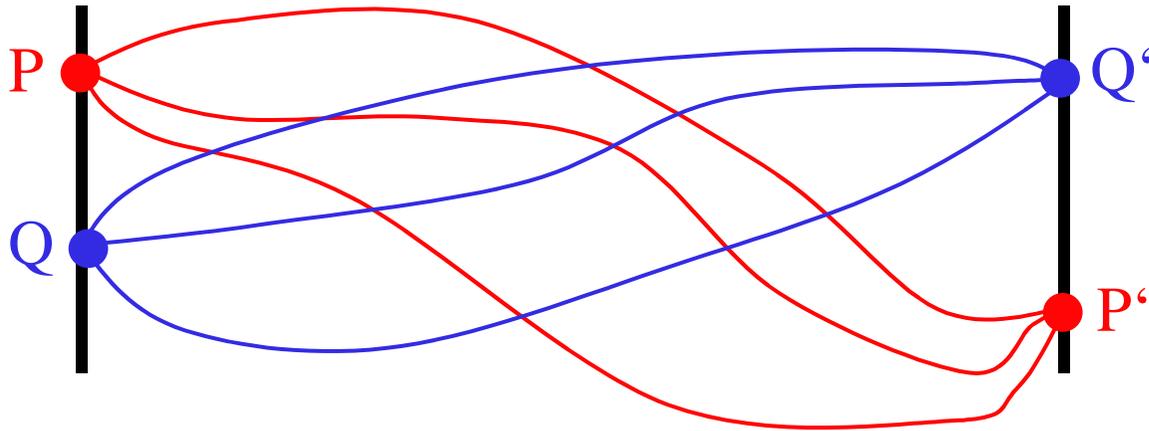


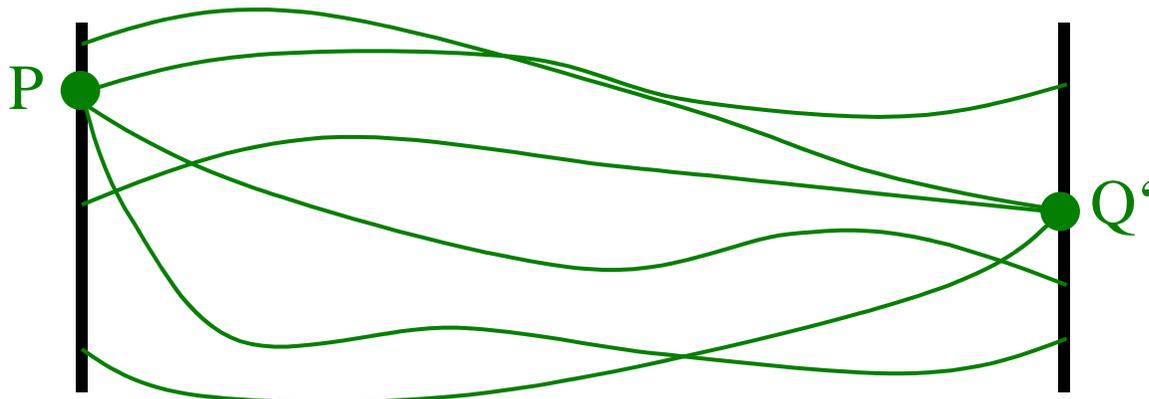
Nichtabbildende Optik



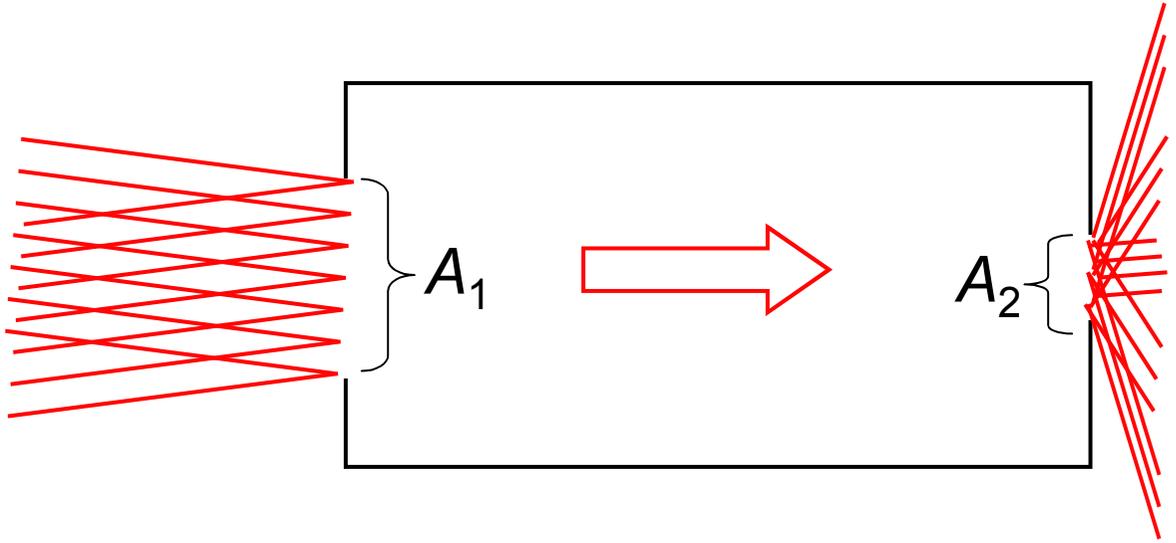
