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Second Edition Paperback

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Quantum ComputingString Theory DemystifiedAn Introduction to Black Holes,
Information and the String Theory RevolutionQuantum Mechanics Demystified, 2nd
EditionQuantum MechanicsThermodynamics DeMYSTiFiedForensics
DemystifiedIntroduction to Quantum MechanicsThe Labyrinth of TimeString Theory
and M-TheoryThe Universe WithinPhotonic CrystalsQuantum Computing
ExplainedGod Does Play Dice with the UniverseQuantum Mechanics
DemystifiedThe Complete Idiot's Guide to String TheoryQuantum Computing for
Computer ScientistsSymmetry and the Beautiful UniverseQuantum Information
TheoryComplex Variables DemystifiedSchaum's Outline of Theory and Problems of
Quantum MechanicsModern Physics DeMYSTiFiedLinear Algebra DemystifiedCircuit
Analysis DemystifiedQuantum Field Theory DemystifiedMolecular Quantum
DynamicsAn Introduction to String Theory and D-brane DynamicsSchaum's Outline
of Quantum Mechanics, Second EditionA First Book of Quantum Field TheoryAn
Introduction to Quantum ComputingFluid MechanicsStatics and Dynamics
DemystifiedSignals & Systems DemystifiedQuantum Mech
DemystifiedSchrödinger's Killer AppRelativity DemystifiedQuantum Theory of
TunnelingThe Quantum MagicianStrings, Conformal Fields, and M-TheoryAn
Introduction To Quantum Field Theory

Quantum Computing

This clear, concise introduction to quantum mechanics is the perfect supplement and complement to the math-heavy texts that dominate the field. The author includes hundreds of worked examples to illustrate the processes discussed and Dirac's Method, explains how to obtain a desired result in familiar terms rather than with confusing terminology and formulas.

String Theory Demystified

A self-contained treatment of the fundamentals of quantum computing This clear, practical book takes quantum computing out of the realm of theoretical physics and teaches the fundamentals of the field to students and professionals who have not had training in quantum computing or quantum information theory, including computer scientists, programmers, electrical engineers, mathematicians, physics students, and chemists. The author cuts through the conventions of typical jargon-laden physics books and instead presents the material through his unique "how-to" approach and friendly, conversational style. Readers will learn how to carry out calculations with explicit details and will gain a fundamental grasp of: * Quantum mechanics * Quantum computation * Teleportation * Quantum cryptography *

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Entanglement * Quantum algorithms * Error correction A number of worked examples are included so readers can see how quantum computing is done with their own eyes, while answers to similar end-of-chapter problems are provided for readers to check their own work as they learn to master the information. Ideal for professionals and graduate-level students alike, Quantum Computing Explained delivers the fundamentals of quantum computing readers need to be able to understand current research papers and go on to study more advanced quantum texts.

An Introduction to Black Holes, Information and the String Theory Revolution

Quantum Mechanics: Concepts and Applications provides a clear, balanced and modern introduction to the subject. Written with the student's background and ability in mind the book takes an innovative approach to quantum mechanics by combining the essential elements of the theory with the practical applications: it is therefore both a textbook and a problem solving book in one self-contained volume. Carefully structured, the book starts with the experimental basis of quantum mechanics and then discusses its mathematical tools. Subsequent chapters cover the formal foundations of the subject, the exact solutions of the Schrödinger equation for one and three dimensional potentials, time-independent

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and time-dependent approximation methods, and finally, the theory of scattering. The text is richly illustrated throughout with many worked examples and numerous problems with step-by-step solutions designed to help the reader master the machinery of quantum mechanics. The new edition has been completely updated and a solutions manual is available on request. Suitable for senior undergraduate courses and graduate courses.

Quantum Mechanics Demystified, 2nd Edition

This powerful study guide makes sometimes-daunting material accessible. More than 240 problems solved step-by-step help students gain a firm grasp of proper methods and a solid foundation for further study. All the essentials of this basic course are covered clearly and concisely, cutting study time and making important points memorable. The next-best thing to a private tutor, this study guide helps boost grades and proves ideal for professionals, too, who wish to study solo to master this discipline.

Quantum Mechanics

A self-contained, graduate-level textbook that develops from scratch classical results as well as advances of the past decade.

