Yariv Optical Waves In Crystals Solution Joburgore

A non-linear wave is one of the fundamental objects of nature. They are inherent to aerodynamics and hydrodynamics, solid state physics and plasma physics, optics and field theory, chemistry reaction kinetics and population dynamics, nuclear physics and gravity. All non-linear waves can be divided into two parts: dispersive waves and dissipative ones. The history of investigation of these waves has been lasting about two centuries. In 1834 J. S. Russell discovered the extraordinary type of waves without the dispersive broadening. In 1965 N. J. Zabusky and M. D. Kruskal found that the Korteweg-de Vries equation has solutions of the solitary wave form. This solitary wave demonstrates the particle-like properties, i. e. , stability under propagation and the elastic interaction under collision of the solitary waves. These waves were named solitons. In succeeding years there has been a great deal of progress in understanding of soliton nature. Now solitons have become the primary components in many important problems of nonlinear wave dynamics. It should be noted that non-linear optics is the field, where all soliton features are exhibited to a great extent. This book had been designed as the tutorial to the theory of non-linear waves in optics. The first version was projected as the book covering all the problems in this field, both analytical and numerical methods, and results as well. However, it became evident in the process of work that this was not a real task.

This monograph collects together papers by leading researchers in the field of photorefractive nonlinear optics. All of the works are presented by eminent researchers in their field and cover topics such as wave mixing in nonlinear optical materials; photorefractive semiconductors; organic photorefractive materials and volume holographic storage. Progress in Photorefractive Nonlinear Optics consists of chapters written by authors all serving as invited speakers to the Waseda International Symposium on Phase Conjugation and Wave Mixing held in Japan in 1997. This integrated collection of papers will be vital reading for all researchers or students of Master's level and above in the fields of optics, physical chemistry and material science.

Nonlinear Optical Crystals contains the most complete and up-to-date reference material on properties of nonlinear optical crystals including: Traditional and specific applications The mathematical formulas necessary for the calculation of the frequency conversion process A survey of 63 nonlinear optical crystals containing more than 1500 different references with full titles Recent applications of common and novel nonlinear materials, including quasi-phase matching Special consideration for periodically-poled and self-frequency-doubling materials Significant amount of crystallophysical, thermophysical, spectroscopic, electro-optic and magneto-optic information

This book, intended for students, researchers and engineers, is a collection of classic papers on photorefractive nonlinear optics. Included are landmark papers on fundamental photorefractive phenomena, two-wave mixing, four-wave mixing, phase conjugators and resonators, material growth and physics, and applications in image processing, optical storage and optical computing.

Das Buch enthält folgende Beiträge: R.B. Heimann, Edmonton, J. Kleiman, Downsview, Canada: Schock-induziertes Wachstum von superharten MaterialienD. Schwabe, Gie€en, FRG: Durch Oberflächenspannungsgradienten getriebene Konvektion in KristallzuchtschmelzenH.-J. Weber, Dortmund, FRG: Elektrooptische Effekte, Kristalle und Bauteile.

The fundamental science and latest applications of liquid crystal technologies An excellent professional reference and superior upper-level student text, Liquid Crystals, Second Edition is a comprehensive treatment of all the basic principles underlying the unique physical and optical properties of liquid crystals. Written by an internationally known pioneer in the nonlinear optics of liquid crystals, the book also provides a unique, in-depth discussion of the

mechanisms and theoretical principles behind all major nonlinear optical phenomena occurring in liquid crystals. Fully revised and updated with the latest developments, this Second Edition covers: Basic physics and optical properties of liquid crystals Nematics, as well as other mesophases such as smectics, ferroelectrics, and cholesterics Fundamentals of liquid crystals for electro-optics, and display and non-display related applications Various theoretical and computational techniques used in describing optical propagation through liquid crystals and anisotropic materials Nonlinear optics of liquid crystals, including updated literature reviews and fundamental discussions Structured to follow a natural sequence of instruction, from basic physics to the latest specialized optical, electro-optical, and nonlinear applications, Liquid Crystals is a textbook that grounds students in the fundamentals before introducing them to the most current discoveries in the field. Written in a clear, reader-friendly style, it features numerous figures, tables, and illustrations, including important and hard-to-find device and material parameters. Invaluable to students, researchers, and those working with liquid crystal applications in various industries, Liquid Crystals, Second Edition is the most comprehensive and up-to-date resource available.

