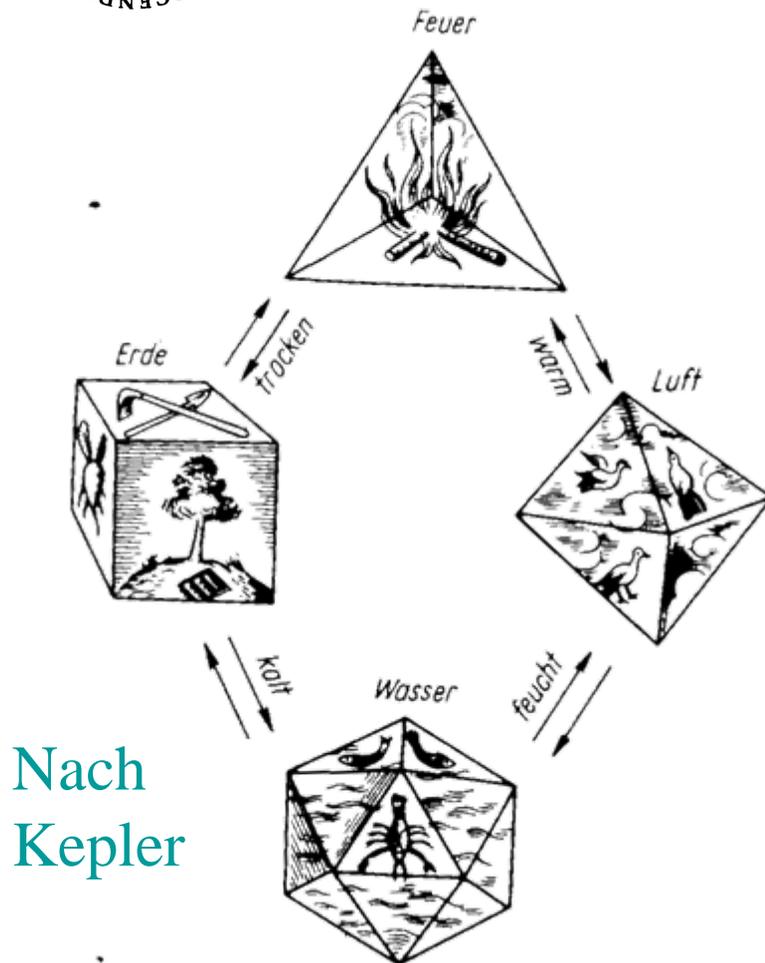


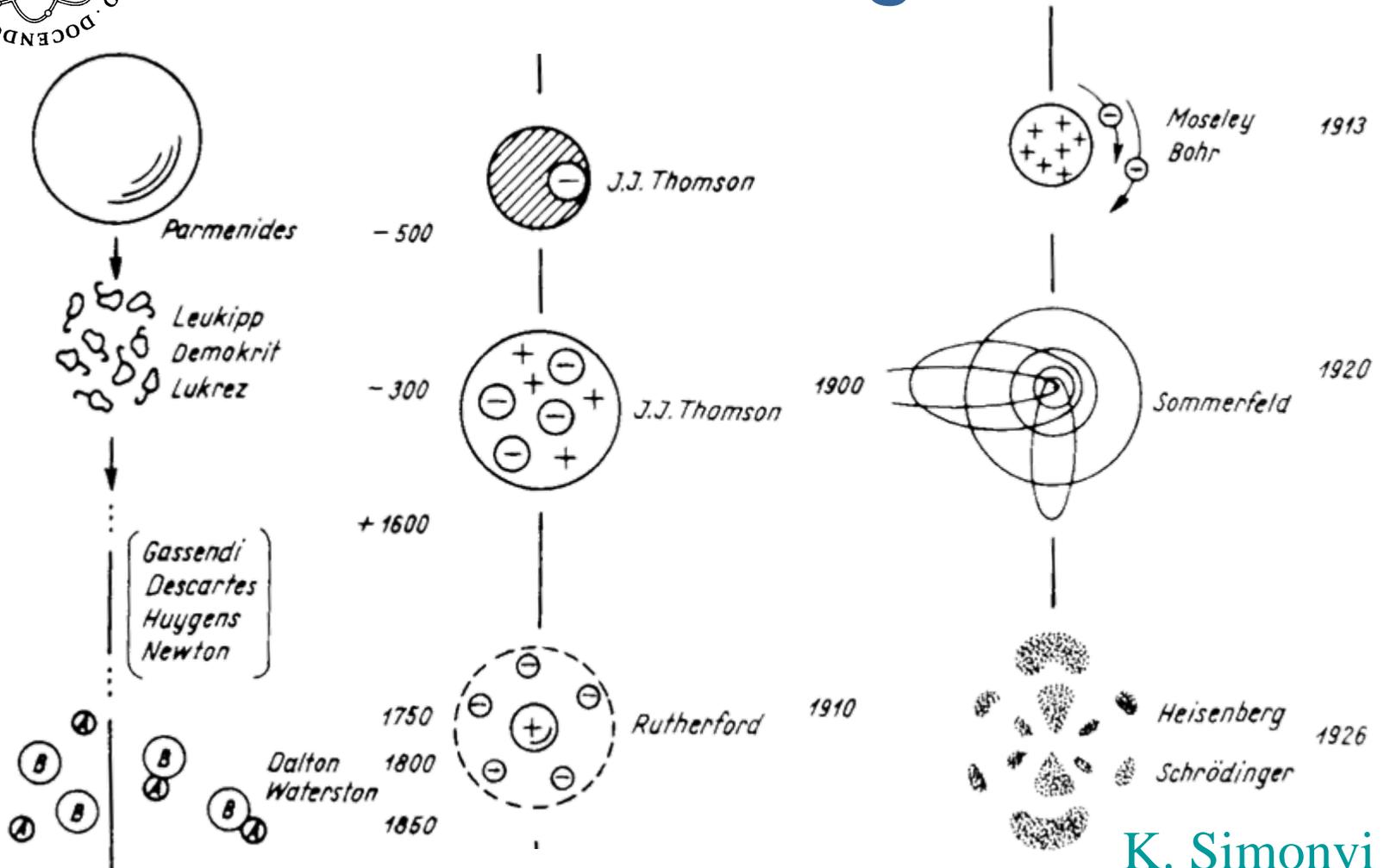
Griechische Ansichten



- Demokrit (-300)
 - ◆ Leere und Fülle machen die Materie aus
 - ◆ Leere ist Seinsform
 - ◆ Atomform bestimmt Eigenschaften
- Aristoteles (-384 - -322)
 - ◆ Es gibt vier Elemente



