LUCE

$3.8 \cdot 10^{14}\ s^{-1} \leq \nu \leq 7.9 \cdot 10^{14}\ s^{-1}$

$0.78 \cdot 10^{-6}\ m \gtrsim \lambda \gtrsim 0.38 \cdot 10^{-6}\ m$

$c \sim 300000\ km/s$

in un materiale $v < c$

$n \equiv \frac{c}{v}$ INDICE DI RIFRAZIONE

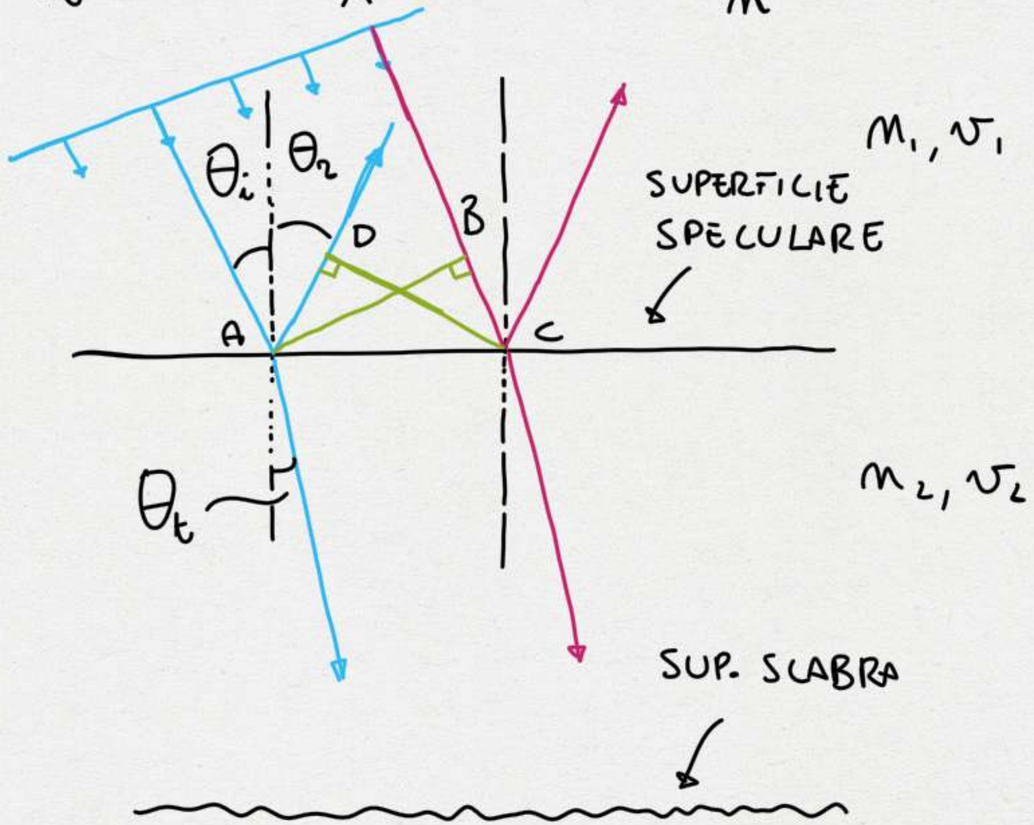
$n \gtrsim 1$

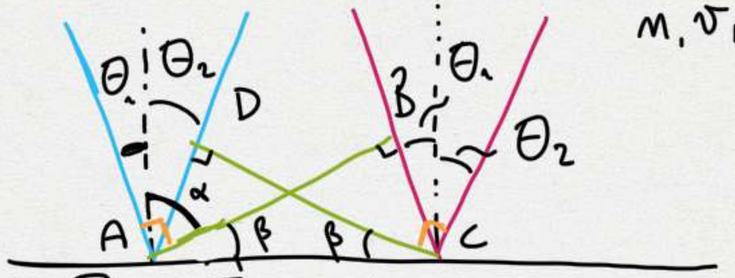
$n_{ARIA} \approx 1$, $n_{ACQUA} = 1.33$, $n_{VETRO} \sim 1.5 \div 2.0$

$k v = \omega$ ONDE

$k_0 \cdot c = \omega_0 \Rightarrow c = \frac{\omega_0}{k_0}$ $\longrightarrow$ MEZZO $v = \frac{\omega_0}{k} = \lambda \nu_0 \Rightarrow$

