

PAUL SCHERRER INSTITUT



WIR SCHAFFEN WISSEN – HEUTE FÜR MORGEN

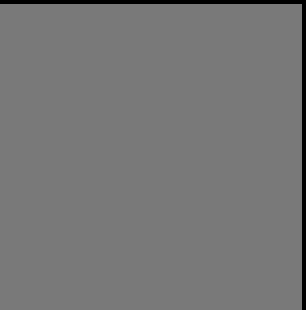
Rasmus Ischebeck

Synchrotron Radiation

Joint Universities Accelerator School

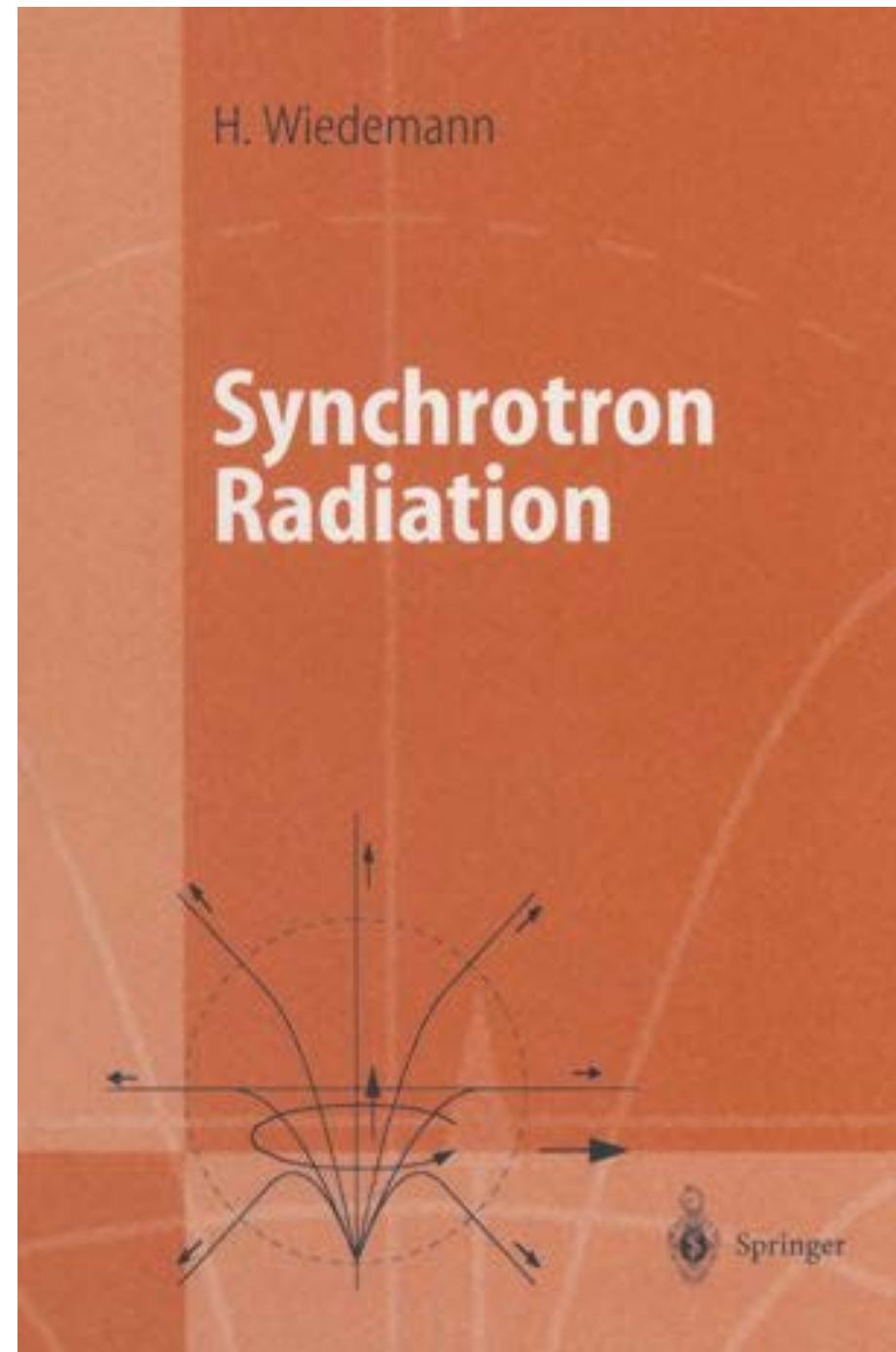


How Did You Like the Course?

