Une Introduction A La Neutronique

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Une Introduction A La Neutronique *2020-11-02*

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Magnetic Neutron Diffraction Springer Science & Business Media
VERKAUFSKATEGORIE 1 e This textbook covers the core subjects of nuclear engineering. Developed to meet the needs of today's students and nuclear power plant operators, the text establishes a framework for the various areas of knowledge that comprise the field and explains rather than just defines the relevant physical phenomena. For today's engineer the principal analytical design tool is the personal computer. The text takes advantage of this recent development. PC programs are provided which either expand the computational range accessible to the student, or serve to illustrate the relevant physical phenomena. Some of the included programs are simplified versions of computational procedures used in the field and can be used as training tool for design calculations. The text devotes special attention to subjects which have an impact on the safe operation of nuclear power reactors. This includes the design of safety optimized core configurations, the physical mechanisms underlying the various reactivity coefficients, and the calibration procedures for control rods. A final chapter is devoted to the licensing and safety evaluation of power reactors.
Introduction to the Theory of Thermal Neutron Scattering Courier Corporation
A long-awaited reprint of the book that has established itself as the classic textbook on neutron scattering. It will be an invaluable introductory text for students taking courses on neutron scattering, as well as for researchers and those who would like to deepen their knowledge on the subject through self-study.
An introduction to neutron physics CRC Press
The masses of neutron stars are limited by an instability to gravitational collapse and an instability driven by gravitational waves limits their spin. Their oscillations are relevant to x-ray observations of accreting binaries and to gravitational wave observations of neutron stars formed during the coalescence of double neutron-star systems. This volume includes more than forty years of research to provide graduate students and researchers in astrophysics, gravitational physics and astronomy with the first self-contained treatment of the structure, stability and oscillations of rotating neutron stars. This monograph treats the equations of stellar equilibrium; key approximations, including slow rotation and perturbations of spherical and rotating stars; stability theory and its applications, from convective stability to the r-mode instability; and numerical methods for computing equilibrium configurations and the nonlinear evolution of their oscillations. The presentation of fundamental equations, results and applications is accessible to readers who do not need the detailed derivations.
Neutron Scattering – Fundamentals Walter de Gruyter GmbH & Co KG
INTRODUCTION TO NUCLEAR REACTOR PHYSICS is the most comprehensive, modern and readable textbook for this course/module. It explains reactors, fuel cycles, radioisotopes, radioactive materials, design, and operation. Chain reaction and fission reactor concepts are presented, plus advanced coverage including neutron diffusion theory. The diffusion equation, Fisk’s Law, and steady state/time-dependent reactor behavior. Numerical and analytical solutions are also covered. The text has full color illustrations throughout, and a wide range of student learning features.
Introduction to Nuclear Reactor Theory CRC Press
Over the past 25 years the field of neutron diffraction for residual stress characterization has grown tremendously, and has matured from the stage of trial demonstrations to provide a practical tool with widespread applications in materials science and engineering. While the literature on the subject has grown commensurately, it has also remained
X-ray and Neutron Reflectivity Cambridge University Press
Covering a wide range of topics related to neutron and x-ray optics, this book explores the aspects of neutron and x-ray optics and their associated background and applications in a manner accessible to both lower-level students while retaining the detail necessary to advanced students and researchers. It is a self-contained book with detailed mathematical derivations, background, and physical concepts presented in a linear fashion. A wide variety of sources were consulted and condensed to provide detailed derivations and coverage of the topics of neutron and x-ray optics as well as the background material needed to understand the physical and mathematical reasoning directly related or indirectly related to the theory and practice of neutron and x-ray optics. The book is written in a clear and detailed manner, making it easy to follow for a range of readers from undergraduate and graduate science, engineering, and medicine. It will prove beneficial as a standalone reference or as a complement to textbooks. Supplies a historical context of covered topics. Detailed presentation makes information easy to understand for researchers within or outside the field. Incorporates reviews of all relevant literature in one convenient resource.
Introduction to Nuclear Reactor Physics Elsevier
After a brief introduction to elementary neutron transport theory, the problem of the transmission of neutrons by straight and bent cylindrical ducts penetrating a radiation shield is considered. The direct scattered component is treated to a first approximation using the diffusion approximation applied to the distribution of effective anisotropic sources along the duct wall. The geometric approximations are such that the method is applicable mainly to ducts with diameter-to-length ratios small compared to unity.
An Introduction to Neutron Physics Springer Science & Business Media
