

New and Notable Titles in Applied Physics

∴ Textbook

ICP Fluid Mechanics – Vol. 2

ELEMENTS OF COMPUTATIONAL FLUID DYNAMICS

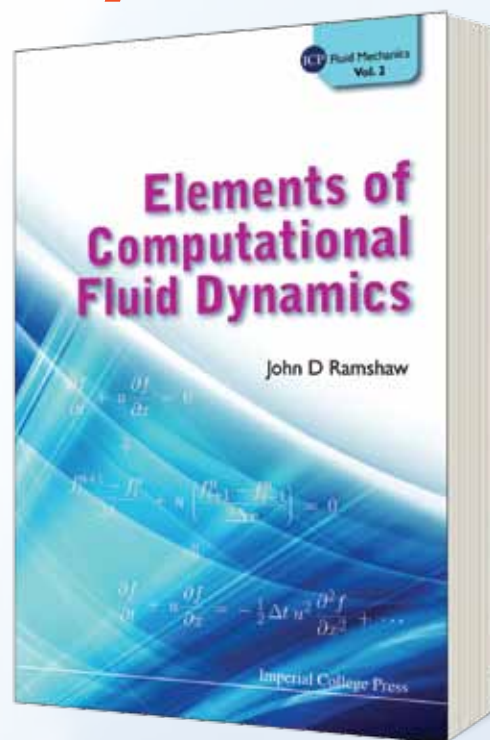
by John D Ramshaw (Portland State University)

This book is a brief introduction to the fundamental concepts of computational fluid dynamics (CFD). It is addressed to beginners, and presents the ABCs or bare essentials of CFD in their simplest and most transparent form. The approach taken is to describe the principal analytical tools required, including truncation-error and stability analyses, followed by the basic elements or building blocks of CFD, which are numerical methods for treating sources, diffusion, convection, and pressure waves. Finally, it is shown how those ingredients may be combined to obtain self-contained numerical methods for solving the full equations of fluid dynamics. The book should be suitable for self-study, as a textbook for CFD short courses, and as a supplement to more comprehensive CFD and fluid dynamics texts.

Contents: Introduction; Finite-Difference Approximations; Finite-Difference Equations; Numerical Stability; Source Terms; Diffusion; Convection; Pressure Waves; Combining the Elements.

Readership: Undergraduates, graduate students, and professionals seeking a simple brief introductory survey of the basic concepts of computational fluid dynamics.

140pp	Feb 2011	
978-1-84816-695-0	US\$69	£43
978-1-84816-705-6(pbk)	US\$32	£20



∴ New

PHOTONICS OF QUANTUM-DOT NANOMATERIALS AND DEVICES

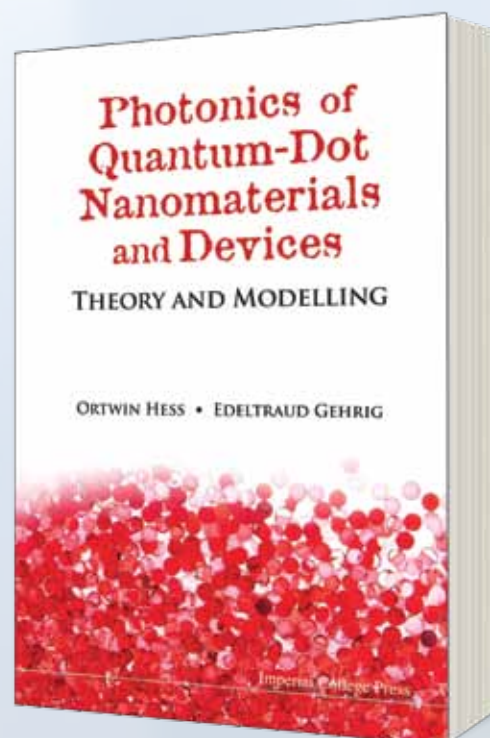
Theory and Modeling

by Ortwin Hess (Imperial College London) & Edeltraud Gehrig (Hochschule Heilbronn, Germany)

Quantum dot nano structures are interesting for applications in information technology and play a growing role in data storage, medical and biological applications. Understanding quantum nanomaterials is thus the key for the conception and optimization of novel structures. This monograph gives an overview of the theory and introduces the concepts of advanced computational modeling of quantum dot nanomaterials and devices ranging from phenomenological models up to fully quantum theoretical description.

