Marie Sklodowska Curie
1867-1934

Physik für Life Sciences II

PHY 127

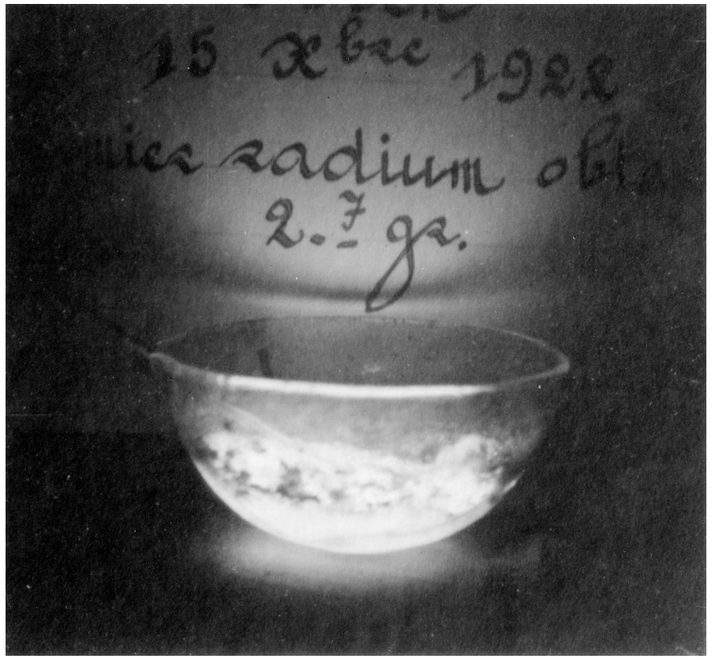
FS21

12. Vorlesung

Thomas Greber, Universität Zürich

Repetition:
Beugung, de Broglie

2105028, Particle in a Box, Lambert Beer, Radioaktivität

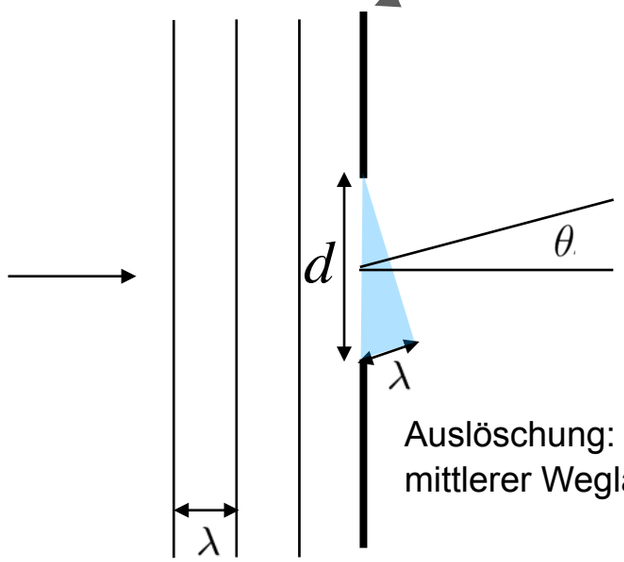


A bowl containing radium bromide (photo taken in the dark),1922.
Source : Musée Curie ; coll. Institut du Radium/ Cote MCP4151

