

Methoden moderner Röntgenphysik II

Methods in modern X-ray physics II

Lectures for “Haupt/Masterstudiengang Physik” SS2010
including “**Proseminar**” and **Exercises**

http://hasylab.desy.de/science/studentsteaching/lectures/ss10/index_eng.html

G. Grübel, M. Martins, E. Weckert, W. Wurth, O. H. Seeck, S. Roth, W.
Caliebe, W. Drube, H. Franz, M. von Zimmermann

Location: **SemRm 3 (NOT SemRm 5)** , Physik, Jungiusstrasse

Tuesday 14:00h – 15:30h (Exercises 16:00h - 17:30h)

Thursday 10:15h – 11:45h

Proseminar on request

Methods in modern X-ray physics II (SS 2010)

Timetable:

06.Apr.	Introduction	(OHS)
06.Apr. – 15.Apr.:	Scattering at Surfaces and Interfaces	(OHS)
April	Soft Matter	(SR)
May	Spectroscopy	(WC,WD)
May	Materials Science	(MvZ, HF)
Rest of semester		W. Wurth

O. H. Seeck (OHS), S. Roth (SR), W. Caliebe (WC),
W. Drube (WD), H. Franz (HF), M. v. Zimmermann (MvZ)

Lectures available at the web-pages

http://hasylab.desy.de/science/studentsteaching/lectures/ss10/index_eng.html

Proseminar

Format: Oral presentation (45 minutes) of a proseminar topic

Procedure: Choose topic from the Proseminar list (website)

http://hasylab.desy.de/science/studentsteaching/lectures/ss10/index_eng.html

Contact supervisor or lecturer (start-up meeting + e-mail)
Prepare topic with help of supervisor
(receive literature, discuss content, discuss presentation,...)
Oral presentation

Start-up meeting:

Date to be announced
Meet your supervisor

Time: Wednesday or Thursday afternoon

preferentially at the DESY/Bahrenfeld Campus

Proseminar

- | | |
|--|-------------|
| 1) Sources of synchrotron radiation – characterisation | H. Franz |
| 2) Quality assessment of surfaces and interfaces with x-ray reflectivity | O. Seeck |
| 3) Statistical properties of interfaces determined by diffuse x-ray scattering | O. Seeck |
| 4) Structure determination of thin polymer- und nano composite films | S. Roth |
| 5) Characterizing of production processes using x-ray small angle scattering | S. Roth |
| 6) Coherent Diffraction Imaging | C. Gutt |
| 7) X-ray Photon Correlation Spectroscopy | C. Gutt |
| 8) Challenges of magnetic x-ray scattering | J. Stempfer |
| 9) Metallic glasses – structure, mechanics, glass transition | H. Franz |
| 10) Introduction in x-ray absorption spectroscopy | W. Caliebe |
| 11) Dichroism and other methods in spectroscopy | W. Caliebe |
| 12) Fluorescence spectroscopy | W. Caliebe |

Exercises

2 h. Tuesday 16:00h - 17:30h SemRm 3

First exercises : 13. April

Exercise sheets available on website each Tuesday in the week before.

Literature

Basic concepts:

[Elements of Modern X-Ray Physics](#)

J. A. Nielsen and D. McMorrow, J. Wiley&Sons (2001)

[X-Ray Diffraction](#)

B.E. Warren, DOVER Publications Inc., New York

[Principles of Optics](#)

M.Born and E. Wolf, Cambridge University Press, 7th. ed.

