
Preface

This book is based on the joint research activities of specialists in X-ray and neutron optics from 11 countries, working together under the framework of the European Programme for Cooperation in Science and Technology (COST, Action P7), initiated by Dr. Pierre Dhez in 2002–2006, and describes modern developments in reflective, refractive and diffractive optics for short wavelength radiation as well as recent theoretical approaches to modelling and ray-tracing the X-ray and neutron optical systems. The chapters are written by the leading specialists from European laboratories, universities and large facilities. In addition to new ideas and concepts, the contents provide practical information on recently invented devices and methods.

The main objective of the book is to broaden the knowledge base in the field of X-ray and neutron interactions with solid surfaces and interfaces, by developing modelling, fabrication and characterization methods for advanced innovative optical elements for applications in this wavelength range. This aim follows from the following precepts:

- Increased knowledge is necessary to develop new types of optical elements adapted to the desired energy range, as well as to improve the efficiency and versatility of existing optics.
- Enhanced optical performances will allow a significant increase in the range of applications possible with current and future X-ray and neutron sources.
- Better cooperation between national groups of researchers in the design and application of X-ray and neutron optics will lead to improvements in many key areas fundamental to societal and economic developments.

Behind each of these precepts is the knowledge that similar optical components are required in many X-ray and neutron systems, although the optics may have originally been developed primarily for X-rays (e.g., zone plates) or for neutrons (e.g., multilayer supermirrors). Bringing together expertise from both fields has led to efficient, cost-effective and enhanced solutions to common problems.

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