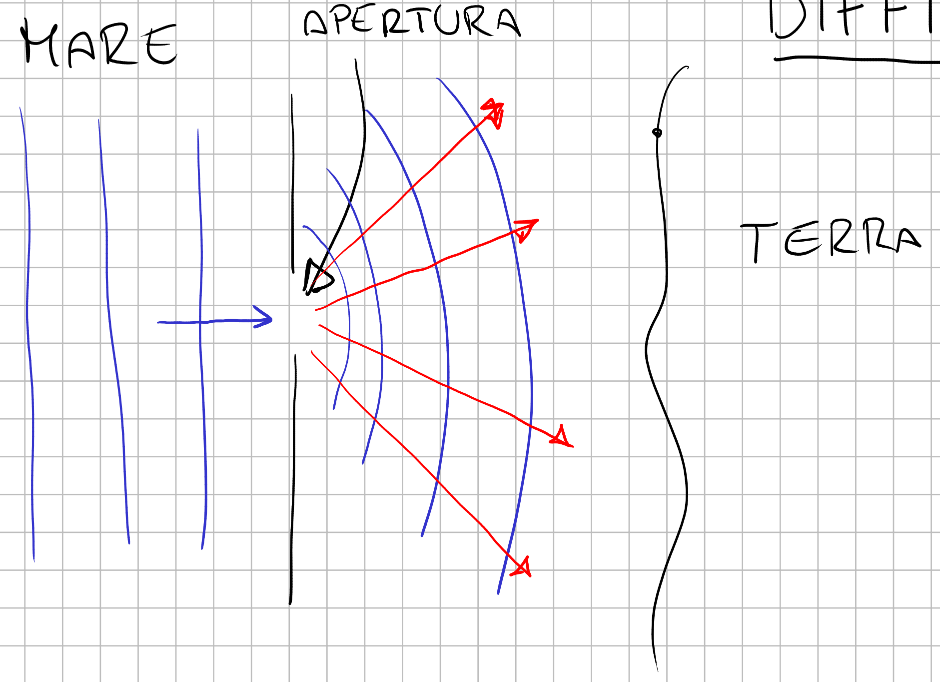