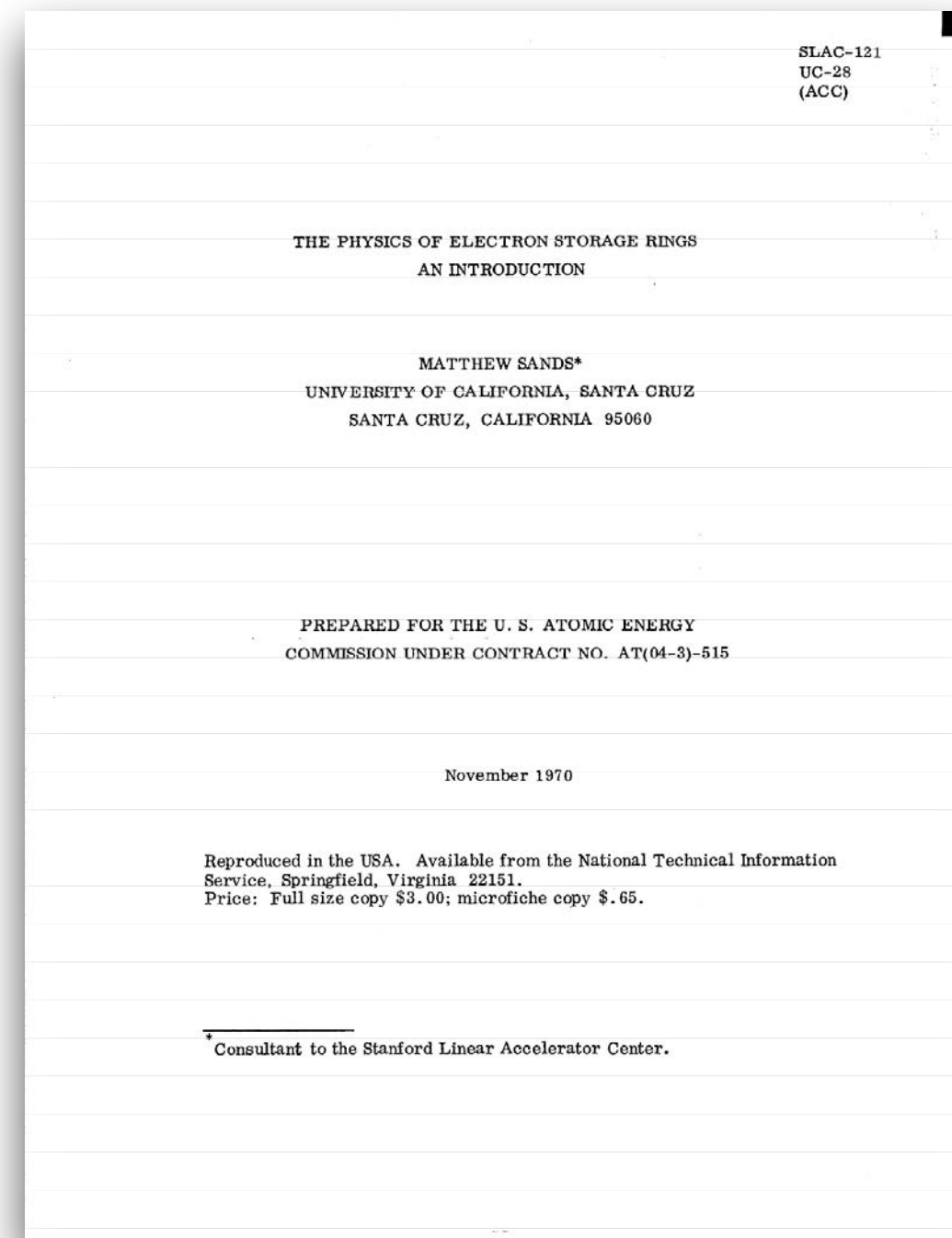


Books on synchrotrons

- Accelerator side:

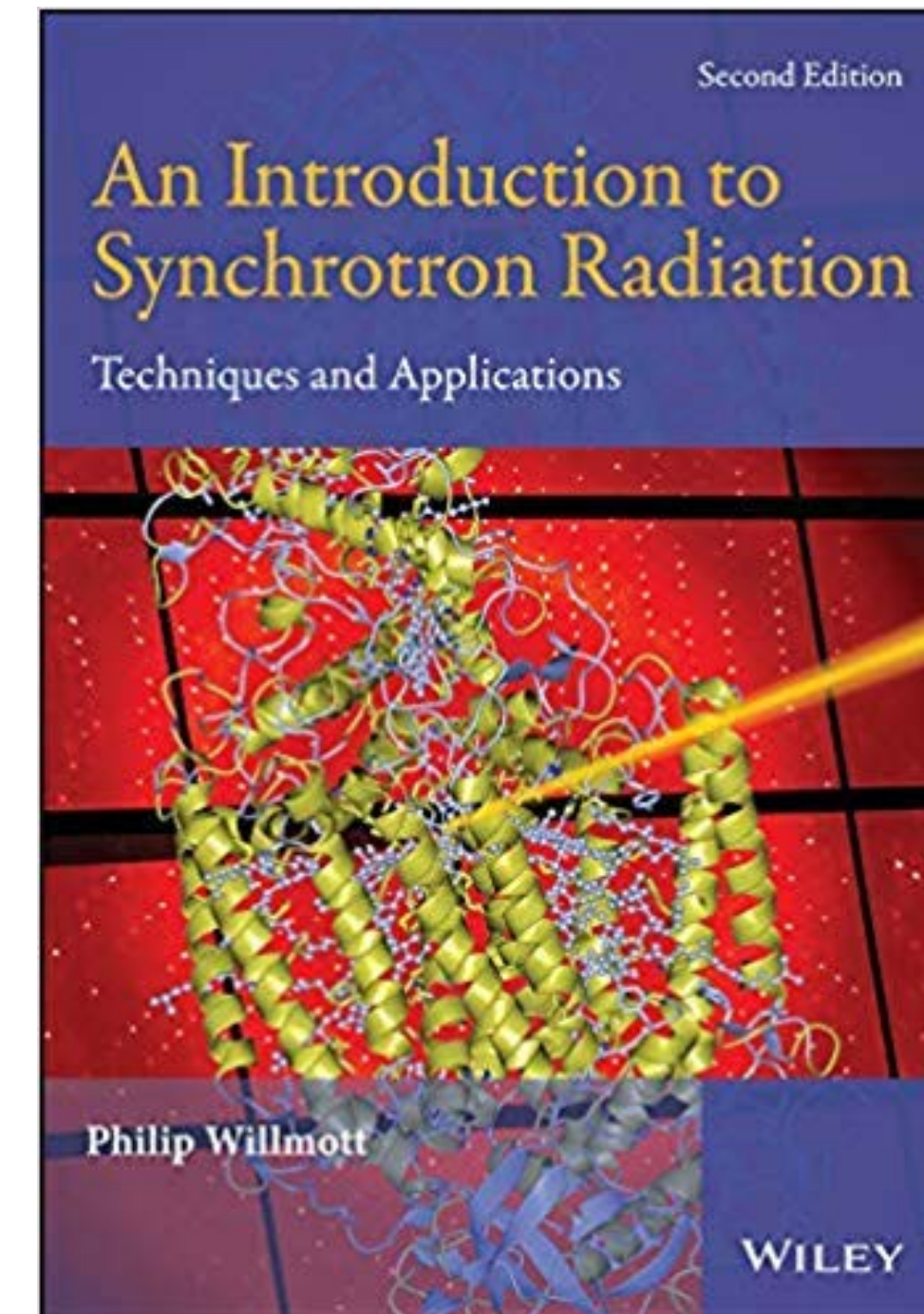


Helmut Wiedemann
Synchrotron Radiation
[3-642-07777-3; 3-662-05312-8]



