

Computational Physics and Related Titles 2011

:: Textbook

FUNDAMENTALS OF QUANTUM INFORMATION

by **Hiroyuki Sagawa** (*University of Aizu*) & **Nobuaki Yoshida** (*Kansai University*)

This book provides an introduction to the basic ideas and concepts of quantum computation and information for both undergraduate and graduate students. The book starts with the quantum bits and the entangled states which turn out to bring revolutionary ideas in information theory. This book is self-contained and unified in its description of the cross-disciplinary nature of this field. The book aims to provide intuitive and transparent ideas of the subjects, and is not strictly mathematical. Quantum mechanics and mathematical tools (especially, number theory) are explained with many examples and illustrations. The students can obtain practical problem-solving ability by solving the exercises at the end of each chapter. Detailed solutions to all problems are provided at the end of the book.

Contents: Mathematical Realization of Quantum Mechanics; Basic Concepts of Quantum Mechanics; EPR Pair and Measurement; Classical Computers; Quantum Gates; Theory of Information and Communication; Quantum Computation; Quantum Cryptography; Quantum Search Algorithm; Physical Devices of Quantum Computers.

Readership: Undergraduate- and graduate-level students, as well as scientists who are neither experts of quantum mechanics nor experts in information theory.

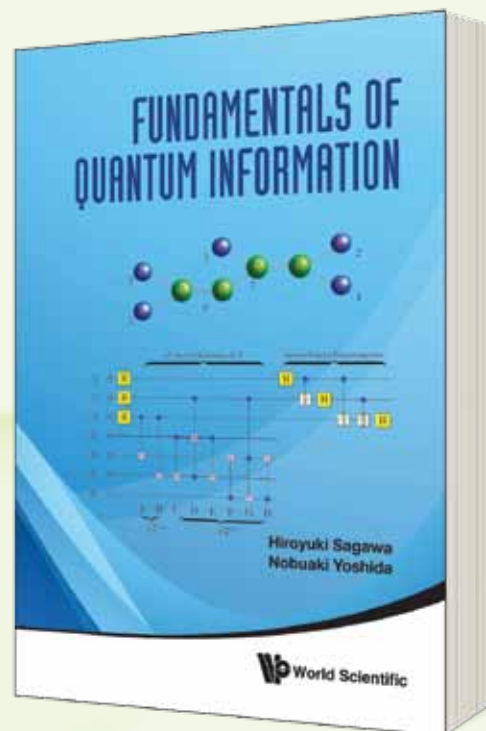
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Series in Soft Condensed Matter – Vol. 3

UNDERSTANDING SOFT CONDENSED MATTER VIA MODELING AND COMPUTATION

edited by **Wenbing Hu** (*Nanjing University*) &

An-Chang Shi (*McMaster University, Canada*)

All living organisms consist of soft matter. For this reason alone, it is important to be able to understand and predict the structural and dynamical properties of soft materials such as polymers, surfactants, colloids, granular matter and liquids crystals. To achieve a better understanding of soft matter, three different approaches have to be integrated: experiment, theory and simulation. This book focuses on the third approach — but always in the context of the other two.

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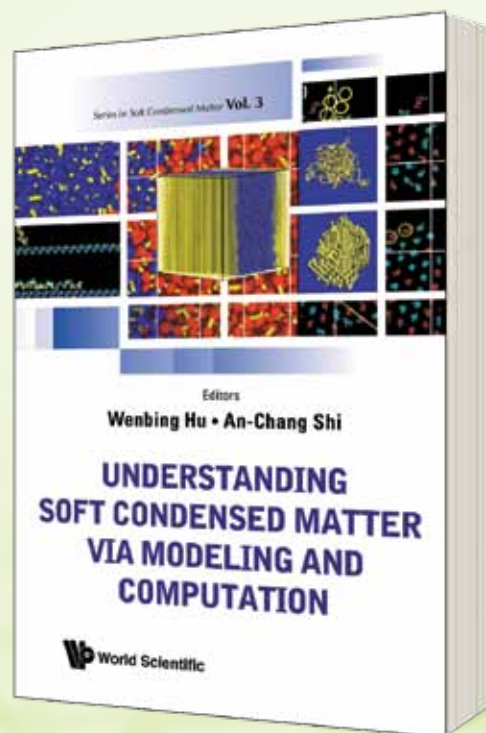
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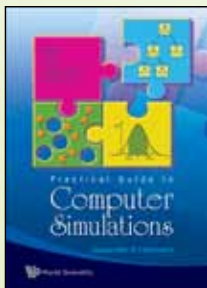
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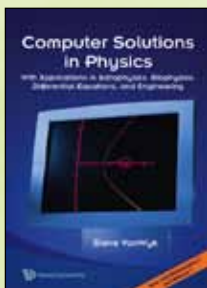
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Third Edition

edited by **William R Gibbs** (*New Mexico State University*)

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Contents: Integration; Introduction to Monte Carlo; Differential Methods; Computers for Physicists; Linear Algebra; Exercises in Monte Carlo; Finite Element Methods; and other topics.