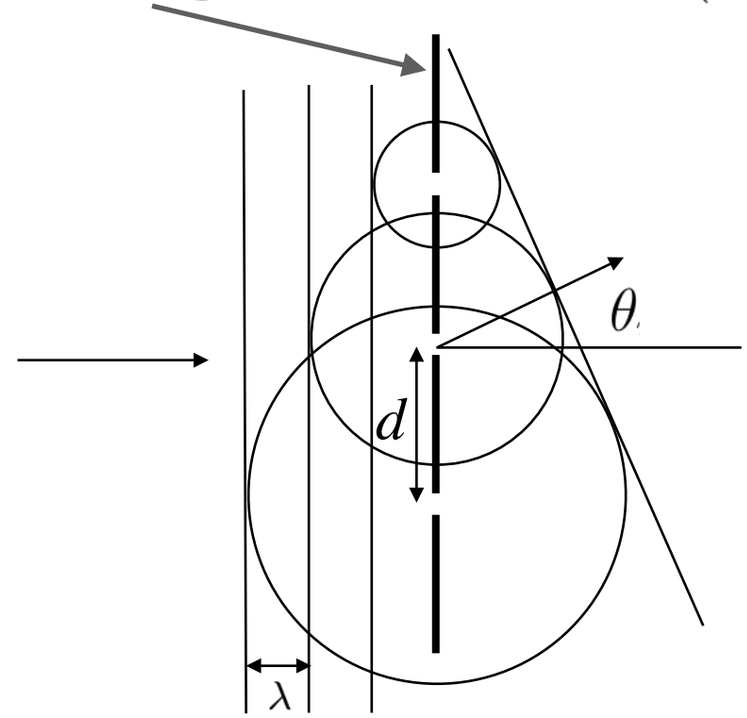
Repetition

Beugung: am Spalt: $\sin(\theta_n) = \frac{n \cdot \lambda}{d}$ Minima

am Strichgitter: $\sin(\theta_n) = \frac{n \cdot \lambda}{d}$ Maxima



Auslöschung:
mittlerer Weglängenunterschied $\lambda/2$



Verstärkung:
Weglängenunterschied $n\lambda$

am Loch: $\theta_{1/2} \approx 1.22\ \frac{\lambda}{d}$ 1. Minimum

Bragg $\sin(\theta_{B,n}) = \frac{n\lambda}{2d}$

Quantenmechanik:

Energie eines Photons: $E = h \cdot \nu$

Materiewellen: de Broglie: $\lambda = \frac{h}{p}$

Photon (Lichtteilchen)