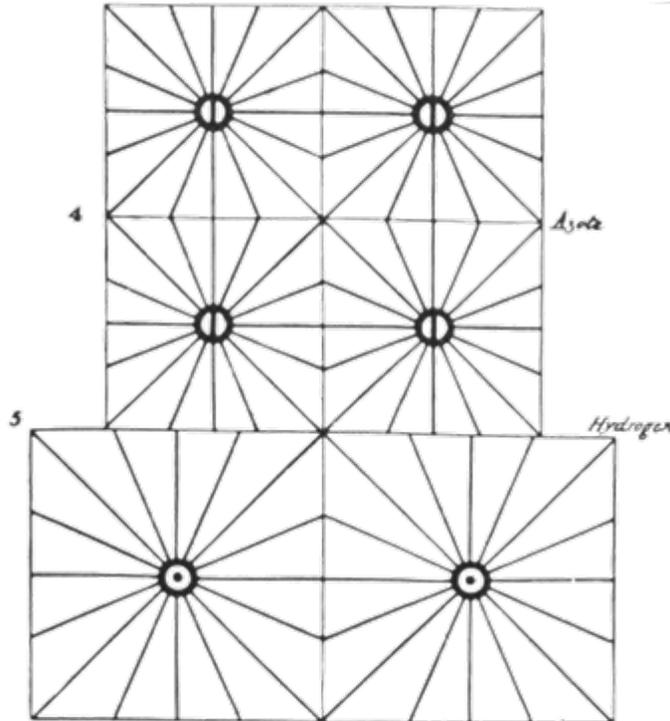
Atomvorstellungen



K. Simonyi

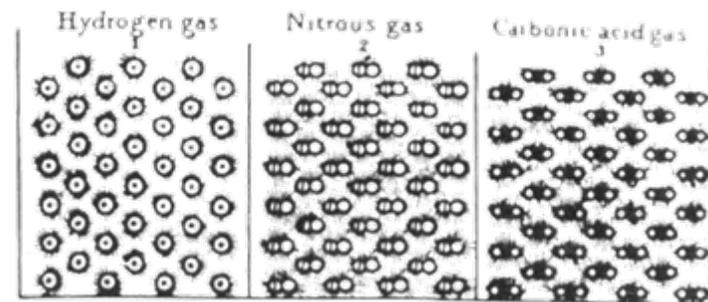


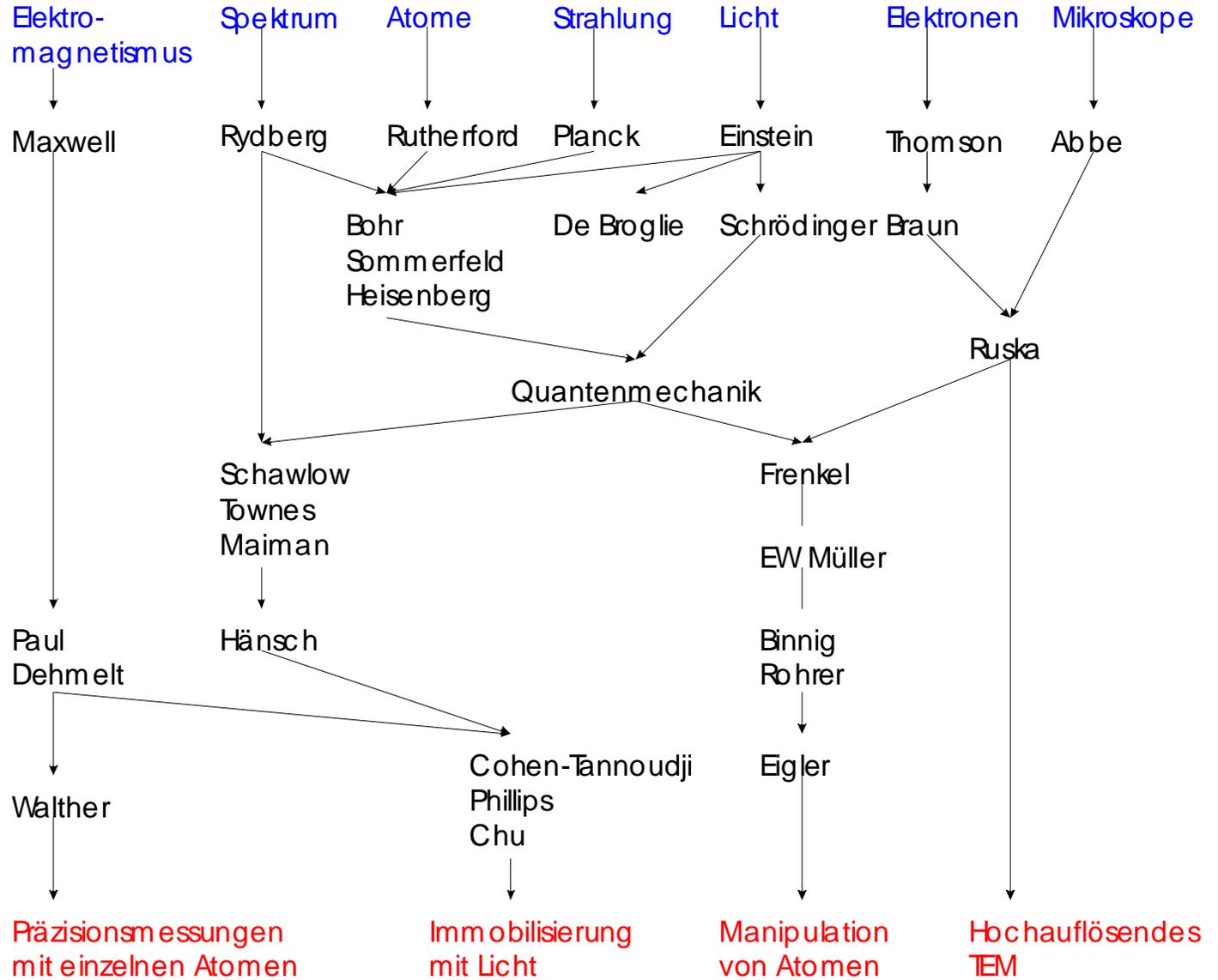
Erste Indizien: Chemie



Das Gesetz der konstanten Proportionen aus *Dalton's* Buch: *A New System of Chemical Philosophy*. 1808, 1810

- Dalton (1766-1844) konnte die bekannten chemischen Reaktionsgesetze mit einer Atomhypothese erklären.



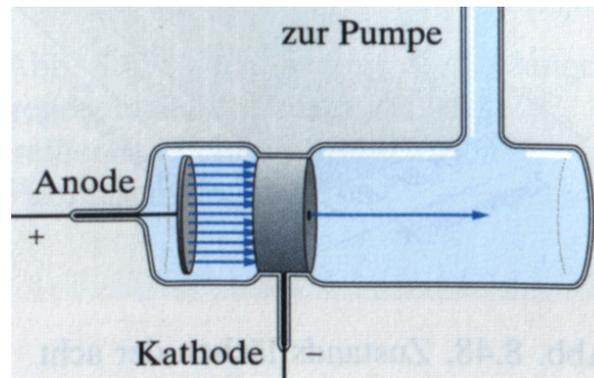




Röntgen und die Röntgenstrahlen



- Wilhelm Conrad Röntgen (1845-1923)