Guiding, Diffraction, and Confinement of Optical Radiation presents a wide array of research studies on optics and electromagnetism. This book is organized into eight chapters that cover the problems related to optical radiation propagation and confinement. Chapter I examines the general features of electromagnetic propagation and introduces the basic concepts pertaining to the description of the electromagnetic field and its interaction with matter. Chapter II is devoted to asymptotic methods of solution of the wave equation, with particular emphasis on the asymptotic representation of the field in the form of the Luneburg-Kline series. This chapter also looks into a number of optical systems characterized by different refractive index distributions relying on the eikonal equation. Chapter III deals with stratified media, such as the multilayered thin films, metallic and dielectric reflectors, and interference filters. Chapters IV and V discuss the problem of propagation and diffraction integrals. Chapter VI describes the scattering from obstacles and the metallic and dielectric gratings. Chapters VII considers the passive and active resonators employed in connection with laser sources for producing a confinement near the axis of an optical cavity and Fabry-Perot interferometers and mainly relies on the use of diffraction theory. Chapter VIII presents the analytic approach to the study of transverse confinement near the axis of a dielectric waveguide hinges on the introduction of modal solutions of the wave equation. This book will be of value to quantum electronics engineers, physicists, researchers, and optics and electromagnetism graduate students.

A concise, comprehensive reference text covering electro-optical systems, optical system design, optical physics, holography, Fourier optics, and optical metrology. It emphasizes physical insight aimed at engineering applications. This book is suitable as an advanced undergraduate or graduate level text; problems and solutions are included.

The field of integrated- or guided-wave optics has experienced significant and continuous growth since its inception in the late 1960s. There has been a considerable increase in research and development activity in this field worldwide and some significant advances in the realization of working in tegrated optic devices and modules have been made in recent years. In fact, there have already been some commercial manufacturing and technical ap plications of such devices and modules. The guided-wave-acoustooptics involving Bragg interactions between guided optical waves and surface acoustic waves is one of the areas of in tegrated-optics that has reached some degree of scientific and technological maturity. This topical volume is devoted to an in-depth treatment of this emerging branch of science and technology. Presented in this volume are concise treatments on bulk-wave acoustooptics, guided-wave optics, and surface acoustic waves, and detailed studies of guided-wave acoustooptic Bragg diffraction in three promising material substrates, namely, LiNb0 , 3 ZnO/Si0 , and GaAs, the resulting wide band modulators and deflectors, 2 and applications. The chapters cover not only

the basic principles and the oretical analysis, but also the design, fabrication, and measurement of the resulting devices and modules, and their applications.
"Coverage of each topic includes examples and problems, all of which are original and derived from realistic applications, such as optical configuration for automatic inspection in industry, surveying systems, robot navigation, X-ray imaging, computerized radiography, microscopy vision and measurements, laser Doppler technique and flow study, non-contact measurement of temperature, acousto-optical scanners, spectral analysis, and more."--BOOK JACKET.
NOW UPDATED—THE HIGHLY PRACTICAL GUIDE TO ANALYZING LIQUIDCRYSTAL DISPLAYS The subject of liquid crystal displays has vigorously evolvedinto an exciting interdisciplinary field of research anddevelopment, involving optics, materials, and electronics. Updatedto reflect recent advances, the Second Edition of Optics ofLiquid Crystal Displays now offers a broader, morecomprehensive discussion on the fundamentals of display systems andteaches readers how to analyze and design new components andsubsystems for LCDs. New features of this edition include: Discussion of the dynamics of molecular reorientation Expanded information of the method of Poincaré sphere invarious optical components, including achromatic wave plates andcompensators Neutral and negative Biaxial thin films for compensators Circular polarizers and anti-reflection coatings The introduction of wide field-of-view wave plates andfilters Comprehensive coverage of VA-LCD and IPS-LCD Additional numerical examples This updated edition is intended as a textbook for students inelectrical engineering and applied physics, as well as a referencebook for engineers and scientists working in the area of researchand development of display technologies.
This book begins by introducing magnetism and discusses magnetic properties of materials, magnetic moments of atoms and ions, and the elements important to magnetism. It covers magnetic susceptibilities and electromagnetic waves in anisotropic dispersive media among other topics. There are problems at the end of each chapter, many of which serve to expand or explain the material in the text. The bibliographies for each chapter give an entry to the research literature.
The field of optics has been accelerating at an unprecedented rate, due both to the tremendous growth of the field of fiber-optic communications, and to the improvement of optical materials and devices. Throughput capabilities of fiber systems are accelerating faster than Moore's law, the famous growth rate of silicon chip capability, which has propelled that industry relentlessly over decades. In addition, new optical storage techniques push the limits of information density, with an ever decreasing cost per bit of storage. Economic investment in photonics is at an all-time high. At the same time, other fields of optics, adaptive optics for instance, are bringing new capabilities to more classical applications such as astronomical imaging. New lasers continue to be developed, with applications in display, sensing, and biomedicine following at ever-shorter intervals after the initial discoveries. Given this background, the NATO Mediterranean Dialog Advanced Research Workshop on Unconventional Optical Elements for Information Storage, Processing and Communications, held in Israel on October 19-21, 1998, came at an opportune moment in the history of optics. Its aim was to overview the current state-of-the-art and encourage cooperation in the Mediterranean region, with a view to highlighting and enhancing the existing potential for further development and innovation. The workshop included participants from Belgium, France, Germany, Greece, Israel, Italy, Jordan, Morocco, Portugal, Romania, Russia, Switzerland, Turkey, United Kingdom and USA.
The Handbook of Applied Superconductivity, Two-Volume Set covers all important aspects of applied superconductivity and the supporting low-temperature technologies. The handbook clearly demonstrates the capabilities of superconducting technologies and illustrates how to implement these technologies in new areas of academic and industrial research and development. Volume One provides an introduction to the theoretical background of both low