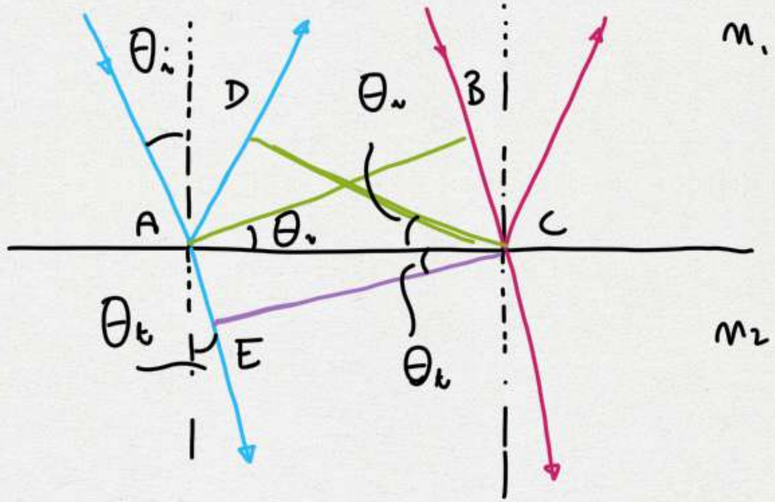
$\frac{c}{v} = n = \frac{\lambda_0}{\lambda} \Rightarrow \lambda = \frac{\lambda_0}{n}$





n_1, v_1

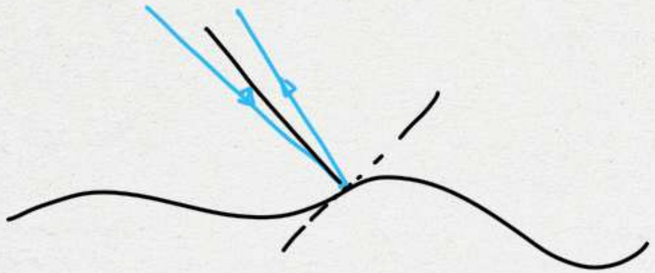
$$\alpha + \theta_i = \frac{\pi}{2} \qquad \alpha + \beta = \frac{\pi}{2} \Rightarrow \beta = \theta_i = \theta_2$$



n_1 v_1

n_2 v_2

$AD = BC$



$$BC = AC \sin\theta_i = v_1 \Delta t \Rightarrow AC = \frac{v_1 \Delta t}{\sin\theta_i}$$

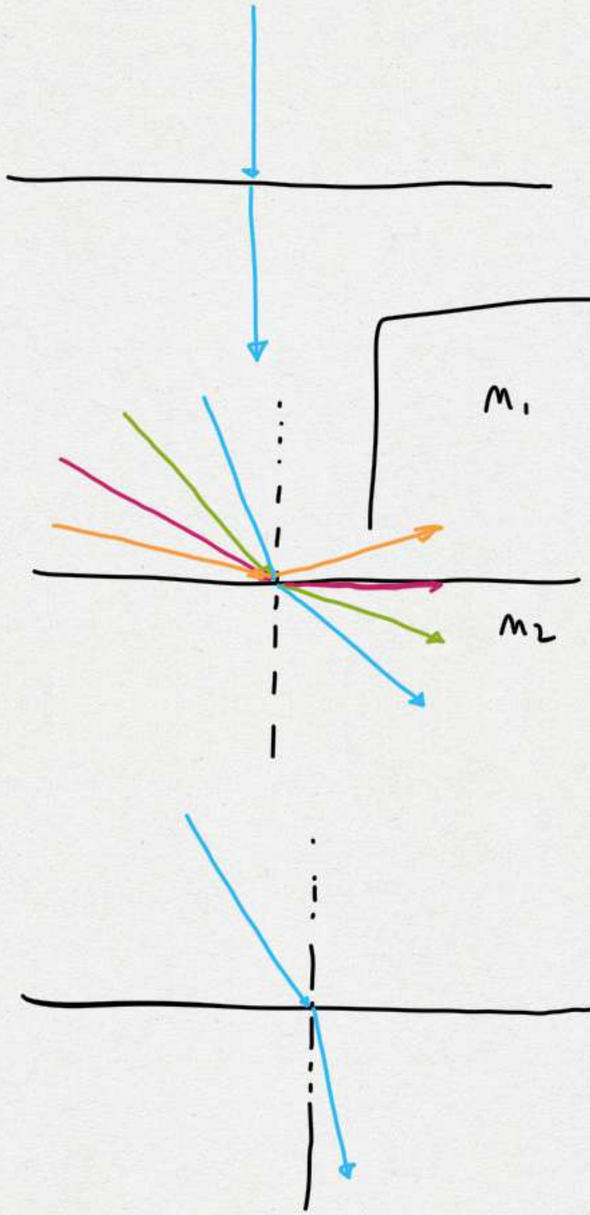
$$AE = AC \sin\theta_t = v_2 \Delta t \Rightarrow AC = \frac{v_2 \Delta t}{\sin\theta_t}$$