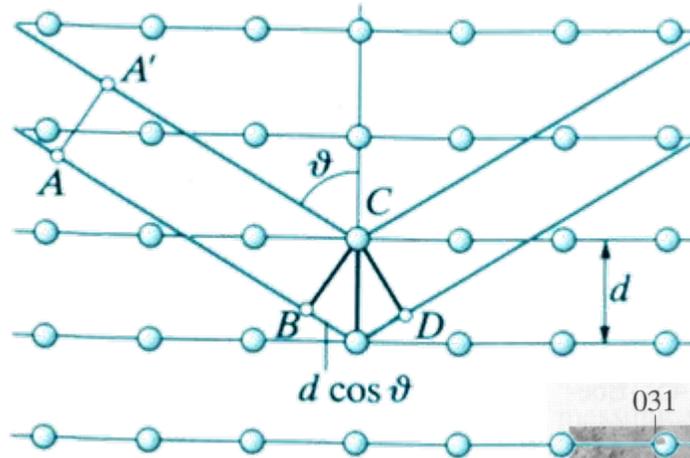
Wellenlänge:
0,001 nm..1nm



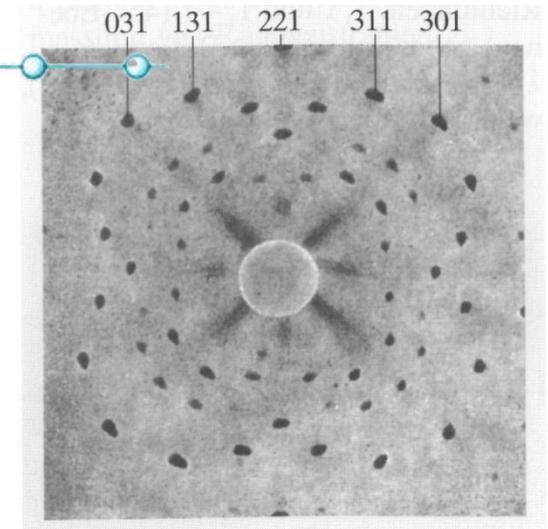
Laue: Beugung



Max von Laue

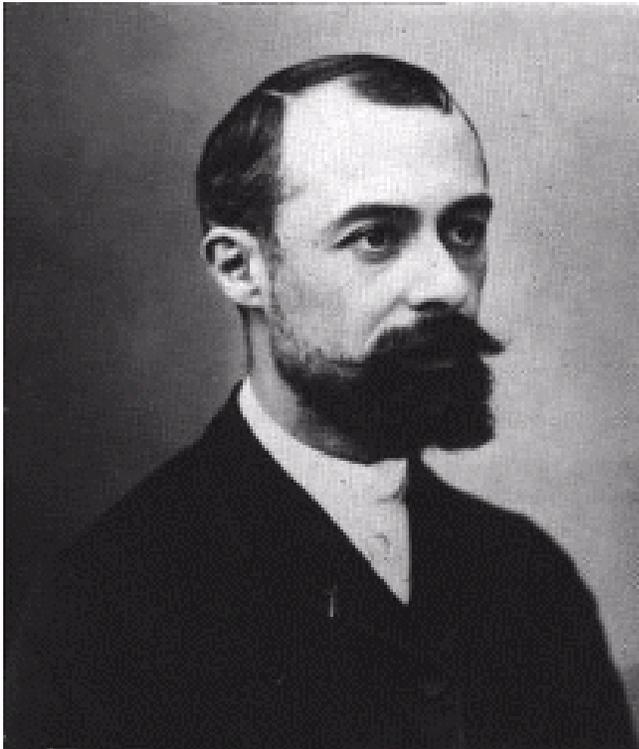


Interferenzeffekt
der
Röntgenstrahlen





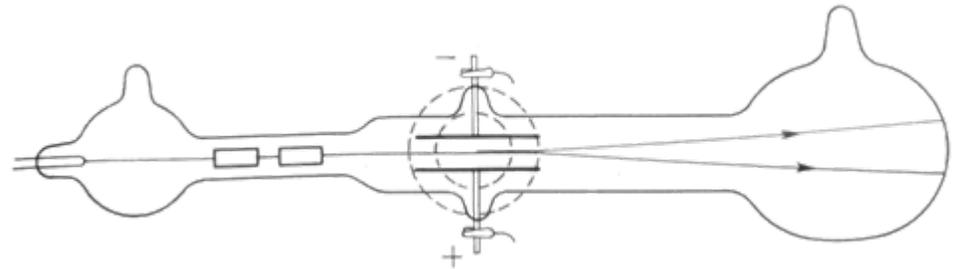
Becquerel und die Radioaktivität



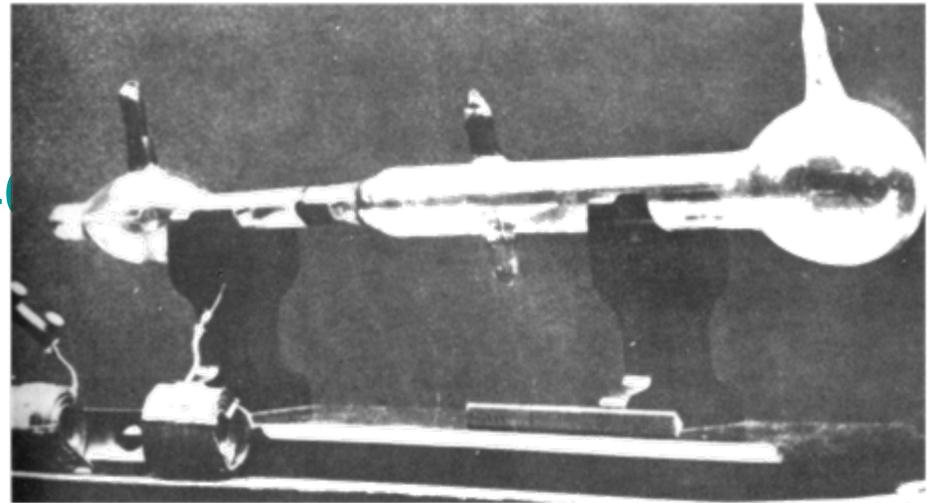
- Becquerel (1852-1908)
- Entdeckte, dass Uransalze verpackte Filme schwärzen können.