Contents: Introduction to Photonic Quantum Dot Nanomaterials and Devices; Theory of Quantum Dot Light-Matter Dynamics; Light Meets Matter I: Microscopic Carrier Effects and Fundamental Light-Matter Interaction; Light Meets Matter II: Mesoscopic Space-Time Dynamics; Performance and Characterisation: Properties on Large Time and Length Scales; Nonlinear Pulse Propagation in Semiconductor Quantum Dot Lasers; High-Speed Dynamics; Quantum Dot Random Lasers; Coherence Properties of Quantum Dot Micro-Cavity Lasers.

184pp	Sep 2011	
978-1-84816-521-2	US\$82	£54
978-1-84816-522-9(ebook)	US\$107	



:: Forthcoming

INDUSTRIAL ACCELERATORS AND THEIR APPLICATIONS

edited by **Robert W Hamm & Marianne E Hamm**
(*R & M Technical Enterprises, California*)

This unique new book is a comprehensive review of the many current industrial applications of particle accelerators, written by experts in each of these fields. Readers will gain a broad understanding of the principles of these applications, the extent to which they are employed, and the accelerator technology utilized. The book also serves as a thorough introduction to these fields for non-experts and laymen.

320pp **Mar 2012**
978-981-4307-04-8 **US\$144 £100**
978-981-4307-05-5(ebook) **US\$187**

:: Forthcoming

AN INTRODUCTION TO THE PHYSICS OF PARTICLE ACCELERATORS

Solutions Manual
(**Second Edition**)

by **Mario Conte** (*INFN Sezione di Genova*) &
William W MacKay (*Brookhaven National Laboratory*)

This manual provides solutions to the problems given in the second edition of the textbook entitled *An Introduction to the Physics of Particle Accelerators*. Simple-to-solve problems play a useful role as a first check of the student's level of knowledge whereas difficult problems will test the student's capacity of finding the bearing of the problems in an interdisciplinary environment. The solutions to several problems will require strong engagement of the student, not only in accelerator physics but also in more general physical subjects, such as the profound approach to classical mechanics (discussed in Chapter 3) and the subtleties of spin dynamics (Chapter 13).

150pp **Mar 2012**
978-981-4295-99-4(pbk) **US\$33 £23**
978-981-4299-00-8(ebook) **US\$43**

:: Forthcoming

J-AGGREGATES

Volume 2

edited by **Takayoshi Kobayashi**
(*University of Electro-Communications, Japan*)

This work deals with J-aggregates, which have a long history of research. The volume covers electronic states, linear and nonlinear optical properties. Various properties and processes of J-aggregates, such as super-radiance, excitons, photon echo, geometrical structure, electron transfer and femtosecond spectroscopy, are discussed.

Contents: Ultrafast Processes in Several J-Aggregate Systems (*Takayoshi Kobayashi*); Vibronic Coupling in J-Aggregates (*Frank C Spano*); Hierarchical Structure of Light-Harvesting Porphyrin Aggregates (*Jeanne L McHale*); The Morphologies of Molecular Cyanine Dye Aggregates as Revealed by Cryogenic Electron Microscopy (*Christoph Bottcher & Hans von Berlepsch*); Interaction Between Aggregates of Cyanine Dyes and Biomolecules (*Yalin Tang*); Organic J-Aggregates and Inorganic Excitons (*Brian Walker & Mounji Bawendi*); and other papers.

325pp **Jan 2012**
978-981-4365-74-1 **US\$112 £74**
978-981-4365-79-6(ebook) **US\$146**

:: New Textbook

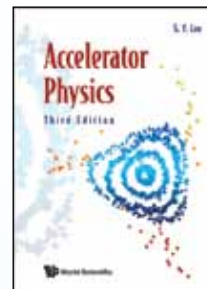
ACCELERATOR PHYSICS

Third Edition

by **S Y Lee** (*Indiana University*)

"The large number of formulas and the excellent table of contents and index make the book a very useful addition to the library of a scientist or engineer already in the field."

Physics Today



This book is intended to be used as a graduate or senior undergraduate textbook in accelerator physics and science. It can be used as preparatory course material in graduate accelerator physics thesis research. The text covers historical accelerator development, transverse betatron motion, synchrotron motion, an introduction to linear accelerators, and synchrotron radiation phenomena in low emittance electron storage rings, introduction to special topics such as the free electron laser and the beam-beam interaction. Attention is paid to derivation of the action-angle variables of the phase space, because the transformation is important for understanding advanced topics such as the collective instability and nonlinear beam dynamics. Each section is followed by exercises, which are designed to reinforce concepts and to solve realistic accelerator design problems.

