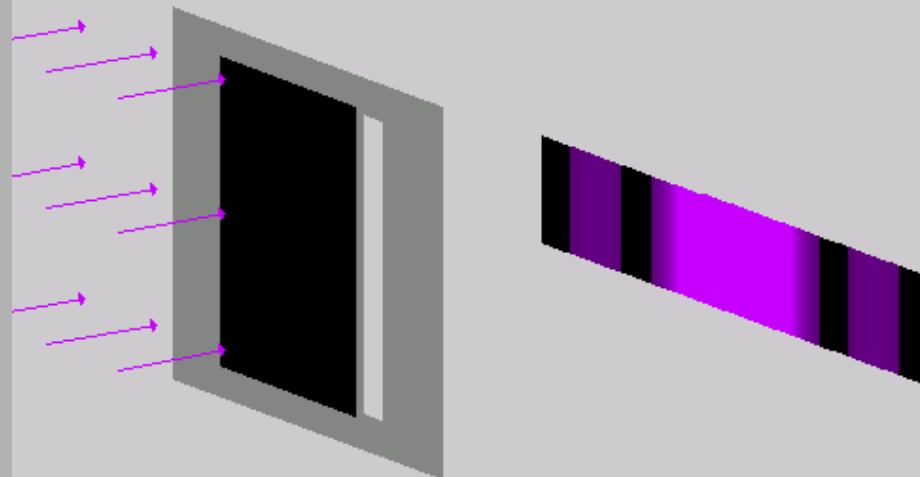




Beugung an Mehrfachspalten (Gittern) Animation

1 2 3 4 5 6

L'intensità del massimo centrale è: $9.66 \cdot I_0$
La larghezza del massimo centrale di diffrazione è: 11.83 mm

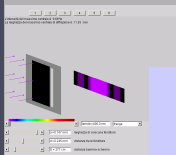


Color scale bar:

