

Föreläsning 11

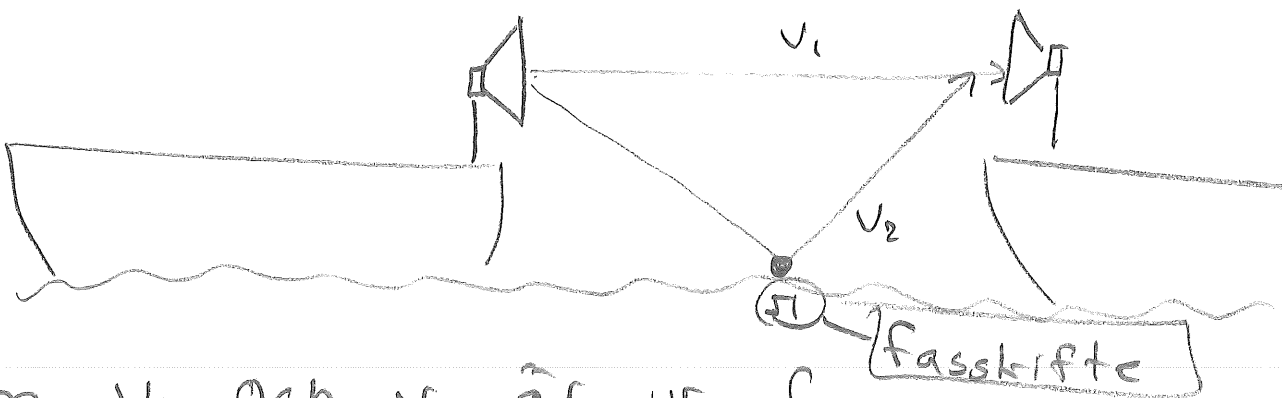
Du måste kunna skillnaden på
Diffraction & Interferens!

ljusets böjning vid hinder
addition av vågor

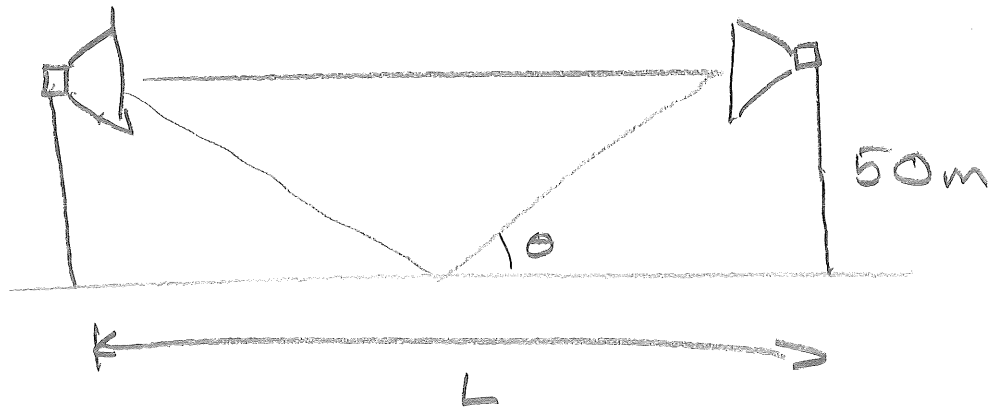
Michelsons interferometer är Amplituddelande!

↳ GOOGLA.

