

2 / 1

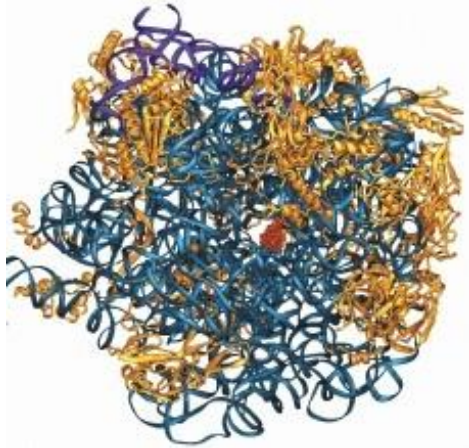
Kristallstrukturbestimmung

Beispiel:

Bestimmung der Struktur von Ribosomen mittels Röntgenbeugung

Ada Jonath, Venkatraman Ramakrishnan und Thomas Steitz

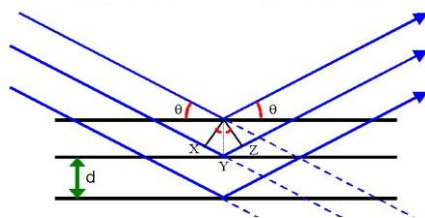
(Nobelpreis für Chemie 2009)



http://desy.de/research/photon_science/nobel_prize/index_eng.html

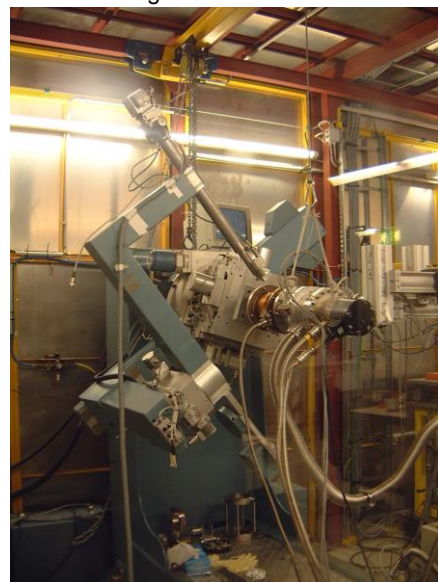
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Bragg-Reflexion



$$n \lambda = 2 d \sin \theta$$

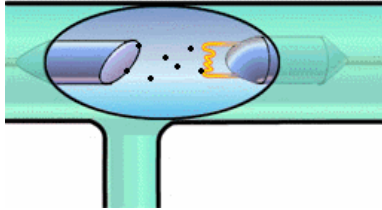
Röntgendiffraktometer



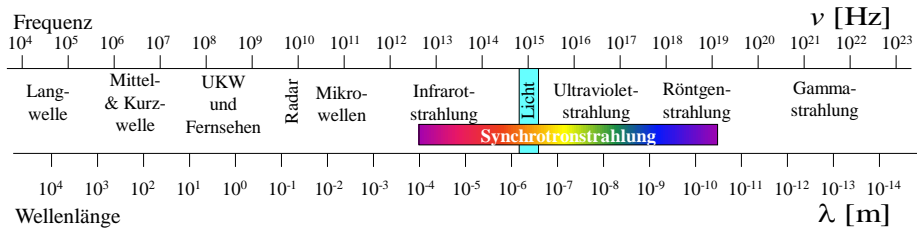
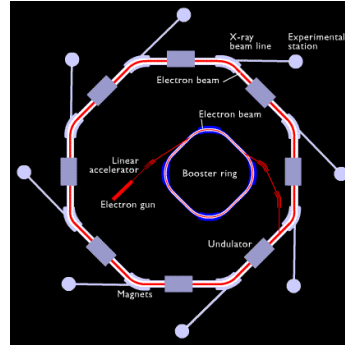
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Erzeugung von Röntgenstrahlung

..... durch abgebremste Elektronen
→ Röntgenröhre (1895)