J.J. Thomson und das Elektron



- J.J. Thomson (1856-1940)
 - ◆ Elektron
 - ◆ Relativistische Massenzunahme

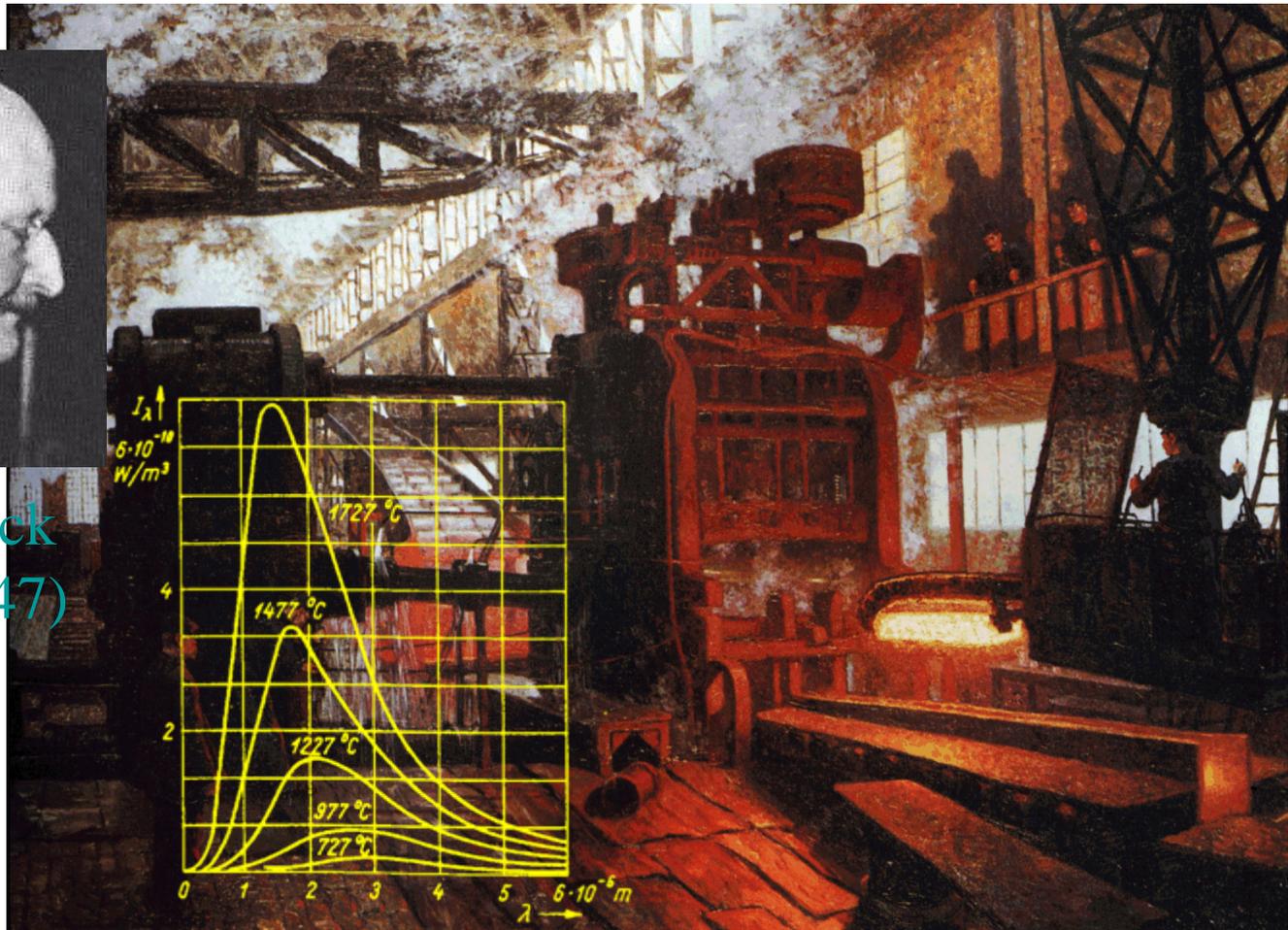




Planck: Strahlungsgesetz

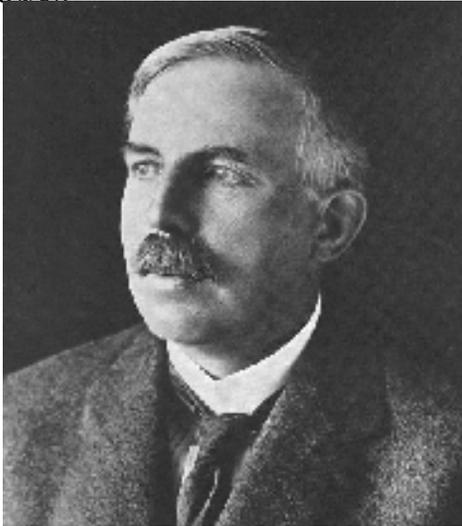


Max Planck
(1858-1947)



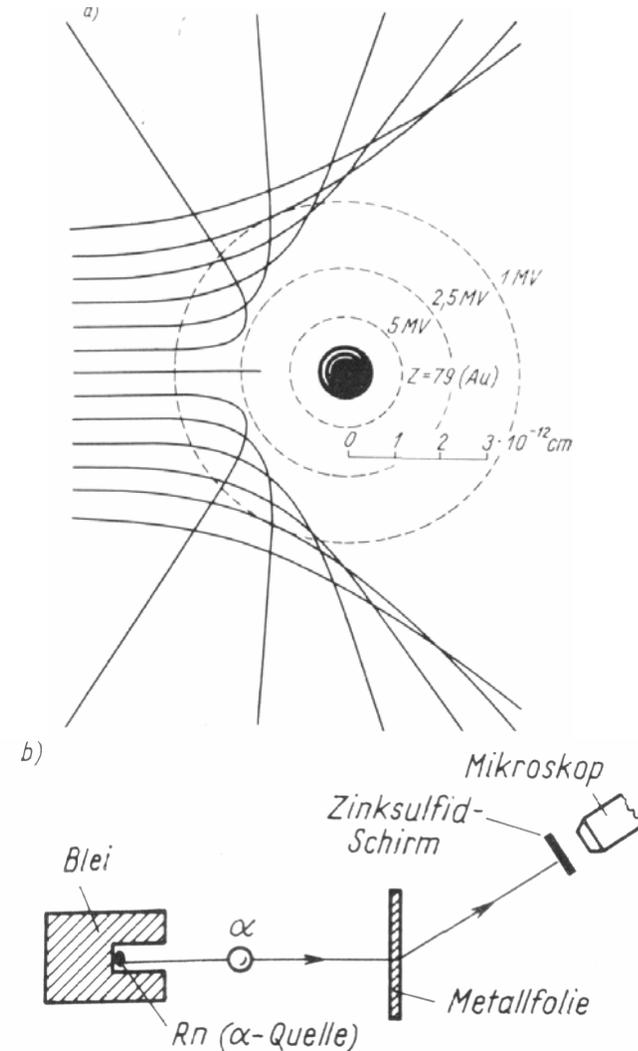


Rutherford und die α -Teilchen