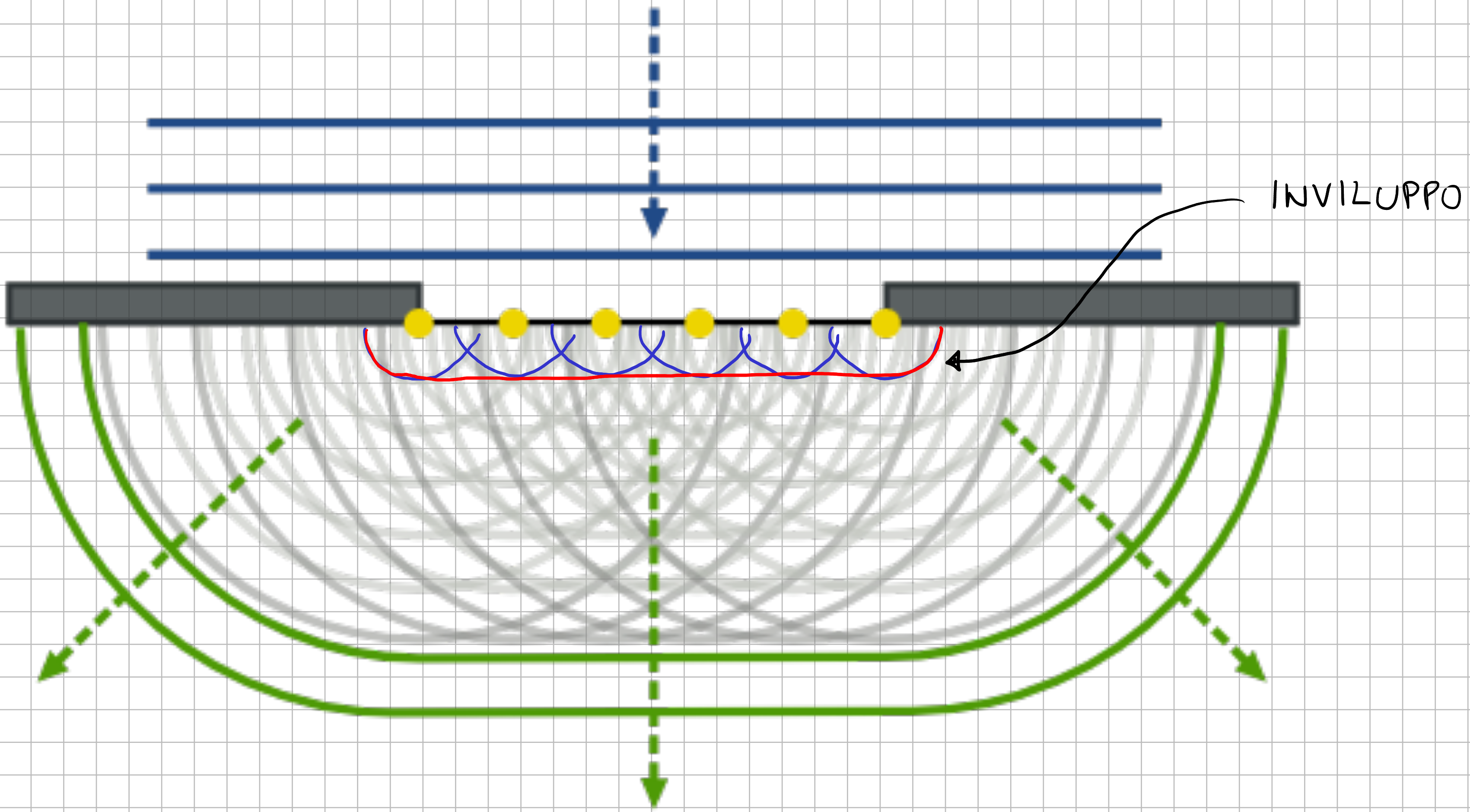
DIFFRAZIONE