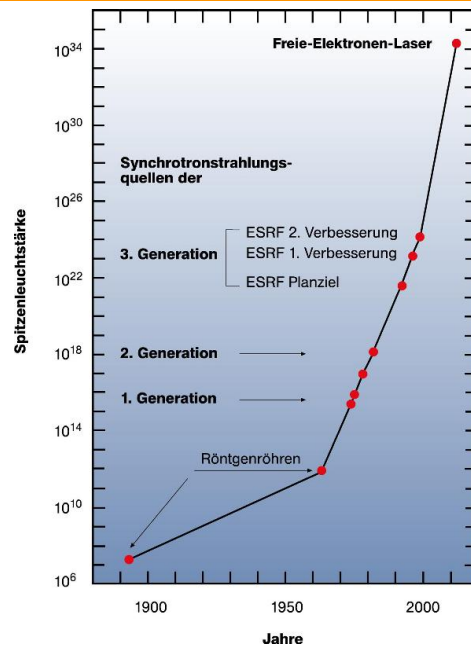
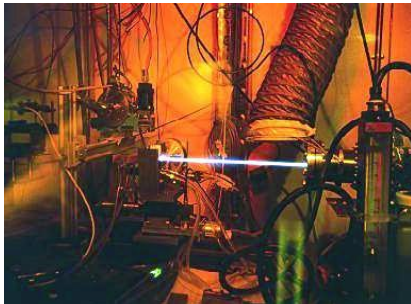
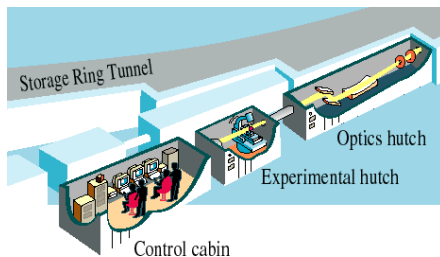


..... durch beschleunigte Elektronen
→ Elektronen-Synchrotron (1947)



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Synchrotronstrahlung



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Synchrotronquellen international



European Synchrotron Radiation Facility,
Grenoble (Frankreich):
E = 6 GeV, U = 844 m