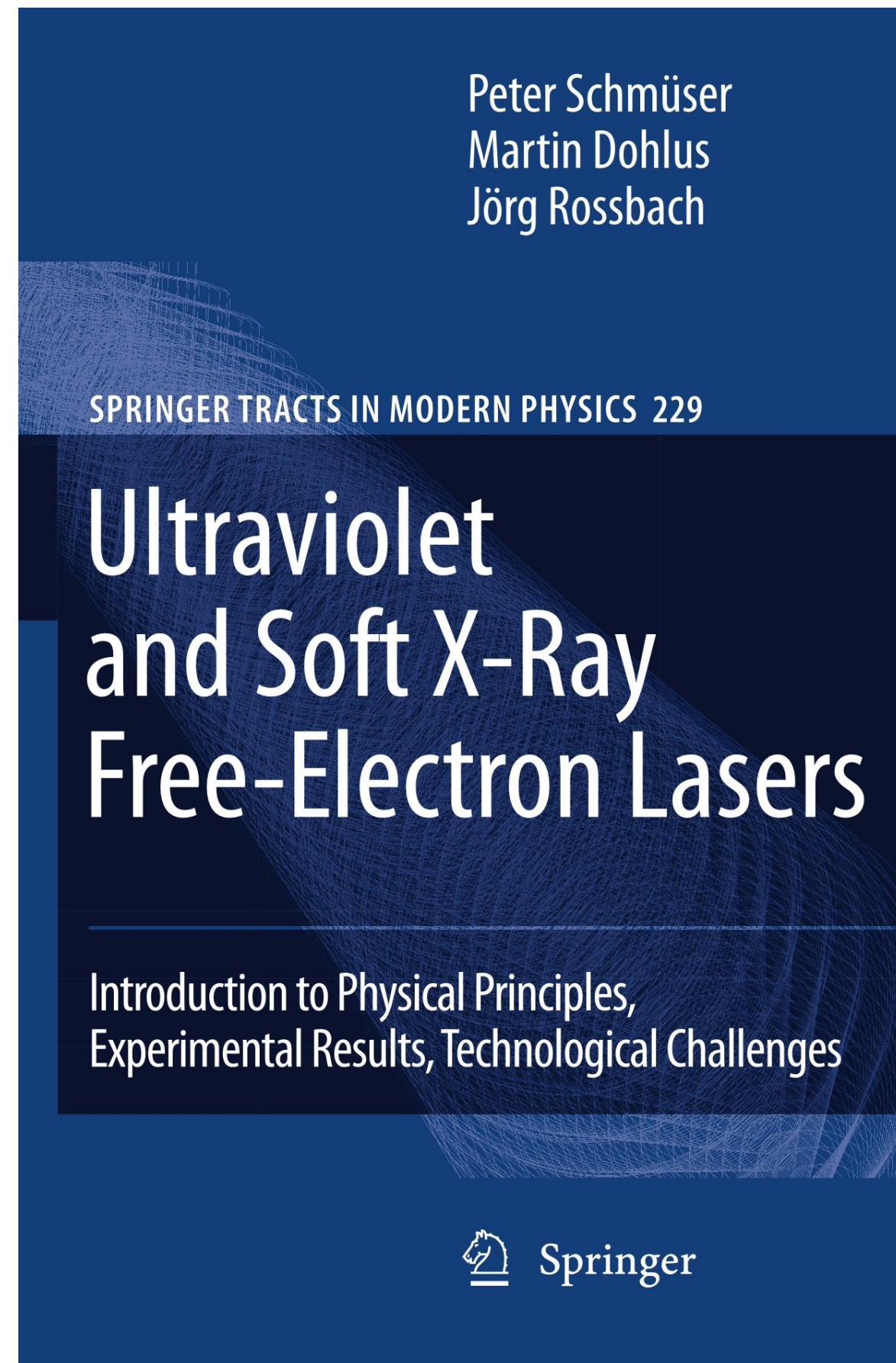
Matthew Sands
The Physics of Electron Storage Rings
SLAC-121