380pp
978-981-256-799-4 May 2006
US\$113 £75

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by **Porter Wear Johnson** (*Illinois Institute of Technology*)

This textbook — appropriate for a one-semester course in classical mechanics at the late undergraduate or early graduate level — presents a fresh, modern approach to mechanics. About 150 exercises, covering a wide variety of topics and applications, have solutions roughly outlined for enhanced understanding. Unique to this text is the versatile application of programming language Mathematica™ throughout to analyze systems and generate results.



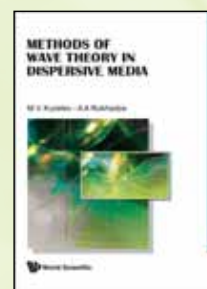
Contents: One Degree of Freedom; Systems with a Few Degrees of Freedom; Systems of Particles; Noninertial Coordinate Systems; Gravitation; Collisions and Scattering; Hamiltonian Mechanics; Stability and Instability; Continuous Systems.

296pp
978-981-4304-15-3 Jan 2010
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by **M V Kuzelez** (*Moscow State University*) & **A A Rukhadze** (*Russian Academy of Sciences*)

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978-981-4261-69-2 Oct 2009
US\$121 £80
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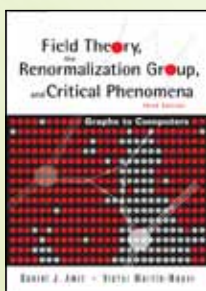
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Journal of Applied Mathematics and Physics, Switzerland



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568pp	Jun 2005	
978-981-256-109-1	US\$107	£66
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PROBLEMS AND SOLUTIONS IN QUANTUM COMPUTING AND QUANTUM INFORMATION

2nd Edition

by **Willi-Hans Steeb & Yorick Hardy**
(Rand Afrikaans University, South Africa)

"This is a nice collection of standard problems and solutions, the latter being formulated on a level as elementary as possible. So it is especially useful for students who want to become acquainted with quantum information and computation. It is also useful for lecturers when they have to prepare exercises."

Zentralblatt MATH

Contents: *Finite-Dimensional Hilbert Spaces:* Qubits; Kronecker Product and Tensor Product; Matrix Properties; Density Operators; Partial Trace; Unitary Transforms and Quantum Gates; Entropy; Measurement; Entanglement; Bell Inequality; Teleportation; Cloning; Quantum Algorithms; Quantum Error Correction; Quantum Cryptography; *Infinite-Dimensional Hilbert Spaces:* Harmonic Oscillator and Bose Operators; Coherent States; Squeezed States; Entanglement; Teleportation; Swapping and Cloning; Hamilton Operators.

348pp	Mar 2006	
978-981-256-740-6	US\$122	£81

:: Textbook

World Scientific Lecture Notes in Physics – Vol. 74

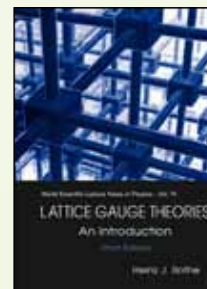
LATTICE GAUGE THEORIES

An Introduction
(Third Edition)

by **Heinz J Rothe** (Universität Heidelberg, Germany)

"This book is of invaluable interest for scientists working in this area (gauge theories on lattices) and it is addressed mainly at the graduate students interested in particle physics. It can be also of interest for physicists working in statistical mechanics, since the lattice formulation of field theories resembles closely that of complex mechanical systems."

Zentralblatt MATH



Contents: The Path Integral Approach to Quantization; The Free Scalar Field on the Lattice; Fermions on the Lattice; Abelian Gauge Fields on the Lattice and Compact QED; Non-Abelian Gauge Fields on the Lattice. Compact QCD; The Wilson Loop and the Static Quark-Antiquark Potential; The QQ^- Potential in Some Simple Models; and other topics.

608pp	Jun 2005	
978-981-256-062-9	US\$132	£87
978-981-256-168-8(pbk)	US\$78	£51

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PROBLEMS AND SOLUTIONS IN SCIENTIFIC COMPUTING WITH C++ AND JAVA SIMULATIONS

by **Willi-Hans Steeb, Yorick Hardy, Alexandre Hardy**
(Rand Afrikaans University, South Africa), & **Ruedi Stoop**
(Institute for Neuroinformatics, Switzerland)

Presented in the format of problems and detailed solutions, important concepts and techniques are introduced and developed. Many problems include software simulations. Algorithms have detailed implementations in C++ or Java. This book will prove to be invaluable not only to students and research workers in the fields of scientific computing, but also to teachers of this subject who will find this text useful as a supplement.

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432pp	Nov 2004	
978-981-256-112-1	US\$95	£56
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Printed in July 2011

SP/KC/07/11/03/HC