

Order Of Magnitude Physics Understanding The World With

This book provides an understanding of the physics at work in sunspots and solar coronal loops, and offers a new approach to Magneto-Fluid-Dynamics (or Magneto-Hydro-Dynamics). The book stresses the use of electric currents in Magneto-Fluid-Dynamics. As a rule, authors discuss magnetic field lines without referring to the required electric currents. It also stresses the importance of electric space charges inside conductors that move in magnetic fields.

Dimensional and order-of-magnitude estimates are

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practiced by almost everybody but taught almost nowhere. When physics students engage in their first theoretical research project, they soon learn that exactly solvable problems belong only to textbooks, that numerical models are long and resource consuming, and that something else is needed to quickly gain insight into the system they are going to study. Qualitative methods are this something else, but typically, students have never heard of them before. The aim of this book is to teach the craft of qualitative analysis using a set of problems, some with solutions and some without, in advanced undergraduate and beginning graduate Quantum Mechanics. Examples include a dimensional analysis solution for the spectrum of a quartic oscillator,

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simple WKB formulas for the matrix elements of a coordinate in a gravitational well, and a three-line-long estimate for the ionization energy of atoms uniformly valid across the whole periodic table. The piece de resistance in the collection is a series of dimensional analysis questions in Integrable Nonlinear Partial Differential Equations with no dimensions existing a priori. Solved problems include the relationship between the size and the speed of solitons of the Korteweg-de Vries equation and an expression for the oscillation period of a Nonlinear Schrödinger breather as a function of its width

Technology has propelled the atmospheric sciences from a fledgling discipline to a global enterprise. Findings in

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this field shape a broad spectrum of decisions--what to wear outdoors, whether aircraft should fly, how to deal with the issue of climate change, and more. This book presents a comprehensive assessment of the atmospheric sciences and offers a vision for the future and a range of recommendations for federal authorities, the scientific community, and education administrators. How does atmospheric science contribute to national well-being? In the context of this question, the panel identifies imperatives in scientific observation, recommends directions for modeling and forecasting research, and examines management issues, including the growing problem of weather data availability. Five subdisciplines--physics, chemistry, dynamics and

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weather forecasting, upper atmosphere and near-earth space physics, climate and climate change--and their status as the science enters the twenty-first century are examined in detail, including recommendations for research. This readable book will be of interest to public-sector policy framers and private-sector decisionmakers as well as researchers, educators, and students in the atmospheric sciences.

Achieve success in your physics course by making the most of what PHYSICS FOR SCIENTISTS AND ENGINEERS has to offer. From a host of in-text features to a range of outstanding technology resources, you'll have everything you need to understand the natural forces and principles of physics. Throughout every

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chapter, the authors have built in a wide range of examples, exercises, and illustrations that will help you understand the laws of physics AND succeed in your course! Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Nuclear Science Abstracts

The Art of Educated Guessing and Opportunistic
Problem Solving

The Constructions of Time in Natural Science

Understanding Physics

Theoretical Concepts in Physics

Astrophysics in a Nutshell

Featuring more than five hundred questions from

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past Regents exams with worked out solutions and detailed illustrations, this book is integrated with APlusPhysics.com website, which includes online questions and answer forums, videos, animations, and supplemental problems to help you master Regents Physics Essentials.

The importance and the beauty of modern quantum field theory resides in the power and variety of its methods and ideas, which find application in domains as different as particle physics, cosmology, condensed matter, statistical mechanics and critical phenomena. This book introduces the reader to the

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modern developments, assuming no previous knowledge of quantum field theory. Along with standard topics like Feynman diagrams, the book discusses effective lagrangians, renormalization group equations, the path integral formulation, spontaneous symmetry breaking and non-abelian gauge theories. The inclusion of more advanced topics will also make this a most useful book for graduate students and researchers.

Numerous sources of ionizing radiation can lead to human exposure: natural sources, nuclear explosions, nuclear power generation, use of

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radiation in medical, industrial and research purposes, and radiation emitting consumer products. Before assessing the radiation dose to a population one requires a precise knowledge of the activity of a number of radionuclides. The basis for the assessment of the dose to a population from a release of radioactivity to the environment, the estimation of the potential clinical health effects due to the dose received and, ultimately, the implementation of countermeasures to protect the population, is the measurement of radioactive contamination in the environment after the release. It

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is the purpose of this book to present the facts about the presence of radionuclides in the environment, natural and man made. There is no aspect of radioactivity, which has marked the passing century, not mentioned or discussed in this book.