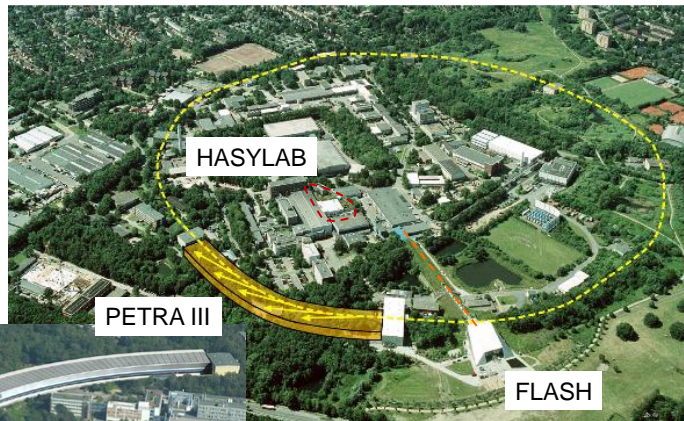


APS,
Argonne, Chicago
E = 7 GeV, U = 1104 m



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Synchrotronquellen Hamburg

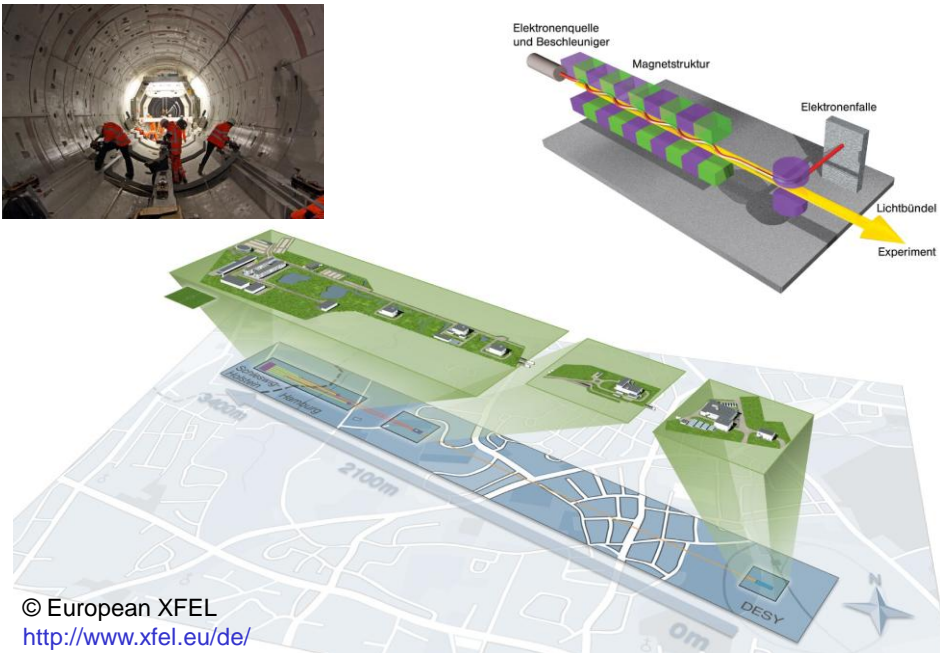


PETRA III (seit 2009)
E = 6 GeV, U = 2300 m

<http://hasylab.desy.de/>

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Röntgen-Freie-Elektronen-Laser XFEL Hamburg



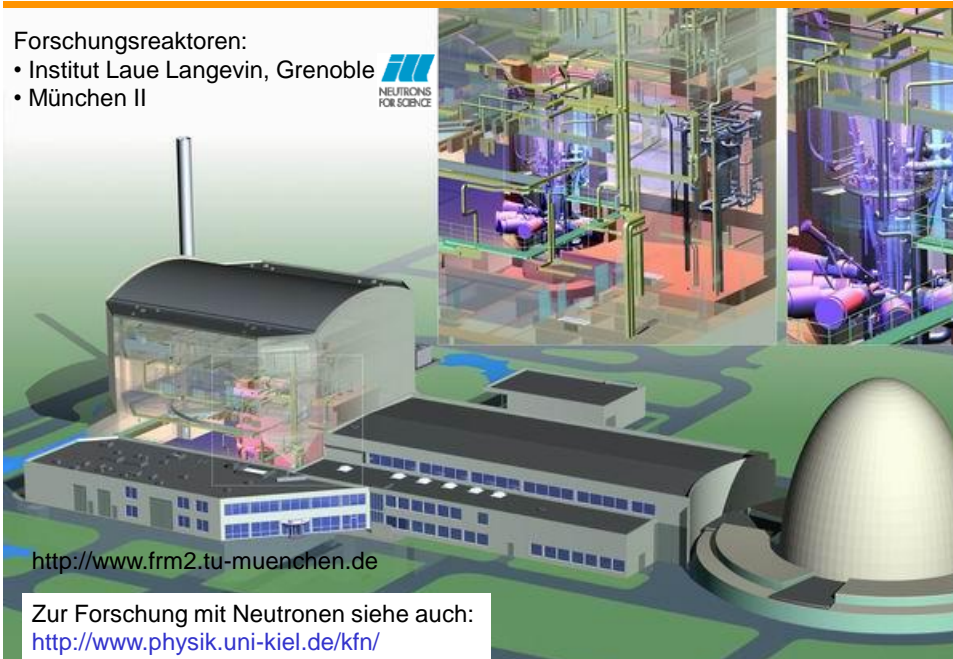
© European XFEL
<http://www.xfel.eu/de/>

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Neutronenquellen

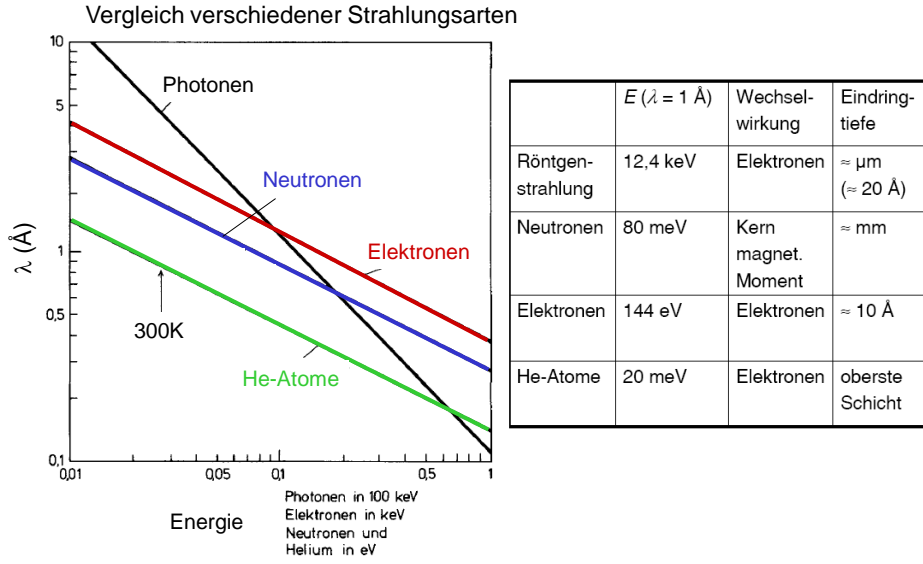
Forschungsreaktoren:

- Institut Laue Langevin, Grenoble
- München II

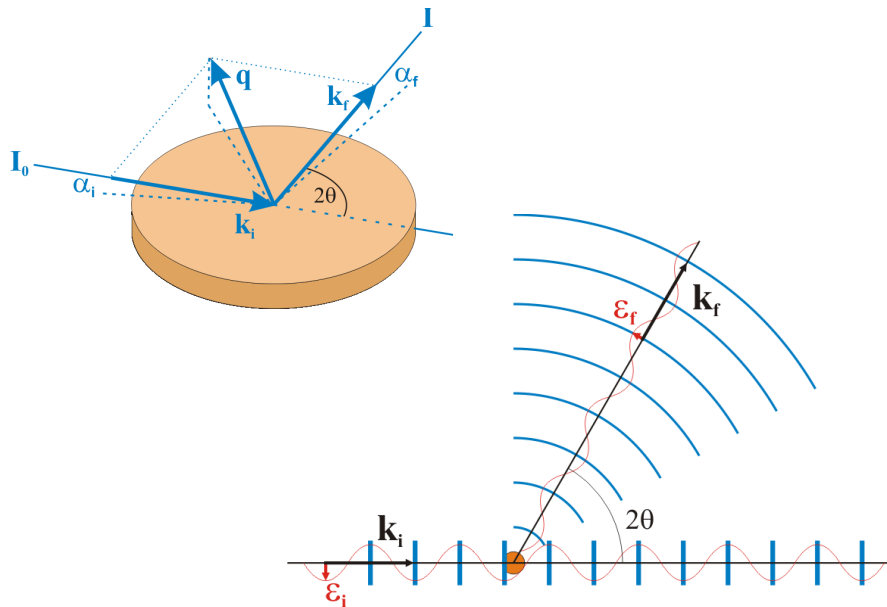


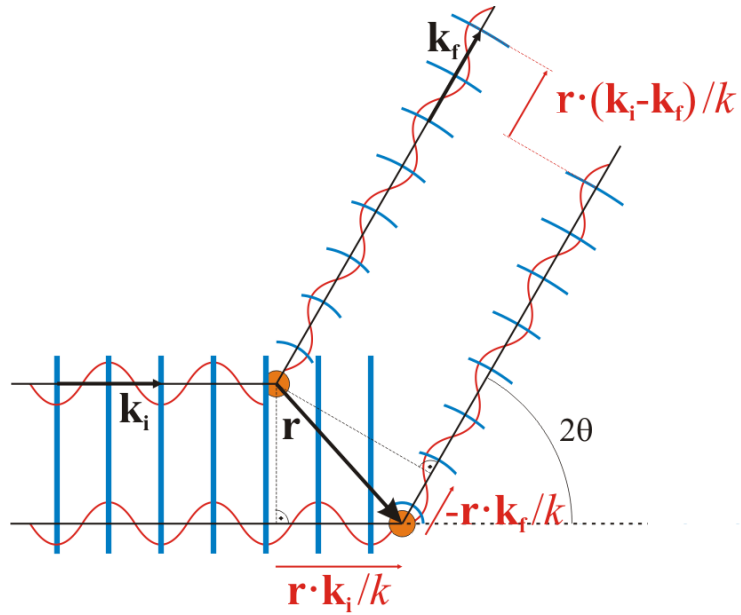
<http://www.frm2.tu-muenchen.de>

Zur Forschung mit Neutronen siehe auch:
<http://www.physik.uni-kiel.de/kfn/>

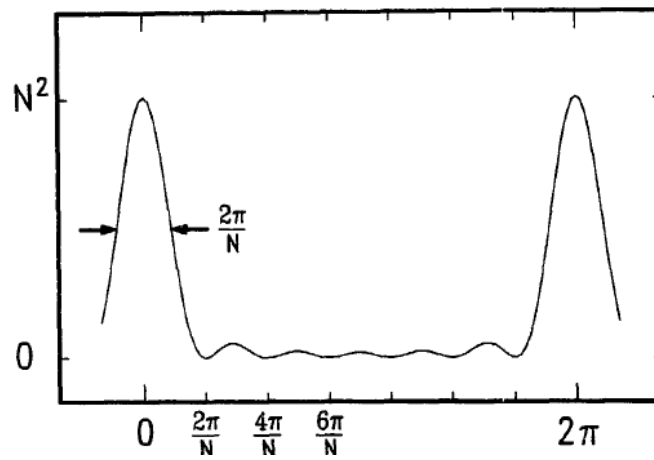


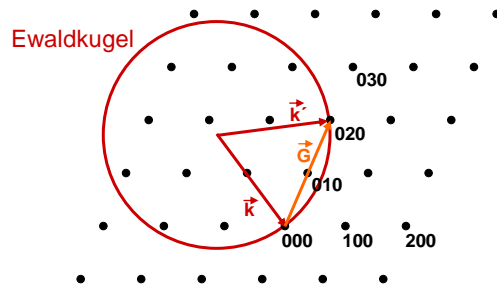
Nach Ibach/Lüth, 6. Aufl., S. 67





Beugung am N-fachen Mehrfachspalt



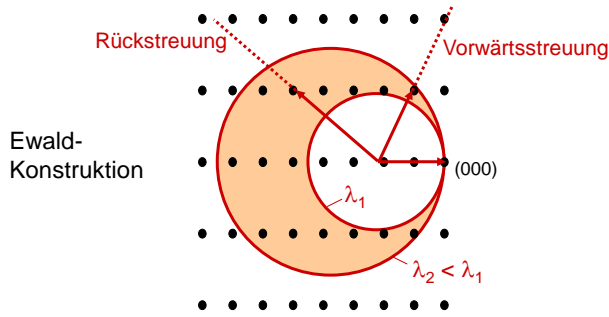


Animation:

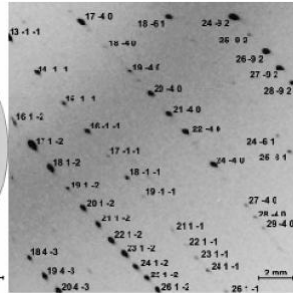
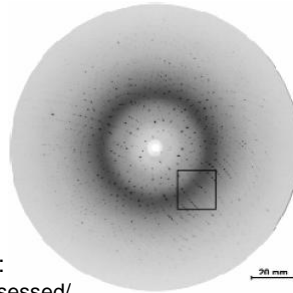
http://www.upf.pf/~guarino/virt_lab/cristallo/ewald.html