■ Ernest Rutherford (1871-1937)

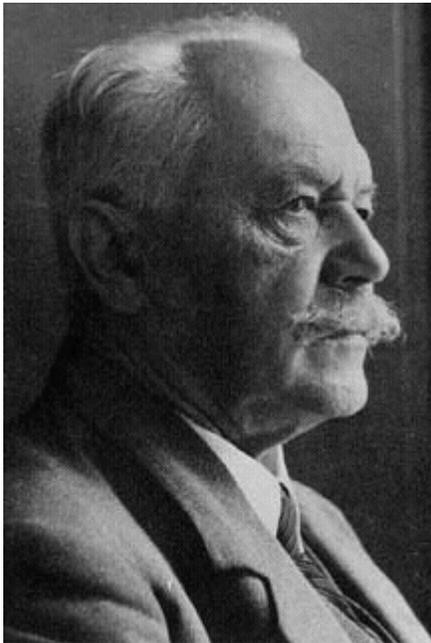
- ◆ Atommodell
- ◆ α - und β -Strahlen
- ◆ Neutronenvermutung



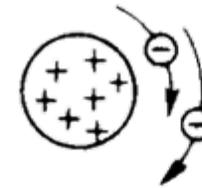


Bohr, Sommerfeld: Atommodelle

Niels Bohr
(1885-1962)

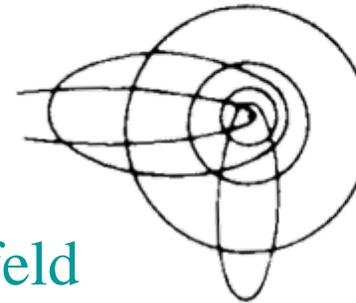


Arnold Sommerfeld
(1868-1951)