"This monograph "Mesons and Quarks" includes a wide range of topics in the frontier areas of research in the overlapping field of nuclear and particle physics. It discusses various aspects of Quantum Chromodynamics (QCD) at different regimes of energy and density."--BOOK JACKET.

Radioactivity in the Environment

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The Atmospheric Sciences

Proceedings of Tokyo Tech-Hitotsubashi

Interdisciplinary Conference + APFA7

Molecular Modeling and Multiscaling Issues for

Electronic Material Applications

Experimental Quantum chemistry

Modern Physics, Philosophy, and the Meaning of
Quantum Theory

*The aim of this book is to convey a
broad perspective of what quantum
cosmology is and how it can be a
relevant field of research in the 21st*

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century. A series of challenges (or research directions to follow) are provided, in the form of chapters, as the means of forwarding some of the main elements of quantum cosmology. This is therefore a more 'practical' oriented book, where a reasonable amount of technical features are presented in a compact appendix. Time is considered as an independent entity which cannot be reduced to the concept of matter, space or field. The

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point of discussion is the ?time flow? conception of N A Kozyrev (1908-1983), an outstanding Russian astronomer and natural scientist. In addition to a review of the experimental studies of ?the active properties of time?, by both Kozyrev and modern scientists, the reader will find different interpretations of Kozyrev's views and some developments of his ideas in the fields of geophysics, astrophysics, general relativity and theoretical

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mechanics.

A Top 25 CHOICE 2016 Title, and recipient of the CHOICE Outstanding Academic Title (OAT) Award. How much energy is released in ATP hydrolysis? How many mRNAs are in a cell? How genetically similar are two random people? What is faster, transcription or translation? Cell Biology by the Numbers explores these questions and dozens of others provided. This is an avant-garde book edited by

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Nobel Laureate Ahmed Zewail with contributions from eminent scientists including four Nobel prize winners. The perspectives of these world leaders in physics, chemistry, and biology define potential new frontiers at the interface of disciplines and including physical, systems, and synthetic biology. This book brings about the confluence of concepts and tools, and that of different disciplines, to address significant problems of our

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time: visualization; theory and computation for complexity; macromolecular function, protein folding and misfolding; and systems integration from cells to consciousness. The scope of tools is wide-ranging, spanning imaging, crystallography, microfluidics, single-molecule spectroscopy, and synthetic probe targeting. Concepts such as dynamic self-assembly, molecular recognition, non-canonical amino acids,

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and others are covered in various chapters as they are cornerstones in building the trilogy description of behavior-structure, dynamics, and function. The volume is uniquely structured to provide overviews with historical perspectives on the evolution of ideas and on the future of physical biology and biological complexity, from atoms to medicine.

Contents: The Preoccupations of Twenty-First-Century Biology (D Baltimore)

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*World as Physics, Mathematics and
Nothing Else (A Varshavsky)Physical
Biology: 4D Visualization of Complexity
(A H Zewail)Revolutionary Developments
from Atomic to Extended Structural
Imaging (J M Thomas)Physical Biology at
the Crossroads (C Bustamante)The
Challenge of Quasi-Regular Structures
in Biology (R D Kornberg)The Future of
Biological X-Ray Analysis (D C
Rees)Reinterpreting the Genetic Code:
Implications for Macromolecular Design,*

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*Evolution and Analysis (D A
Tirrell) Designing Ligands to Bind
Tightly to Proteins (G M Whitesides et
al.) Biology by the Numbers (R
Phillips) Eppur si muove (M
Parrinello) Protein Folding and Beyond:
Energy Landscapes and the Organization
of Living Matter in Time and Space (P G
Wolynes) Protein Folding and Misfolding:
From Atoms to Organisms (C M Dobson) A
Systems Approach to Medicine Will
Transform Healthcare (L Hood) The*

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Neurobiology of Consciousness (C Koch & F Mormann)
Computer-Aided Drug Discovery: Physics-based Simulations from the Molecular to the Cellular Level (J A McCamom)
Precision Measurements in Biology (S R Quake)
Potassium Channels and the Atomic Basis of Selective Ion Conduction (R MacKinnon)
Symmetry Breaking, Delocalization and Dynamics in Electron Transfer Systems (N S Hush)
The Initial Value Representation of Semiclassical