- User side:



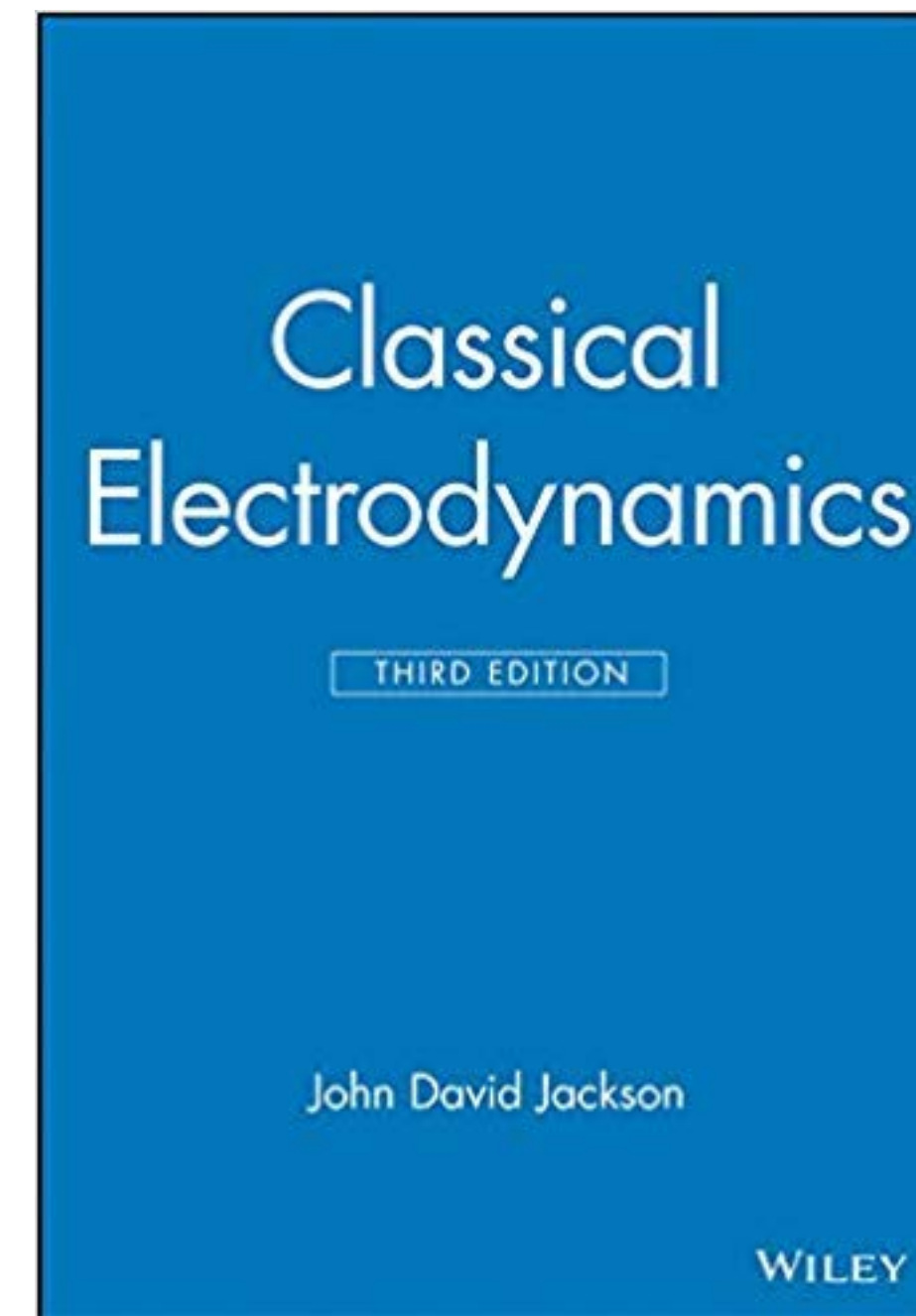
Philip Willmott
An Introduction to Synchrotron Radiation
[1119280397]

