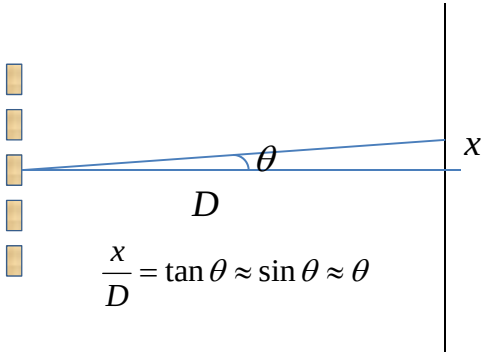
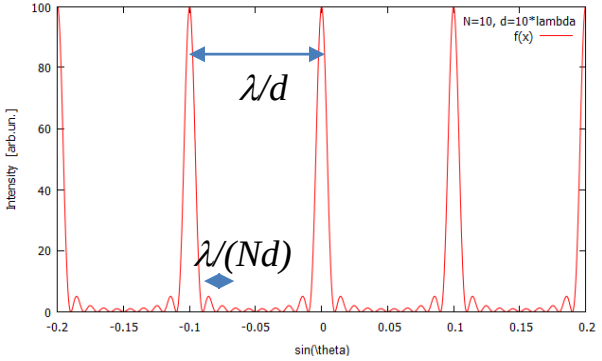
CONTI CON GNUPLOT SU INTERFERENZA MULTIPLA

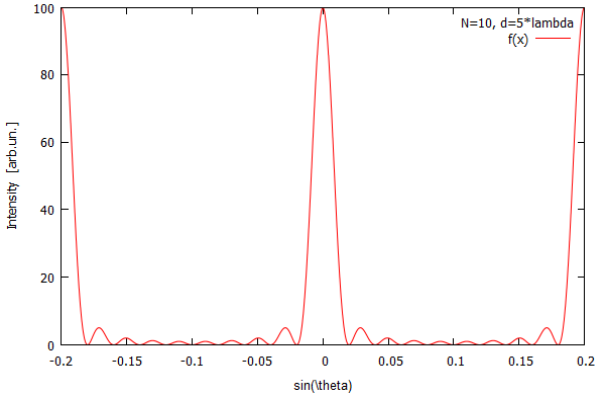
- N sorgenti (secondarie) che emettono in fase
- d distanza fra le sorgenti (puntiformi)

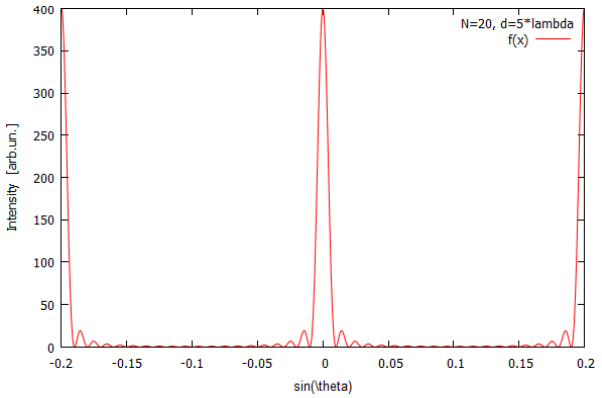
$$I(\theta) \propto \frac{\sin^2(N\gamma)}{\sin^2(\gamma)}$$

$$\gamma = \frac{\pi d}{\lambda}\sin\theta$$









- Diminuendo d le frange si separano
- Aumentando N le frange si "stringono" (e i "ripples" si attenuano)

In un reticolo di diffrazione *N* dipende dalla densità di linee

FENDITURA

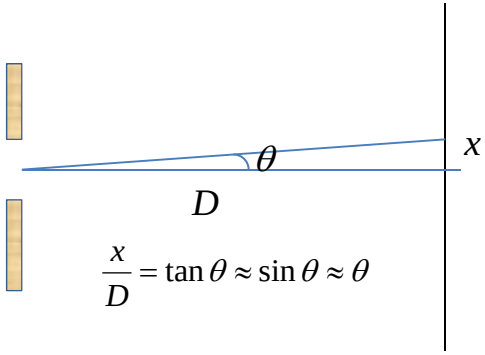
Limite per $N \rightarrow \infty$, $d \rightarrow 0$

$Nd \rightarrow a$

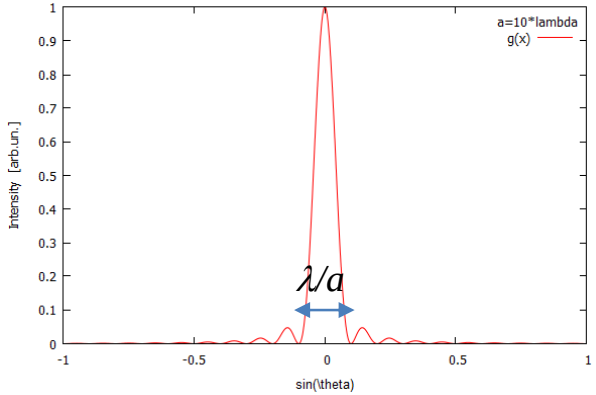
(a : dimensione trasversale dell'apertura)