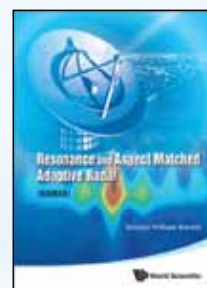
550pp **Nov 2011**
978-981-4374-94-1(pbk) **US\$68 £45**

:: Recommended Title

RESONANCE AND ASPECT MATCHED ADAPTIVE RADAR (RAMAR)

by **Terence William Barrett** (*BSEI, USA*)

The book describes a new form of radar for which the target response is frequency, i.e., resonance-dependent. The book provides both prototype designs and empirical results collected from a variety of targets. The new form of radar, called RAMAR (Resonance and Aspect Matched Adaptive Radar) advances radar — mere ranging and detection — to the level of RF spectroscopy, and permits an advance of spectroscopic methods from optical, through infrared and into the RF spectral range. The book will describe how a target's response can be a function of frequency components in the transmitted signal's envelope as well as the signal's carrier.



288pp **Nov 2011**
978-981-4329-89-7 **US\$110 £73**
978-981-4329-90-3(ebook) **US\$143**

PHYSICAL FOUNDATIONS OF QUANTUM ELECTRONICS BY DAVID KLYSHKO

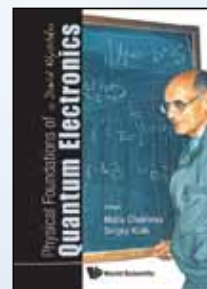
edited by **Maria Chekhova & Sergey Kulik**
(*Lomonosov Moscow State University*)

This concise textbook introduces a graduate student to the various fields of physics related to the interaction between radiation and matter. The scope of the book is very broad, ranging from nonlinear to quantum optics and from quantum transitions in atoms to the dispersion of polaritons in continuous media.

Contents: Introduction; Stimulated Quantum Transitions; Density Matrix, Populations and Relaxation; The Susceptibility of Matter; Non-Stationary Optics; Nonlinear Optics; Statistical Optics.

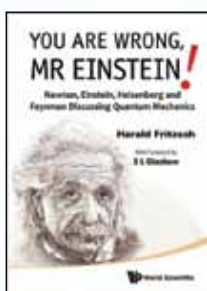
Readership: Graduate students and researchers moving into the fields of quantum and nonlinear optics.

368pp **Apr 2011**
978-981-4324-50-2 **US\$118 £77**



YOU ARE WRONG, MR EINSTEIN!**Newton, Einstein, Heisenberg and Feynman Discussing Quantum Mechanics**by **Harald Fritzsche** (*University of Munich*)
with Foreword by **S L Glashow**

Werner Heisenberg and Richard Feynman find quantum physics fascinating and necessary for understanding the atoms. Albert Einstein dislikes it and Isaac Newton does not understand it, which is not surprising. This is the scenario for animated discussions between five people. Harald Fritzsche brings together Newton and the three great physicists of the 20th century in an imaginary meeting. His "alter ego" Adrian Haller moderates the discussions. By means of questions and answers the whole cosmos of quantum physics is described in a simple way, easily understandable non-physicists. The beginnings of quantum theory and atomic physics as well as the importance of quantum physics for our daily life — these and many more topics are the subjects of the interesting and fascinating discussions.



200pp **Feb 2011**
978-981-4324-99-1 **US\$35 £23**

REVIEWS OF ACCELERATOR SCIENCE AND TECHNOLOGY**Volume 3: Accelerators as Photon Sources**edited by **Alexander W Chao** (*SLAC National Accelerator Laboratory*)
& **Weiren Chou** (*Fermi National Accelerator Laboratory*)

Contents: Invention of the Free Electron Laser (*J M J Madey*); Photon Science at Accelerator-Based Light Sources (*J R Schneider*); Electromagnetic Radiation in Accelerator Physics (*G Stupakov*); Storage Ring Light Sources (*Z T Zhao*); Low-Gain Free Electron Lasers (*N Vinokurov*); Soft and Hard X-Ray SASE Free Electron Lasers (*S Schreiber*); Energy Recovery Linacs for Light Sources (*R Hajima*); Compton Sources of Electromagnetic Radiation (*G A Krafft & G Priebe*); Accelerator-Based Sources of Infrared and Terahertz Radiation (*A-S Müller*); and other papers.

