

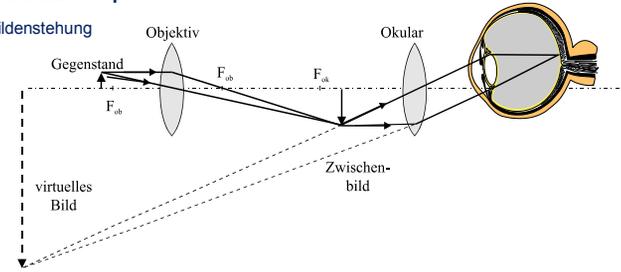


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## VII. Mikroskopie

### 1. Lichtmikroskop

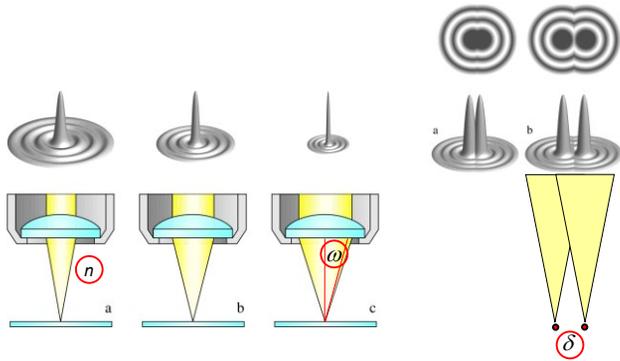
- Bildenstehung



- Vergrößerung:

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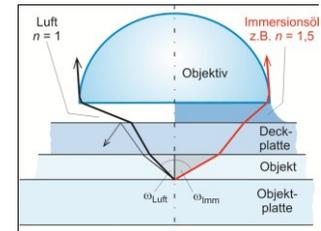
- Auflösungsgrenze ( $\delta$ ):



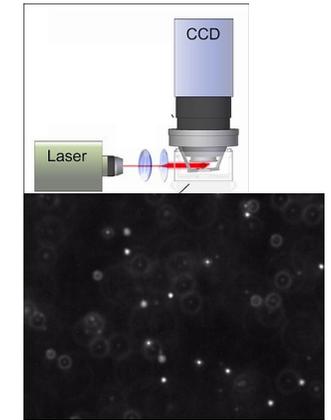
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### 2. Spezialmikroskope

- Immersionsobjektiv

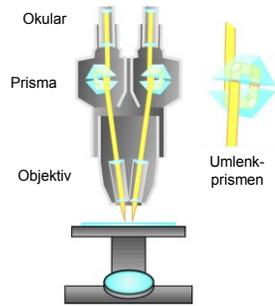


- Ultramikroskop (Dunkelfeldmikroskop)



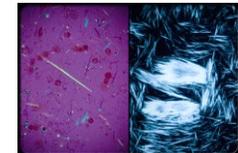
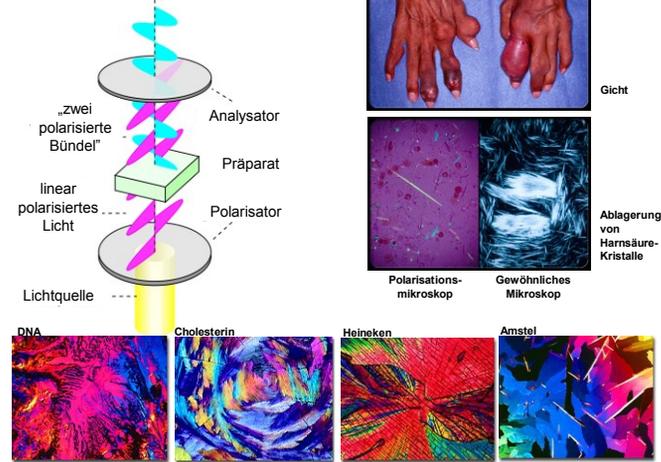
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▪ Stereomikroskop