larghezza di ciascuna fenditura

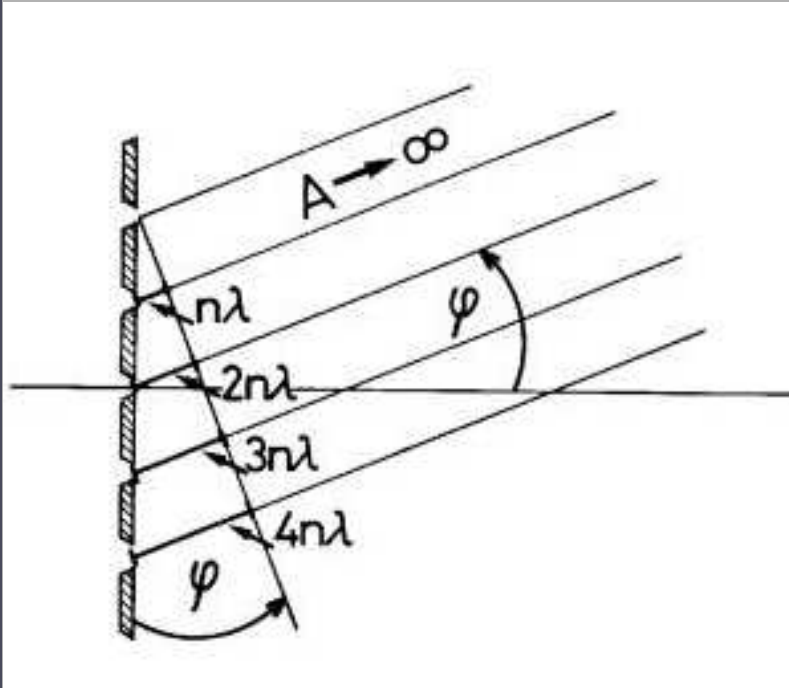
distanza tra le fenditure

distanza barriera-schermo





Beugung an Gittern



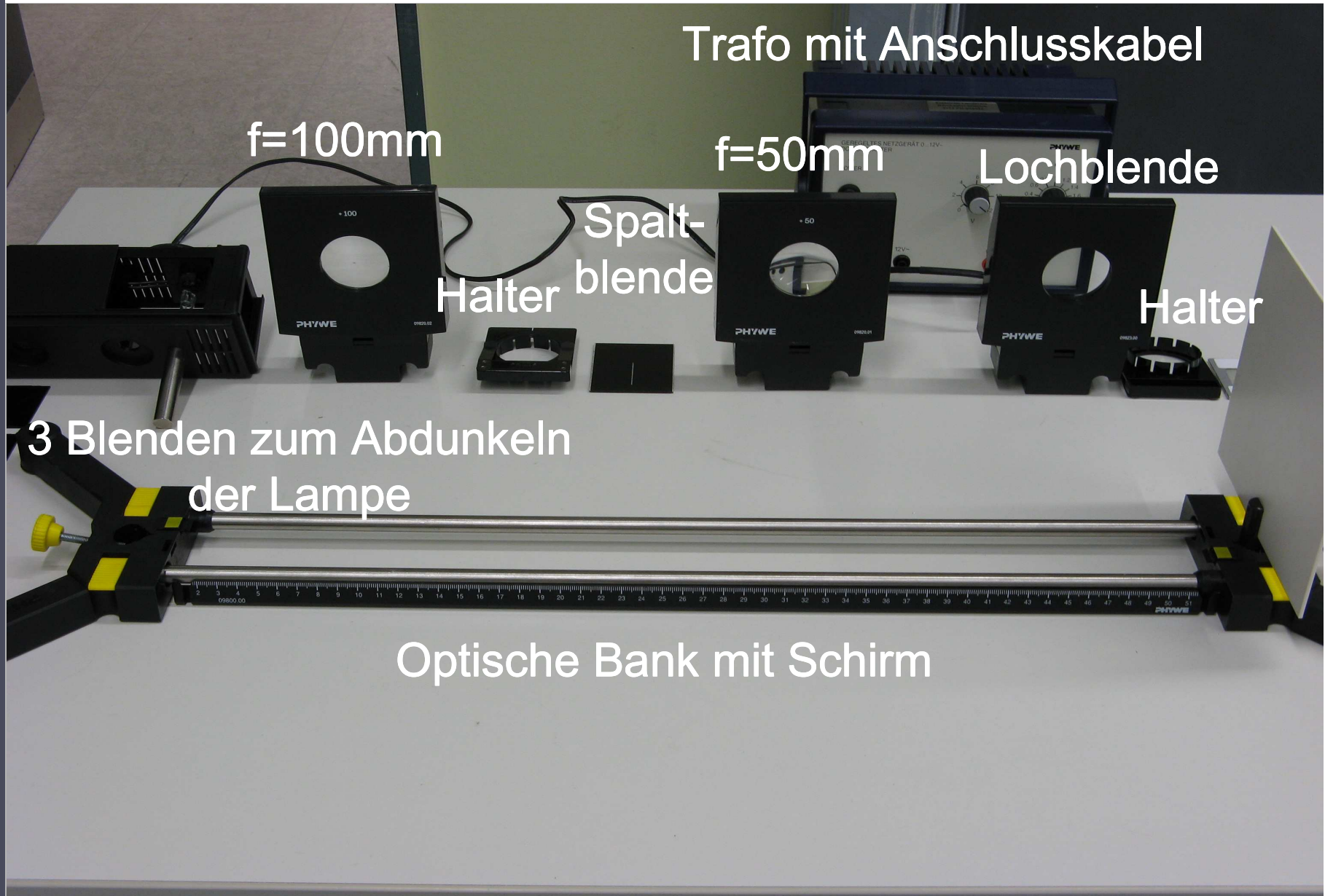
Maxima, wenn

$$\Delta = n \cdot \lambda$$

$$g \cdot \sin(\alpha) = n \cdot \lambda$$

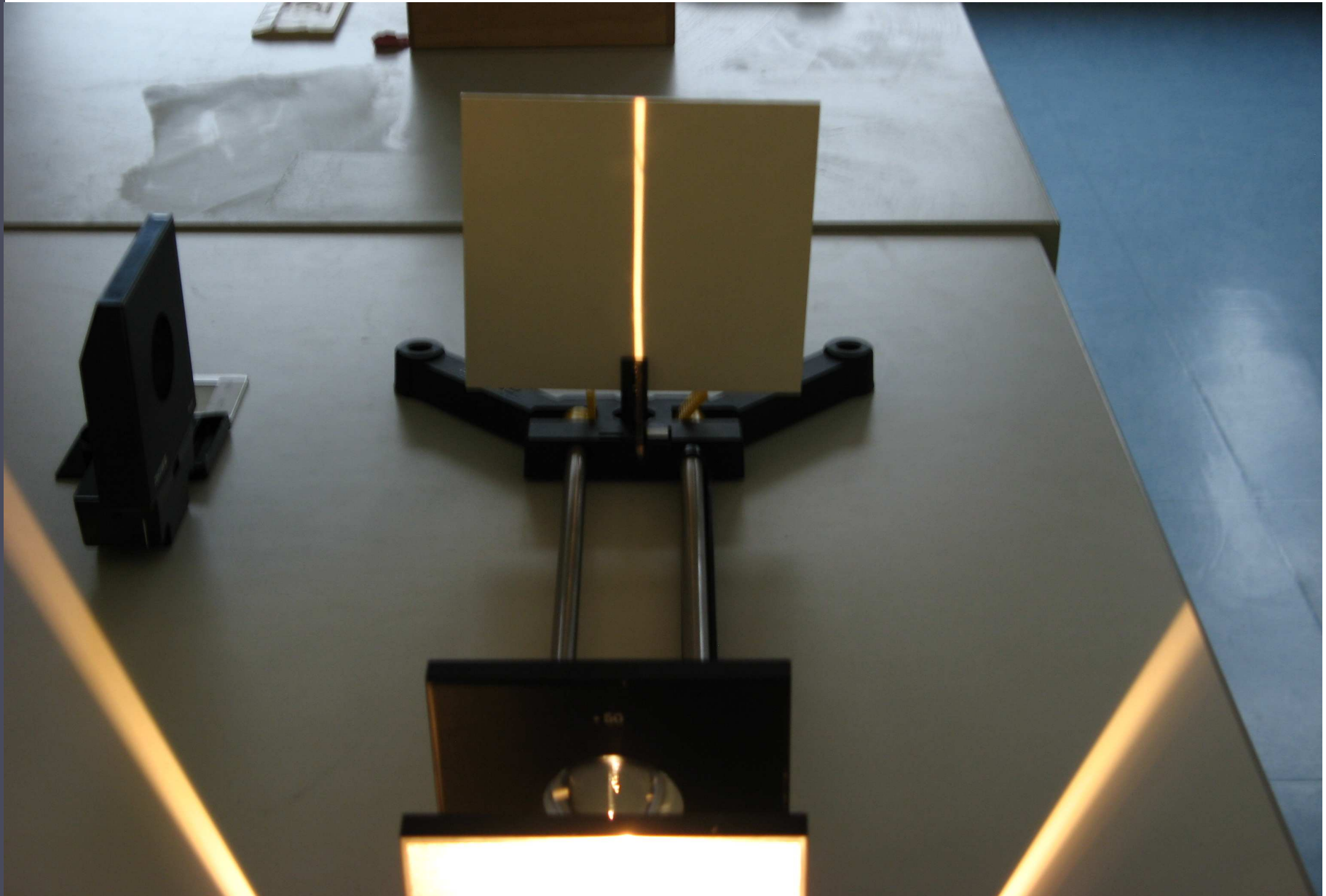


Beugung an Gittern -Schülerexperiment





Zuerst wird ein scharfes Bild des Spalts erzeugt





Beugung an einem Gitter 80/mm





Beugung an Gittern



Entfernung Gitter-Schirm: $a=0,3\text{m}$



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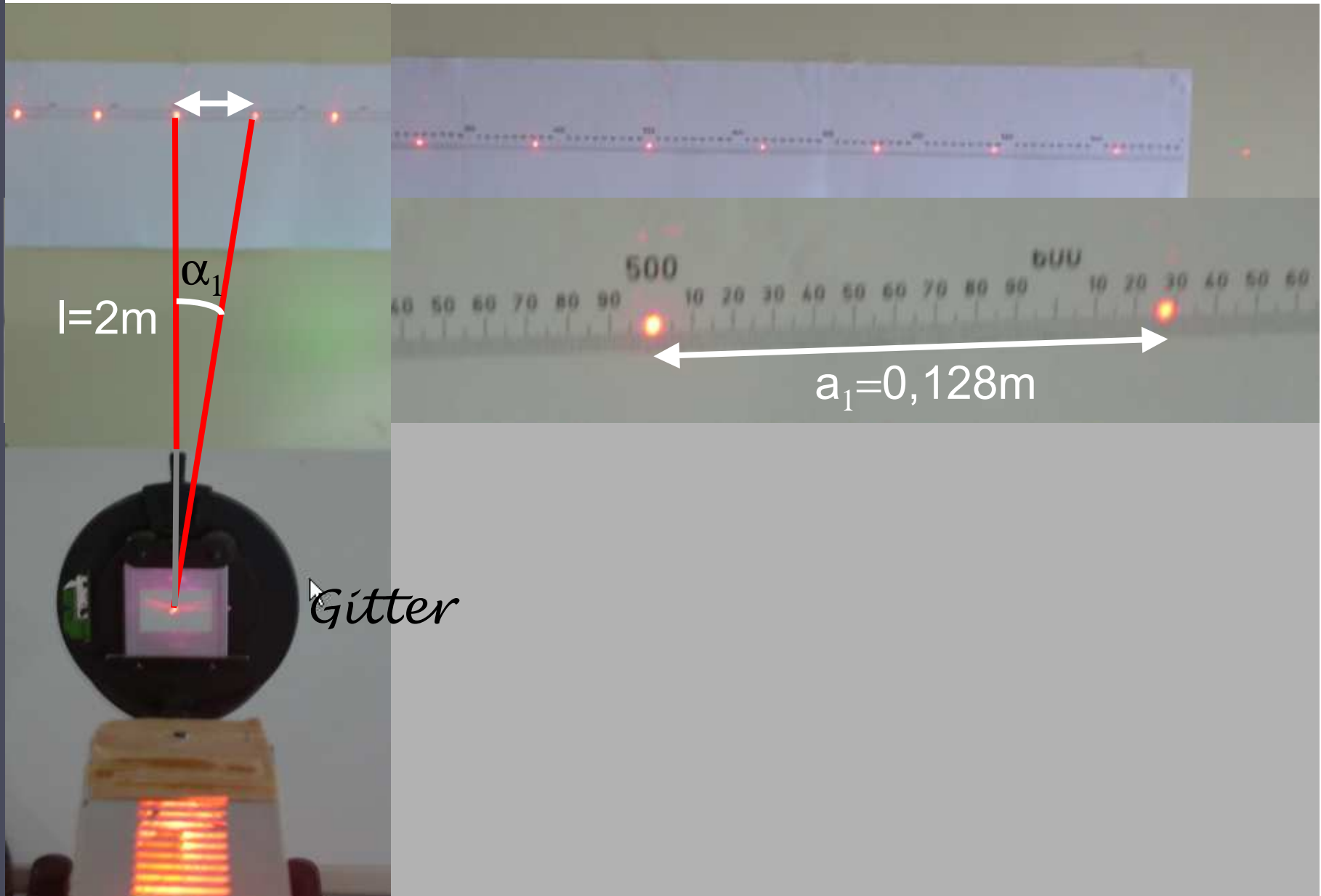
Fachlehrer : W. Zimmer