300pp **Jan 2011**
978-981-4340-38-0 **US\$138 £86**
978-981-4340-39-7(ebook) **US\$179**

Book Series on Complex Metallic Alloys – Vol. 4

MECHANICAL PROPERTIES OF COMPLEX INTERMETALLICSedited by **Esther Belin-Ferré** (*Université Pierre et Marie Curie*)

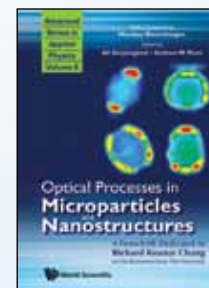
Contents: The Plasticity of Metals: Basic Concepts (*M Feuerbacher*); Basics of Mechanical Properties of Metals (*J P Chateau*); Microstructure — Properties Relationships in Metal-Based Alloys (*A Deschamps*); Deformation of Intermetallic Alloys at High Temperatures (*G Sauthoff*); Metadisllocations in Complex Metallic Alloys (*M Heggen & M Feuerbacher*); Cold Welding due to Impact and Fretting Under Vacuum. Considering Scaling for Applications in Space Mechanisms (*A Merstallinger & M Sales*); Mechanical Properties of Metals at the Nanoscale (*R Spolenak*); Formation of High-strength Nanocrystalline Alloys and Their Mechanical Properties (*T Yamasaki*); Dislocations and Plasticity in Minerals with Large Unit Cells (*P Cordier & P Carrez*); Inorganic Nanotubes Based on Transition Metal Dichalcogenides: Synthesis and Mechanical Properties (*M Remškar*); An Introduction to Spin Electronics (*J M D Coey*); Spintronics (*M-H Jung*); Thermoelectric Materials (*S Paschen*).

468pp **Nov 2010**
978-981-4322-16-4 **US\$150 £93**
978-981-4322-17-1(ebook) **US\$195**

Advanced Series in Applied Physics – Vol. 6

OPTICAL PROCESSES IN MICROPARTICLES AND NANOSTRUCTURES**A Festschrift Dedicated to Richard Kounai Chang on His Retirement from Yale University**edited by **Ali Serpengüzel** (*Koç University, Turkey*) &
Andrew W Poon (*The Hong Kong University of Science & Technology*)

Contents: Nonlinear Optical Spectroscopy for Interfaces (*Y R Shen*); Surface-Enhanced Raman Scattering (SERS) of Carbon Dioxide on Cold-Deposited Copper Films: An Electronic Effect at a Minority of Surface Sites (*A Otto*); Combustion Diagnostics by Pure Rotational Coherent Anti-Stokes Raman Scattering (*A Leipertz & T Seeger*); Imaging Flames: From Advanced Laser Diagnostics to Snapshots (*M Long*); Elastic and Inelastic Light Scattering from Levitated Microparticles (*E J Davis*); and many other papers.



488pp **Nov 2010**
978-981-4295-77-2 **US\$140 £87**
978-981-4295-78-9(ebook) **US\$182**

BCS: 50 YEARSedited by **Leon N Cooper** & **Dmitri Feldman** (*Brown University*)

"... the editors deserve praise for the selection of topics and for enlisting a distinguished set of authors. BCS: 50 Years is a successful attempt to capture the history of the development of superconductivity theory and its continuing impact. Any person curious about superconductivity will find something in this book to enjoy."

Physics Today

"I would highly recommend this book to anyone and everyone as a wonderful review of a powerful unifying concept that covers an enormous range of phenomena."

CERN Courier



588pp **Nov 2010**
978-981-4304-64-1 **US\$135 £84**
978-981-4304-65-8(pbk) **US\$65 £40**
978-981-4304-66-5(ebook) **US\$176**

Series on Complexity, Nonlinearity and Chaos – Vol. 1

RAY AND WAVE CHAOS IN OCEAN ACOUSTICS**Chaos in Waveguides**by **Denis Makarov**, **Sergey Prants** (*Pacific Oceanological Institute, Vladivostok*), **Anatoly Virovlyansky** (*Institute of Applied Physics, Nizhny Novgorod, Russia*), & **George Zaslavsky** (*New York University*)

This book is the first monograph summarizing results obtained in this field. Emphasis is made on the exploration of ray and modal structures of the wave field in an idealized environmental model with periodic range dependence and in a more realistic model with sound speed fluctuations induced by random internal waves. The book is intended for acousticians investigating the long-range sound transmission through the fluctuating ocean and also for researchers studying waveguide propagation in other media. It will be of major interest to scientists working in the field of dynamical and quantum chaos.