Masse $m = 0$

Ladung $q = 0$

Energie $E = h\nu$

Impuls $p = \frac{h}{\lambda}$

entlang der Ausbreitungsrichtung

Drehimpuls $L = \pm \frac{h}{2\pi}$

entlang der Ausbreitungsrichtung

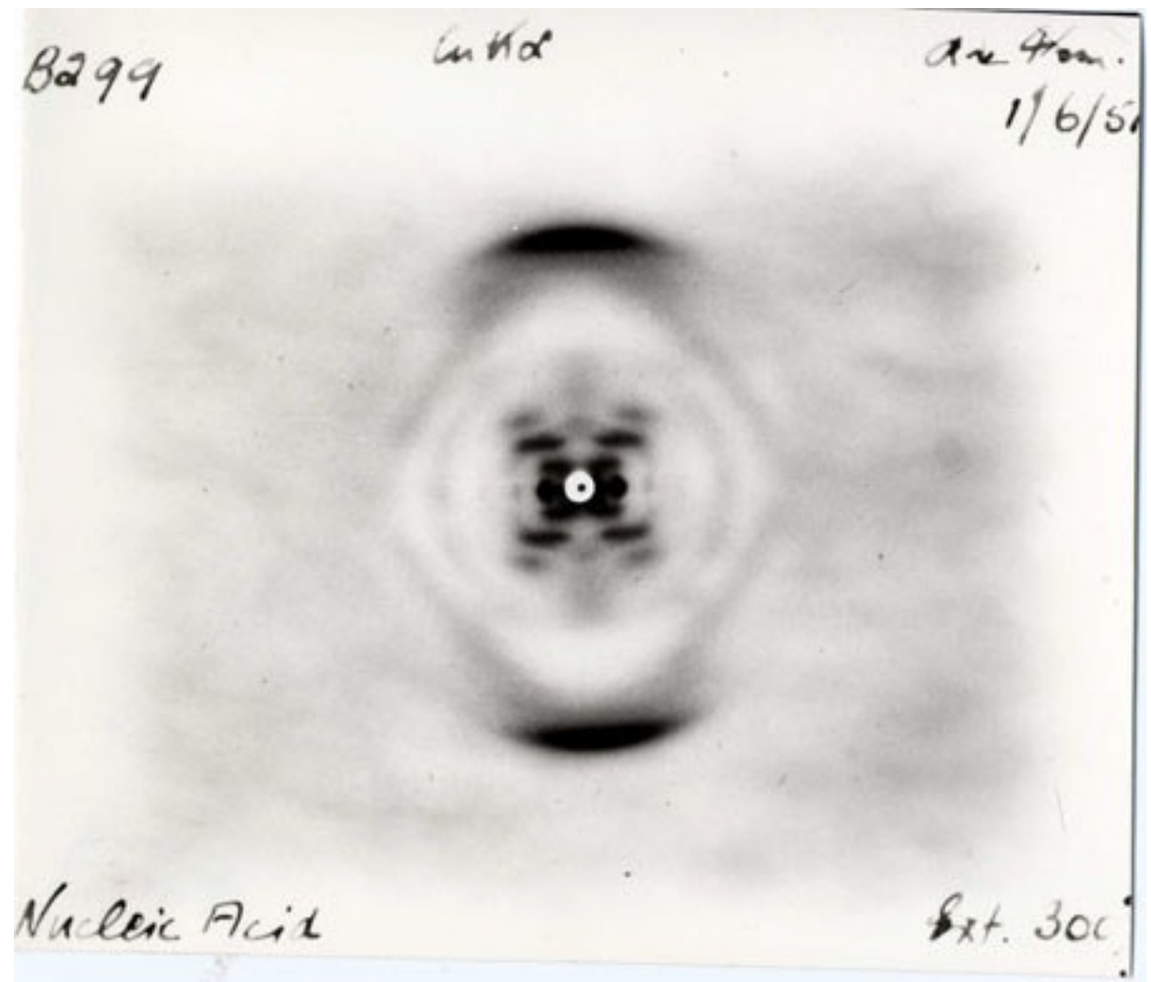
Dispersionsrelation