Thermodynamics DeMYSTiFied

Tough Test Questions? Missed Lectures? Not Enough Time? Fortunately for you, there's Schaum's. More than 40 million students have trusted Schaum's to help them succeed in the classroom and on exams. Schaum's is the key to faster learning and higher grades in every subject. Each Outline presents all the essential course information in an easy-to-follow, topic-by-topic format. You also get hundreds of examples, solved problems, and practice exercises to test your skills. This Schaum's Outline gives you Hundreds of examples with explanations of quantum mechanics concepts Exercises to help you test your mastery of quantum mechanics Complete review of all course fundamentals Fully compatible with your classroom text, Schaum's highlights all the important facts you need to know. Use Schaum's to shorten your study time--and get your best test scores! Topics include: Mathematical Background; Schrodinger Equation and Applications; Foundations of Quantum Mechanics; Harmonic Oscillator; Angular Momentum; Spin; Hydrogen-Like Atoms; Particle Motion in an Electromagnetic Field; Solution Methods in Quantum Mechanics; Solutions Methods in Quantum Mechanics; Numerical Methods in Quantum Mechanics; Identical Particles; Addition of Angular Momenta; Scattering Theory; and Semiclassical Treatment of Radiation Schaum's Outlines--Problem Solved.

Forensics Demystified

Here's the sure cure for CIRCUIT PARALYSIS! Need to learn circuit analysis but experiencing some resistance in your brain waves? No stress! Circuit Analysis Demystified will give you the jolt you need to understand this complex subject--without getting your circuits crossed. In the first part of the book, you'll learn the fundamentals such as voltage and current theorems, Thevenin and Norton's theorems, op amp circuits, capacitance and inductance, and phasor analysis of circuits. Then you'll move on to more advanced topics including Laplace transforms, three-phase circuits, filters, Bode plots, and characterization of circuit stability. Featuring end-of-chapter quizzes and a final exam, this book will have you in a steady state when it comes to circuit analysis in no time at all. This fast and easy guide offers: Numerous figures to illustrate key concepts Sample equations with worked solutions Coverage of Kirchhoff's laws, the superposition theorem, Millman's theorem, and delta-wye transformations Quizzes at the end of each chapter to reinforce learning A time-saving approach to performing better on an exam or at work Simple enough for a beginner, but challenging enough for an advanced student, Circuit Analysis Demystified will transform you into a master of this essential engineering subject.

Introduction to Quantum Mechanics

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The multidisciplinary field of quantum computing strives to exploit some of the uncanny aspects of quantum mechanics to expand our computational horizons. Quantum Computing for Computer Scientists takes readers on a tour of this fascinating area of cutting-edge research. Written in an accessible yet rigorous fashion, this book employs ideas and techniques familiar to every student of computer science. The reader is not expected to have any advanced mathematics or physics background. After presenting the necessary prerequisites, the material is organized to look at different aspects of quantum computing from the specific standpoint of computer science. There are chapters on computer architecture, algorithms, programming languages, theoretical computer science, cryptography, information theory, and hardware. The text has step-by-step examples, more than two hundred exercises with solutions, and programming drills that bring the ideas of quantum computing alive for today's computer science students and researchers.

The Labyrinth of Time

If you think projection operators work in the cinema, or learning about spin-1/2 makes your head, well, spin, Quantum Mechanics DeMYSTiFieD will energize your knowledge of this topic's fundamental concepts and theories, and allow you to learn at your own pace. This thoroughly revised and updated guide eases you into the subject, beginning with wave mechanics then introducing you to the

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mathematical foundations needed to do modern quantum physics. As you progress, you will learn the fundamentals of matrix mechanics, including how to compute the trace of a matrix, find eigenvalues, and use ladder operators. You will understand the difference between time independent perturbation and time dependent perturbation theory and other once-complicated concepts. Detailed examples make it easy to understand the material, and end-of-chapter quizzes and a final exam help reinforce key ideas. It's a no-brainer! You'll learn about: State Space Basis Vectors Functions of Operators The Postulates of Quantum Mechanics Angular Momentum Spin and the Pauli Matrices Scattering Theory Simple enough for a beginner, but challenging enough for an advanced student, Quantum Mechanics DeMYSTiFieD, Second Edition is your shortcut to a working knowledge of this engaging science.