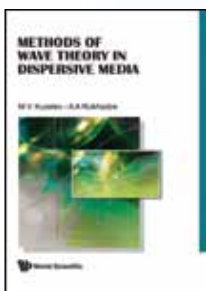
412pp **Nov 2009**
978-981-4273-17-6 **US\$138 £91**
978-981-4273-18-3(ebook) **US\$179**

New and Notable Titles in Applied Physics

METHODS OF WAVE THEORY IN DISPERSIVE MEDIA

by **M V Kuzelev** (Moscow State University) &
A A Rukhadze (Russian Academy of Sciences)

This book presents the main mathematical methods of description and general problems in the theory of linear waves in dispersive systems and media, including equilibrium and nonequilibrium waves. To show how the general theory can be applied in practice, the authors give a unified description of the waves in all important physical systems which are traditionally studied in the mechanics of continuous media, electrodynamics, plasma physics, electronics and physical kinetics.



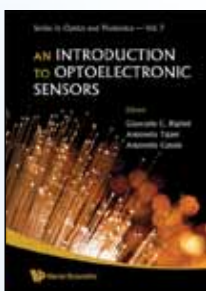
272pp
978-981-4261-69-2 Oct 2009 US\$121 £80
978-981-4261-70-8(ebook) US\$157

Series in Optics and Photonics – Vol. 7

AN INTRODUCTION TO OPTOELECTRONIC SENSORS

edited by **Giancarlo C Righini**, **Antonella Tajani** (CNR, Italy),
& **Antonello Cutolo** (University of Sannio)

This invaluable book offers a comprehensive overview of the technologies and applications of optoelectronic sensors. Based on the R&D experience of more than 70 engineers and scientists, highly representative of the Italian academic and industrial community in this area, this book provides a broad and accurate description of the state-of-the-art optoelectronic technologies for sensing. The most innovative approaches, such as the use of photonic crystals, squeezed states of light and microresonators for sensing, are considered. Application areas range from environment to medicine and healthcare, from aeronautics, space, and defence to food and agriculture. Written in a self-contained manner, this volume presents both the sensing methodologies and the fundamentals of the various technologies, as well as their applications in the real world.

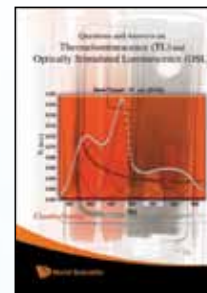


584pp
978-981-283-412-6 Jan 2009 US\$140 £92
978-981-283-413-3(ebook) US\$182

QUESTIONS AND ANSWERS ON THERMOLUMINESCENCE (TL) AND OPTICALLY STIMULATED LUMINESCENCE (OSL)

by **Claudio Furetta** (Touro University Rome)

Currently, thermoluminescence (TL) and optically stimulated luminescence (OSL) are the main techniques for studying the luminescence properties of several materials, mainly insulators called phosphors. Frequently, however, students and experts alike need to clarify some concepts related to the effects and defects present in the radiation interaction with solids generated by these phenomena. In this book, a series of questions and corresponding answers give a clearer explanation about the concepts, theory and models related to TL and OSL, including applications in important related areas.



Readership: Graduate students in solid state physics, radiation protection dosimetry, geological and archeological dating; research lab practitioners in solid state physics and radiation physics; official and private radiation protection lab scientists; lab scientists involved in irradiation of food, cosmetic and medical instruments for sterilization; industries involved in the manufacture of TL and OSL apparatus/materials.

180pp
978-981-281-883-6 Nov 2008 US\$65 £36
978-981-281-884-3(ebook) US\$85

AT THE LEADING EDGE

The ATLAS and CMS LHC Experiments

edited by **Dan Green** (Fermi National Accelerator Laboratory)

“... this book should be on the shelf of all friends of the LHC. It represents a nicely balanced record of the historical developments, technical challenges and scientific background, and packed with photos of the LHC machine and its two major general-purpose detectors, ATLAS and CMS, taken during construction and assembly.”

CERN Courier

448pp
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