- A book on FELs



Schmüser, Dohlus & Rossbach
Ultraviolet and Soft X-Ray Free-Electron Lasers
[978-3-540-79571-1]

- Derivation of synchrotron radiation from Maxwell's Equations



John David Jackson
Classical Electrodynamics
[978-0471309321]

“Undergraduate E&M is about solving the simple problems exactly. Jackson E&M is about learning to approximate reliably. The entire book, with few exceptions, is a mathematical discussion on finding way to solve only 4 equations for different boundary conditions.” (Davon Ferrara)

henke.lbl.gov/optical_constants/

Tell us what else you wish this tool could do!
We want to make this tool even more capable and useful to you so let us know how it can be improved. [SHARE MY IDEAS](#)

CXRO
THE CENTER FOR X-RAY OPTICS

X-Ray Database

- Nanomagnetism
- X-Ray Microscopy
- EUV Lithography
- EUV Mask Imaging
- Reflectometry
- Zoneplate Lenses
- Coherent Optics
- Nanofabrication
- Optical Coatings
- Engineering
- Education
- Publications
- Contact

BERKELEY LAB

The Center for X-Ray Optics is a multi-disciplined research group within Lawrence Berkeley National Laboratory's (LBNL) Materials Sciences Division

X-Ray Interactions With Matter

Introduction

Access the [atomic scattering factor](#) files.
Look up [x-ray properties of the elements](#).
The [index of refraction](#) for a compound material.
The x-ray [attenuation length](#) of a solid.

X-ray transmission

- Of a [solid](#).
- Of a [gas](#).

X-ray reflectivity

- Of a [thick mirror](#).
- Of a [single layer](#).
- Of a [bilayer](#).
- Of a [multilayer](#).

The diffraction efficiency of a [transmission grating](#).

Related calculations:

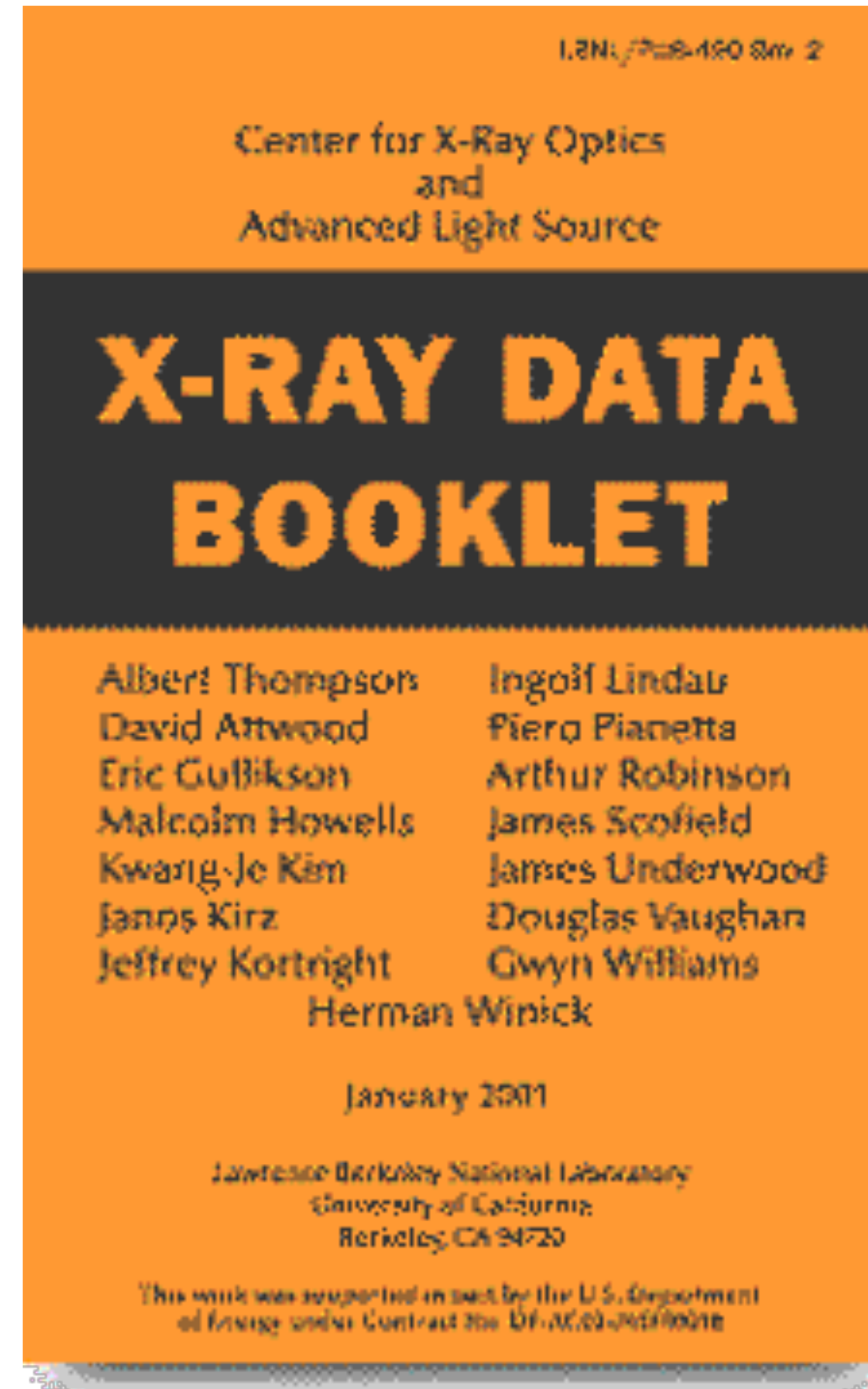
- Synchrotron [bend magnet radiation](#).