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*Theory: A Practical Way for Adding
Quantum Effects to Classical Molecular
Dynamics Simulations of Complex
Molecular Systems (W H Miller)*

*Readership: Graduate students and
researchers in life sciences
(structural biology, genomics, systems
biology, molecular biology,
neuroscience), biochemistry, physical
chemistry, chemical engineering, and
biophysics. Keywords: Visualization; Comp
lexity; Macromolecular Function; Protein*

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*Folding;Molecular Recognition;Systems I
ntegration;Cells;Consciousness;Crystall
ography;Microfluidics;Spectroscopy;Synt
hetic Probe Targeting*Reviews:“Even the
shorter contributions, written by
masters of their fields, are
penetrating.”Chemistry World “The scope
of this collection of overviews of the
present state and future possible
developments in physical biology is
very broad. The result is both
informative and readable. Anyone

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*interested in how physics, engineering and mathematics can contribute to research in biology and medicine, be it on the molecular level or on the healthcare level, should be able to find useful information and inspiration in this book."*Acta Paediatrica
Proceedings of Conference IX : Convened Under Auspices of National Earthquake Hazards Reduction Program, 29 July 1979 - 2 August 1979
Entering the Twenty-First Century

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Street-Fighting Mathematics

Modern Introductory Physics

Mastering Complexity

*An Alternative View of Theoretical
Reasoning in Physics for Final-Year
Undergraduates*

A thorough grounding in contemporary physics while placing the subject into its social and historical context.

Based largely on the highly respected Project Physics Course developed by two of the authors, it also integrates the

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results of recent pedagogical research. The text thus teaches the basic phenomena in the physical world and the concepts developed to explain them; shows that science is a rational human endeavour with a long and continuing tradition, involving many different cultures and people; develops facility in critical thinking, reasoned argumentation, evaluation of evidence, mathematical modelling, and ethical values. The treatment emphasises not

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only what we know but also how we know it, why we believe it, and what effects this knowledge has.

University Physics is designed for the two- or three-semester calculus-based physics course. The text has been developed to meet the scope and sequence of most university physics courses and provides a foundation for a career in mathematics, science, or engineering. The book provides an important opportunity for students to

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learn the core concepts of physics and understand how those concepts apply to their lives and to the world around them. Due to the comprehensive nature of the material, we are offering the book in three volumes for flexibility and efficiency. Coverage and Scope Our University Physics textbook adheres to the scope and sequence of most two- and three-semester physics courses nationwide. We have worked to make physics interesting and accessible to

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students while maintaining the mathematical rigor inherent in the subject. With this objective in mind, the content of this textbook has been developed and arranged to provide a logical progression from fundamental to more advanced concepts, building upon what students have already learned and emphasizing connections between topics and between theory and applications. The goal of each section is to enable students not just to recognize

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concepts, but to work with them in ways that will be useful in later courses and future careers. The organization and pedagogical features were developed and vetted with feedback from science educators dedicated to the project.

VOLUME I Unit 1: Mechanics Chapter 1: Units and Measurement Chapter 2: Vectors Chapter 3: Motion Along a Straight Line Chapter 4: Motion in Two and Three Dimensions Chapter 5: Newton's Laws of Motion Chapter 6:

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Applications of Newton's Laws Chapter
7: Work and Kinetic Energy Chapter 8:
Potential Energy and Conservation of
Energy Chapter 9: Linear Momentum and
Collisions Chapter 10: Fixed-Axis
Rotation Chapter 11: Angular Momentum
Chapter 12: Static Equilibrium and
Elasticity Chapter 13: Gravitation
Chapter 14: Fluid Mechanics Unit 2:
Waves and Acoustics Chapter 15:
Oscillations Chapter 16: Waves Chapter
17: Sound

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This book is intended to give a clear and concise introductory account of the basic ideas underlying nuclear and elementary particle physics. The attempt throughout is to convey a sound physical understanding of the structures and processes encountered. It assumes some knowledge of elementary quantum mechanics, particularly the treatment of angular momentum, and the rudiments of special relativity. In addition to 'standard' calculations

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based on this knowledge, frequent use is made of 'order-of-magnitude' and 'dimensional' arguments. In this way it has been possible to give some discussion of quite advanced topics and recent developments. Although reference is made from time to time to the apparatus of nuclear and particle physics no technical detail is given. My basic hope is that students using this book will acquire a sound understanding of what nuclear and

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particle physics is about and will wish to learn more. I am indebted to Dr David Bailin and various (nameless) referees for penetrating and helpful comments on parts of the text.