Moseley
Bohr

1913



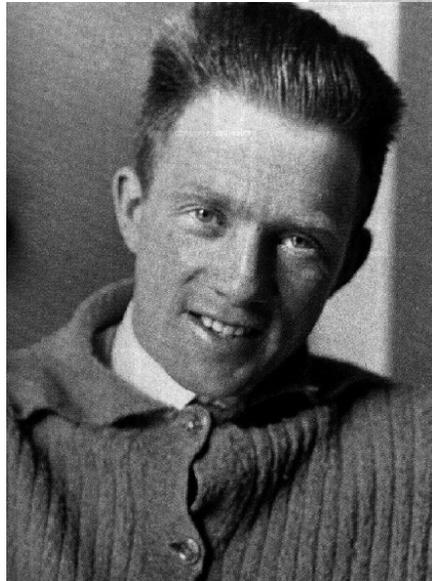
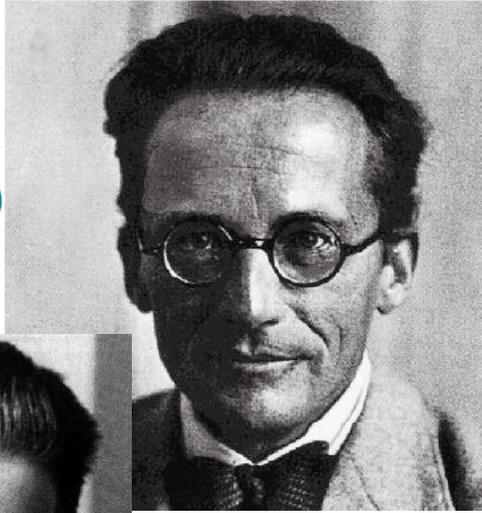
Sommerfeld

1920



Schrödinger und Heisenberg: Quantenphysik

Erwin
Schrödinger
(1887-1961)

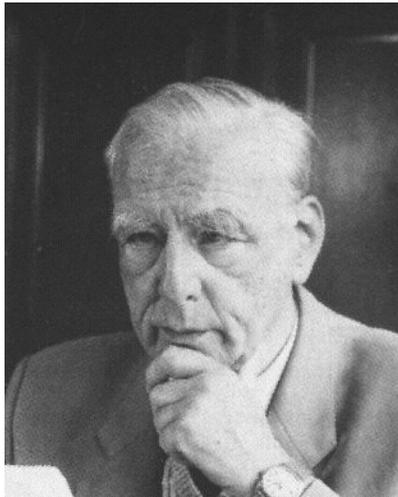


Werner
Heisenberg
(1901-1976)

- 1925: Heisenberg: Matrizenmechanik
- 1926: Schrödinger: Wellenmechanik
 - ◆ Beide Formulierungen sind äquivalent.

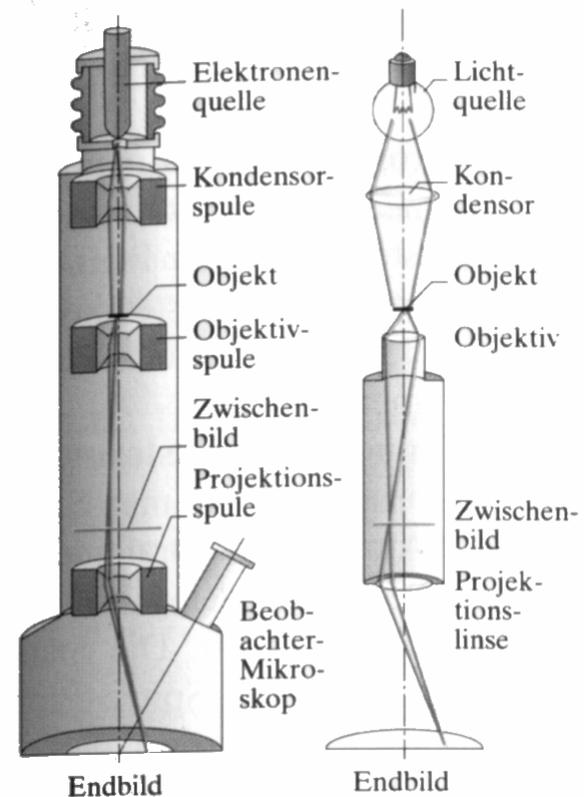


Ruska: Elektronenmikroskopie



Ernst Ruska (1906-1988)

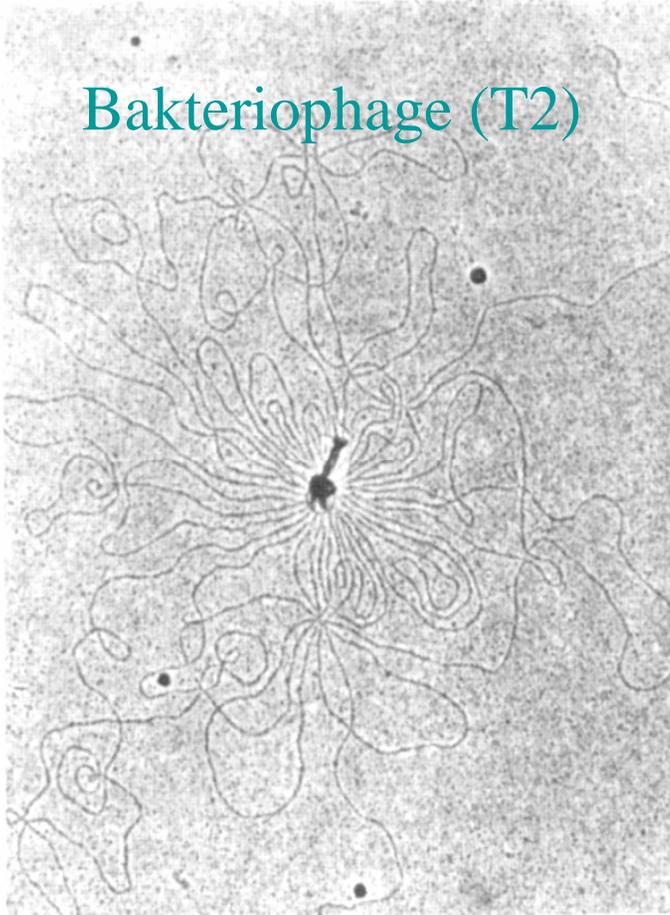
- Elektronen. Kleine Wellenlänge gibt höhere Auflösung