String Theory and M-Theory

This invaluable book provides a quick introduction to the rudiments of perturbative string theory and a detailed introduction to the more current topic of D-brane dynamics. The presentation is very pedagogical, with much of the technical detail streamlined. The rapid but highly coherent introduction to the subject is perhaps what distinguishes this book from other string theory or D-brane books. The material is based on mini-courses delivered by the author at various summer schools in theoretical high energy physics, so its actual level has been

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appropriately tested. Contents: A Brief History of String Theory; Classical String Theory; Quantization of the Bosonic String; Superstrings; RamondOCoRamond Charges and T-Duality; D-Branes and Gauge Theory; D-Brane Dynamics; RamondOCoRamond Couplings of D-Branes. Readership: Researchers and graduate students in high energy, mathematical and theoretical physics."

The Universe Within

Everything is connected We're living in the midst of a scientific revolution that's captured the general public's attention and imagination. The aim of this new revolution is to develop a "theory of everything"- -- a set of laws of physics that will explain all that can be explained, ranging from the tiniest subatomic particle to the universe as a whole. Here, readers will learn the ideas behind the theories, and their effects upon our world, our civilization, and ourselves.

Photonic Crystals

This book focuses on current applications of molecular quantum dynamics. Examples from all main subjects in the field, presented by the internationally renowned experts, illustrate the importance of the domain. Recent success in helping to understand experimental observations in fields like heterogeneous

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catalysis, photochemistry, reactive scattering, optical spectroscopy, or femto- and attosecond chemistry and spectroscopy underline that nuclear quantum mechanical effects affect many areas of chemical and physical research. In contrast to standard quantum chemistry calculations, where the nuclei are treated classically, molecular quantum dynamics can cover quantum mechanical effects in their motion. Many examples, ranging from fundamental to applied problems, are known today that are impacted by nuclear quantum mechanical effects, including phenomena like tunneling, zero point energy effects, or non-adiabatic transitions. Being important to correctly understand many observations in chemical, organic and biological systems, or for the understanding of molecular spectroscopy, the range of applications covered in this book comprises broad areas of science: from astrophysics and the physics and chemistry of the atmosphere, over elementary processes in chemistry, to biological processes (such as the first steps of photosynthesis or vision). Nevertheless, many researchers refrain from entering this domain. The book "Molecular Quantum Dynamics" offers them an accessible introduction. Although the calculation of large systems still presents a challenge - despite the considerable power of modern computers - new strategies have been developed to extend the studies to systems of increasing size. Such strategies are presented after a brief overview of the historical background. Strong emphasis is put on an educational presentation of the fundamental concepts, so that the reader can inform himself about the most important concepts, like eigenstates, wave packets, quantum mechanical resonances, entanglement, etc. The chosen

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examples highlight that high-level experiments and theory need to work closely together. This book thus is a must-read both for researchers working experimentally or theoretically in the concerned fields, and generally for anyone interested in the exciting world of molecular quantum dynamics.

Quantum Computing Explained

There's no easier, faster, or more practical way to learn the really tough subjects Forensics Demystified explains forensic science in a logical progression from evidence collection through analysis and finally to the scientist actually testifying in court. This self-teaching guide comes complete with key points, background information, quizzes at the end of each chapter, and even a final exam. Simple enough for beginners but challenging enough for advanced students, this is a lively and entertaining brush-up, introductory text, or classroom supplement.

God Does Play Dice with the Universe

This bestselling textbook teaches students how to do quantum mechanics and provides an insightful discussion of what it actually means.

Quantum Mechanics Demystified

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Learn quantum field theory relatively easily Trying to comprehend quantum field theory but don't have infinite time or the IQ of Einstein? No problem! This easy-to-follow guide helps you understand this complex subject matter without spending a lot of energy. Quantum Field Theory Demystified covers essential principles such as particle physics and special relativity. You'll learn about Lagrangian field theory, group theory, and electroweak theory. The book also explains continuous and discrete symmetries, spontaneous symmetry breaking, and supersymmetry. With thorough coverage of the mathematics of quantum field theory and featuring end-of-chapter quizzes and a final exam to test your knowledge, this book will teach you the fundamentals of this theoretical framework in no time at all. This fast and easy guide offers: Numerous figures to illustrate key concepts Sample equations with worked solutions Coverage of quantum numbers Details on the Dirac equation, the Feynman rules, and the Higgs mechanism A time-saving approach to performing better on an exam or at work Simple enough for a beginner, but challenging enough for an advanced student, Quantum Field Theory Demystified is your shortcut to understanding this fascinating area of physics.