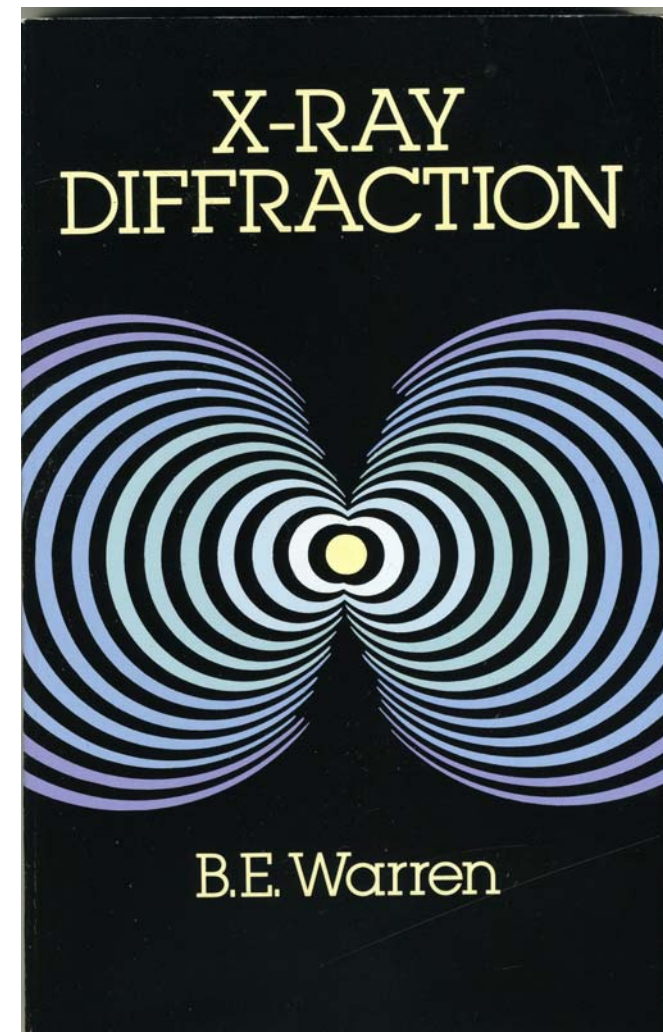
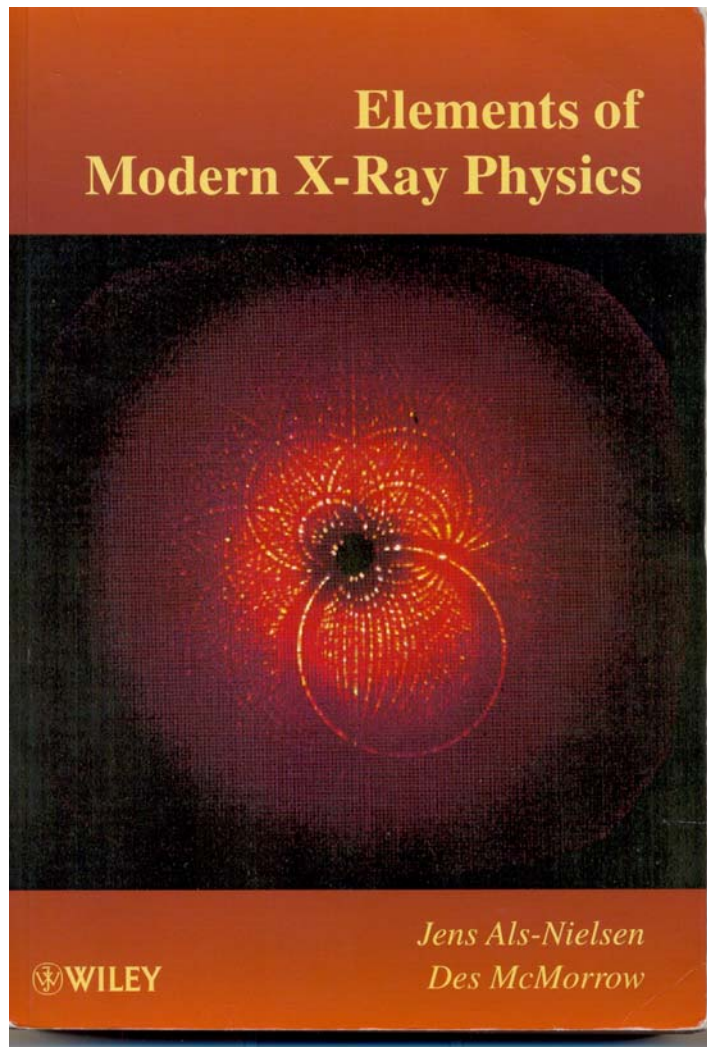
and others to be announced

Lecture Notes

http://hasylab.desy.de/science/studentsteaching/lectures/ss10/index_eng.html

also: Exercises

Proseminar literature



My part

Scattering at surfaces- and interfaces: 6.4.-15.4.

Oliver Seeck

Scattering at surfaces- and interfaces (basics)

Cut-Off of the bulk leads to a surfaces function (convolution in the scattering signal)

Crystal Truncation rods (in Born approximation only)and examples(s)

X-ray reflectivity

X-ray reflectivity as a special case of the 000-CTR (Born approximation)

X-ray reflectivity (exact formalism): roughness, anomalous scattering

Examples, instrumentation, experimental procedures, examples

Grazing Incidence Diffraction

Depth profiling using GID

Example: surface phase transition