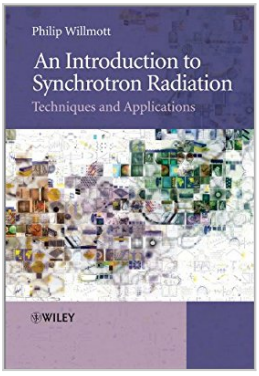

An Introduction to Synchrotron Radiation: Techniques and Applications

By Philip Willmott

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This book introduces the reader to the basic concepts of the generation and manipulation of synchrotron light, its interaction with matter, and the application of synchrotron light in the “classical” techniques, while including some of the most modern technological developments. As much as possible, complicated mathematical derivations and formulas are avoided. A more heuristic approach is adopted, whereby the general physical reasoning behind the equations is highlighted.

Key features:

- A general introduction to synchrotron radiation and experimental techniques using synchrotron radiation
- Contains many detailed “worked examples” from the literature
- Of interest for a broad audience - synchrotrons are possibly one of the best examples of multidisciplinary research
- Four-colour presentation throughout

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Editorial Review

Review

“Numerous very well-done, informative figures/graphs support the text. Chapters are well referenced, up-to-date, and very readable. Summing Up: Recommended. Lower-division undergraduates and above in physics. (*Choice*, 1 July 2012)

From the Back Cover
Since the first use of synchrotron light to investigate the properties of materials half a century ago, it has become increasingly recognized as an invaluable research tool by a broad spectrum of scientists, ranging from physicists and chemists, through molecular biologists and environmental scientists, to geologists and archaeologists. This rising demand for access to synchrotron radiation has also expressed itself in a recent increase in the construction of facilities worldwide to accommodate this diverse and burgeoning user community. Modern synchrotron facilities are therefore one of the premier examples of multidisciplinary research. Major applications of synchrotron light include condensed-matter physics, materials science, catalytical chemistry, structural biology, biological and soft-matter imaging, archaeology, and medicine.

This book introduces the reader to the basic concepts of the generation and manipulation of synchrotron light, its interaction with matter, and the application of synchrotron light in classical techniques. As well as including fundamentals of the main experimental methods, many of the most recent technological developments are described, especially with regards to detectors, time-resolved studies, and the advent of fourth-generation sources. Detailed descriptions, including full-colour illustrations, of the underlying physics and experimental applications are presented, while worked examples facilitate learning from a practical perspective.

Undergraduate and postgraduate students from all areas of natural and physical sciences working with synchrotron light will benefit from this informative text and its heuristic style. In addition, synchrotron scientists and facility staff will find this book a useful reference regarding essential synchrotron radiation techniques and beamline infrastructure, and in optimizing the use of synchrotron light in this rapidly developing multifaceted enterprise.

About the Author
Philip Willmott is a physicist with over 25 years' experience in diverse aspects of experimental physics and materials science. He was based at the Physical Chemistry Institute of Zurich University between 1995 and 2001, researching in surface science and teaching undergraduate courses in physical chemistry. He has been teaching elective courses in surface science, laser physics, and introductory courses in synchrotron physics and techniques since 2001 and has been a titular professor in the Physics Institute of Zurich University since 2009. He became the Beamline Manager at the Materials Science beamline of the Swiss Light Source at the Paul Scherrer Institut in 2007.

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