The Complete Idiot's Guide to String Theory

Understanding modern physics just got relatively easy! Students struggling through all the complex topics offered in modern physics courses will appreciate the guidance of the tried-and-true Demystified format and style--with hundreds of

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equations and sample problems. Many of these topics featured in Modern Physics Demystified have not been covered before in any Demystified book, such as statistical physics, solid state physics, models of the atom, nuclear reactions, reprocessing of spent nuclear fuel, and molecular physics. Veteran Demystified author David McMahon makes it easy to understand the challenging material.

Quantum Computing for Computer Scientists

- A unique exposition of the foundations of the quantum theory of black holes including the impact of string theory, the idea of black hole complementarity and the holographic principle; Aims to educate the physicist or student of physics who is not an expert on string theory, on the revolution that has grown out of black hole physics and string theory

Symmetry and the Beautiful Universe

Take the heat off of understanding thermodynamics Now you can get much-needed relief from the pressure of learning the fundamentals of thermodynamics! This practical guide helps you truly comprehend this challenging engineering topic while sharpening your problem-solving skills. Written in an easy-to-follow format, Thermodynamics Demystified begins by reviewing basic principles and discussing

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the properties of pure substances. The book goes on to cover laws of thermodynamics, power and refrigeration cycles, psychrometrics, combustion, and much more. Hundreds of worked examples and equations make it easy to understand the material, and end-of-chapter quizzes and two final exams help reinforce learning. This hands-on, self-teaching text offers: Numerous figures to illustrate key concepts Details on the first and second laws of thermodynamics Coverage of vapor and gas cycles, psychrometrics, and combustion An overview of heat transfer SI units throughout A time-saving approach to performing better on an exam or at work Simple enough for a beginner, but challenging enough for an advanced student, Thermodynamics Demystified is your shortcut to mastering this essential engineering subject.

Quantum Information Theory

Building on the foundations laid in his Introduction to Superstrings and M Theory, Professor Kaku discusses such topics as the classification of conformal string theories, knot theory, the Yang-Baxter relation, quantum groups, and the insights into 11-dimensional strings recently obtained from M-theory. New chapters discuss such topics as Seiberg-Witten theory, M theory and duality, and D-branes. Throughout, the author conveys the vitality of the current research and places readers at its forefront. Several chapters reviewing the fundamentals of string theory, making the presentation of the material self-contained while keeping

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overlap with the earlier book to a minimum.

Complex Variables Demystified

In *Relativity Demystified* a physicist explains Einstein's theory of relativity in layman's terms, minus heavy-duty discussion or formal mathematics. Author David McMahon gradually builds up readers' practical skills to a point where they can eventually solve real problems in the field of general relativity. The book offers examples that vary in complexity from textbook-like problems to real-world situations from actual current research. *Relativity Demystified* also focused on quick definitions and demonstrations of procedures needed to solve problems.

Schaum's Outline of Theory and Problems of Quantum Mechanics

UNRAVEL the mystery of STRING THEORY Trying to understand string theory but ending up with your brain in knots? Here's your lifeline! This straightforward guide explains the fundamental principles behind this cutting-edge concept. *String Theory Demystified* elucidates the goal of the theory--to combine general relativity and quantum theory into a single, unified framework. You'll learn about classical strings, conformal field theory, quantization, compactification, and T duality. The

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book covers supersymmetry and superstrings, D-branes, the holographic principle, and cosmology. Hundreds of examples and illustrations make it easy to understand the material, and end-of-chapter quizzes and a final exam help reinforce learning. This fast and easy guide offers: Numerous figures to illustrate key concepts Sample problems with worked solutions Coverage of equations of motion, the energy-momentum tensor, and conserved currents A discussion of the Randall-Sundrum model A time-saving approach to performing better on an exam or at work Simple enough for a beginner, but challenging enough for an advanced student, String Theory Demystified is your key to comprehending this theory of everything.

Modern Physics DeMYSTiFied

Taught at junior level math courses at every university, Linear Algebra is essential for students in almost every technical and analytic discipline.