www.physikdidaktik.uni-karlsruhe.de



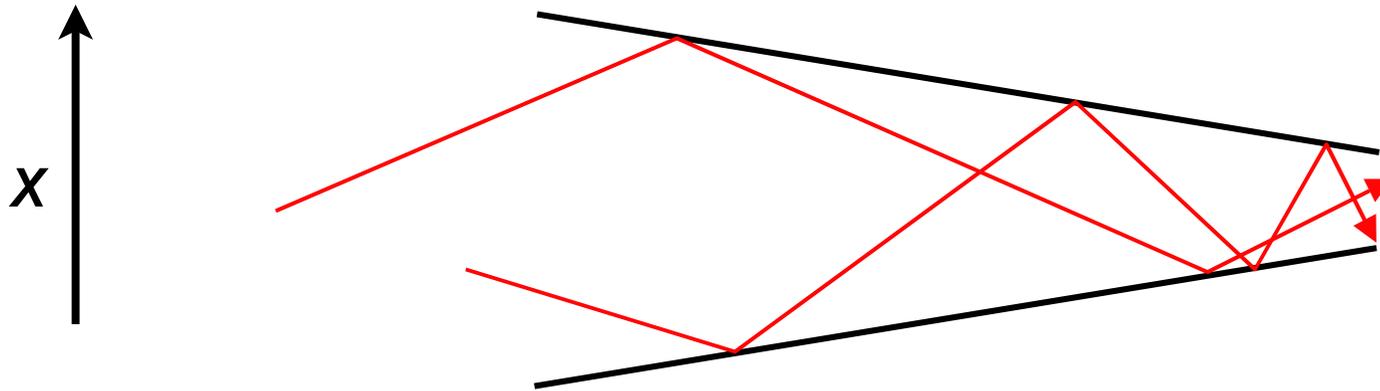
abbildende Optik: Punkt \rightarrow Punkt