and high Tc superconductivity, followed by details of the basic hardware such as wires, tapes, and cables used in applications of superconductivity and the necessary supporting science and technology. Theoretical discussions are in most cases followed by examples of real designs, fabrication techniques, and practical instrumentation guidance. A final chapter examines materials properties at low temperatures. Volume Two provides examples of current and future applications of superconductivity. It covers medical systems for magnetic resonance imaging (MRI), high field magnets for research, superconducting magnets for accelerators, industrial systems for magnetic separation, and transportation systems. The final chapters look to future applications in power and superconducting electronics. With fully referenced, peer-refereed contributions from experts in various fields, this two-volume work is an essential reference for a wide range of scientists and engineers in academic and industrial research and development environments.

Diode Lasers and Photonic Integrated Circuits, Second Edition provides a comprehensive treatment of optical communication technology, its principles and theory, treating students as well as experienced engineers to an in-depth exploration of this field. Diode lasers are still of significant importance in the areas of optical communication, storage, and sensing. Using the the same well received theoretical foundations of the first edition, the Second Edition now introduces timely updates in the technology and in focus of the book. After 15 years of development in the field, this book will offer brand new and updated material on GaN-based and quantum-dot lasers, photonic IC technology, detectors, modulators and SOAs, DVDs and storage, eye diagrams and BER concepts, and DFB lasers. Appendices will also be expanded to include quantum-dot issues and more on the relation between spontaneous emission and gain.

This is the first volume of a set of three within the Springer Series in Optical Sciences, and is devoted to photorefractive effects, photorefractive materials, and their applications. Since the publication of our first two Springer books on Photorefractive Materials and Their Applications (Topics in Applied Physics, Vols. 61 and 62) almost 20 years ago, a lot of research has been done in this area. New and often expected effects have been discovered, theoretical models developed, known effects finally explained, and novel applications proposed. We believe that the field has now reached a high level of maturity, even if research continues in all areas mentioned above and with new discoveries arriving quite regularly. We therefore have decided to invite some of the top experts in the field to put together the state of the art in their respective fields. This after we had been encouraged to do so for more than ten years by the publisher, due to the fact that the former volumes were long out of print.

This book presents an analytical theory of the electronic states in ideal low dimensional systems and finite crystals based on a differential equation theory approach. It provides precise and fundamental understandings on the electronic states in ideal low-dimensional systems and finite crystals, and offers new insights into some of the basic problems in low-dimensional systems, such as the surface states and quantum confinement effects, etc., some of which are quite different from what is traditionally believed in the solid state physics community. Many previous predictions have been confirmed in subsequent investigations by other authors on various relevant problems. In this new edition, the theory is further extended to one-dimensional photonic crystals and phononic crystals, and a general theoretical formalism for investigating the existence and properties of surface states/modes in semi-infinite one-dimensional crystals is developed. In addition, there are various revisions and improvements, including using the Kronig-Penney model to illustrate the analytical theory and make it easier to

understand. This book is a valuable resource for solid-state physicists and material scientists.