$$c = \frac{E}{p} = \lambda\nu$$

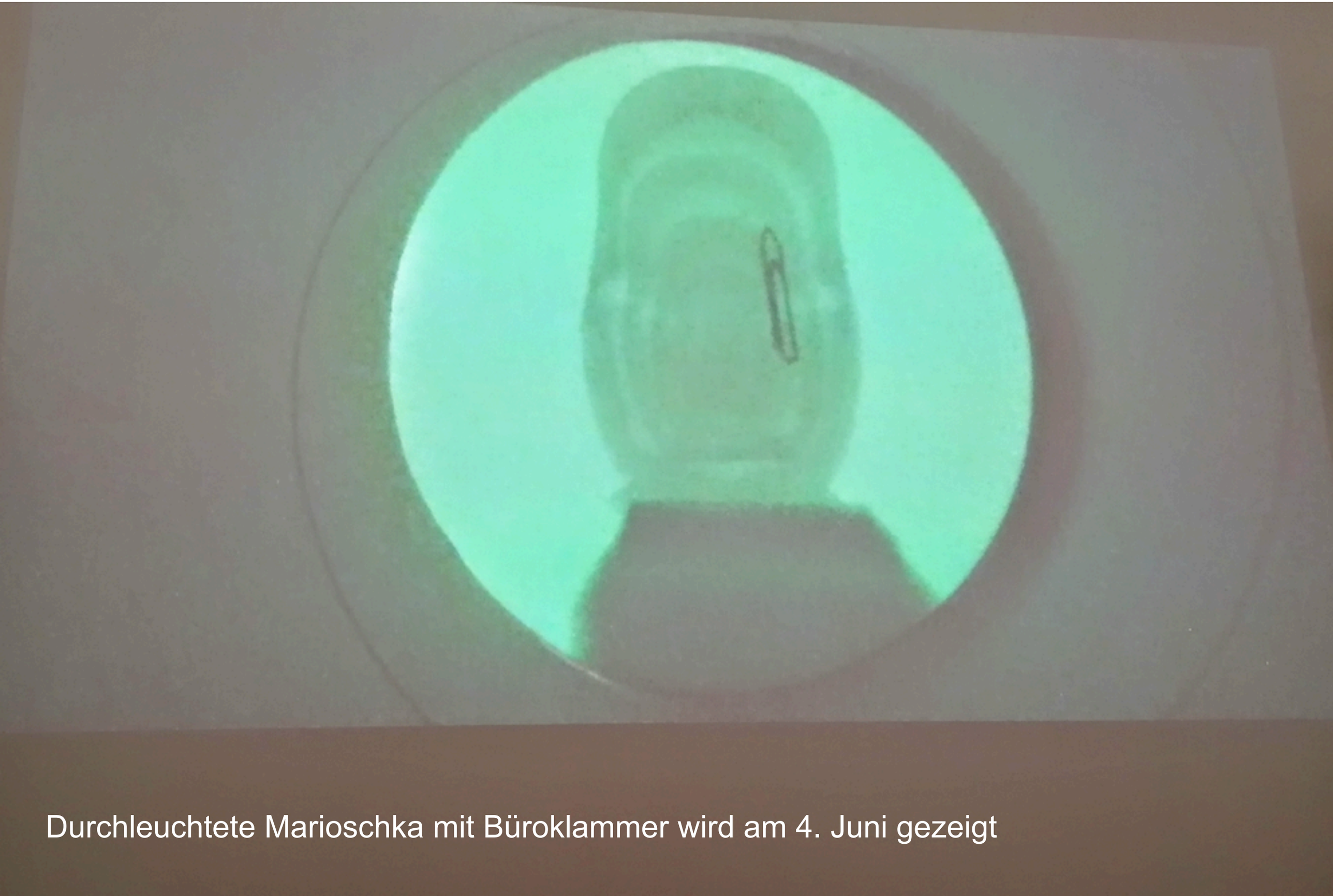
Lichtgeschwindigkeit

Röntgenstrahlen, X-rays

1895

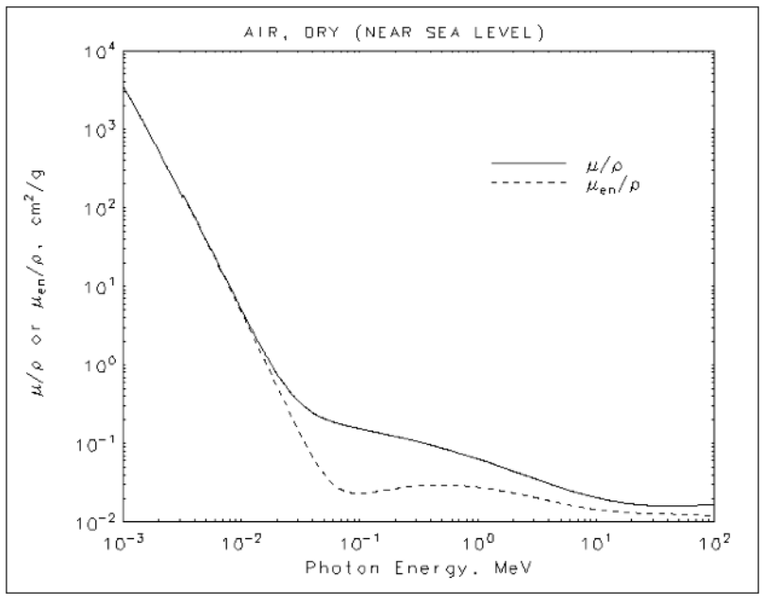


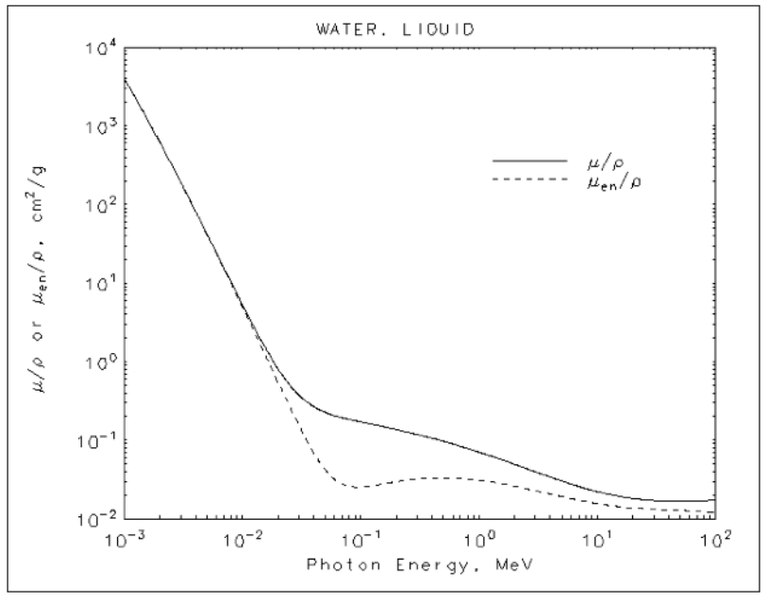
1951

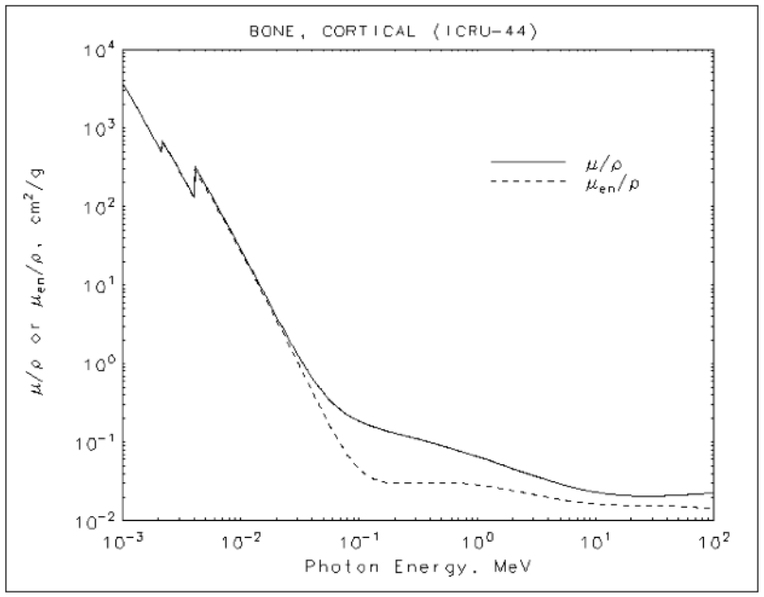