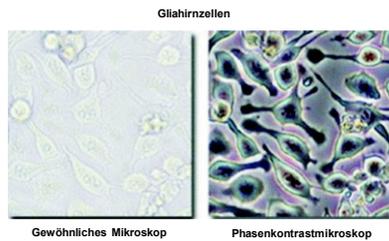
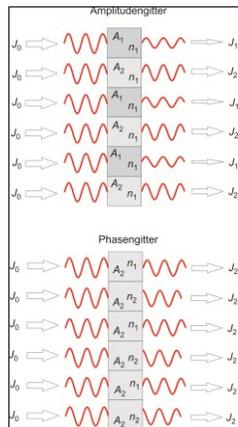
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▪ Polarisationsmikroskop



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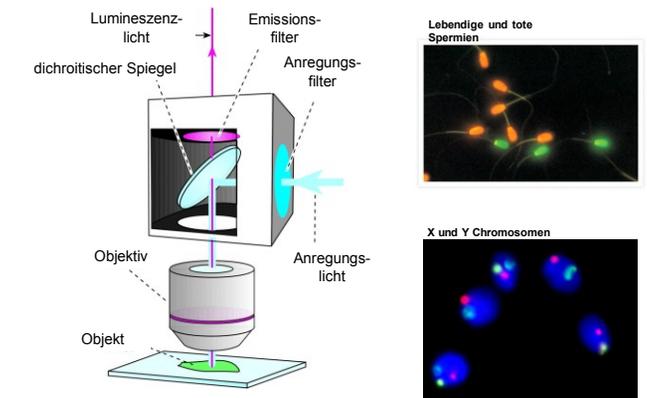
▪ Phasenkontrastmikroskop



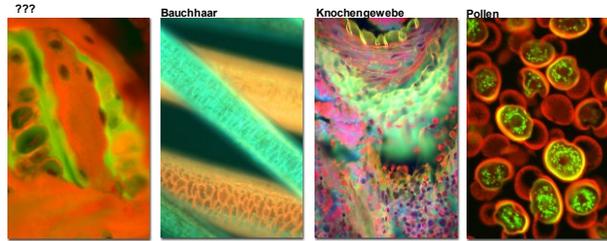
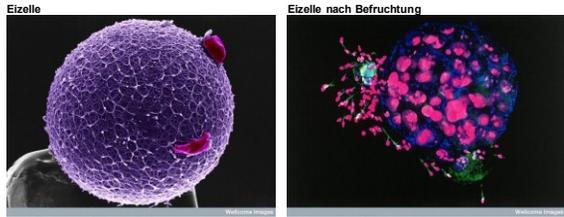
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▪ Fluoreszenzmikroskop

Epifluoreszenz-Anordnung:

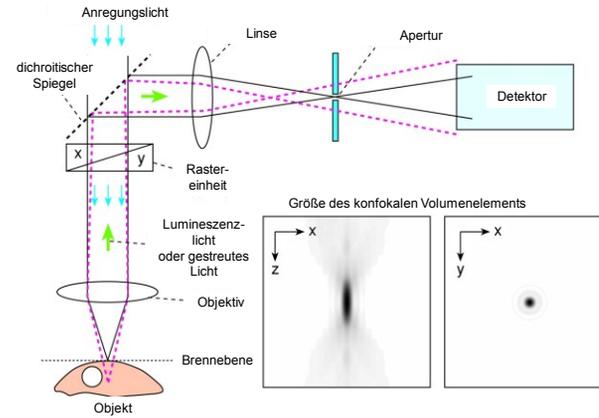


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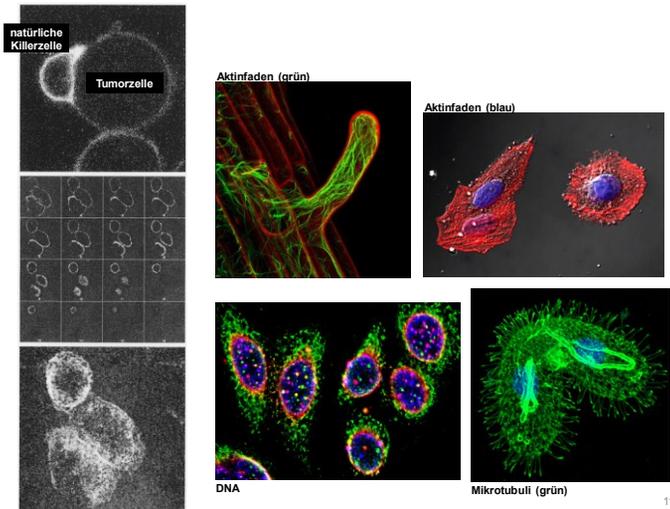


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### 3. Konfokales Laser Rastermikroskop (CLSM)

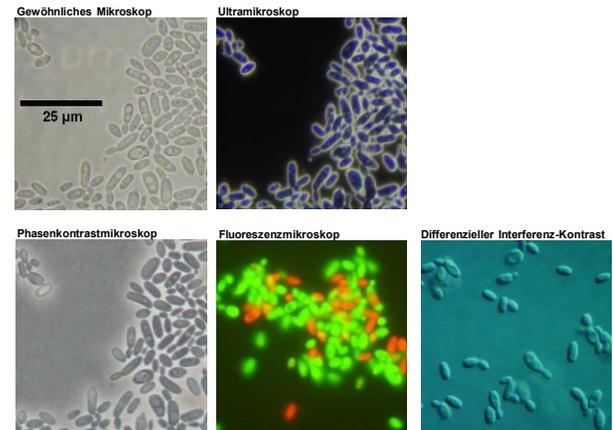


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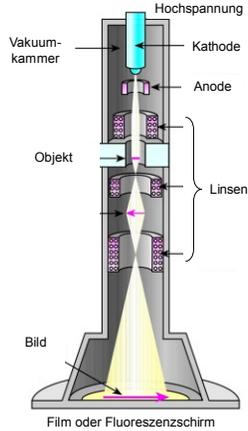
### Beispiel: Hefe unter verschiedenen Mikroskopen



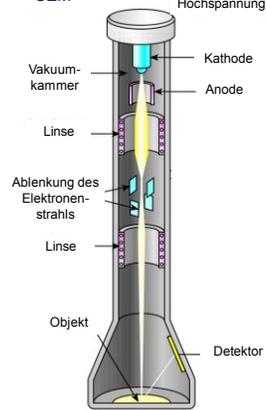
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#### 4. Elektronenmikroskope

- TEM



- SEM



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- Auflösungsgrenze ( $\delta$ ):  $\delta \approx \frac{\lambda}{A}$

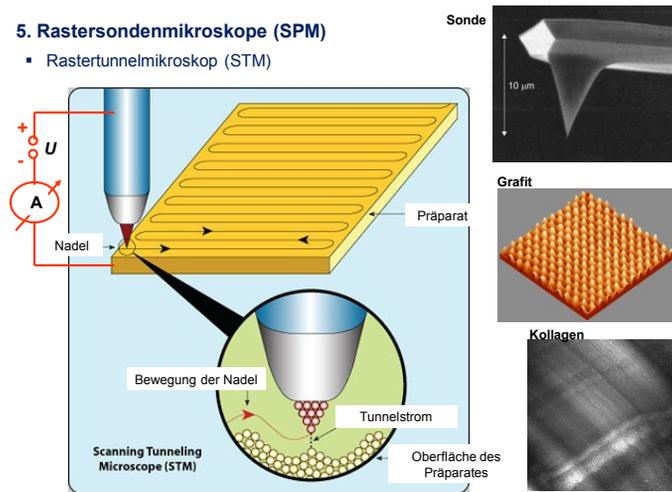
$\lambda$  ?



