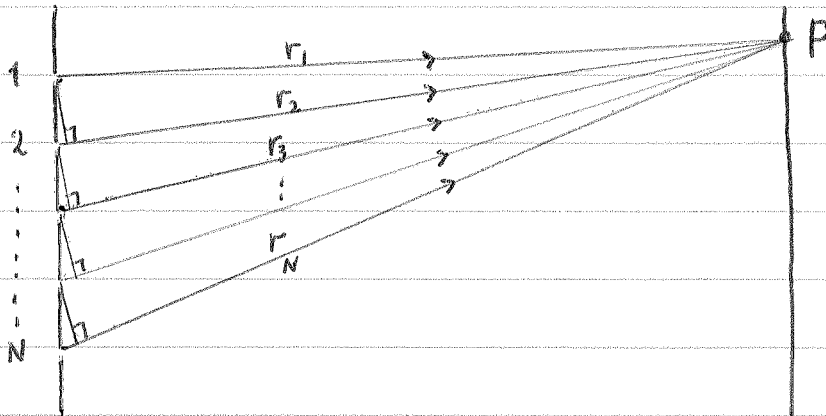


Mange spalter : Diffraksjonsgitter

(LHL 30.4)

 $(N=5)$

$$r_2 - r_1 \approx r_3 - r_2 \approx \dots \approx r_N - r_{N-1} \approx d \sin \theta$$

små veilengdeforskjeller $\Rightarrow$ antar like amplitude E_0 i P fra alle N spaltene

$$\Rightarrow E = E_1 + E_2 + \dots + E_N$$

$$= E_0 \sin(kr_1 - \omega t) + E_0 \sin(kr_1 + kd \sin \theta - \omega t) + \dots + E_0 \sin(kr_1 + (N-1)kd \sin \theta - \omega t)$$

$$= E_0 \sum_{j=0}^{N-1} \sin(kr_1 + jkd \sin \theta - \omega t) = E_0 \operatorname{Im} \sum_{j=0}^{N-1} e^{i(kr_1 + jkd \sin \theta - \omega t)}$$

$$= E_0 \frac{\sin\left(\frac{Nkd \sin \theta}{2}\right)}{\sin\left(\frac{kd \sin \theta}{2}\right)} \sin\left(kr_1 + \frac{(N-1)kd \sin \theta}{2} - \omega t\right)$$

$$\Rightarrow I = \underbrace{\frac{1}{2} E_0^2 c \epsilon_0}_{I_0} \left\{ \frac{\sin(Nkd \sin \theta / 2)}{\sin(kd \sin \theta / 2)} \right\}^2$$

(fra en spalte)