nichtabbildende Optik: Fläche \rightarrow Fläche



$$c = \frac{A_1}{A_2}$$



$$\Delta x \cdot \Delta k_x = \text{const}$$

$$\Delta y \cdot \Delta k_y = \text{const}$$

$$\sin \alpha_x = \frac{\Delta k_x}{k}$$

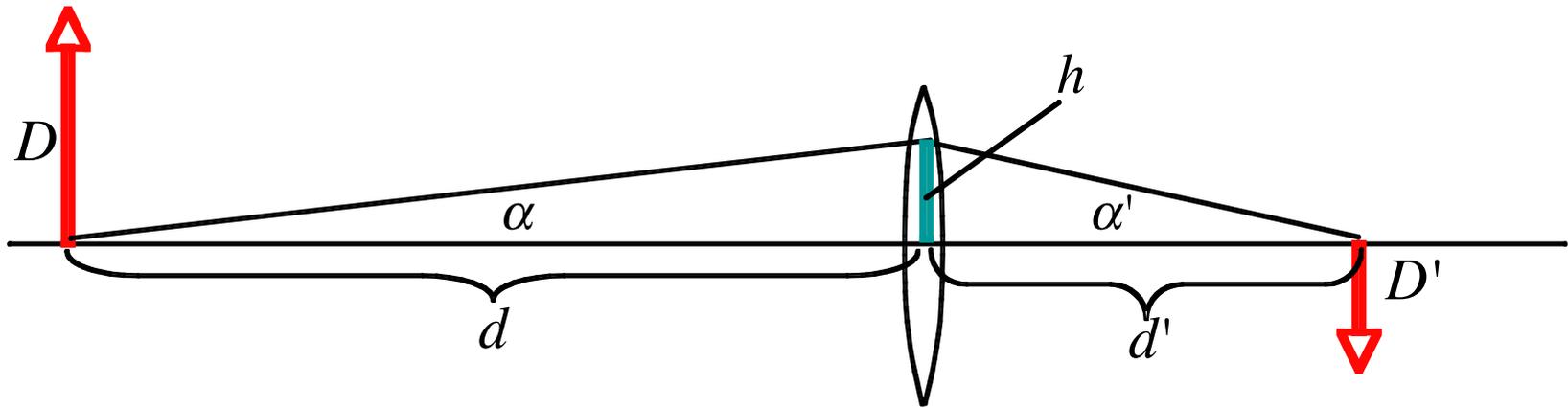
$$\sin \alpha_y = \frac{\Delta k_y}{k}$$