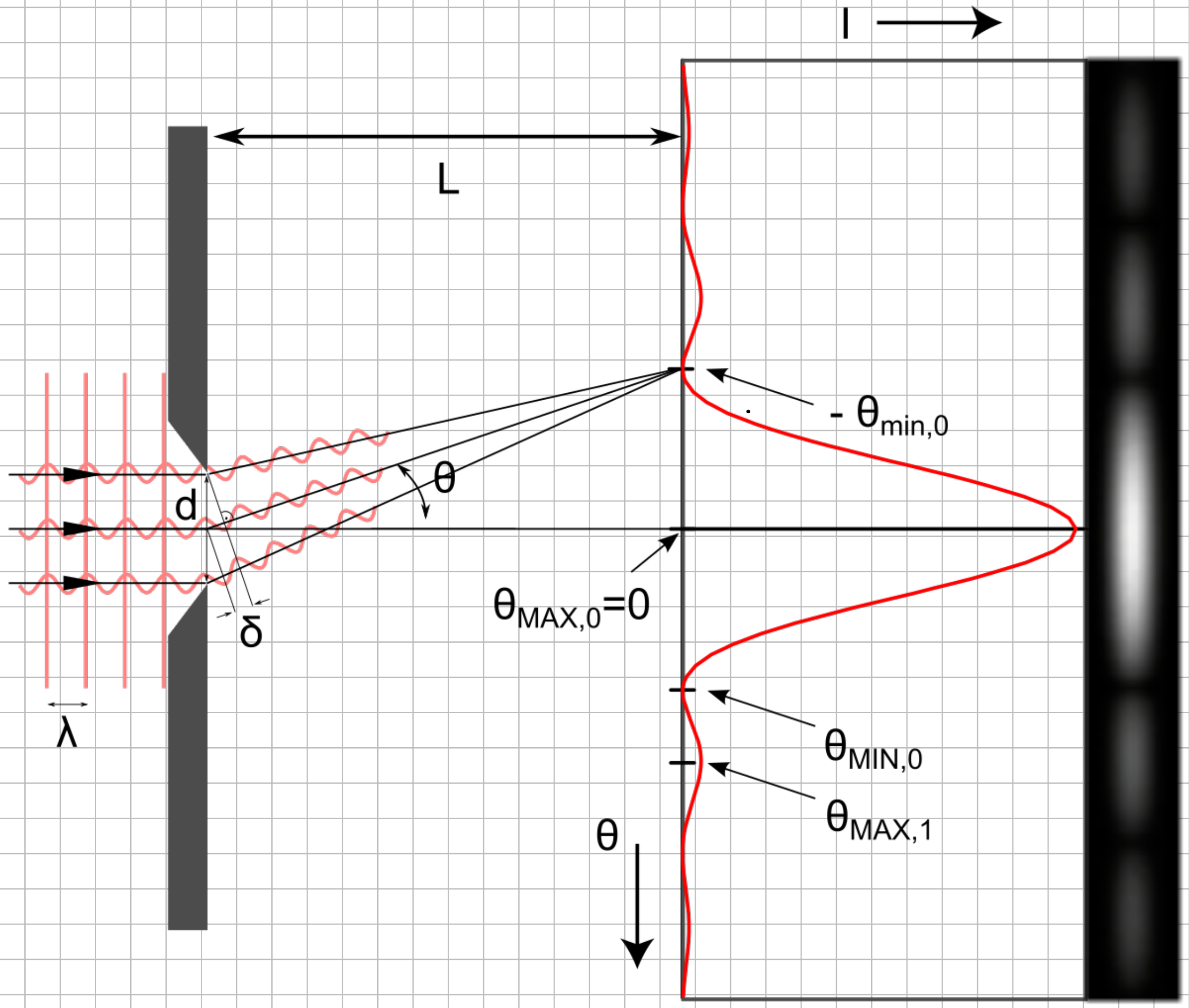


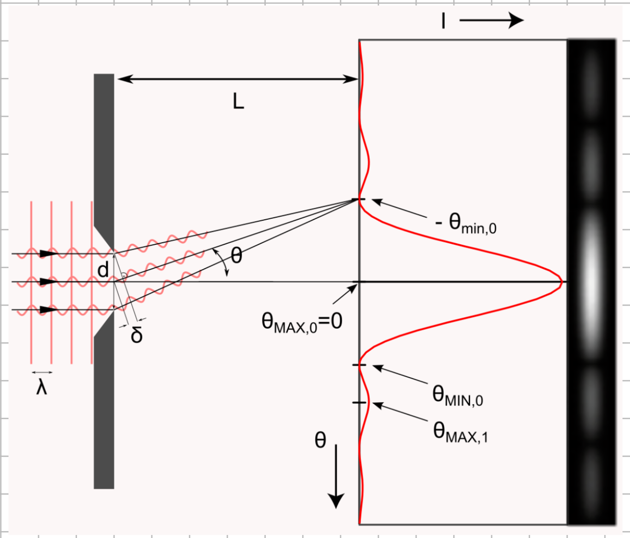
DIFFRAZIONE : interferenza di un' onda con se stessa