Beugung an Gittern



Beugung an Gittern



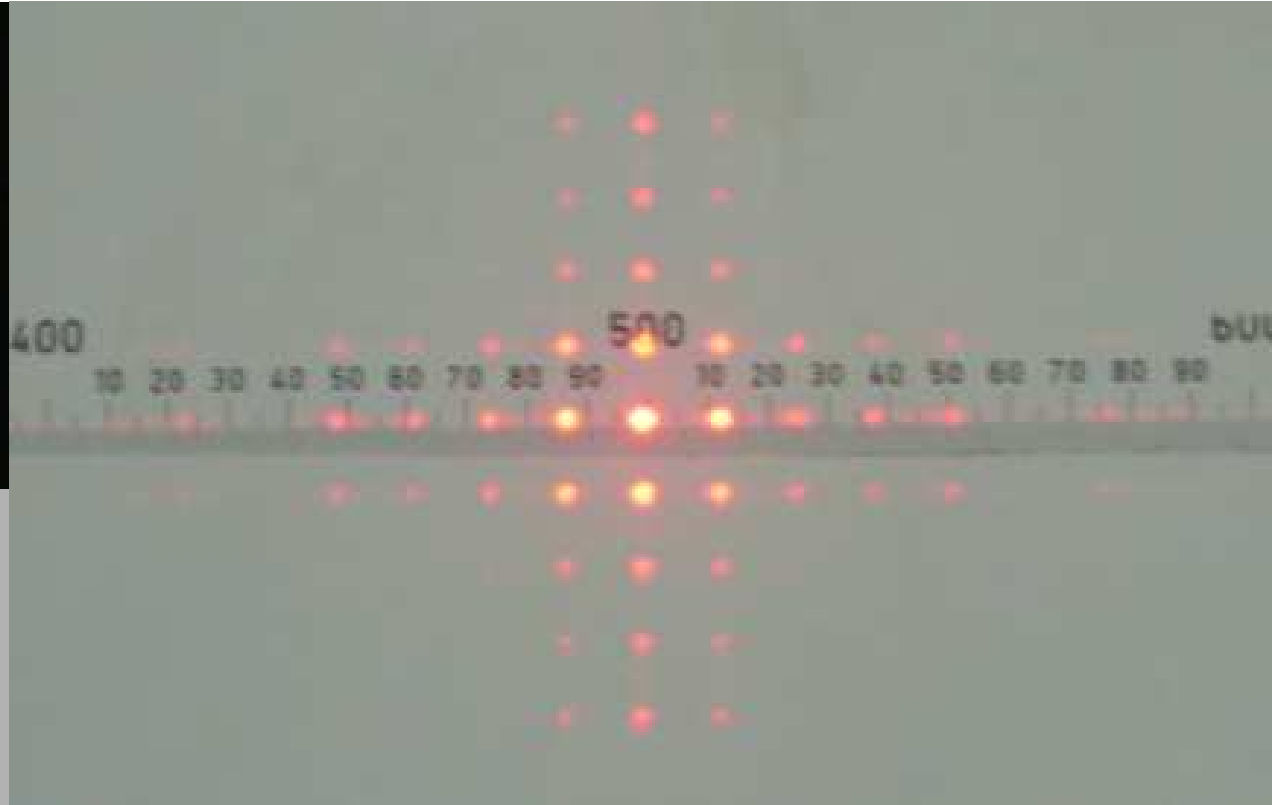
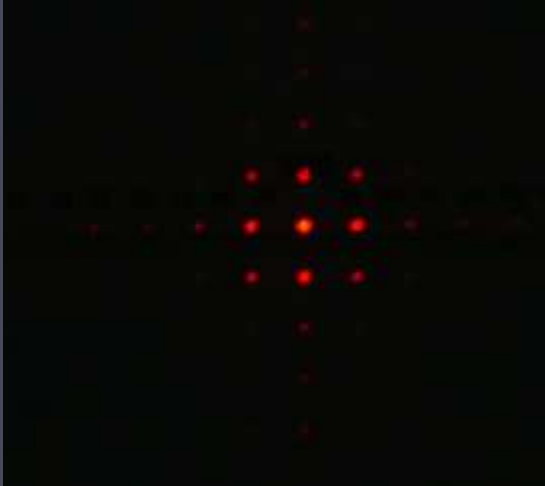