Strukturfaktoren der Reflexe im kubischen System

hkl	sc	bcc	fcc
100	f	0	0
110	f	2f	0
111	f	0	4f
200	f	2f	4f
210	f	0	0
211	f	2f	0
220	f	0	4f

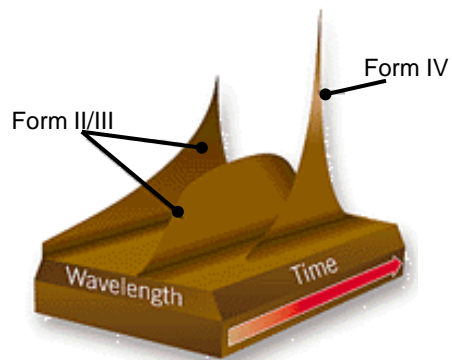
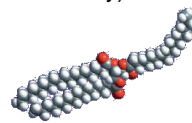
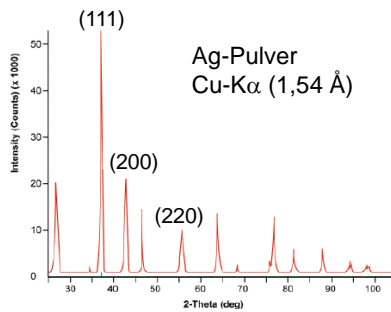


Modernes Beispiel:
zeitaufgelöste Messungen
(150 ps, ESRF / ID09)



Mehr zu Proteinkristallographie:
<http://www.thirteen.org/naturally-obsessed/>

Modernes Beispiel:
Strukturveränderungen von Kakaofett in
Schokolade während Abkühlen und Rühren
(SERC Darsbury)



4-Kreis Diffraktometer mit Eulerwiege

