Optische Instrumente

Deutlichkeitsweite $a_D = -25\,cm$

Lupe: $\tan\sigma' = \frac{y}{f'}$ $\qquad \tan\sigma = \frac{y}{-a_D} \Rightarrow \Gamma' = \frac{\tan\sigma'}{\tan\sigma} = \frac{y/f'}{y/(-a_D)} = \frac{-a_D}{f'}$

Vergrößerung beim Mikroskop:

$$\Gamma'_{Obj} = \frac{y'}{y} = \frac{a'}{a} \approx -\frac{t}{f'_{Obj}} \Rightarrow \Gamma' = \Gamma'_{Obj} \cdot \Gamma'_{Okl} = \frac{(-t)}{f'_{Obj}} \cdot \frac{(-a_D)}{f'_{Okl}} = \frac{t \cdot a_D}{f'_{Obj} \cdot f'_{Okl}}$$

genau rechnen: $\frac{1}{a'} - \frac{1}{a} = \frac{1}{f'_{Obj}}$ (*)

$$-\frac{t}{f'_{Obj}} = -\frac{a' - f'}{f'} = 1 - a' \cdot \frac{1}{f'} \overset{(*)}{=} 1 - a'\left(\frac{1}{a'} - \frac{1}{a}\right) = 1 - 1 + \frac{a'}{a}$$

$$= \frac{a'}{a}$$

Keplersches Fernrohr:

$$\Gamma' = \frac{\tan\sigma'}{\tan\sigma} = \frac{y'/f'_{ok}}{-y'/f'_{oj}} = -\frac{f'_{oj}}{f'_{ok}}$$