Linear Algebra Demystified

Circuit Analysis Demystified

Modern physics has revealed the universe as a much stranger place than we could

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have imagined. The puzzle at the centre of our knowledge of the universe is time. Lockwood investigates philosophical questions about past, present, and future, our experience of time, and the possibility of time travel. On this fascinating journey, he provides a careful, lively, and up-to-date introduction to the physics of time and the structure of the universe, guiding the reader step by step through relativity theory and quantum physics, introducing and explaining the ground-breaking ideas of Newton and Boltzmann, Einstein and Schroedinger. From entropy and gravity, black holes and wormholes, The Labyrinth of Time explains how it all began and questions where it may all be headed.

Quantum Field Theory Demystified

Molecular Quantum Dynamics

Annual enrollment in Complex Variables courses is 102,000

An Introduction to String Theory and D-brane Dynamics

When scientists peer through a telescope at the distant stars in outer space or use a particle-accelerator to analyze the smallest components of matter, they discover

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that the same laws of physics govern the whole universe at all times and all places. Physicists call the eternal, ubiquitous constancy of the laws of physics symmetry. Symmetry is the basic underlying principle that defines the laws of nature and hence controls the universe. This all-important insight is one of the great conceptual breakthroughs in modern physics and is the basis of contemporary efforts to discover a grand unified theory to explain all the laws of physics. Nobel Laureate Leon M. Lederman and physicist Christopher T. Hill explain the supremely elegant concept of symmetry and all its profound ramifications to life on Earth and the universe at large in this eloquent, accessible popular science book. They not only clearly describe concepts normally reserved only for physicists and mathematicians, but they also instill an appreciation for the profound beauty of the universe's inherent design. Central to the story of symmetry is an obscure, unpretentious, but extremely gifted German mathematician named Emmy Noether. Though still little known to the world, she impressed no less a scientist than Albert Einstein, who praised her "penetrating mathematical thinking." In some of her earliest work she proved that the law of the conservation of energy was connected to the idea of symmetry and thus laid the mathematical groundwork for what may be the most important concept of modern physics. Lederman and Hill reveal concepts about the universe, based on Noether's work, that are largely unknown to the public and have wide-reaching implications in connection with the Big Bang, Einstein's theory of relativity, quantum mechanics, and many other areas of physics. Through ingenious analogies and illustrations, they bring these

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astounding notions to life. This book will open your eyes to a universe you never knew existed.

Schaum's Outline of Quantum Mechanics, Second Edition

This book provides a comprehensive introduction to the theoretical foundations of quantum tunneling, stressing the basic physics underlying the applications. The topics addressed include exponential and nonexponential decay processes and the application of scattering theory to tunneling problems. In addition to the Schrödinger equation approach, the path integral, Heisenberg's equations and the phase space method are all used to study the motion of a particle under the barrier. Extensions to the multidimensional cases and tunneling of particles with internal degrees of freedom are also considered. Furthermore, recent advances concerning time delay and tunneling times and some of the problems associated with their measurement are also discussed. Finally, some examples of tunneling in atomic, molecular, nuclear and condensed matter physics are presented.

A First Book of Quantum Field Theory

This book introduces QFT for readers with no prior knowledge of the subject. It is meant to be a textbook for advanced undergraduate or beginning postgraduate

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students. The book discusses quantization of fields, S-matrix theory, Feynman diagrams, calculation of decay rates and cross sections, renormalization, symmetries and symmetry breaking. Some background material on classical field theory and group theory, needed for the exposition, are also presented in the book. Detailed calculations of weak and electromagnetic processes are included. There are many exercise problems to help the students, instructors and beginning researchers in the field. The second edition improves upon some notations and explanations, and includes answers to selected exercises.

An Introduction to Quantum Computing

Winner of the Lane Anderson Award, longlisted for the Charles Taylor Prize, shortlisted for the Libris Award for Non-Fiction and selected as an Amazon.ca Best Book "With [The Universe Within's] deeply thoughtful reflections on the place of science in society, on the need to educate the underserved, and on plenty of other topics rarely addressed in this sort of book, Turok takes you where no physicist has gone before. It's well worth making the journey with him." — TIME Magazine The most anticipated nonfiction book of the season, this year's Massey Lectures is a visionary look at the way the human mind can shape the future by world-renowned physicist Neil Turok. Every technology we rely on today was created by the human mind, seeking to understand the universe around us. Scientific knowledge is our most precious possession, and our future will be shaped by the breakthroughs to