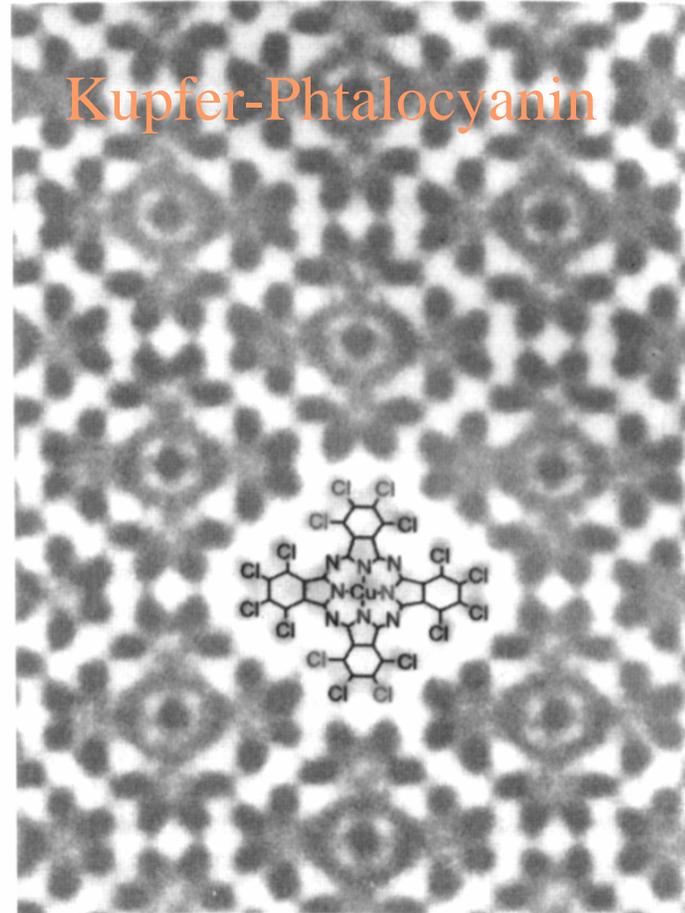


TEM-Bilder

Bakteriophage (T2)



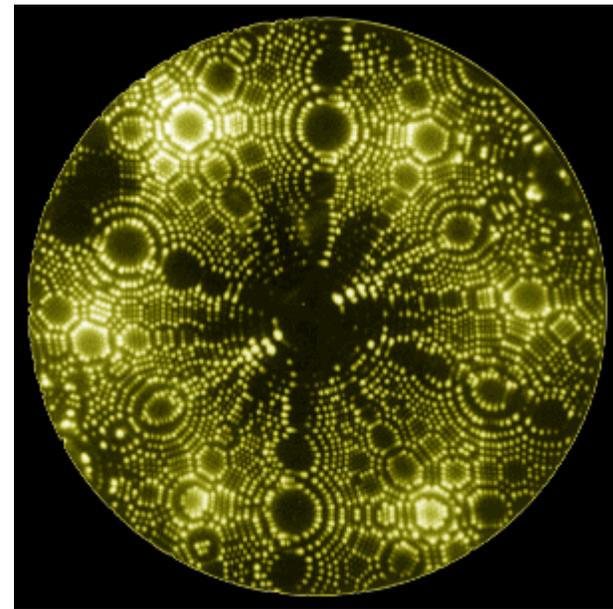
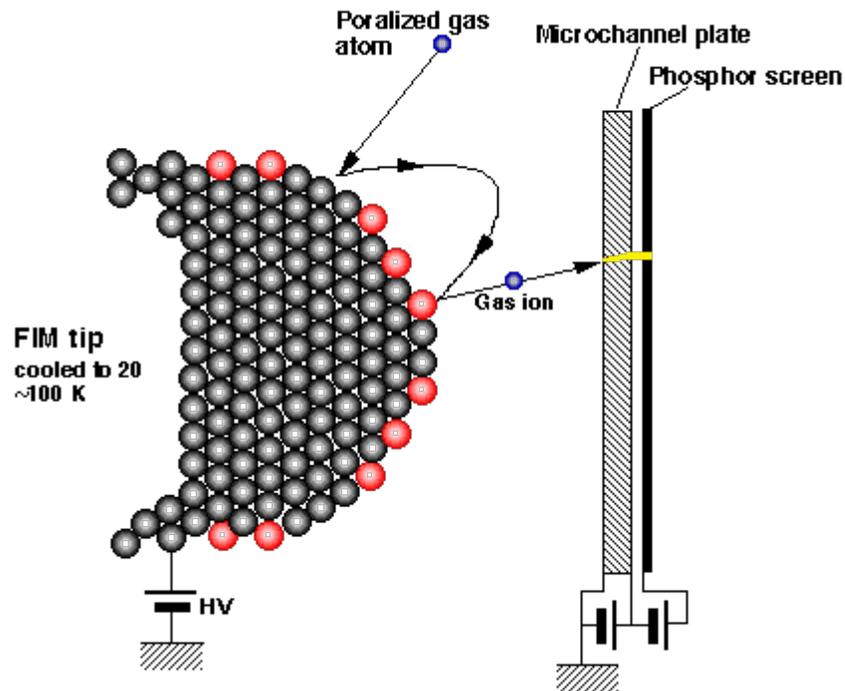
Kupfer-Phtalocyanin





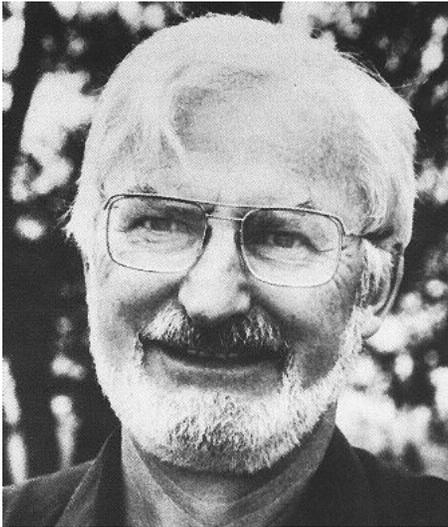
E.W. Müller: Feldionenmikroskopie

Principle of Field Ion Microscope (FIM)