The material for these volumes has been selected from the past twenty years' examination questions for graduate students at the University of California at Berkeley, Columbia University, the University of Chicago, MIT, the State University of New York

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at Buffalo, Princeton University and
the University of Wisconsin.

Second Edition

Physics for Scientists and Engineers,
Volume 2

Aplusphysics

Non-Equilibrium Thermodynamics

Problems And Solutions On Quantum
Mechanics

Your Guide to Regents Physics

Essentials

"University Physics is a three-volume

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collection that meets the scope and sequence requirements for two- and three-semester calculus-based physics courses. Volume 1 covers mechanics, sound, oscillations, and waves. This textbook emphasizes connections between theory and application, making physics concepts interesting and accessible to students while maintaining the mathematical rigor inherent in the subject. Frequent, strong examples focus on how to approach a problem, how

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to work with the equations, and how to check and generalize the result."--Open Textbook Library.

An antidote to mathematical rigor mortis, teaching how to guess answers without needing a proof or an exact calculation. In problem solving, as in street fighting, rules are for fools: do whatever works--don't just stand there! Yet we often fear an unjustified leap even though it may land us on a correct result. Traditional mathematics

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teaching is largely about solving exactly stated problems exactly, yet life often hands us partly defined problems needing only moderately accurate solutions. This engaging book is an antidote to the rigor mortis brought on by too much mathematical rigor, teaching us how to guess answers without needing a proof or an exact calculation. In *Street-Fighting Mathematics*, Sanjoy Mahajan builds, sharpens, and demonstrates tools for

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educated guessing and down-and-dirty, opportunistic problem solving across diverse fields of knowledge—from mathematics to management. Mahajan describes six tools: dimensional analysis, easy cases, lumping, picture proofs, successive approximation, and reasoning by analogy. Illustrating each tool with numerous examples, he carefully separates the tool—the general principle—from the particular application so that the reader can most

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easily grasp the tool itself to use on problems of particular interest. Street-Fighting Mathematics grew out of a short course taught by the author at MIT for students ranging from first-year undergraduates to graduate students ready for careers in physics, mathematics, management, electrical engineering, computer science, and biology. They benefited from an approach that avoided rigor and taught them how to use mathematics to solve

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real problems. Street-Fighting Mathematics will appear in print and online under a Creative Commons Noncommercial Share Alike license. Narrated by a longtime New York City ward boss, this volume reveals the successful application of corrupt practices such as patronage-based appointments and the exercise of power for personal gain. Classic monograph treats irreversible processes and phenomena of

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thermodynamics: non-equilibrium
thermodynamics. Covers statistical
foundations and applications with
chapters on fluctuation theory, theory
of stochastic processes, kinetic theory
of gases, more.

Order of Magnitude Physics

A Basic Guide to Order of Magnitude
Physics

Fundamentals and Case Studies of
Natural Phenomena

The Art of Insight in Science and

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Engineering

The Emperor's New Mind

Leg N Level Sci Physics

Tools to make hard problems easier to solve. In this book, Sanjoy Mahajan shows us that the way to master complexity is through insight rather than precision. Precision can overwhelm us with information, whereas insight connects seemingly disparate pieces of information into a simple picture. Unlike computers, humans depend on insight. Based on the author's fifteen years of teaching at MIT, Cambridge University, and Olin College,

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The Art of Insight in Science and Engineering shows us how to build insight and find understanding, giving readers tools to help them solve any problem in science and engineering. To master complexity, we can organize it or discard it. The Art of Insight in Science and Engineering first teaches the tools for organizing complexity, then distinguishes the two paths for discarding complexity: with and without loss of information. Questions and problems throughout the text help readers master and apply these groups of tools. Armed with this three-part toolchest, and without complicated

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mathematics, readers can estimate the flight range of birds and planes and the strength of chemical bonds, understand the physics of pianos and xylophones, and explain why skies are blue and sunsets are red. The Art of Insight in Science and Engineering will appear in print and online under a Creative Commons Noncommercial Share Alike license. In this highly individual, and truly novel, approach to theoretical reasoning in physics, the author has provided a course that illuminates the subject from the standpoint of real physics as practised by research scientists. Professor Longair gives the basic

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insights, attitudes, and techniques that are the tools of the professional physicist, in a manner that conveys the intellectual excitement and beauty of the subject. The book is intended to be a supplement to more traditional courses for physics undergraduates, and the author assumes that his readers already have some knowledge of the main branches of physics. As the story unfolds, much of the core material of an undergraduate course in physics is reviewed from a more mature point of view. This is not, in fact, a substitute for existing texts. Rather it goes beyond them by

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improving the student's appreciation of the subject.