Beugung an Gittern



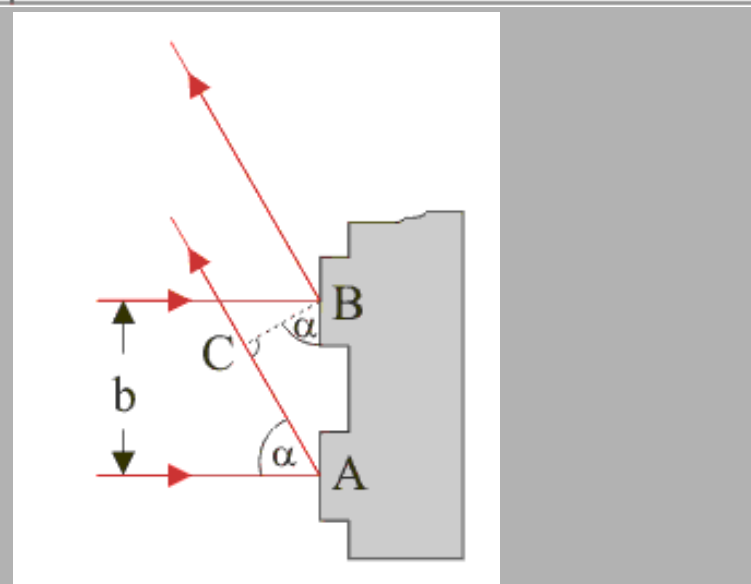
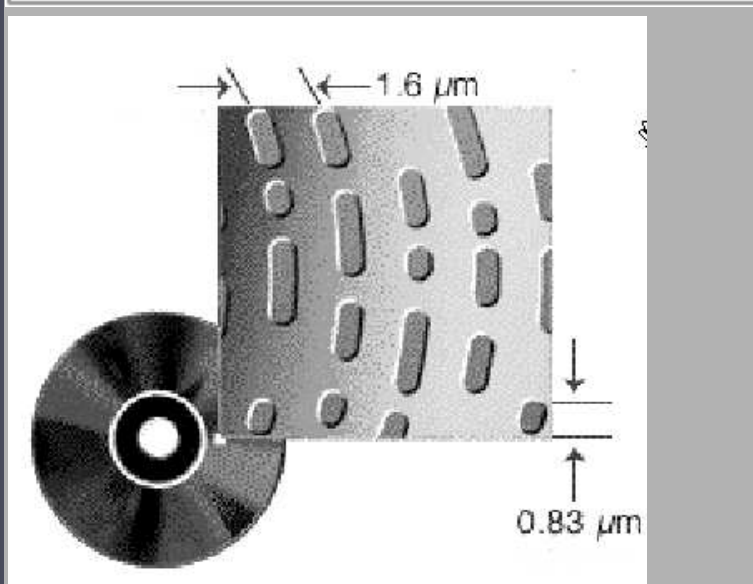
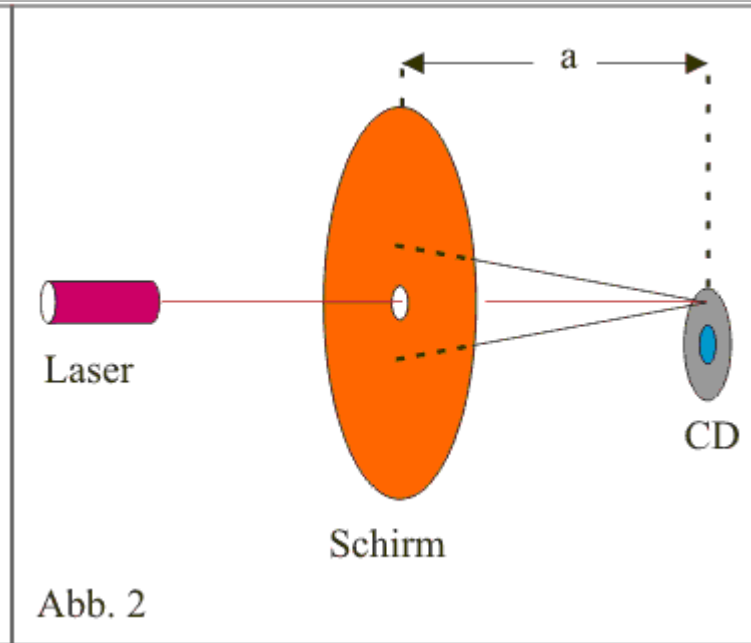
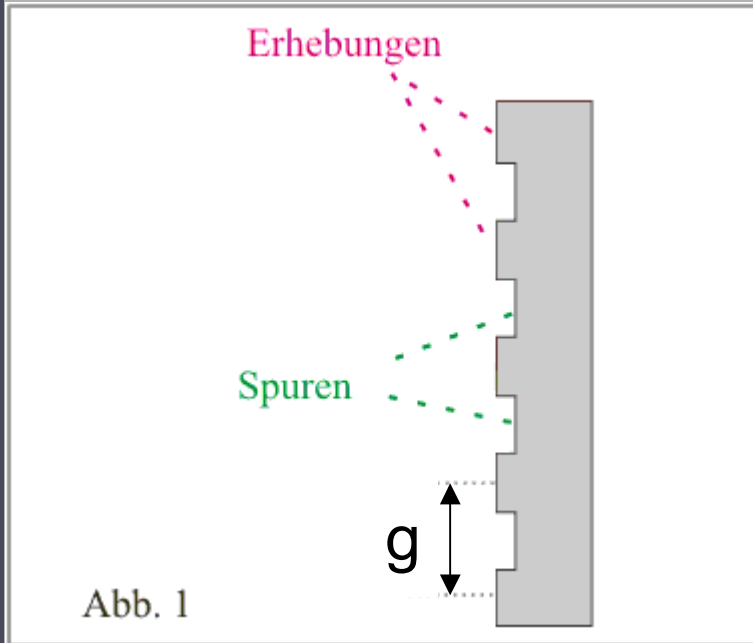