Diffraction



Om v_2 och v_1 är ur fas
så kommer de att släcka
ut varandra

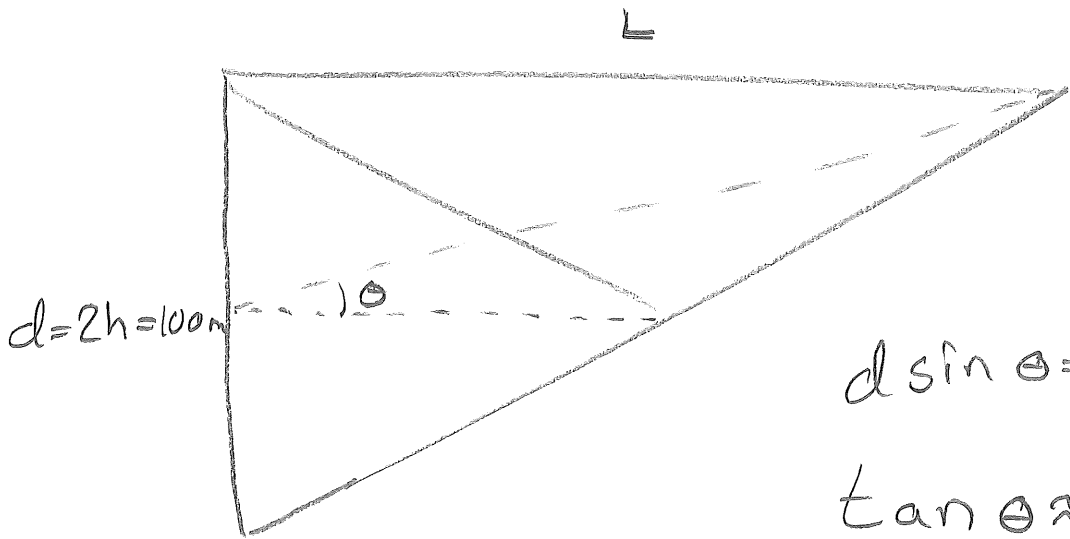


$$h = 50\text{m}$$

$$f = 75\text{MHz}$$

$$L > 0,5\text{km}$$

* fasskifte $\Rightarrow d \sin \theta = m \lambda$ ger destr. intf.



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

$$\tan \theta \approx \sin \theta$$

$$\tan \theta = \frac{h}{L} = \frac{d}{2L}$$

$$\tan \theta = \sin \theta = \frac{m \lambda}{d} = \frac{d}{2L}$$

$$\Rightarrow L = d^2 \cdot \frac{1}{2m\lambda} = \boxed{d^2 \cdot \frac{f}{2mc}}$$

Flera spalter (4st)

① Huvudmax alla bidrag i fas

$$\delta = m\lambda$$

$$A_p = NA^{(4)}$$

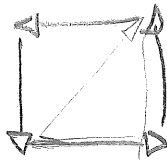


② Det kan finnas två minima. N-1 minima

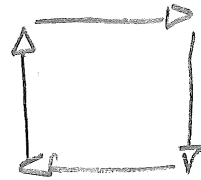
3st



$$\alpha = \pi$$



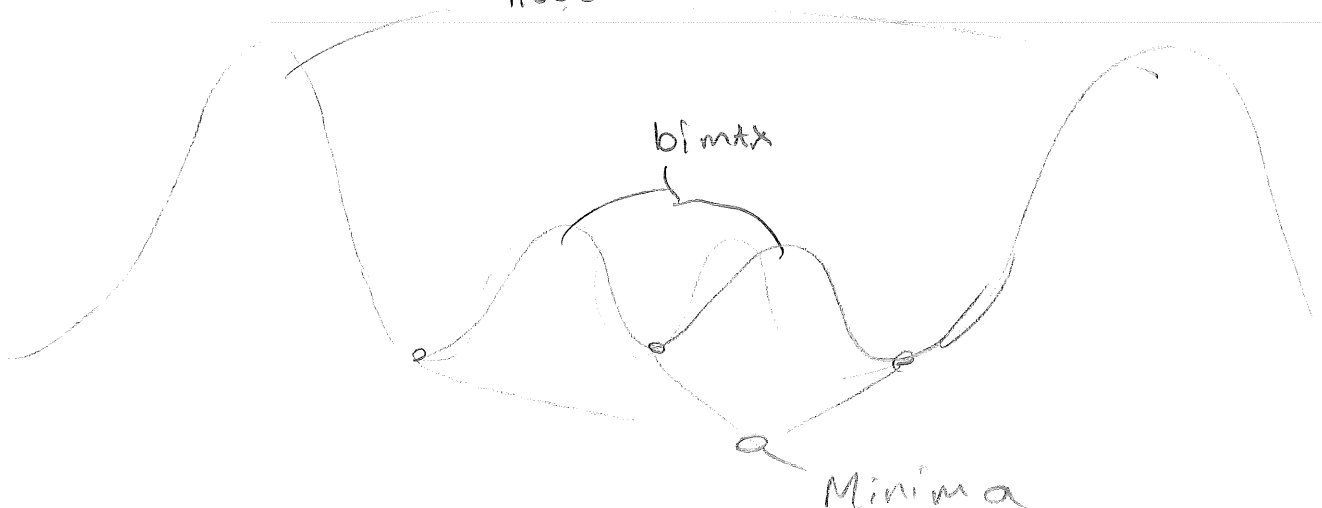
$$\alpha = \frac{\pi}{2}$$



$$\alpha = \frac{3\pi}{2}$$

③ Det finns ~~en~~ N-2 lokala max (bimax)

Huvudmax



Uppgift



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

$$, d = \frac{\lambda}{2}$$

$$\sin \theta = 2m?$$

Här tappade han bort sig

Intensiteten = Amplituden i kvadrat.

$$A_p = NA$$

$$I = N^2 I_0$$

Fler spalter ger högre och smalare

○ huvudmax.