Durchleuchtete Marioschka mit Büroklammer wird am 4. Juni gezeigt

Mass attenuation coefficients

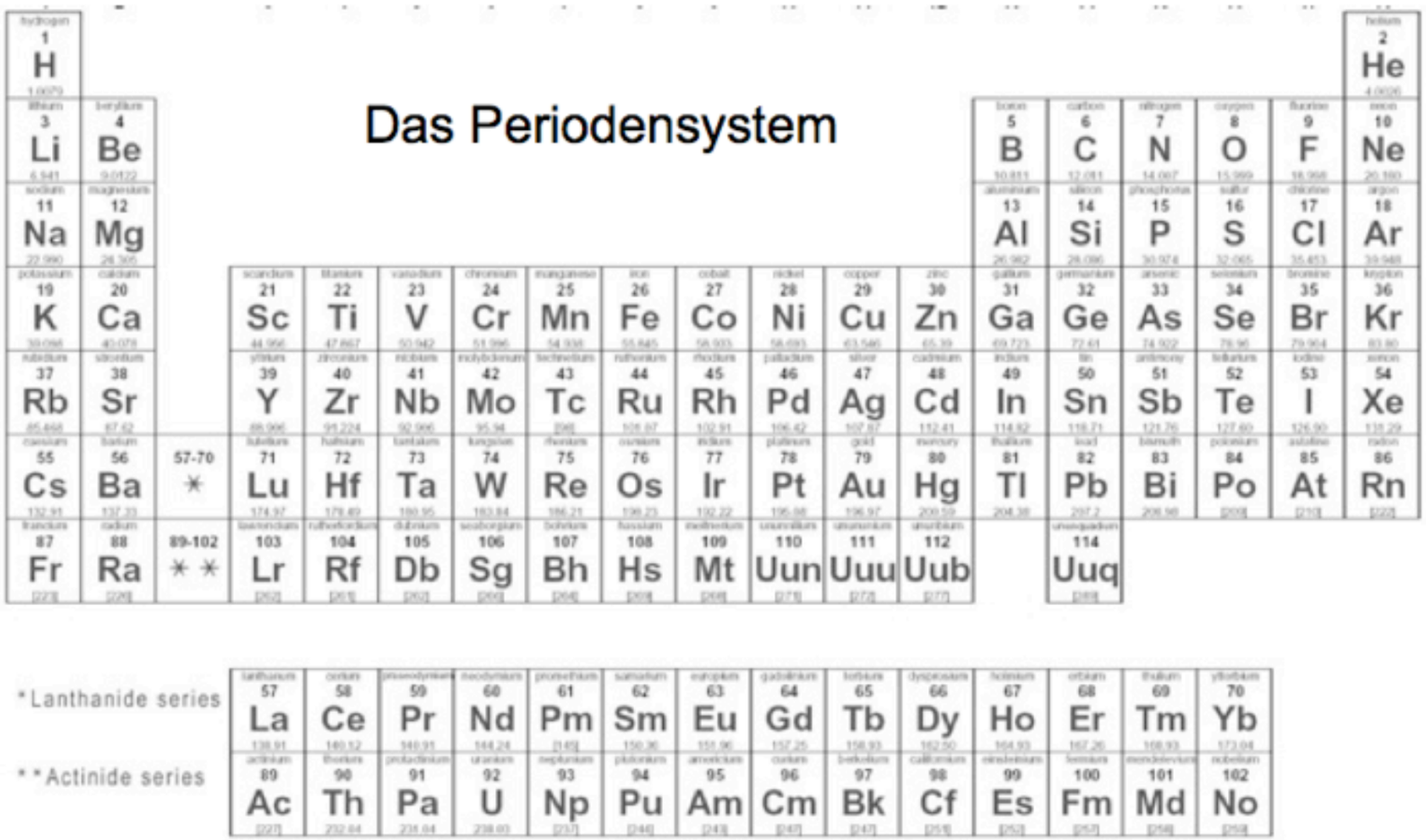






Data from NIST Values of the mass attenuation coefficient, μ/ϱ, and the mass energy-absorption coefficient, μ_{en}/ϱ