The aim of this book is to present the theoretical foundations of modeling the optical characteristics of liquid crystal displays, critically reviewing modern modeling methods and examining areas of applicability. The modern matrix formalisms of optics of anisotropic stratified media, most convenient for solving problems of numerical modeling and optimization of LCD, will be considered in detail. The benefits of combined use of the matrix methods will be shown, which generally provides the best compromise between physical adequacy and accuracy with computational efficiency and optimization facilities in the theoretical model. The book will include algorithms for solving common problems of LCD optics, and will give recommendations of how to build the basic theoretical model and choose mathematical tools to solve particular problems. Special attention will be paid to solving optimization and inverse problems of liquid crystal optics. Earlier books have covered the classic Jones Matrix method, but the authors will cover the newer, more universal and successful electrodynamic Jones matrix method; this has extremely high accuracy and is especially useful in oblique light incidence and because it acknowledges multiple reflection. This book will prove a useful tool for developers of new generations of liquid crystal displays, and for scientists dealing with optical investigation of liquid crystals. An appendix will be provided which includes a robust technique for calculating the equilibrium LC director field in 1D case.

This book collects chapters on different theoretical and experimental aspects of photonics crystals for Nanophotonics applications. It is divided in two parts - a theoretical section and an experimental and applicative section. The first part includes chapters developing several numerical methods for analysis and design of photonic crystal devices, such as 2D ring resonators for filters, single and coupled nanobeam cavities, birefringence in photonic crystal cavities, threshold analysis in photonic crystal lasers, gap solitons in photonic crystals, novel photonic atolls, dynamic characteristics of photonic crystal filters. The second part focuses on some aspects of photonic crystals fabrication and relevant applications, such as nitrogen defect technology in diamond, silicon nitride free standing membranes, photonic crystals structures in silicon, photonic crystals for optical sensing.

This book provides an in-depth description and discussion of different multi-modal diagnostic techniques for cancer detection and treatment using exact optical methods, their comparison, and combination. Coverage includes detailed descriptions of modern state of design for novel methods of optical non-invasive cancer diagnostics; multi-modal methods for earlier cancer diagnostic enhancing the probability of effective cancer treatment; modern clinical trials with novel methods of clinical cancer diagnostics; medical and technical aspects of clinical cancer diagnostics, and long-term monitoring. Biomedical engineers, cancer researchers, and scientists will find the book to be an invaluable resource.

Introduces optical imaging strategies; Focuses on multimodal optical diagnostics as a fundamental approach; Discusses novel methods of optical non-invasive cancer diagnostics.

Magnetic materials can support propagating waves of magnetization; since these are oscillations in the magnetostatic properties of the material, they are called magnetostatic waves (sometimes "magnons" or "magnetic polarons"). Under the proper circumstances these waves can exhibit, for example, either dispersive or nondispersive, isotropic or anisotropic propagation, nonreciprocity, frequency-selective nonlinearities, soliton propagation, and chaotic behavior. This rich variety of behavior has led to a number of proposed applications in microwave and optical signal processing. This textbook begins by discussing the basic physics of magnetism in magnetic insulators and the propagation of electromagnetic waves in anisotropic dispersive media. It then treats magnetostatic modes, describing how the modes are excited, how they propagate, and how they interact with light. There are problems at the end of each chapter; many of these serve to expand or explain the material in the text. To enhance the book's usefulness as a reference, the answers are given for many of the problems. The bibliographies for each chapter give an entry to the research literature. Magnetostatic Waves will thus serve not only as an introduction to an active area of research, but also as a handy reference for workers in the field.

As most crystals are generated by crystals, the interaction between light and crystals is vital to the success of any optics-related endevour. This paperback reprint provides a new generation of engineers and physicists with the fundamental knowledge needed to study this complex interaction.

A comprehensive review of optical pattern recognition techniques and implementations, for graduate students and researchers.