Beugung an Kruezgittern





Beugung an einer CD





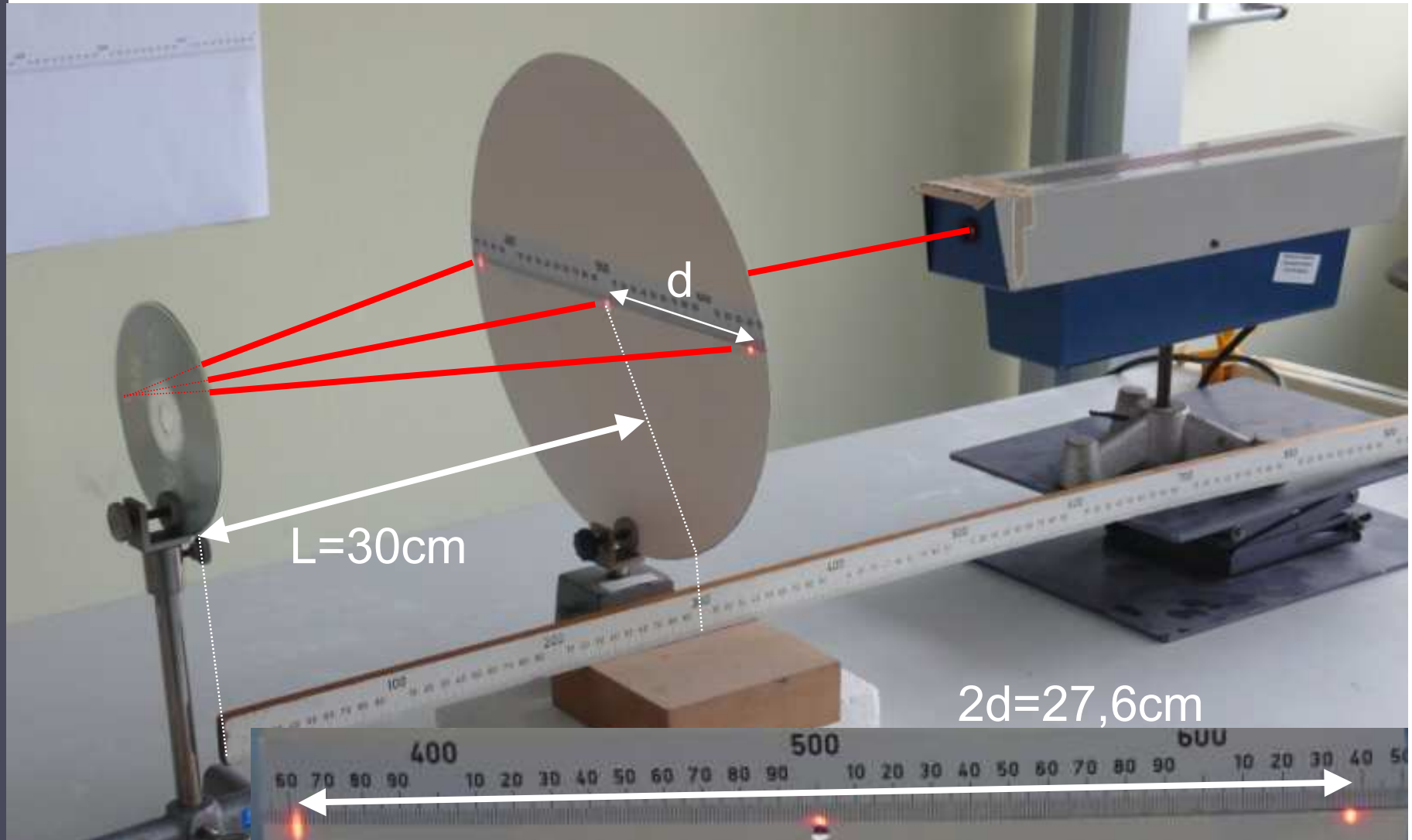
Beugung an einer DVD / CD



$$\sin \alpha_k = \frac{k\lambda}{d}$$



Beugung an einer CD-ROM (700MB)



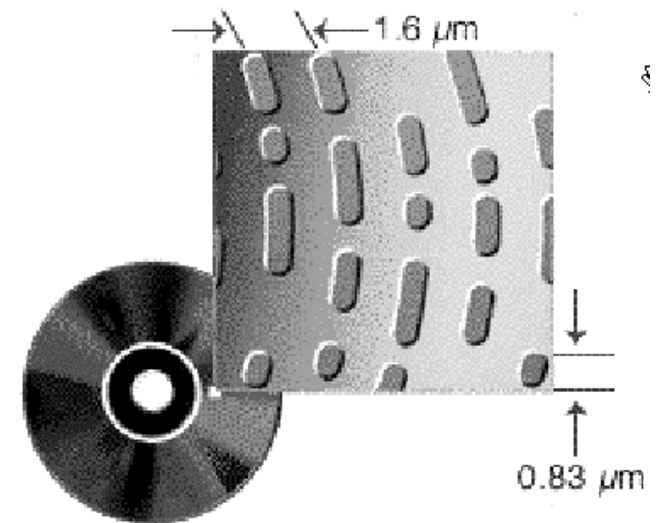


Gitterkonstante einer CD-ROM



$$\tan(\alpha_1) = \frac{0,138}{0,3} \Rightarrow \alpha_1 \approx 24,7^\circ$$

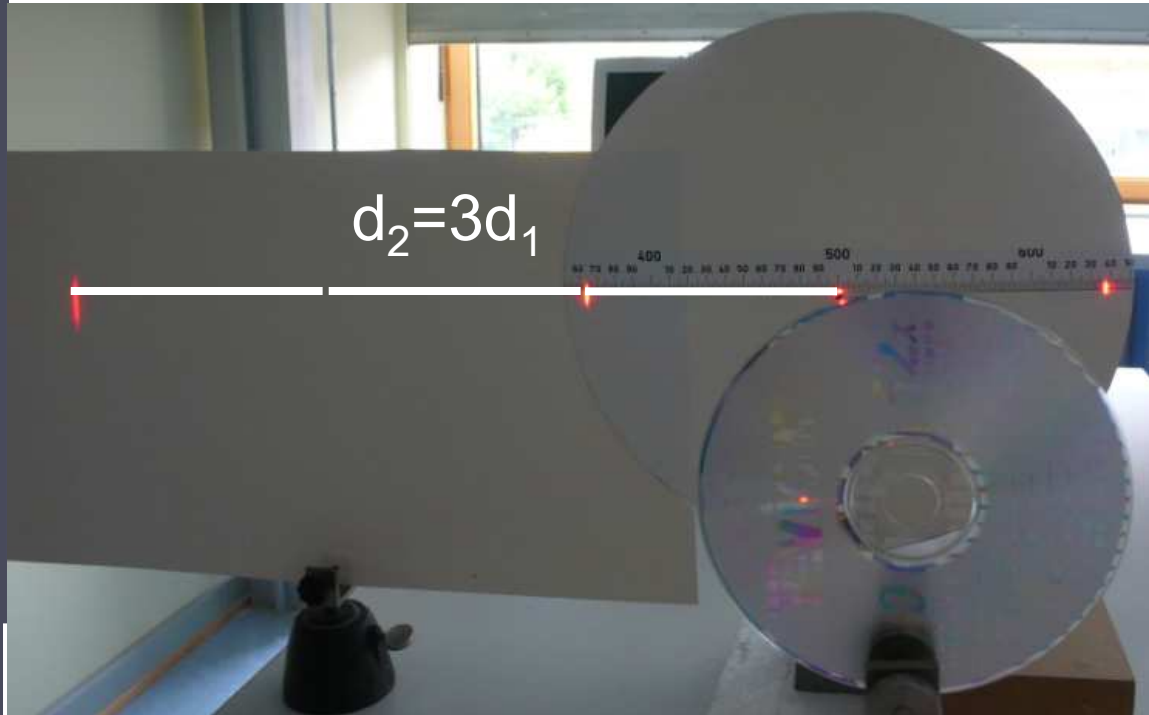
$$g = \frac{\lambda}{\sin(\alpha_1)} = \frac{630\text{nm}}{\sin(24,7^\circ)} \approx 1,6\mu\text{m}$$



α_1

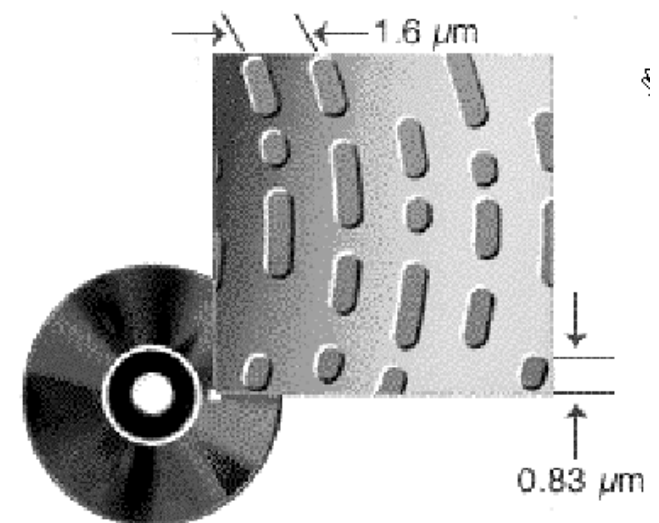


Gitterkonstante einer CD-ROM



$$\tan(\alpha_2) = \frac{0,415}{0,3} \Rightarrow \alpha_1 \approx 54,1^\circ$$

$$g = \frac{2\lambda}{\sin(\alpha_2)} = \frac{1260\text{nm}}{\sin(54,1^\circ)} \approx 1,6\mu\text{m}$$