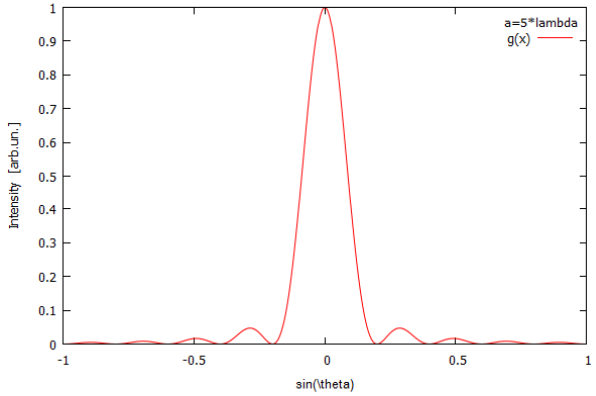
$$I(\theta) \propto \frac{\sin^2(\beta)}{\beta^2}$$

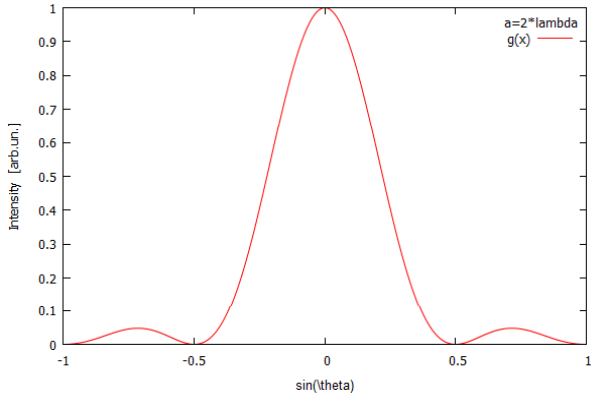
$$\beta = \frac{\pi a}{\lambda} \sin\theta$$



- La "larghezza" del cono di diffrazione è ~ λ/a
- La frangia principale porta la gran parte dell'intensità
- La distanza tra minimi (o massimi) contigui è λ/a





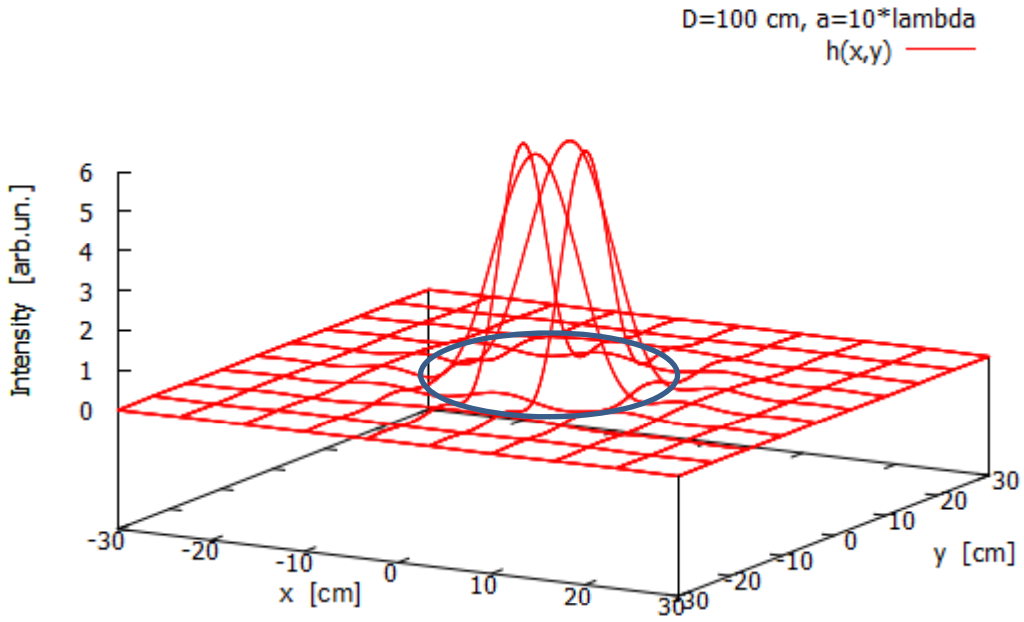


PIN-HOLE

J_1 : funzione di Bessel del primo ordine

$$I(\theta) \propto \frac{J_1^2(\beta)}{\beta^2}$$

$$\beta = \frac{\pi a}{\lambda} \sin\theta$$



Prima frangia scura (primo zero f.ne Bessel): $\beta \sim 1.22$

Diametro frangia scura:

$$\beta = \frac{a}{\lambda} \sin\theta \approx 1.22$$

$$\sin\theta \approx \tan\theta = \frac{x_{\text{primo min}}}{D}$$

$$\text{diametro} = 2\, x_{\text{primo min}} \approx 1.22 \frac{2\lambda D}{a}$$