The invention of the laser was one of the towering achievements of the twentieth century. At the opening of the twenty-first century we are witnessing the burgeoning of the myriad technical innovations to which that invention has led. The Handbook of Laser Technology and Applications is a practical and long-lasting reference source for scientists a

Since the early days of nonlinear optics in the 1960s, the field has expanded dramatically, and is now a vast and vibrant field with countless technological applications. Providing a gentle introduction to the principles of the subject, this textbook is ideal for graduate students starting their research in this exciting area. After basic ideas have been outlined, the book offers a thorough analysis of second harmonic generation and related second-order processes, before moving on to third-order effects, the nonlinear optics of short optical pulses and coherent effects such as electromagnetically-induced transparency. A simplified treatment of high harmonic generation is presented at the end. More advanced topics, such as the linear and nonlinear optics of crystals, the tensor nature of the nonlinear coefficients and their quantum mechanical representation, are confined to specialist chapters so that readers can focus on basic principles before tackling these more difficult aspects of the subject.

The Only Source You Need for Understanding the Design and Applications of Photonic Crystal-Based Devices This book presents in detail the fundamental theoretical background necessary

to understand the unique optical phenomena arising from the crystalline nature of photonic-crystal structures and their application across a range of disciplines. Organized to take readers from basic concepts to more advanced topics, the book covers: Preliminary concepts of electromagnetic waves and periodic media Numerical methods for analyzing photonic-crystal structures Devices and applications based on photonic bandgaps Engineering photonic-crystal dispersion properties Fabrication of two- and three-dimensional photonic crystals The authors assume an elementary knowledge of electromagnetism, vector calculus, Fourier analysis, and complex number analysis. Therefore, the book is appropriate for advanced undergraduate students in physics, applied physics, optics, electronics, and chemical and electrical engineering, as well as graduate students and researchers in these fields.

This book reviews techniques used to characterize non-linear optical constants of chalcogenide glasses in bulk or thin films, and presents the properties of many chalcogenide systems. A range of applications of these glasses are surveyed, including ultra-fast switching, optical limiting, second harmonic generation and electro-optic effects. Also addressed are suitability of chalcogenide films in all-optical integrated circuits, fabrication of rib as well as ridge waveguides and of fiber gratings.

This book will address the advances, applications, research results, and emerging areas of optics, photonics, computational approaches, nano-photonics, bio-photonics, with applications in information systems. The objectives are to bring together novel approaches, analysis, models, and technologies that enhance sensing, measurement, processing, interpretation, and visualization of information. The book will concentrate on new approaches to information systems, including integration of computational algorithms, bio-inspired models, photonics technologies, information security, bio-photonics, and nano-photonics. Applications include bio-photonics, digitally enhanced sensing and imaging systems, multi-dimensional optical imaging and image processing, bio-inspired imaging, 3D visualization, 3D displays, imaging on nano-scale, quantum optics, super resolution imaging, photonics for biological applications, microscopy, information optics, and holographic information systems.

Optical Waves in CrystalsPropagation and Control of Laser RadiationWiley-Interscience

The advances of photorefractive optics have demonstrated many useful and practical applications, which include the development of photorefractive optic devices for computer communication needs. To name a couple significant applications: the large capacity optical memory, which can greatly improve the accessible high-speed CD-ROM and the dynamic photorefractive gratings, which can be used for all-optic switches for high-speed fiber optic networks. This book is an important reference both for technical and non-technical staffs who are interested in this field. * Covers the recent development in materials, phenomena, and applications * Includes growth, characterization, dynamic gratings, and liquid crystal PR effect * Includes applications to photonic devices such as large capacity optical memory, 3-D interconnections, and dynamic holograms * Provides the recent overall picture of current trends in photorefractive optics * Includes optical and electronic properties of the materials as applied to dynamic photorefractive fiber

In the thirty-seven years that have gone by since the first volume of Progress in Optics was published, optics has become one of the most dynamic fields of science. At the time of inception of this series, the first lasers were only just becoming operational, holography was in its infancy, subjects such as fiber optics, integrated optics and optoelectronics did not exist and quantum optics was the domain of only a few physicists. The term photonics had not yet been coined. Today these fields are flourishing and have become areas of specialisation for many science and engineering students and numerous research workers and engineers throughout the world. Some of the advances in these fields have been recognized by awarding Nobel prizes to seven physicists in the last twenty years. The volumes in this series which have appeared up to now contain nearly 190 review articles by distinguished research workers,

which have become permanent records for many important developments. They have helped optical scientists and optical engineers to stay abreast of their fields. There is no sign that developments in optics are slowing down or becoming less interesting. - Gaussian apodization and beam propagation - Electromagnetically-induced transparency - Three-dimensional electromagnetic fields - Quantum cryptography - Optical quantum cloning