ways in which the magnetic interaction between neutrons and magnetic moments can yield information on the magnetization densities of thin ?lms and multilayers. I commend the organizers for having organized a group of expert lecturers to present this subject in a detailed but clear fashion, as the importance of the subject deserves. Argonne, IL S. K. Sinha Contents 1 The Interaction of X-Rays (and Neutrons) with Matter . . . . . 1 F. de Bergevin 1. 1 Introduction . . . . . 1 1. 2 Generalities and De?nitions . . . . . 2 1. 3 From the Scattering by an Object to the Propagation in a Medium . 14 1. 4 X-Rays . . . . . 26 1. 5 X-Rays: Anisotropic Scattering . . . . . 47 1. A Appendix: the Born Approximation . . . . . 54 References . . . . . 56 2 Statistical Aspects of Wave Scattering at Rough Surfaces . . . . . 59 A. Sentenac and J. Daillant 2. 1 Introduction . . . . . 59 2. 2 Description of Randomly Rough Surfaces . . . . . 60 2. 3 Description of a Surface Scattering Experiment, Coherence Domains . . . . . 67 2. 4 Statistical Formulation of the Diffraction Problem . . . . . 72 2. 5 Statistical Formulation of the Scattered Intensity Under the Born Approximation . . . . . 79 References . . . . . 84 3 Specular Re?ectivity from Smooth and Rough Surfaces . . . . . 85 A. Gibaud and G. Vignaud 3. 1 The Re?ected Intensity from an Ideally Flat Surface . . . . . 85 3. 2 X-Ray Re?ectivity in Strati?ed Media . . . . . 98 3. 3 From Dynamical to Kinematical Theory . . . . . 107 3. 4 In?uence of the Roughness on the Matrix Coef?cients . . . . . 111 3. A Appendix: The Treatment of Roughness in Specular Re?ectivity . . 113 3. B Appendix: Inversion of re?ectivity data . . . . . .
Introduction to the Theory of Neutron Diffusion Cambridge University Press
This introductory chapter provides a self-contained survey of the merits, strengths, and conceptual framework underpinning the use of neutrons as a probe of the structure and dynamics of materials. We also take the opportunity to illustrate important concepts using examples taken from the scientific literature, as well as establish the basic notation that will be used throughout, and listed in more detail in the List of Commonly Used Symbols.
Introduction to neutron physics CRC Press
Volume 63 of Reviews in Mineralogy and Geochemistry provides an introduction for those not yet familiar with neutrons by describing basic features of neutrons and their interaction with matter as well illustrating important applications. The volume is divided into 17 Chapters. The first two chapters introduce properties of neutrons and neutron facilities, setting the stage for applications. Some applications rely on single crystals (Chapter 3) but mostly powders (Chapters 4-5) and bulk polycrystals (Chapters 15-16) are analyzed, at ambient conditions as well as low and high temperature and high pressure (Chapters 7-9). Characterization of magnetic structures remains a core application of neutron scattering (Chapter 6). The analysis of neutron data is not trivial and crystallographic methods have been modified to take account of the complexities, such as the Rietveld technique (Chapter 4) and the pair distribution function (Chapter 11). Information is not only obtained about solids but about liquids, melts and aqueous solutions as well (Chapters 11-13). In fact this field, approached with inelastic scattering (Chapter 10) and small angle scattering (Chapter 13) is opening unprecedented opportunities for earth sciences. Small angle scattering also contributes information about microstructures (Chapter 14). Neutron diffraction has become a favorite method to quantify residual stresses in deformed materials (Chapter 16) as well as preferred orientation patterns (Chapter 15). The volume concludes with a short introduction into neutron tomography and radiography that may well emerge as a principal application of neutron scattering in the future (Chapter 17).
Nuclear Engineering World Scientific
This book is based on lecture notes developed for a one-semester graduate course entitled The Interaction of Radiation with Matter, taught in the Department of Nuclear Engineering at the Massachusetts Institute of Technology. The main objective of the course is to teach enough quantum and classical radiation theory to allow students in engineering and the applied sciences to understand and have access to the vast literature on applications of ionizing and non-ionizing radiation in materials research. Besides presenting the fundamental physics of radiation interactions, the book devotes individual chapters to some of the important modern-day experimental tools, such as nuclear magnetic resonance, photon correlation spectroscopy, and the various types of neutron, x-ray and light-scattering techniques.
An Introduction to the Neutron Kinetics of Nuclear Power Reactors Cambridge University Press
Ultra-Cold Neutrons is a complete, self-contained introduction and review of the field of ultra-cold neutron (UCN) physics. Over the last two decades, developments in UCN technology include the storage of UCN in material and magnetic bottles for time periods limited only by the beta decay rate of the free neutron. This capability has opened up the possibility of a wide range of applications in the fields of both fundamental and condensed state physics. The book explores some of these applications, such as the search for the electric dipole moment of the neutron that constitutes the most sensitive test of time reversal invariance yet devised. The book is suitable as an introduction to the field for research students, as a useful compendium of results and techniques for researchers, and is of general interest to nonspecialists in other areas of physics such as neutron, atomic, and fundamental physics and neutron scattering.
Introduction au génie nucléaire Springer Science & Business Media
The inter action between the magnetic field generated by the neutron and the magnetic moment of atoms containing unpaired electrons was experimentally demonstrated for the first time about twenty years ago. The basic theory describing such an in teraction had already been developed and the first nuclear reactors with large available thermal neutron fluxes had recently been con structed. The power of the magnetic neutron interaction for in vestigating the structure of magnetic materials was immediately recognized and put to use where possible. Neutron diffraction, however, was practicable only in countries with nuclear reactors. The earliest neutron determinations of magnetic ordering were hence primarily carried out at Oak Ridge and