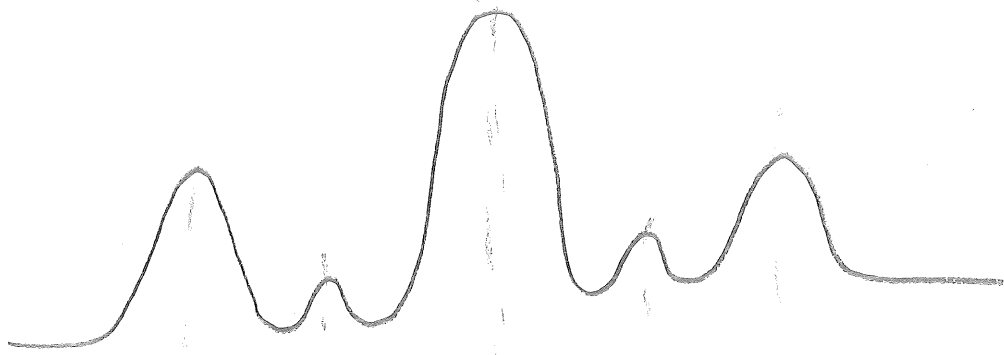
○ spalter $I = I_0 \left(\frac{\sin Nr}{\sin r} \right)^2$, $\gamma = \frac{\pi}{\lambda} d \sin \theta$

○ böjning $I = I_0 \left(\frac{\sin \beta}{\beta} \right)^2$

$$I = I_0 \left(\frac{\sin \beta}{\beta} \right)^2 \cdot \left(\frac{\sin(Nr)}{\sin r} \right)^2 \quad \text{Totalt}$$

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Trippelspalt, intensitet ser ut så här:



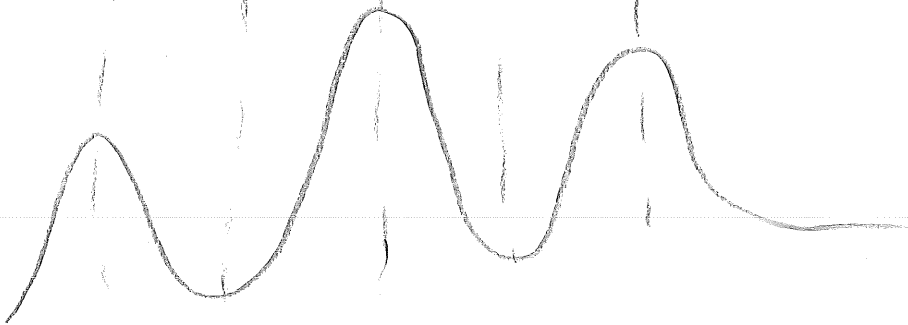
a) spalt 2 blockas

⇒



Handwritten scribble

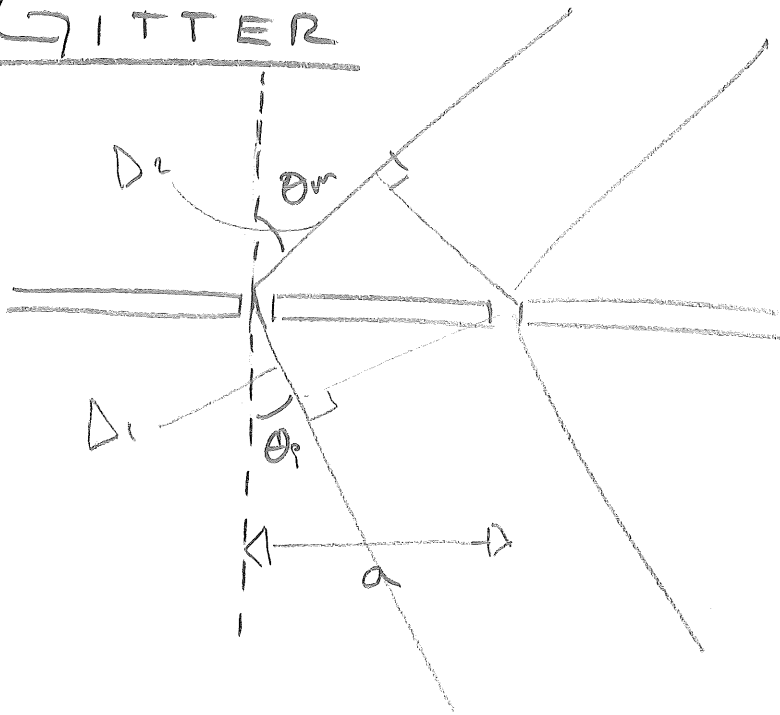
b) ~~3~~ 3 blockas



c) 1 och 2 blockas



GITTER



$$\Delta = \Delta_1 + \Delta_2 = a \sin \theta_i + a \sin \theta_m, \quad \Delta = m\lambda$$

$$\Rightarrow \boxed{a (\sin \theta_i + \sin \theta_m) = m\lambda}, \quad m = \pm 0, \pm 1, \pm 2 \dots$$

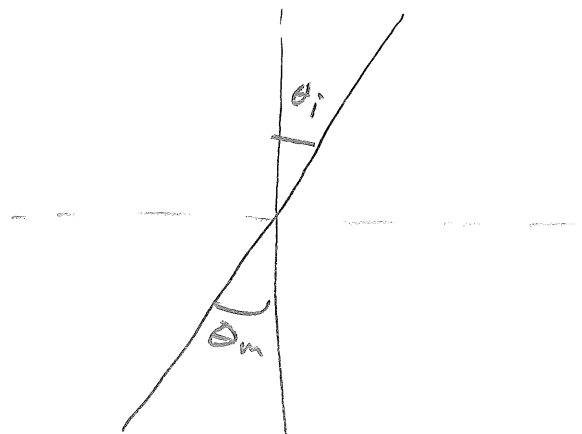
Nollte ordningen $m=0$

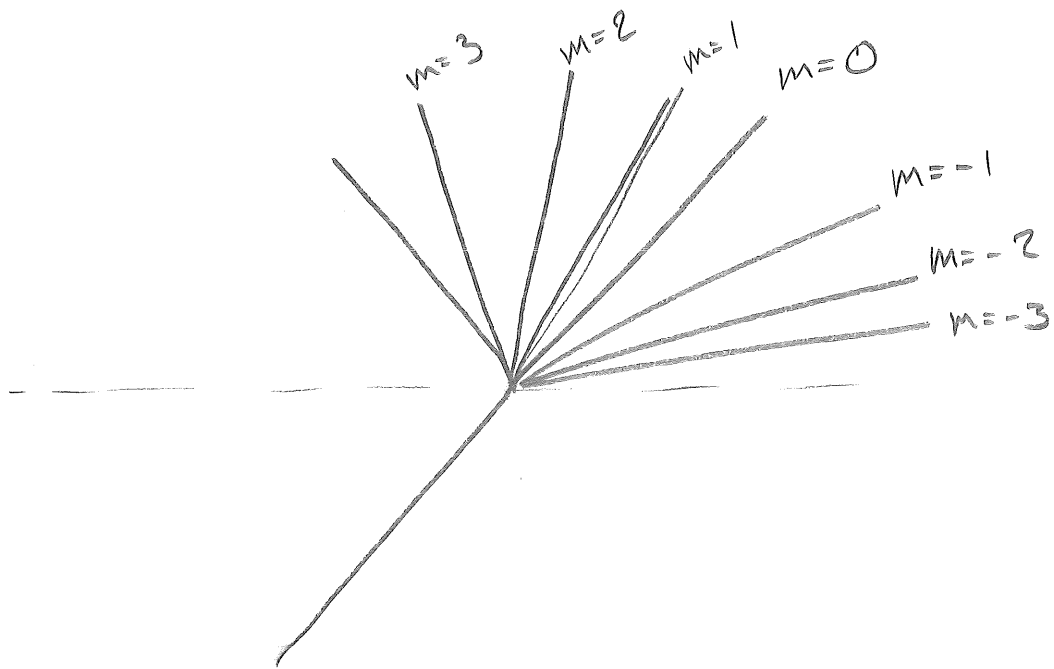
\Rightarrow oberoende av λ

refl-gitter



trans-gitter





Fritt spektralområde