$$\Delta x \cdot k \cdot \sin \alpha_x = \text{const}$$

$$\Delta y \cdot k \cdot \sin \alpha_y = \text{const}$$

$$A \cdot \sin^2 \alpha = \text{const}$$

Abbescher Sinussatz



$$\tan \alpha = \frac{h}{d}$$

$$\tan \alpha' = \frac{h}{d'}$$

$$d' \cdot \tan \alpha' = d \cdot \tan \alpha$$

$$\frac{d'}{d} = \frac{D'}{D}$$

$$D' \cdot \tan \alpha' = D \cdot \tan \alpha$$

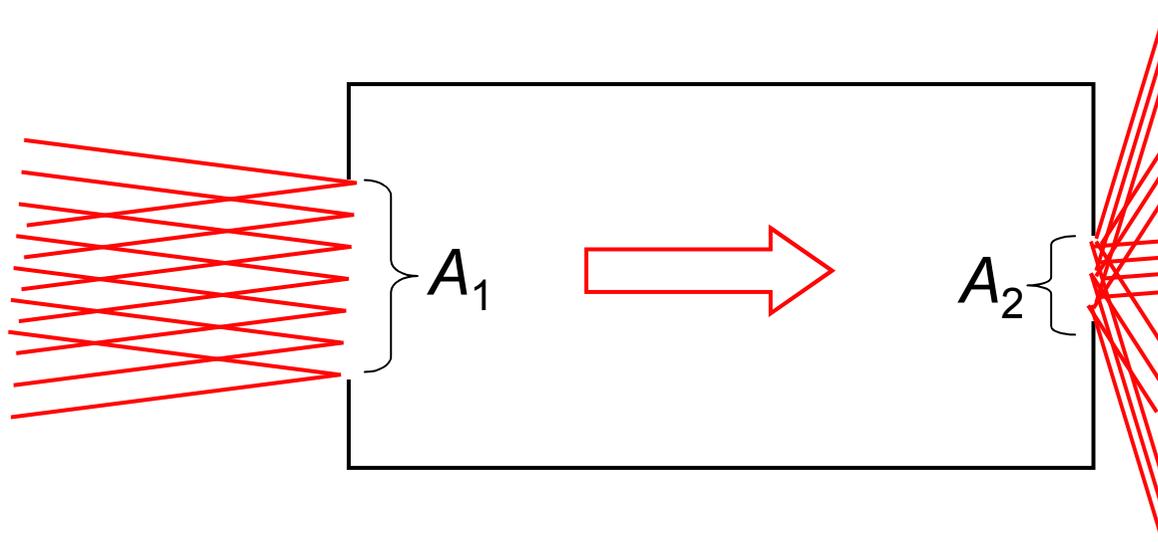
$$D \cdot \tan \alpha = \text{const}$$

Konstruktionsregeln der geometrischen Optik

$$A \cdot \tan^2 \alpha = \text{const}$$

Abbescher Sinussatz

$$A \cdot \sin^2 \alpha = \text{const}$$



$$c = \frac{A_1}{A_2}$$

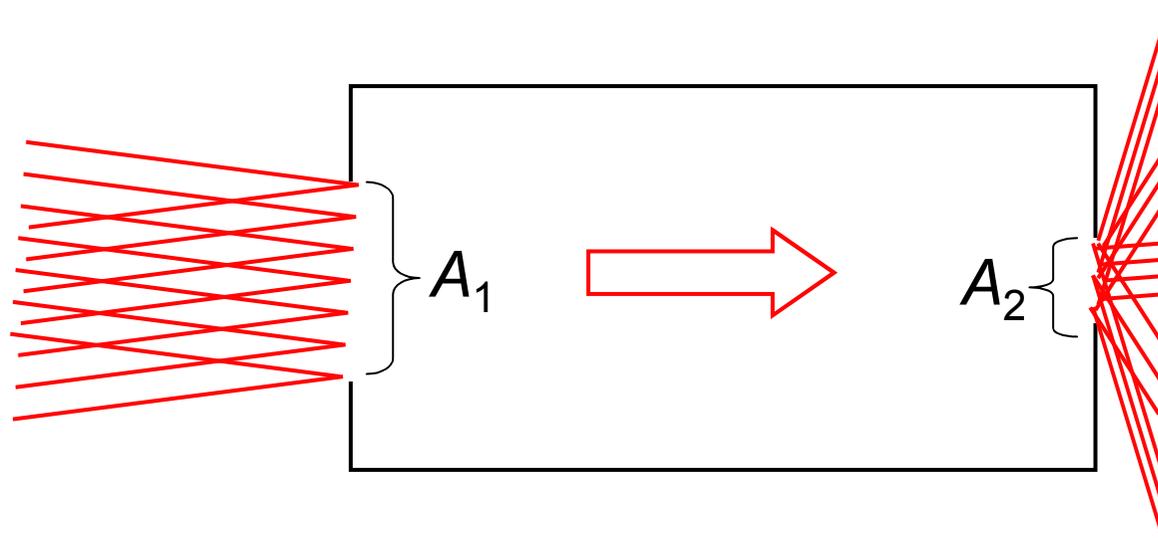
$$A \cdot \sin^2 \alpha = \text{const}$$

$$A_1 \cdot \sin^2 \alpha_1 = A_2 \cdot \sin^2 \alpha_2$$

$$c = \frac{A_1}{A_2} = \frac{\sin^2 \alpha_2}{\sin^2 \alpha_1}$$

$$c_{\text{max}} = \frac{1}{\sin^2 \alpha_1}$$

Diffuses Licht kann man nicht konzentrieren.



$$c_{\max} = \frac{1}{\sin^2 \alpha_1}$$

Sonnenlicht: $\alpha = 0,266^\circ$ $c_{\max} = 46\,400$

kegelförmiger Trichter: bis 92 % der maximalen Konzentration

gutes Objektiv (1,7): etwa 10 % der maximalen Konzentration

Ende