PRINCIPIO HUYGENS - FRESNEL



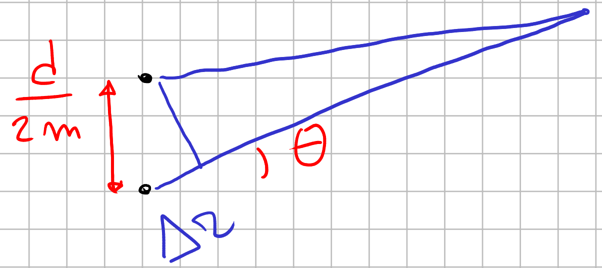
DIFFRAZIONE DI FRAUNHOFER





- dividiamo la fenditura in $2m$ parti, $m \geq 1$
- due onde virtuali vicine distano $\frac{d}{2m}$, d larghezza fenditura
- la diff. di cammino ottico è $\Delta r = \frac{d}{2m} \sin\theta$
- si hanno minimi quando $\frac{d}{2m} \sin\theta_{MIN} = \frac{\lambda}{2} \iff$

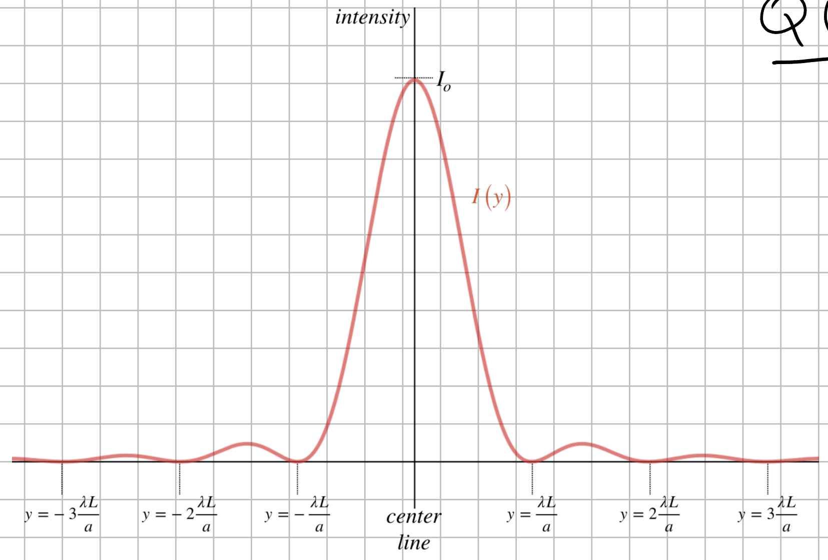
$$\boxed{\sin\theta_{MIN} = \frac{\lambda}{d} m \quad , \quad m \geq 1}$$