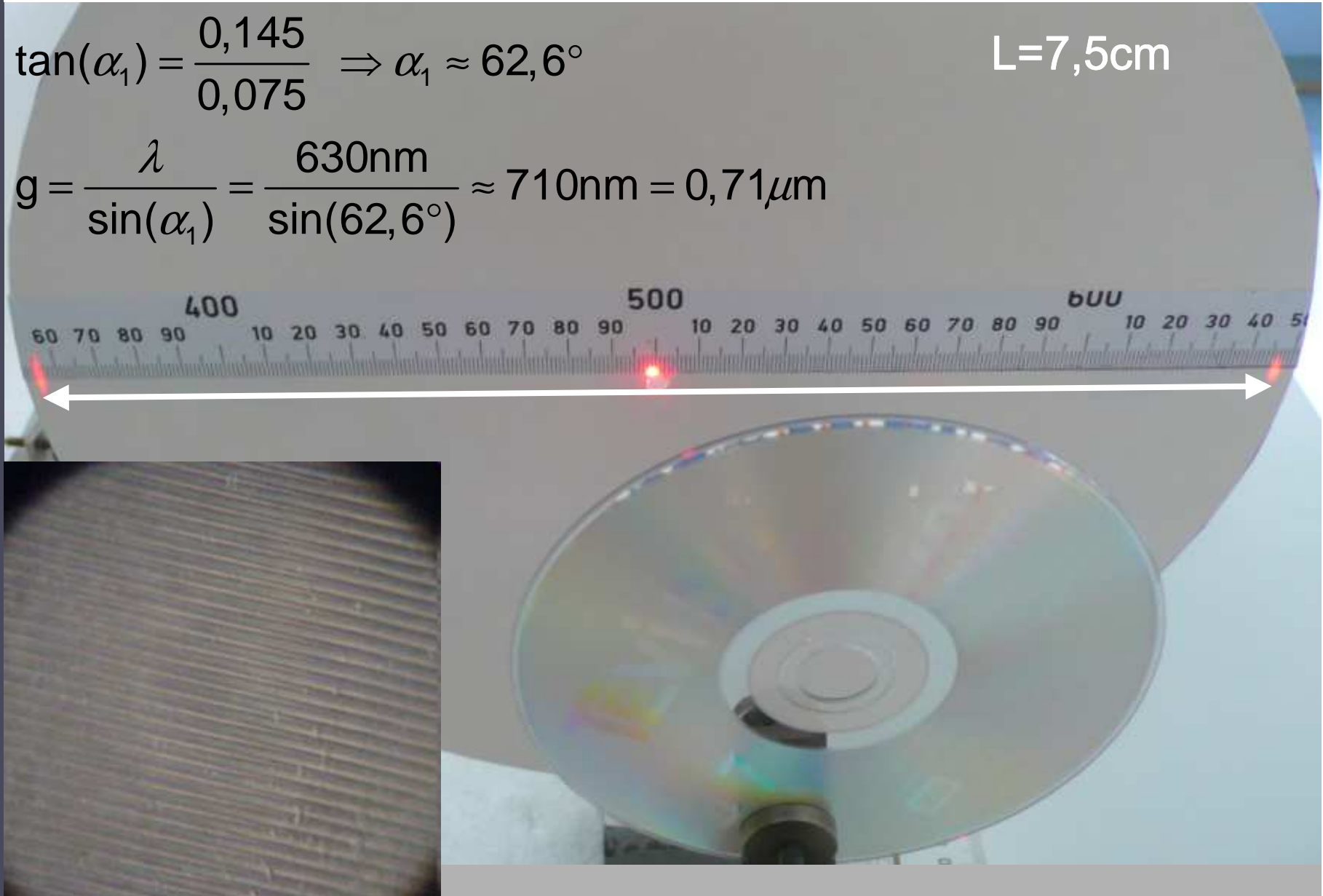


Gitterkonstante einer DVD(4,7GB)

$$\tan(\alpha_1) = \frac{0,145}{0,075} \Rightarrow \alpha_1 \approx 62,6^\circ$$

L=7,5cm

$$g = \frac{\lambda}{\sin(\alpha_1)} = \frac{630\text{nm}}{\sin(62,6^\circ)} \approx 710\text{nm} = 0,71\mu\text{m}$$





Spektrum von Quecksilber (Hg)



