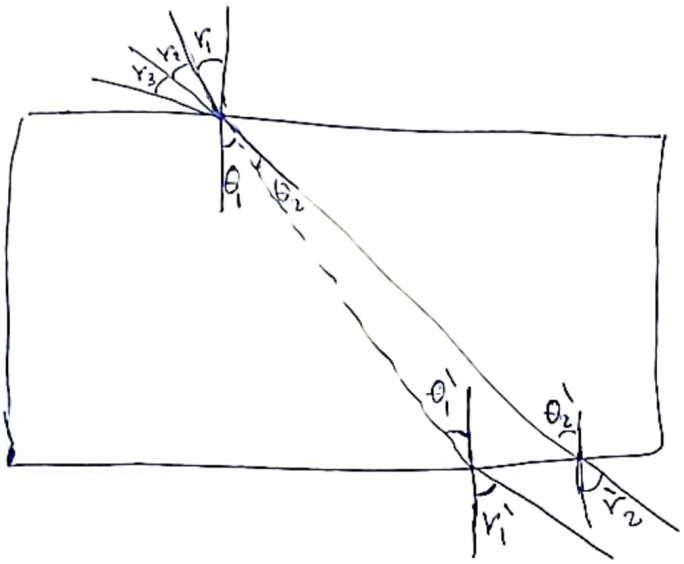
$$\frac{\Delta\mu}{\mu} = \left[\left|\frac{\cos i}{\sin i}\right| \Delta i + \left|\frac{\cos r}{\sin r}\right| \Delta r\right]$$

$\Rightarrow$ but in this exp, we will use anew method to find μ, $\Delta\mu$.

procedure

$r_1 = 10^\circ$ $\quad r_3 = 30^\circ$

$r_2 = 20^\circ$ $\quad r_4 = 40^\circ$ ...



$$\frac{r_1 + r_1'}{2} = \bar{r}_1$$

$$\frac{r_2 + r_2'}{2} = \bar{r}_2$$

⋮

زوايا السقوط (في الهواء)

$$\frac{\theta_1 + \theta_1'}{2} = \bar{\theta}_1$$

$$\frac{\theta_2 + \theta_2'}{2} = \bar{\theta}_2$$

⋮

زوايا الانكسار (في الزجاج)

* نغير زاوية السقوط ست مرات ونأخذ قياسات الزاويتا

← انظر للجدول في التقرير ...

Calculation:

By using the least square fit method.:

- mathmatical analysis to determine the line of best fit for aset of data