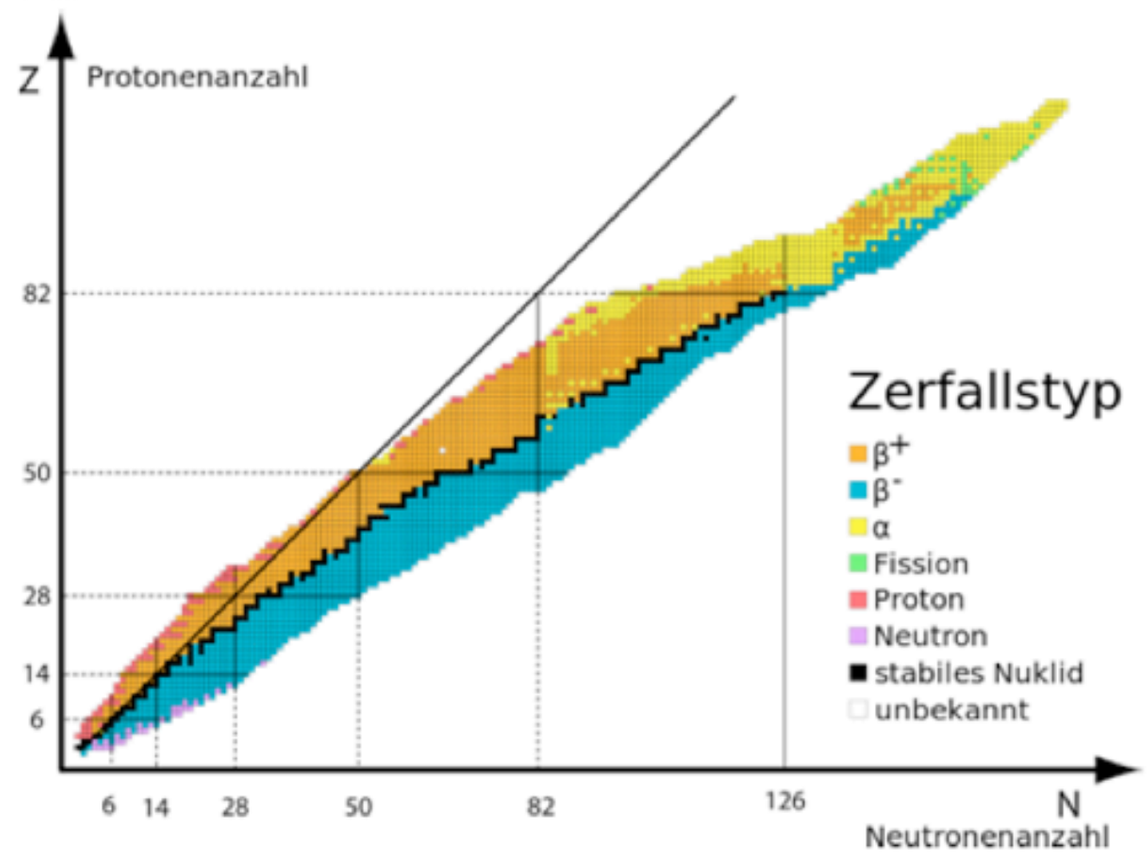
Abschwächung: $$I_x = I_0 e^{-\mu x} = I_0 e^{-\left(\frac{\mu}{\rho}\right)\rho x}$$



+ *Pauli (Spin)*

79 stabile Elemente

Nuklid Karte

$${}^{A}_{Z}X_{N}$$

254 stabile Kerne