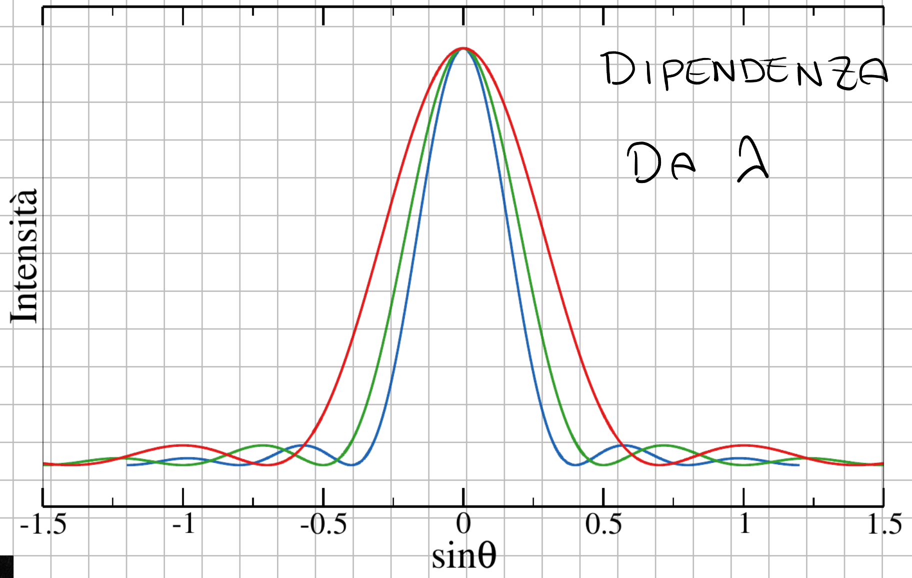


- con una trattazione un po' complicata,

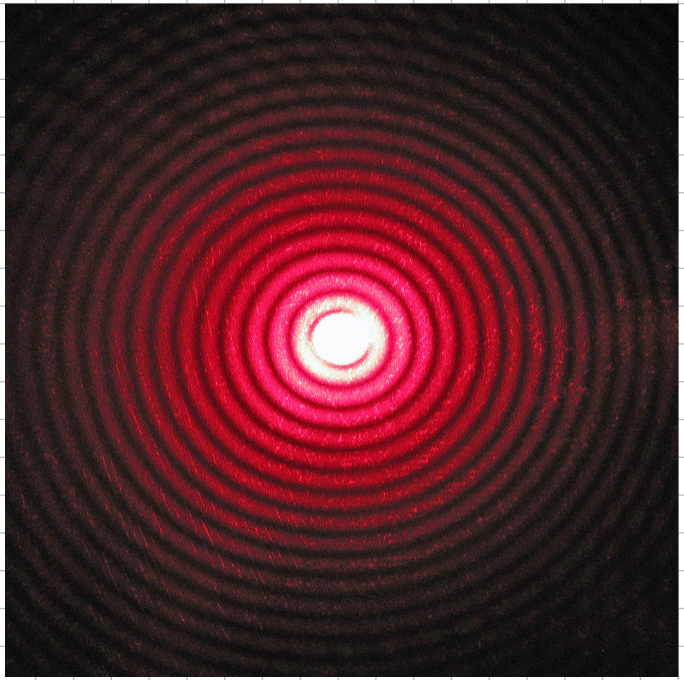
$$I(\theta) = I_{MAX} \left[\frac{\sin\left(\frac{\pi d}{\lambda} \sin\theta\right)}{\frac{\pi d}{\lambda} \sin\theta} \right]^2$$