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come. In this personal, visionary, and fascinating work, Neil Turok, Director of the Perimeter Institute for Theoretical Physics, explores the transformative scientific discoveries of the past three centuries — from classical mechanics, to the nature of light, to the bizarre world of the quantum, and the evolution of the cosmos. Each new discovery has, over time, yielded new technologies causing paradigm shifts in the organization of society. Now, he argues, we are on the cusp of another major transformation: the coming quantum revolution that will supplant our current, dissatisfying digital age. Facing this brave new world, Turok calls for creatively re-inventing the way advanced knowledge is developed and shared, and opening access to the vast, untapped pools of intellectual talent in the developing world. Scientific research, training, and outreach are vital to our future economy, as well as powerful forces for peaceful global progress. Elegantly written, deeply provocative, and highly inspirational, *The Universe Within* is, above all, about the future — of science, of society, of ourselves.

Fluid Mechanics

The fast and easy way to learn signals and systems Get a working knowledge of signal processing and systems--even if you don't have formal training, unlimited time, or a genius IQ. *Signals and Systems Demystified* offers an effective, illuminating, and entertaining way to learn this essential electrical engineering subject. First, you'll learn methods used to calculate energy and power in signals.

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Next, you'll study signals in the frequency domain using Fourier analysis. Other topics covered include amplitude, frequency, and phase modulation, spectral analysis, convolution, the Laplace transform, and the z-transform. Packed with hundreds of sample equations and explained solutions, and featuring end-of-chapter quizzes and a final exam, this book will teach you the fundamentals of signals and systems in no time at all. Simple enough for a beginner, but challenging enough for an advanced student, Signals and Systems Demystified is your shortcut to mastering this complex subject. This hands-on, self-teaching text offers:

- An easy way to understand signal processing and systems
- Hundreds of worked examples with solutions
- A quiz at the end of each chapter to reinforce learning and pinpoint weaknesses
- A final exam at the end of the book
- No unnecessary technical jargon
- A time-saving approach to performing better on an exam or at work!

Statics and Dynamics Demystified

An Introduction to Quantum Field Theory is a textbook intended for the graduate physics course covering relativistic quantum mechanics, quantum electrodynamics, and Feynman diagrams. The authors make these subjects accessible through carefully worked examples illustrating the technical aspects of the subject, and intuitive explanations of what is going on behind the mathematics. After presenting the basics of quantum electrodynamics, the authors discuss the

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theory of renormalization and its relation to statistical mechanics, and introduce the renormalization group. This discussion sets the stage for a discussion of the physical principles that underlie the fundamental interactions of elementary particle physics and their description by gauge field theories.

Signals & Systems Demystified

Now anyone can master the basics of quantum mechanics -- without formal training, unlimited time, or a genius IQ. In Quantum Mechanics Demystified, physicists (and student-savvy author) David McMahon provides an effective and illuminating way to learn the essentials of quantum mechanics. With Quantum Mechanics Demystified, you master the subject one step at a time at your own speed. This unique self-teaching guide is filled with solved examples throughout, and offers problems to try at the end of each chapter to pinpoint weaknesses. A final exam serves to reinforce the entire book.

Quantum Mech Demystified

The authors provide an introduction to quantum computing. Aimed at advanced undergraduate and beginning graduate students in these disciplines, this text is illustrated with diagrams and exercises.

Schrödinger's Killer App

The fast and easy way to learn statics and dynamics This new title in the popular Demystified series offers practical, easy-to-follow coverage of the difficult statics and dynamics course. Expert author David McMahon follows the standard curriculum, starting with basic mathematical concepts and moving on to advanced topics such as Newton's Law, structural analysis, centrifugal forces, kinematics, and the LaGrange method.

Relativity Demystified

"The text covers the basic building blocks of quantum information processing, quantum bits and quantum gates, showing their relationship to the key quantum concepts of quantum measurement, quantum state transformation, and entanglement between quantum subsystems; it treats quantum algorithms, discussing notions of complexity and describing a number of simple algorithms as well as the most significant algorithms to date; and it explores entanglement and robust quantum computation, investigating such topics as quantifying entanglement, decoherence, quantum error correction, and fault tolerance."--Back cover.