$$\frac{v_1 \Delta t}{\sin\theta_i} = \frac{v_2 \Delta t}{\sin\theta_t} \Rightarrow$$

$$\frac{\sin\theta_i}{\sin\theta_t} = \frac{v_1}{v_2} = \frac{n_2}{n_1} \Rightarrow \boxed{n_1 \sin\theta_i = n_2 \sin\theta_t}$$

LEGGE DI SNELL

$$\sin\theta_t = \frac{n_1 \sin\theta_i}{n_2}$$



→ RIFLESSIONE TOTALE

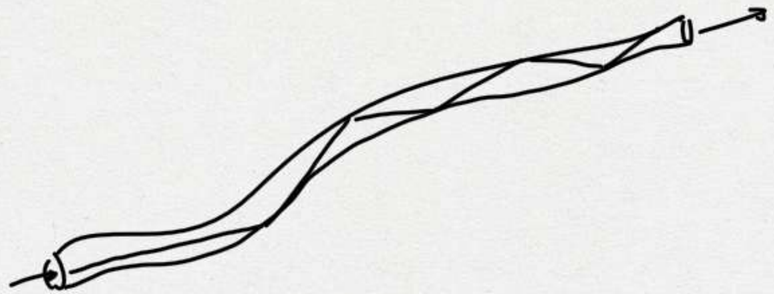
SE $n_1 > n_2$

$\theta_t > \theta_i$

$$\sin\theta_t = 1 = \frac{n_1}{n_2}\sin\theta_i \quad \mapsto \quad \frac{n_2}{n_1} = \sin\theta_{lim}$$