QUALCHE FIGURA



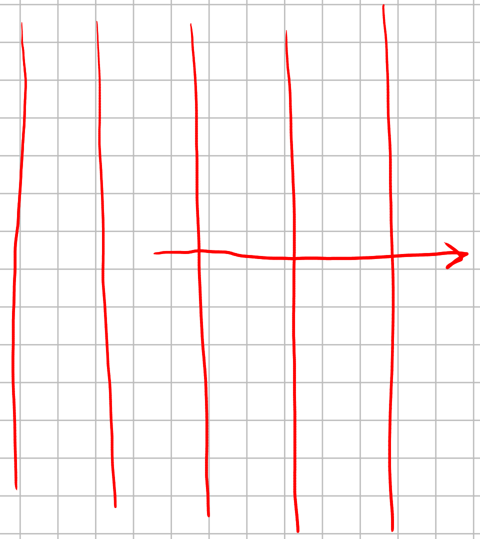


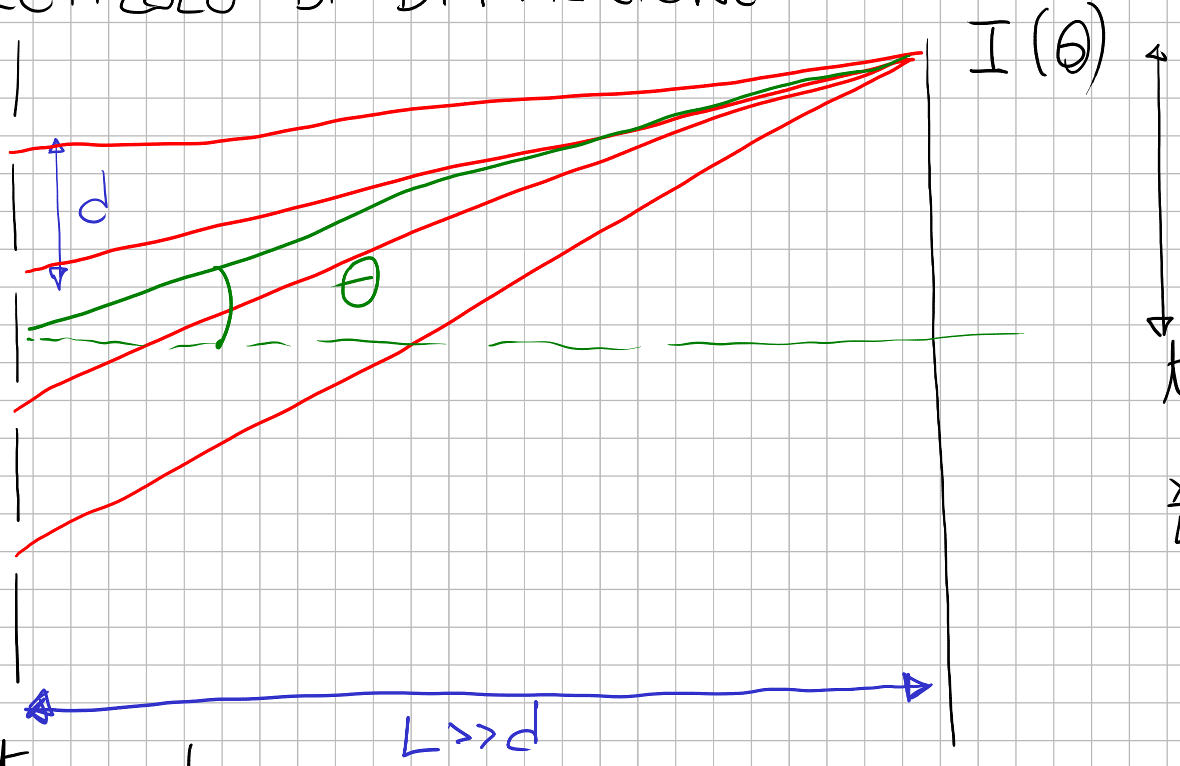
DIPENDENZA DA λ



APERTURA CIRCOLARE

INTERFERENZA TRA MOLTE SORGENTI
O
RETICOLO DI DIFFRAZIONE





x , $\frac{x}{L} = tg\,\theta$

se $L \gg d$ allora