Quantum Theory of Tunneling

String theory is one of the most exciting and challenging areas of modern theoretical physics. This book guides the reader from the basics of string theory to recent developments. It introduces the basics of perturbative string theory, world-sheet supersymmetry, space-time supersymmetry, conformal field theory and the heterotic string, before describing modern developments, including D-branes, string dualities and M-theory. It then covers string geometry and flux compactifications, applications to cosmology and particle physics, black holes in string theory and M-theory, and the microscopic origin of black-hole entropy. It concludes with Matrix theory, the AdS/CFT duality and its generalizations. This book is ideal for graduate students and researchers in modern string theory, and will make an excellent textbook for a one-year course on string theory. It contains over 120 exercises with solutions, and over 200 homework problems with solutions available on a password protected website for lecturers at www.cambridge.org/9780521860697.

The Quantum Magician

The race is on to construct the first quantum code breaker, as the winner will hold the key to the entire Internet. From international, multibillion-dollar financial

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transactions to top-secret government communications, all would be vulnerable to the secret-code-breaking ability of the quantum computer. Written by a renowned quantum physicist closely involved in the U.S. government's development of quantum information science, Schrödinger's Killer App: Race to Build the World's First Quantum Computer presents an inside look at the government's quest to build a quantum computer capable of solving complex mathematical problems and hacking the public-key encryption codes used to secure the Internet. The "killer application" refers to Shor's quantum factoring algorithm, which would unveil the encrypted communications of the entire Internet if a quantum computer could be built to run the algorithm. Schrödinger's notion of quantum entanglement—and his infamous cat—is at the heart of it all. The book develops the concept of entanglement in the historical context of Einstein's 30-year battle with the physics community over the true meaning of quantum theory. It discusses the remedy to the threat posed by the quantum code breaker: quantum cryptography, which is unbreakable even by the quantum computer. The author also covers applications to other important areas, such as quantum physics simulators, synchronized clocks, quantum search engines, quantum sensors, and imaging devices. In addition, he takes readers on a philosophical journey that considers the future ramifications of quantum technologies. Interspersed with amusing and personal anecdotes, this book presents quantum computing and the closely connected foundations of quantum mechanics in an engaging manner accessible to non-specialists. Requiring no formal training in physics or advanced mathematics, it

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explains difficult topics, including quantum entanglement, Schrödinger's cat, Bell's inequality, and quantum computational complexity, using simple analogies.

Strings, Conformal Fields, and M-Theory

Science has made a mighty advance since it originated in ancient Greece more than 2500 years ago. Yet we still live in Plato's cave today; we think everything around us moves continuously, but continuous motion is merely a shadow of real motion. This book will lead you to walk out the cave along a logical and comprehensible road. After passing Zeno's arrow, Newton's inertia, Einstein's light, and Schrodinger's cat, you will reach the real world, where every thing in the universe, whether it is an atom or a ball or even a star, ceaselessly jumps in a random and discontinuous way. In a famous metaphor, God does play dice with the universe. The new discovery may finally solve Zeno's paradoxes and the quantum puzzle, and it will deeply change our view of the world.

An Introduction To Quantum Field Theory

Since it was first published in 1995, Photonic Crystals has remained the definitive text for both undergraduates and researchers on photonic band-gap materials and their use in controlling the propagation of light. This newly expanded and revised

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edition covers the latest developments in the field, providing the most up-to-date, concise, and comprehensive book available on these novel materials and their applications. Starting from Maxwell's equations and Fourier analysis, the authors develop the theoretical tools of photonics using principles of linear algebra and symmetry, emphasizing analogies with traditional solid-state physics and quantum theory. They then investigate the unique phenomena that take place within photonic crystals at defect sites and surfaces, from one to three dimensions. This new edition includes entirely new chapters describing important hybrid structures that use band gaps or periodicity only in some directions: periodic waveguides, photonic-crystal slabs, and photonic-crystal fibers. The authors demonstrate how the capabilities of photonic crystals to localize light can be put to work in devices such as filters and splitters. A new appendix provides an overview of computational methods for electromagnetism. Existing chapters have been considerably updated and expanded to include many new three-dimensional photonic crystals, an extensive tutorial on device design using temporal coupled-mode theory, discussions of diffraction and refraction at crystal interfaces, and more. Richly illustrated and accessibly written, Photonic Crystals is an indispensable resource for students and researchers. Extensively revised and expanded Features improved graphics throughout Includes new chapters on photonic-crystal fibers and combined index-and band-gap-guiding Provides an introduction to coupled-mode theory as a powerful tool for device design Covers many new topics, including omnidirectional reflection, anomalous refraction and diffraction,

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computational photonics, and much more.

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