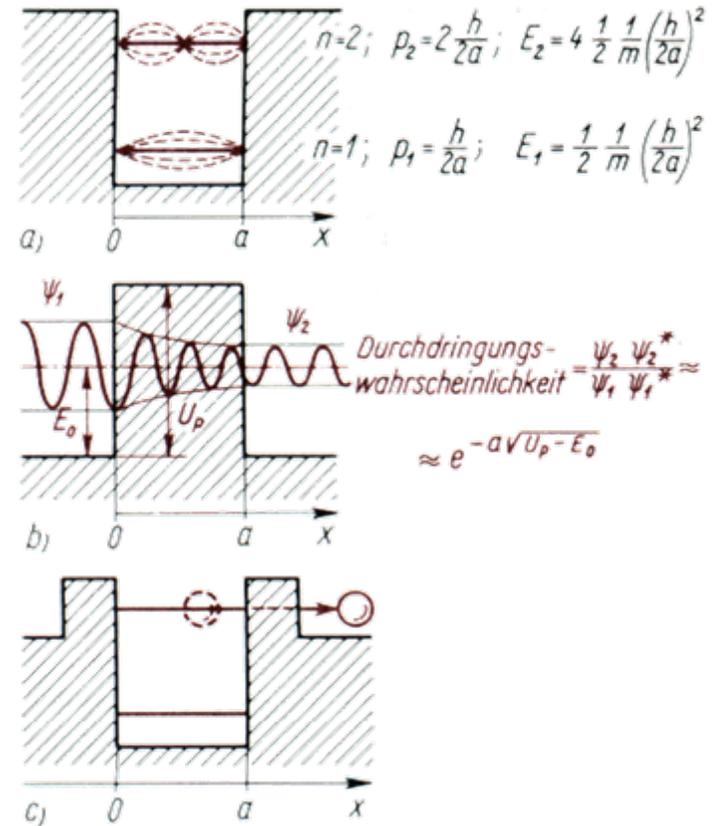


Binnig und Rohrer: Tunnelmikroskopie



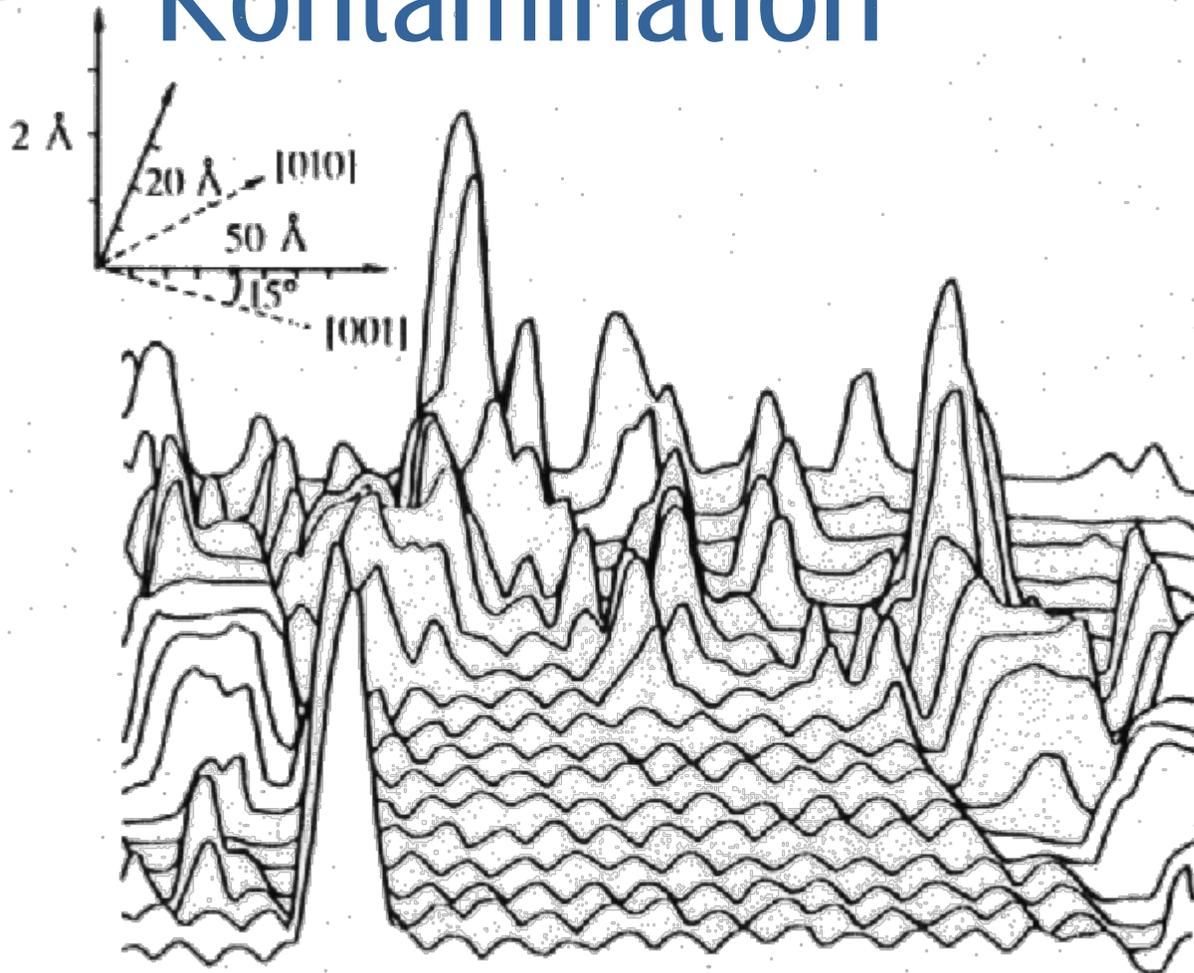
Heinrich Rohrer
(1933-)

Gerd Binnig
(1947-)





Behm: Platin(100)- Oberfläche mit C- Kontamination





Binnig und Rohrer: Si(111) 7x7