[Other x-ray web resources.](#)
[X-ray Data Booklet](#)

The screenshot shows a web browser window with the URL `courses.edx.org/dashboard`. The page features the edX logo and navigation tabs for **Courses**, **Programs**, and **Profile**. A user profile for **ischebeck** is visible in the top right corner. The main content area is titled **My Courses** and displays a course card for **Synchrotrons and X-Ray Free Electron Lasers**. The course is listed as **EPFLx - SynchrotronsX** and is marked as **Ended - May 15, 2018**. Below the course title are social media icons for settings, Twitter, and Facebook, along with a **View Archived Course** button. To the right of the course card is a promotional box with the text **Browse recently launched courses and see what's new in your favorite subjects.** and a button labeled **Explore New Courses**. The footer contains the edX logo, a list of links under the heading **edX** (About, edX for Business, Affiliates, Open edX), a **Legal** section (Terms of Service & Honor Code, Privacy Policy, Accessibility Policy), a **Connect** section (Blog, Contact Us, Help Center, Media Kit), and social media icons for Facebook, Twitter, YouTube, LinkedIn, Google+, and Reddit. At the bottom right, there are buttons for **Download on the App Store** and **GET IT ON Google play**.

The X-Ray Data Booklet

- On-line: <http://xdb.lbl.gov/xdb-new.pdf>



Resources for the Exam

- The exam will be an open-book exam.
- You are permitted to use all the course materials, as well as your notes.
- Please bring a calculator, install a calculator app on your computer/tablet, or use Python/Matlab/Mathematica. (Make sure your application runs without an online connection.)
- Please download all lecture material to your computer/tablet.
- In addition, please download from the Indico site:
 - The sheet with natural constants
 - A periodic table
- **Mobile phones are not permitted. Only your laptop/tablet is allowed.**
- **On-line connections during the exams are not permitted.**
- **Turn your Wi-Fi off, switch your tablet to airplane mode, and deposit your mobile phone with the instructors.**



Any More Questions...

- e-mail: rasmus.ischebeck@psi.ch
- web page: <https://ischebeck.net>
- see (some of) you at PSI!