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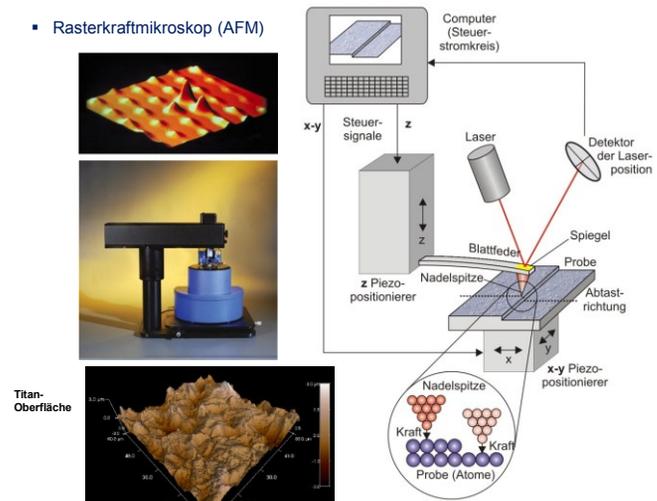
#### 5. Rastersondenmikroskope (SPM)

- Rastertunnelmikroskop (STM)

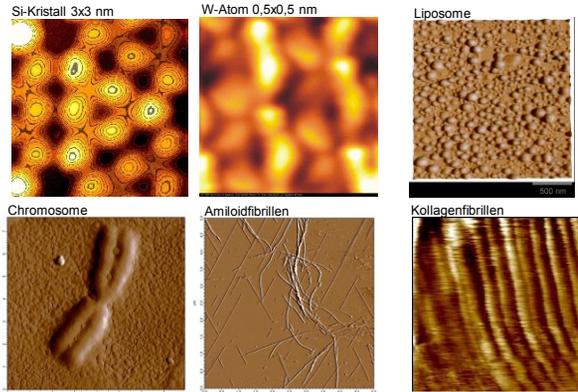


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- Rasterkraftmikroskop (AFM)



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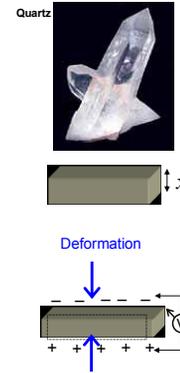


- Auflösung:
  - Spitze der Sonde
  - Feinheit des Rastern  $\rightarrow$  Piezopositionierer

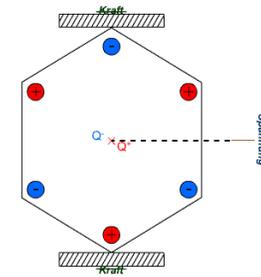
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▪ Piezoelektrizität (piezoelektrischer Effekt)

(s. später Sonographie)

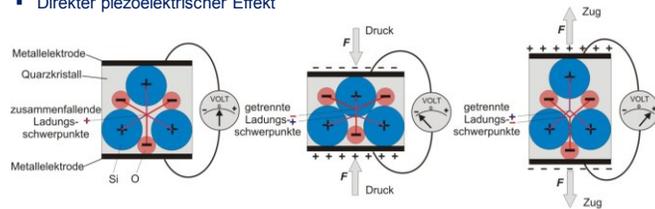


$$U = \delta \cdot \Delta x$$

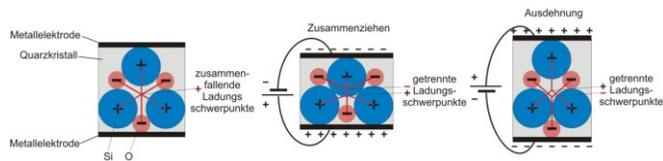


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▪ Direkter piezoelektrischer Effekt



▪ Inverser piezoelektrischer Effekt



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Biophysik für Mediziner

Praktikumsbuch

- VI/2.2
- VI/2.3
- X/2
- X/3.1
- X/5

- Kapitel 3
- Kapitel 4

Rechnaufgabe:  
Praktikumsbuch: 17, 54, 55

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