Brookhaven in the US, at Chalk River in Canada and at Harwell in England. Diffraction patterns from polycrystalline ferromagnets and antiferromagnets are interpretable if produced by simple spin arrays. More complex magnetic scattering patterns could often be unravelled, in terms of a three-dimensional array of atomic moments, if the specimen studied is a single crystal. The devel opment of sophisticated cryogenic equipment, with independently alignable magnetic fields, opened the way to greater complexity in the magnetic structures that could be successfully determined, as did also the introduction of polarized neutron beams. By the end of the 'sixties, many countries were contributing significantly to neutron diffraction studies of a wide variety of magnetic materials.

Une introduction à la neutronique Elsevier Inc. Chapters

An Introduction to the Neutron Kinetics of Nuclear Power Reactors introduces the reader to the neutron kinetics of nuclear power reactors. Topics covered include the neutron physics of reactor kinetics, feedback effects, water-moderated reactors, fast reactors, and methods of plant control. The reactor transients following faults are also discussed, along with the use of computers in the study of power reactor kinetics. This book is comprised of eight chapters and begins with an overview of the reactor physics characteristics of a nuclear power reactor and their influence on system design and operation. The use of a mathematical model of the system to study reactor kinetics and control is described. The following chapters explore the neutronic aspects of reactor kinetics; the interaction between neutronic events and the behavior of other physical quantities of the reactor; the influence of feedback effects on neutron kinetics; and the neutron kinetics of water-moderated reactors and fast reactors. The different control schemes for nuclear power reactors are also considered. The final chapter looks at the use of computers to solve the equations of kinetic models for nuclear power reactors. This monograph will be a useful resource for nuclear scientists, physicists, and engineers.

Introduction to the Theory of Neutron Diffusion Addison Wesley Publishing Company

The reflection of and neutrons from surfaces has existed as an x-rays exp- imental for almost it is in the last technique fifty Nevertheless, only years. decade that these methods have become as of enormously popular probes This the surfaces and interfaces. to be due to of several appears convergence of intense different circumstances. These include the more n- availability be measured orders tron and sources that can over (so reflectivity x-ray many of and the much weaker surface diffuse can now also be magnitude scattering of thin films and studied in some the detail); growing importance multil- basic the realization of the ers in both and technology research; important which in the of surfaces and and role roughness plays properties interfaces; the of statistical models to characterize the of finally development topology its and its characterization from on roughness, dependence growth processes The of and to surface scattering experiments. ability x-rays neutro4s study four five orders of in scale of surfaces over to magnitude length regardless their and also their to ability probe environment, temperature, pressure, etc. , makes these the choice for buried interfaces often probes preferred obtaining information about the microstructure of often in statistical a global surfaces, the local This is manner to complementary imaging microscopy techniques, of such studies in the literature witnessed the veritable by explosion published the last few Thus these lectures will useful for over a resource years.

Introduction to neutron distribution theory Springer Science & Business Media

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X-Ray and Neutron Reflectivity: Principles and Applications Newnes

An Introduction to the Theory of Neutron Optical Phenomena and their Applications.

Rotating Relativistic Stars New York : Oxford University Press

This book provides a comprehensive and up-to-date introduction to the fundamental theory and applications of slow-neutron scattering.

Interaction of Photons and Neutrons with Matter Hassell Street Press

"A first-principles discussion of the fundamental neutron interactions . . . the writing is clear, and the explanations stress essential physical principles . . . an excellent survey."—Physics Today "A must for libraries of all universities and laboratories that are engaged in nuclear physics, particle physics, nuclear energy, astrophysics or condensed matter research . . . an outstanding multidisciplinary introduction to the physics and applications of cold neutrons."—Physics World "So many tables, facts and figures . . . the coverage is remarkable."—American Scientist This encyclopedic reference work covers nearly every conceivable aspect of neutron physics. Assembled by an expert in the field, it ranges from the neutron's role as a major element in tests of the standard model of astro-particle physics to its use in nuclear energy generation and the study of condensed matter systems. The multidisciplinary approach includes detailed treatment of strong, weak, and electromagnetic properties of the neutron as well as parallel developments in cosmology and astrophysics. Each subject is placed within its scientific context and receives considerable attention to historical detail.

Ultra-Cold Neutrons