$tg\,\theta \approx \sin\theta \Rightarrow$

$\frac{x}{L} \approx \sin\theta$

N fenditure a distanza d

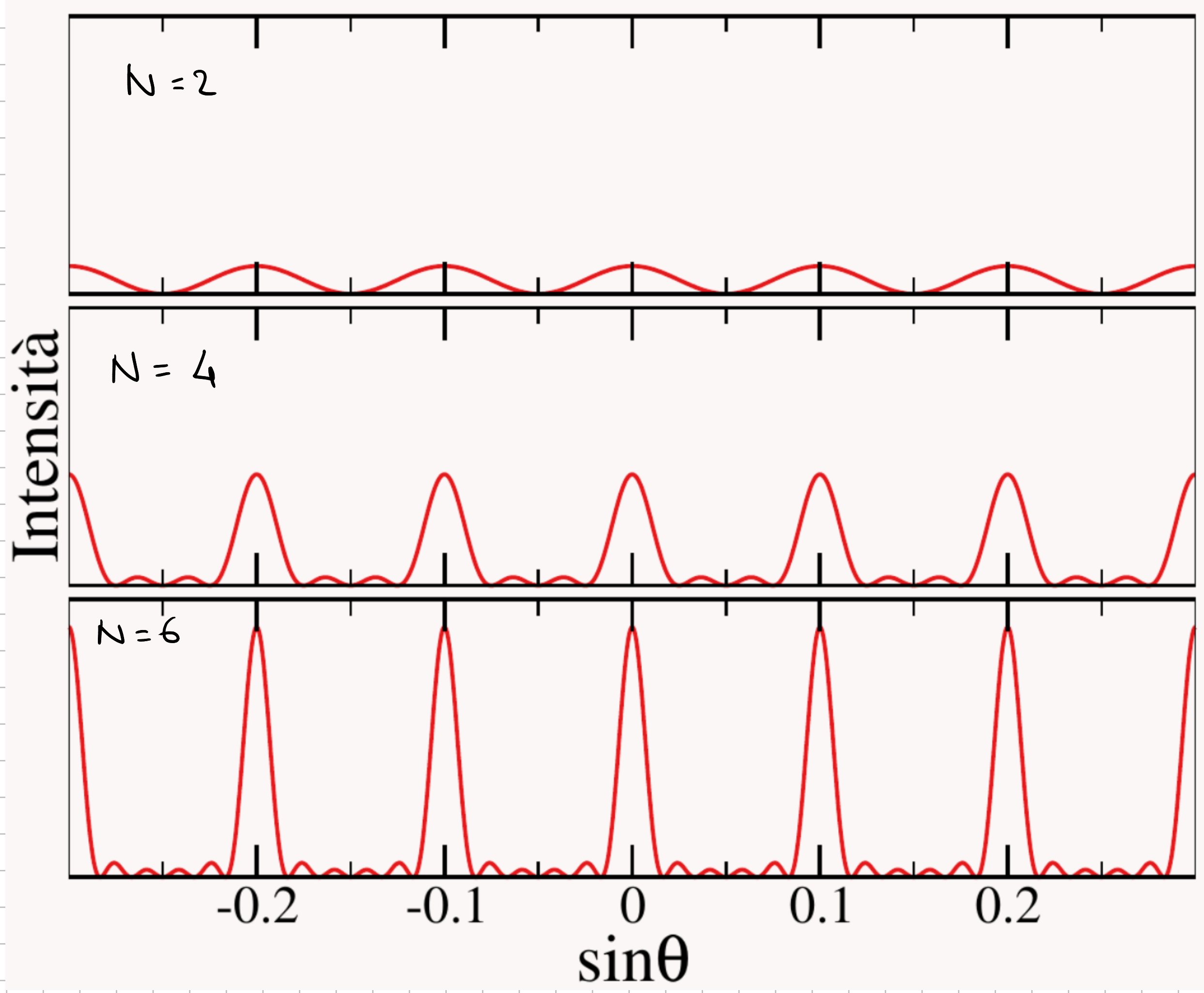
$$I(\theta) = I_0 \left[\frac{\sin\left(\frac{\pi N d}{\lambda}\sin\theta\right)}{\sin\left(\frac{\pi d}{\lambda}\sin\theta\right)} \right]^2$$