Quantum theory is one the most important and successful theories of modern physical science. It has been estimated that its principles form the basis for about 30 per cent of the world's manufacturing economy. This is all the more remarkable because quantum theory is a theory that nobody understands. The meaning of Quantum Theory introduces science students to the theory's fundamental conceptual and philosophical problems, and the basis of its non-understandability. It does this with the

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barest minimum of jargon and very little mathematics in the main text. Readers wishing to delve more deeply into the theory's mathematical subtleties can do so in an extended series of appendices. The book brings the reader up to date with the results of new experimental tests of quantum weirdness and reviews the latest thinking on alternative interpretations, the frontiers of quantum cosmology, quantum gravity and potential application of this weirdness in computing, cryptography and teleportation. This book grew out of an ongoing effort to modernize Colgate University's three-

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term, introductory, calculus-level physics course. The book is for the first term of this course and is intended to help first-year college students make a good transition from high-school physics to university physics. The book concentrates on the physics that explains why we believe that atoms exist and have the properties we ascribe to them. This story line, which motivates much of our professional research, has helped us limit the material presented to a more humane and more realistic amount than is presented in many beginning university physics courses. The theme of atoms also

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supports the presentation of more non-Newtonian topics and ideas than is customary in the first term of calculus-level physics. We think it is important and desirable to introduce students sooner than usual to some of the major ideas that shape contemporary physicists' views of the nature and behavior of matter. Here in the second decade of the twenty-first century such a goal seems particularly appropriate. The quantum nature of atoms and light and the mysteries associated with quantum behavior clearly interest our students. By adding and emphasizing more modern content, we seek not

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only to present some of the physics that engages contemporary physicists but also to attract students to take more physics. Only a few of our beginning physics students come to us sharply focused on physics or astronomy. Nearly all of them, however, have taken physics in high school and found it interesting.

Disciplined Minds

Cell Biology by the Numbers

Nuclear and Particle Physics

Physical Biology

A Modern Introduction to Quantum Field Theory

Beyond Measure

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Experimental Quantum Chemistry is a comprehensive account of experimental quantum chemistry and covers topics ranging from basic quantum theory to atoms and ions, photons, electrons, and positrons. Nuclei, molecules, and free radicals are also discussed. This volume is comprised of eight chapters and begins with an overview of the basic experiments and ideas leading to the development of quantum theory, with special emphasis on the problems of chemistry. The main properties of electromagnetic radiation are then considered, along with the most important relations of electrons and positrons in chemistry; the quantum theory of isolated atoms and ions; the structure of nuclei and the main applications to organic chemistry; and the chemical structure and reactivity of molecules. The theoretical and experimental aspects of interpreting free radical structures on the basis of the

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molecular orbital and valence bond theories are also explored. The final chapter is devoted to the chemistry of the organic solid state, paying particular attention to the structure and molecular mobilities of organic solids, collective crystal states (excitons, phonons, and polaritons), energy transfer processes, and reactions in the solid state. This book should be of interest to physicists and organic chemists.

In recent years, as part of the increasing “informationization” of industry and the economy, enterprises have been accumulating vast amounts of detailed data such as high-frequency transaction data in financial markets and point-of-sale information on individual items in the retail sector. Similarly, vast amounts of data are now available on business networks based on inter firm transactions and shareholdings. In the past, these types of information were studied only by

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economists and management scholars. More recently, however, researchers from other elds, such as physics, mathematics, and information sciences, have become interested in this kind of data and, based on novel empirical approaches to searching for regularities and “laws” akin to those in the natural sciences, have produced intriguing results. This book is the proceedings of the international conference THICCAPFA7 that was titled “New Approaches to the Analysis of Large-Scale Business and E- nomic Data,” held in Tokyo, March 1–5, 2009. The letters THIC denote the Tokyo Tech (Tokyo Institute of Technology)–Hitotsubashi Interdisciplinary Conference. The conference series, titled APFA (Applications of Physics in Financial Analysis), focuses on the analysis of large-scale economic data. It has traditionally brought physicists and economists together to exchange viewpoints and

