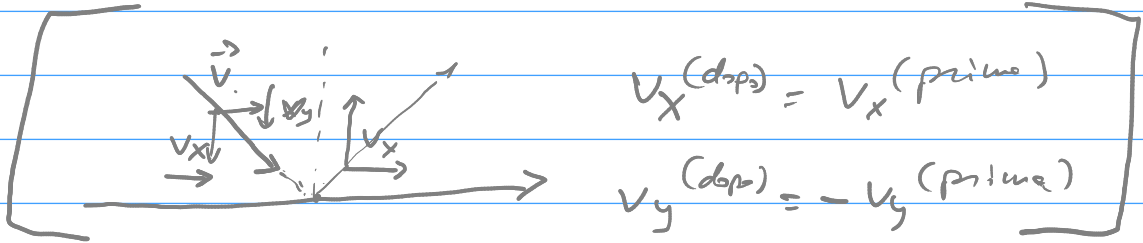


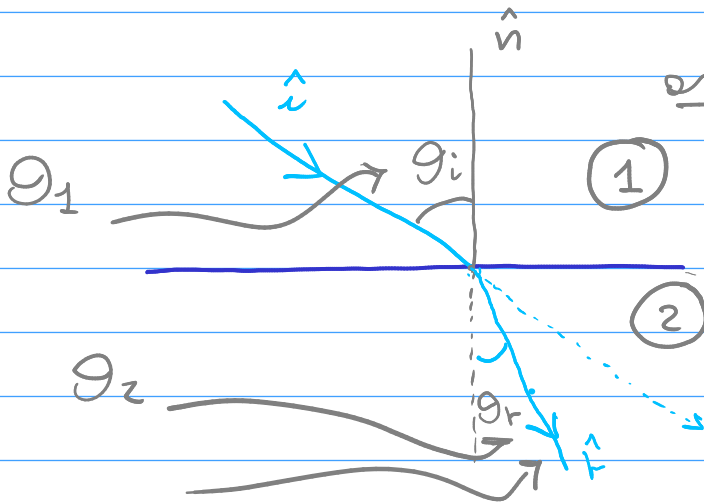
$$\theta_i = \theta_r$$

$$(\hat{i}, \hat{r}, \hat{n}) \text{ coplanari}$$



$$v_x^{(dps)} = v_x^{(prime)}$$

$$v_y^{(dps)} = -v_y^{(prime)}$$



aria

①

acqua

②

$(\hat{i}, \hat{r}, \hat{n})$: coplanari

RIFRATTO!

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

legge di Snell

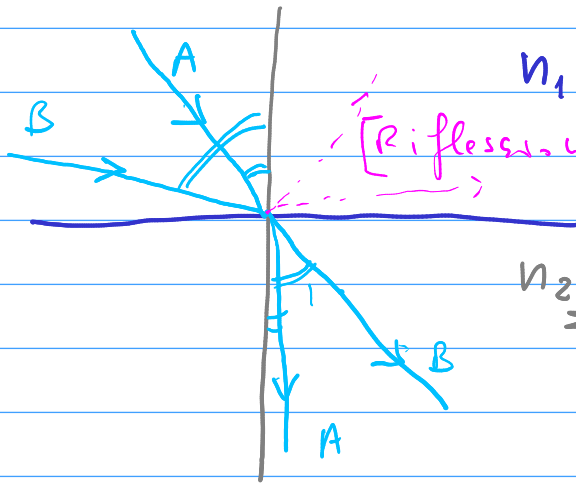
n : indice di rifrazione

- $v_{\text{vuoto}}, n=1$
- aria $\approx v_{\text{vuoto}}$
- acqua $n=1,33$
- vetro $n \approx 1,5$
- diavante

$$\frac{\sin \theta_2}{\sin \theta_1} = \frac{n_1}{n_2}$$

$$\frac{\theta_2}{\theta_1} < 1 \iff \frac{\sin \theta_2}{\sin \theta_1} < 1 \iff \frac{n_1}{n_2} < 1$$

Arie



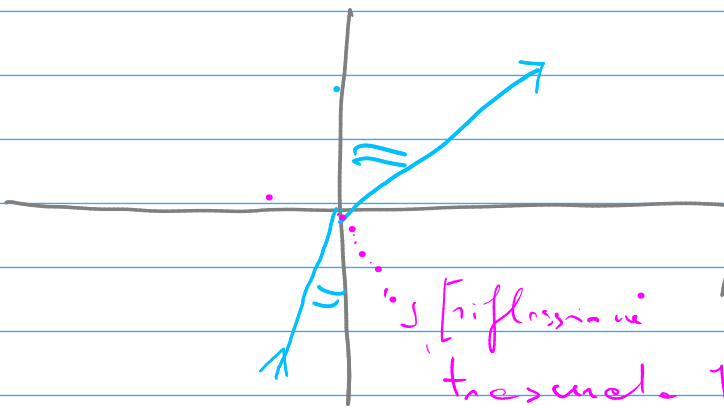
$n_1 = 1$

[Riflessioni - trascurate]