$$I(\theta_{MAX}^{PRINC.}) \propto N^2$$

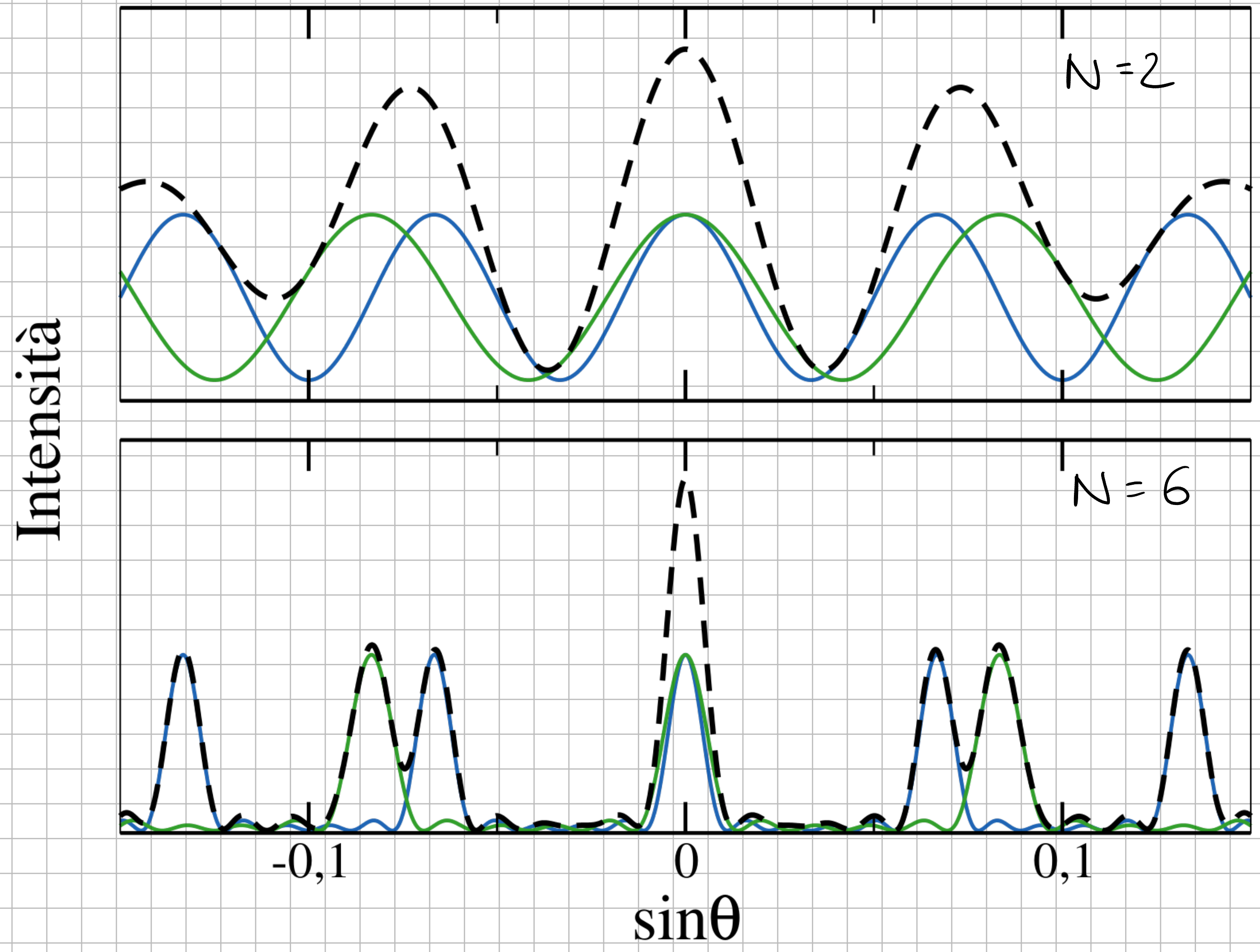
\# di MASSIMI SECONDARI : $N-2$

$\Delta\theta$ distanza tra massimi e minimi adiacenti:

$$\Delta\theta = \pm \frac{\lambda}{Nd}$$



EFFETTI CROMATICI



$$I(\theta) = I_0 \left[\frac{\sin\left(\frac{\pi N d}{\lambda} \sin\theta\right)}{\sin\left(\frac{\pi d}{\lambda} \sin\theta\right)} \right]^2$$, massimi principali quando

$$\frac{\pi d}{\lambda} \sin\theta = \pi m \Rightarrow \sin\theta_{MAX}^{PRINC} = \frac{\lambda}{d} m$$

- distanza tra due massimi $\Delta(\sin\theta) = \frac{\lambda}{d} \simeq \frac{\Delta x}{L} \Rightarrow d = \frac{\lambda L}{\Delta x}$

$$d = \frac{6.5 \cdot 10^{-7} m \cdot 1.9 m}{0.15 m} = \frac{6.5 \cdot 1.9}{1.5 \cdot 10^{-1}} \cdot 10^{-7} m \simeq 8.2\overline{3} \cdot 10^{-6} m = 8.2\overline{3}\,\mu m$$

$$d_{TEORICO} = 8.\overline{3}\,\mu m$$