This volume contains papers presented at the NATO Advanced Study Institute (ASI) Photonic Crystals and Light Localization held at the Creta Maris Hotel in Limin Hersonissou, Crete, June 18-30, 2000. Photonic crystals offer unique ways to tailor light and the propagation of electromagnetic waves (EM). In analogy to electrons in a crystal, EM waves propagating in a structure with a periodically modulated dielectric constant are organized into photonic bands, separated by gaps where propagating states are forbidden. There have been proposals for novel applications ofthese photonic band gap (PBG) crystals, with operating frequencies ranging from microwave to the optical regime, that include zero threshold lasers, low-loss resonators and cavities, and efficient microwave antennas. Spontaneous emission, suppressed for photons in the photonic band gap, offers novel approaches to manipulate the EM field and create high-efficiency light-emitting structures. Innovative ways to manipulate light can have a profound iofluence on science and technology.

????:Optical waves in crystals

Here, more than 20 experts from leading research institutes around the world present the entire scope of this rapidly developing field. In so doing, they cover a wide range of topics, including the characterization and investigation of structural, dielectric and piezoelectric properties of ceramic materials, a well as phase transitions, electrical and optical properties and microscopic investigations. Another feature is a complete profile of the properties of polar oxides -- from their proof to their latest applications. Throughout, the authors review, discuss and assess the material properties with regard to new and advanced characterization and imaging techniques. For physicists, physicochemists, semiconductor and solid state physicists, materials scientists, and students of chemistry and physics.

Since its inception in 1966, the series of numbered volumes known as Semiconductors and Semimetals has distinguished itself through the careful selection of well-known authors, editors, and contributors. The "Willardson and Beer" Series, as it is widely known, has succeeded in publishing numerous landmark volumes and chapters. Not only did many of these volumes make an impact at the time of their publication, but they continue to be well-cited years after their original release. Recently, Professor Eicke R. Weber of the University of California at Berkeley joined as a co-editor of the series. Professor Weber, a well-known expert in the field of semiconductor materials, will further contribute to continuing the series' tradition of publishing timely, highly relevant, and long-impacting volumes. Some of the recent volumes, such as Hydrogen in Semiconductors, Imperfections in III/V Materials, Epitaxial Microstructures, High-Speed Heterostructure Devices, Oxygen in Silicon, and others promise that this tradition will be maintained and even expanded. Reflecting the truly interdisciplinary nature of the field that the series covers, the volumes in Semiconductors and Semimetals have been and will continue to be of great interest to physicists, chemists, materials scientists, and device engineers in

modern industry.

In the continuing push toward optical computing, the focus remains on finding and developing the right materials. Characterizing materials, understanding the behavior of light in these materials, and being able to control the light are key players in the search for suitable optical materials. Optics in Magnetic Multilayers and Nanostructures presents an accessible introduction to optics in anisotropic magnetic media. While most of the literature presents only final results of the complicated formulae for the optics in anisotropic media, this book provides detailed explanations and full step-by-step derivations that offer insight into the procedure and reveal any approximations. Based on more than three decades of experimental research on the subject, the author explains the basic concepts of magnetooptics; nonreciprocal wave propagation; the simultaneous effect of crystalline symmetry and arbitrarily oriented magnetization on the form of permittivity tensors; spectral dependence of permittivity; multilayers at polar, longitudinal, transverse, and arbitrary magnetization; the effect of normal or near-normal incidence on multilayers; and anisotropic multilayer gratings. Making the subject of magnetooptics and anisotropic media approachable by the nonspecialist, Optics in Magnetic Multilayers and Nanostructures serves as an ideal introduction to newcomers and an indispensable reference for seasoned researchers.

This volume describes modern developments in reflective, refractive and diffractive optics for short wavelength radiation. It also covers recent theoretical approaches to modelling and ray-tracing the x-ray and neutron optical systems. It is based on the joint research activities of specialists in x-ray and neutron optics, working together under the framework of the European Programme for Cooperation in Science and Technology (COST, Action P7) in the period 2002-2006.