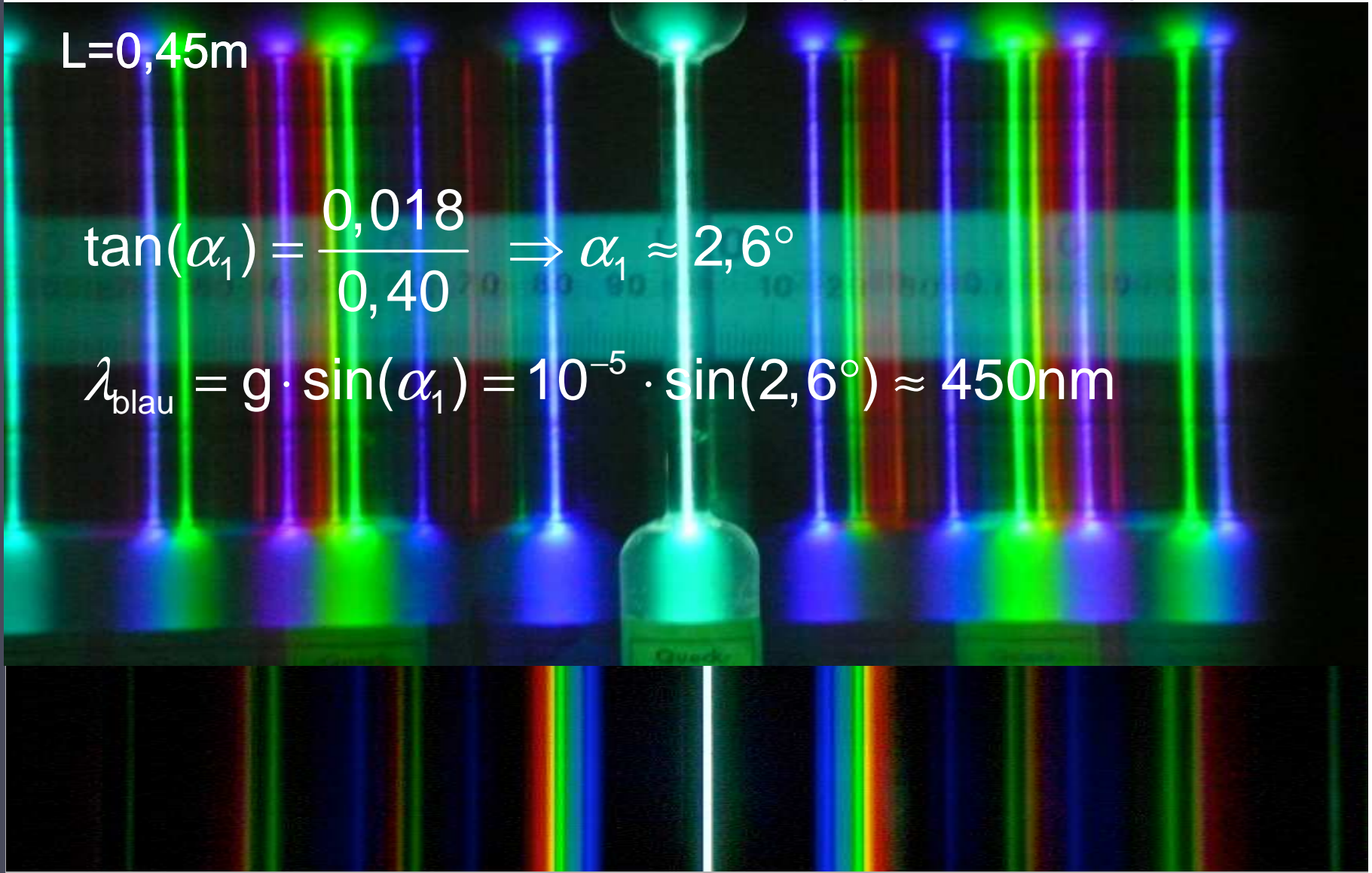


Spektrum von Quecksilber ($g=1/1000 \text{ cm}$)

$L=0,45\text{m}$

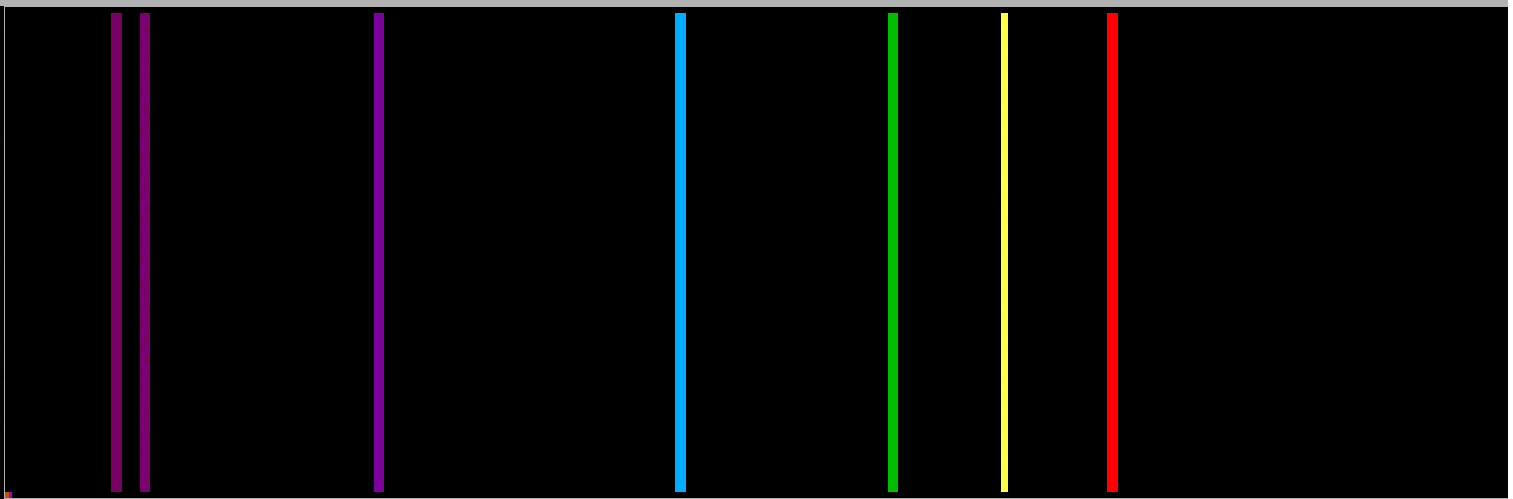
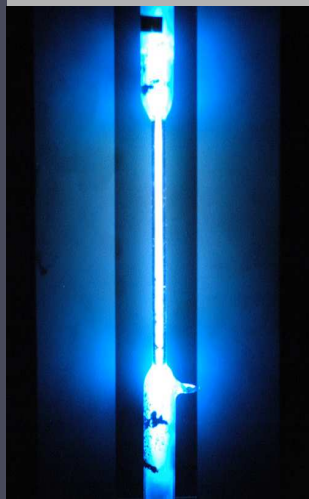
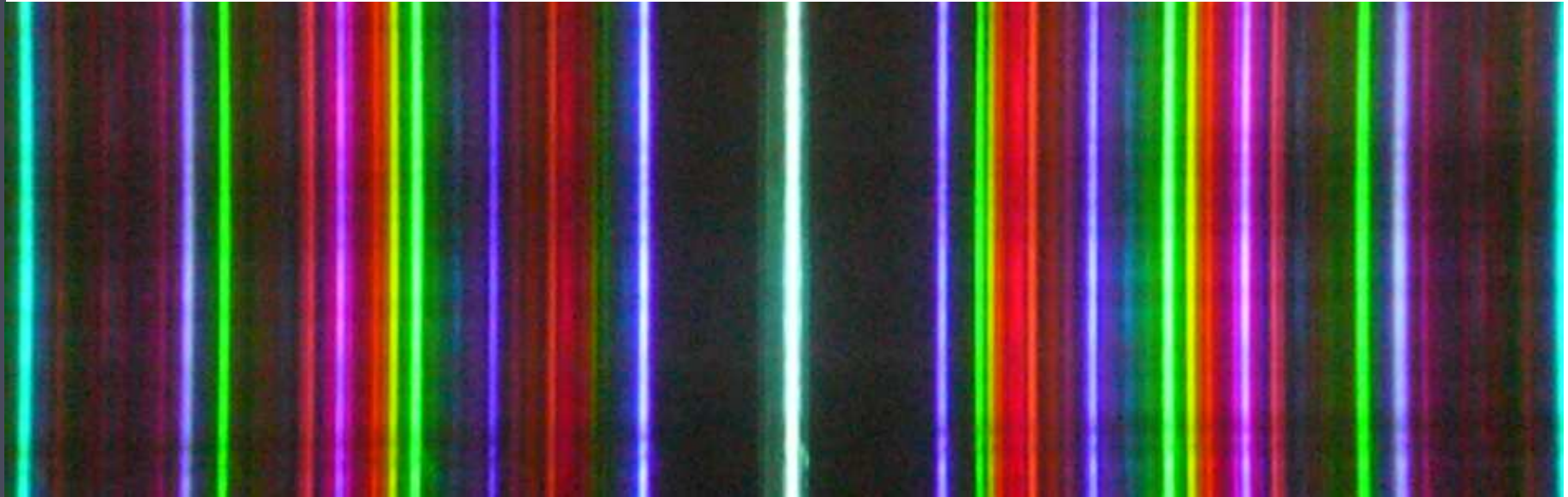
$$\tan(\alpha_1) = \frac{0,018}{0,40} \Rightarrow \alpha_1 \approx 2,6^\circ$$

$$\lambda_{\text{blau}} = g \cdot \sin(\alpha_1) = 10^{-5} \cdot \sin(2,6^\circ) \approx 450\text{nm}$$