$n_2 > n_1$

Acqua

$n_2 = 1,33$



Arie

[riflessioni trascurate] Acqua

Acqua \rightarrow Arie
[velocità ...]

$$n \sin \theta_1 = 1 \cdot \sin \theta_2$$

Acqua
Arie

$$\sin \theta_2 = n \cdot \sin \theta_1$$

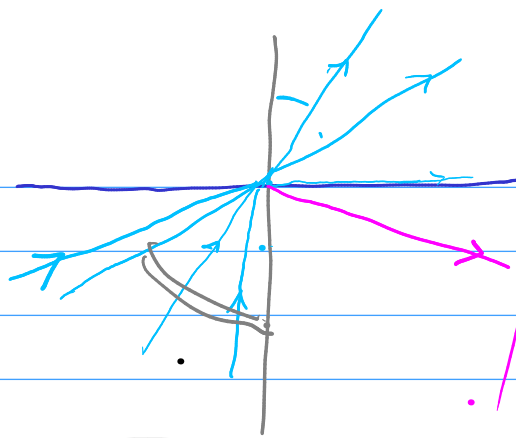
[0, n]
[0, 1]

???
00. [0, 1,33]

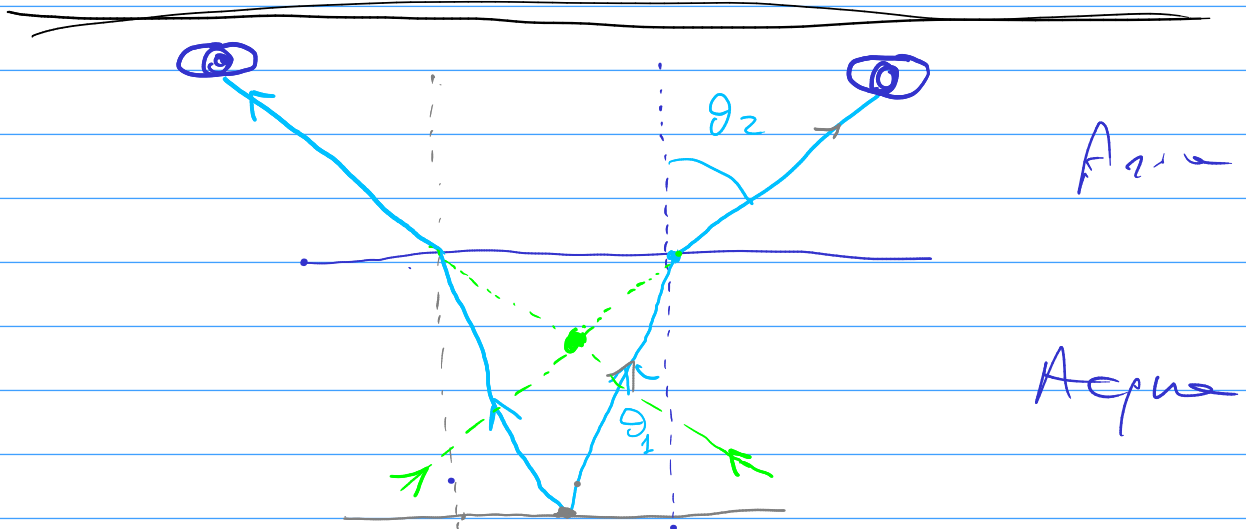
max

$1 = n \cdot \sin \theta_{1 \max}$

$$\sin \theta_{1 \max} = \frac{1}{n}$$



riflessione
totale!



$$d \tan \theta = d' \tan \theta'$$

$$d \sin \theta = d' \sin \theta'$$

$$\frac{d'}{d} = \frac{\sin \theta}{\sin \theta'}$$

$$\approx \frac{1}{n}$$

$$\begin{aligned} \theta &\ll 1 \\ \theta' &\ll 1 \end{aligned}$$

da
sopra!

$$n \cdot \sin \theta = 1 \cdot \sin \theta'$$

$$\frac{\sin \theta}{\sin \theta'} = \frac{1}{n}$$

specchi sferici!