SE $n_2 > n_1$

$\theta_t < \theta_i$



INTERFERENZA

ONDA SFERICA

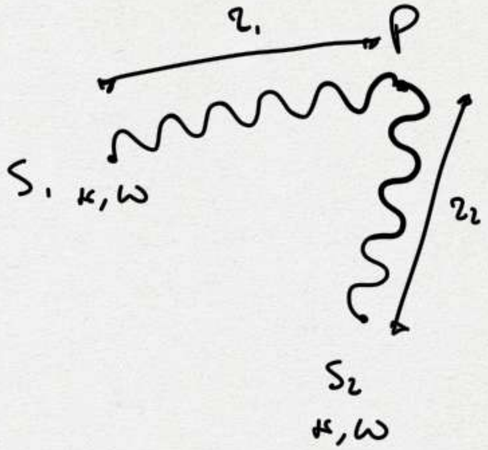
↳ ARMONICA

$$E(r,t) = \frac{E_0}{r}\cos(kr - \omega t)$$

r: DIST. DALLA SORGENTE

FASE

$$E_1(r,t) = \frac{E_{10}}{r_1}\cos(kr_1 - \omega t + \phi_1)$$



$$E_2(r,t) = \frac{E_{20}}{r_2}\cos(kr_2 - \omega t + \phi_2)$$

$$\delta = (kr_2 - \omega t + \phi_2) - (kr_1 - \omega t + \phi_1) =$$

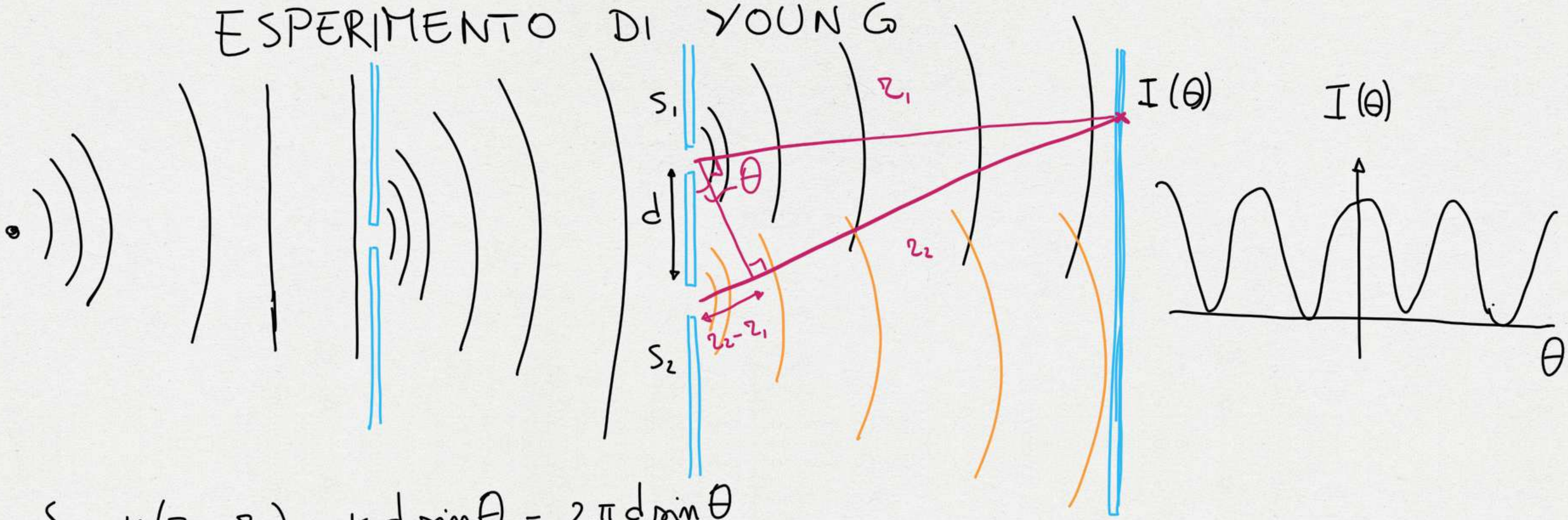
$$= k(r_2 - r_1) + (\phi_2 - \phi_1)$$

D.D.F. INTRINSECA

① k e ω delle onde devono essere le stesse

② $\phi_2 - \phi_1 = \Delta\phi$ deve essere costante nel tempo, cioè le due sorgenti devono essere <u>coerenti</u>. Se $\Delta\phi = 0$ le sorgenti <u>sincrone</u>.

ESPERIMENTO DI YOUNG



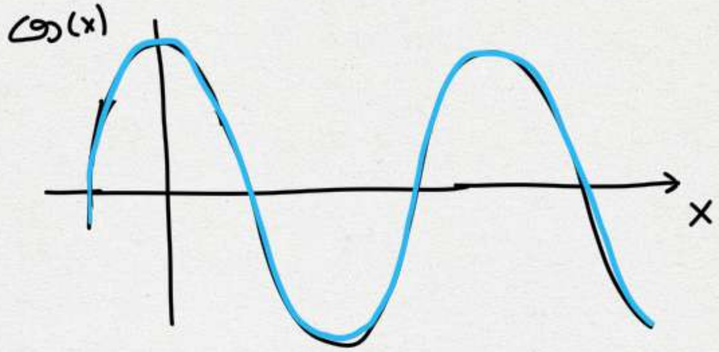
$$\delta = k(r_2 - r_1) = k\, d \sin\theta = \frac{2\pi d \sin\theta}{\lambda}$$

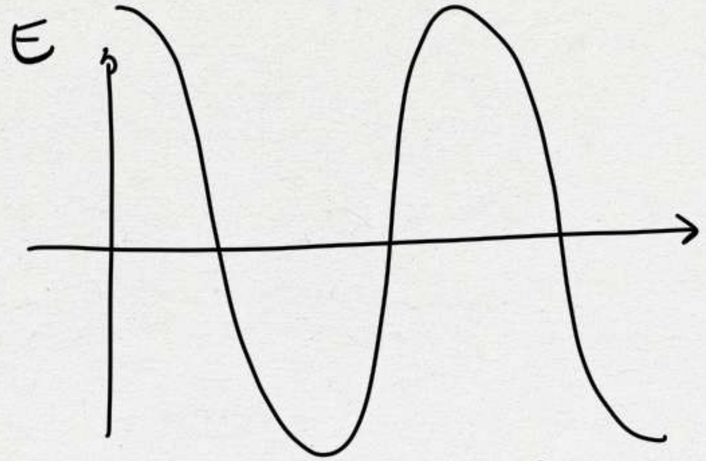
$$I(\theta) = 4 I_0 \cos^2\left(\frac{\pi d \sin\theta}{\lambda}\right), \quad \frac{\pi d \sin\theta}{\lambda} = m\pi \quad \text{con } m \text{ intero}$$

INTERFERENZA COSTRUTTIVA

$$\downarrow$$

$$d \sin\theta = m\lambda$$





$$d \sin\theta = \left(m + \frac{1}{2}\right) \lambda$$

INTERFERENZA DISTRUTTIVA