Spektrum einer Hg-Lampe



405

436

495

546

577

697

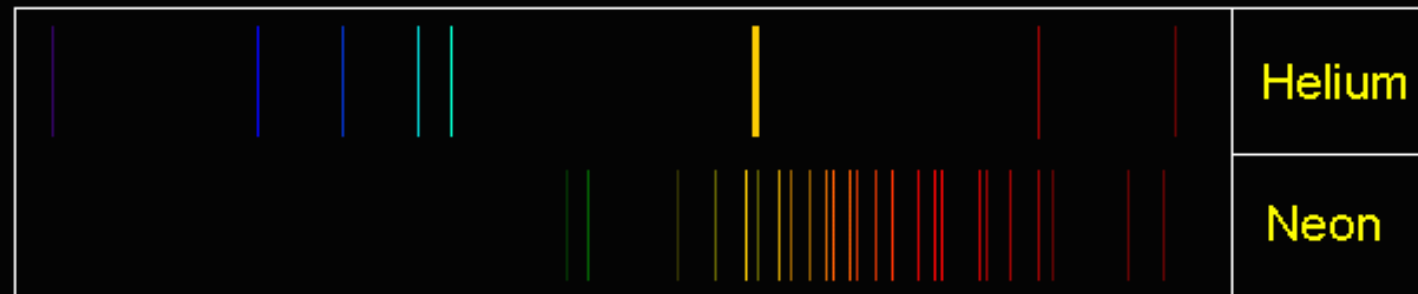


Spektrum von Neon (Gitter $g=1/1000$ cm)

$$L=0,85\text{m}$$

$$\tan(\alpha_1) = \frac{0,05}{0,85} \Rightarrow \alpha_1 \approx 3,4^\circ$$

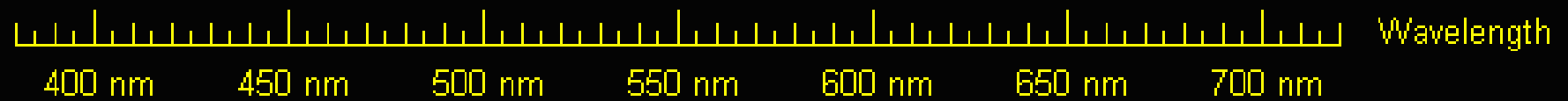
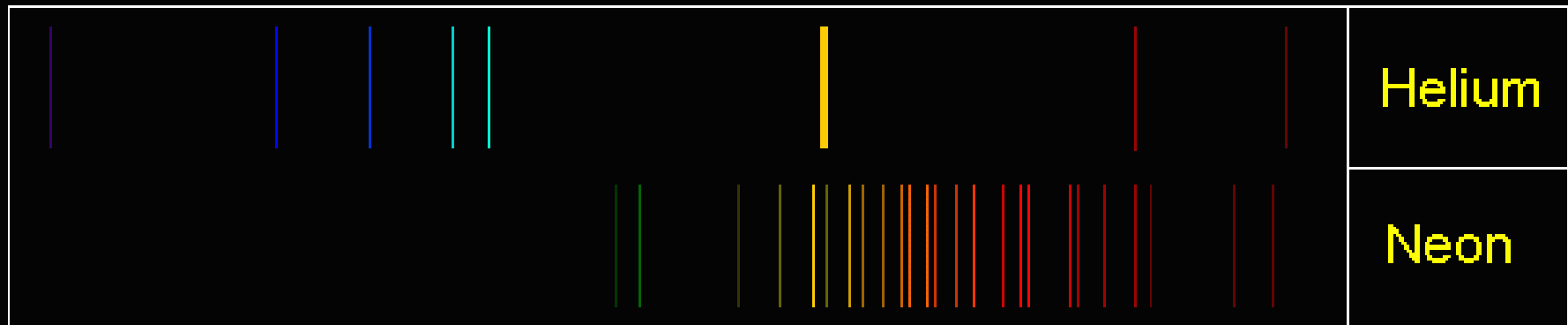
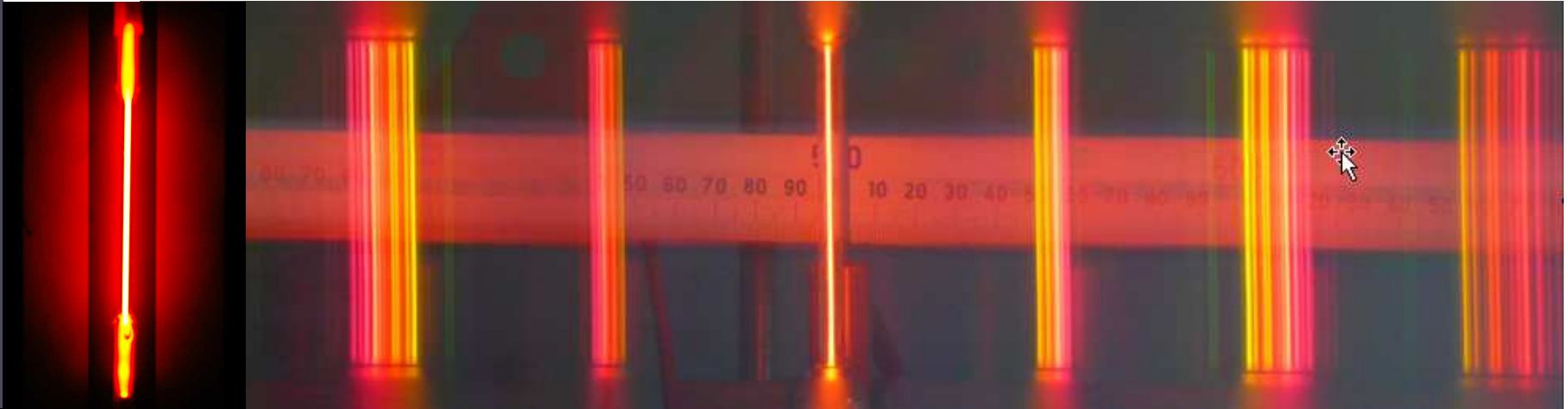
$$\lambda_{\text{gelb}} = g \cdot \sin(\alpha_1) = 10^{-5} \cdot \sin(3,4^\circ) \approx 590\text{nm}$$



Bright Line Spectra of Helium and Neon



Spektrum einer Ne-Lampe



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