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experience (APFA1 in Dublin 1999, APFA2 in Liege ` 2000, APFA3 in London 2001, APFA4 in Warsaw 2003, APFA5 in Torino 2006, and APFA6 in Lisbon 2007). The aim of the conference is to establish fundamental analytical techniques and data collection methods, taking into account the results from a variety of academic disciplines.

The original edition was immediately recognized as a classic of condensed matter physics. This new edition covers the main properties of nematics, cholesterics, and smectics and columnar phases, particularly the symmetry and the mechanical and optical characteristics of each phase. The latter includes some applications to display systems. The emphasis on order-of-magnitude considerations should make it accessible to researchers and graduate students alike.

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Winner of the Wolf Prize for his contribution to our understanding of the universe, Penrose takes on the question of whether artificial intelligence will ever approach the intricacy of the human mind.

144 illustrations.

Magnitude of Deviatoric Stresses in the Earth's Crust and Upper Mantle

A Series of Very Plain Talks on Very Practical Politics

Back-of-the-envelope Quantum Mechanics

On the Way to Understanding the Time Phenomenon

Beyond The Standard Model Iii

Hearings, Reports and Prints of the Joint Committee on Atomic Energy

Molecular Modeling and Multiscaling Issues for Electronic Material Applications provides a snapshot on

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the progression of molecular modeling in the electronics industry and how molecular modeling is currently being used to understand material performance to solve relevant issues in this field. This book is intended to introduce the reader to the evolving role of molecular modeling, especially seen through the eyes of the IEEE community involved in material modeling for electronic applications. Part I presents the role that quantum mechanics can play in performance prediction, such as properties dependent upon electronic structure, but also shows examples how molecular models may be used in performance diagnostics, especially when chemistry is part of the performance issue. Part II gives examples of

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large-scale atomistic methods in material failure and shows several examples of transitioning between grain boundary simulations (on the atomistic level) and large-scale models including an example of the use of quasi-continuum methods that are being used to address multiscale issues. Part III is a more specific look at molecular dynamics in the determination of the thermal conductivity of carbon-nanotubes. Part IV covers the many aspects of molecular modeling needed to understand the relationship between the molecular structure and mechanical performance of materials. Finally, Part V discusses the transitional topic of multiscale modeling and recent developments to reach

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the submicronscale using mesoscale models, including examples of direct scaling and parameterization from the atomistic to the coarse-grained particle level.

The ideal one-semester astrophysics introduction for science undergraduates—now expanded and fully updated Winner of the American Astronomical Society's Chambliss Award, *Astrophysics in a Nutshell* has become the text of choice in astrophysics courses for science majors at top universities in North America and beyond. In this expanded and fully updated second edition, the book gets even better, with a new chapter on extrasolar planets; a greatly expanded chapter on the interstellar medium; fully updated facts and figures on all

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subjects, from the observed properties of white dwarfs to the latest results from precision cosmology; and additional instructive problem sets. Throughout, the text features the same focused, concise style and emphasis on physics intuition that have made the book a favorite of students and teachers. Written by Dan Maoz, a leading active researcher, and designed for advanced undergraduate science majors, *Astrophysics in a Nutshell* is a brief but thorough introduction to the observational data and theoretical concepts underlying modern astronomy. Generously illustrated, it covers the essentials of modern astrophysics, emphasizing the common physical principles that govern astronomical

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phenomena, and the interplay between theory and observation, while also introducing subjects at the forefront of modern research, including black holes, dark matter, dark energy, and gravitational lensing. In addition to serving as a course textbook, *Astrophysics in a Nutshell* is an ideal review for a qualifying exam and a handy reference for teachers and researchers. The most concise and current astrophysics textbook for science majors—now expanded and fully updated with the latest research results. Contains a broad and well-balanced selection of traditional and current topics. Uses simple, short, and clear derivations of physical results. Trains students in the essential skills of order-of-magnitude

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analysis Features a new chapter on extrasolar planets, including discovery techniques Includes new and expanded sections and problems on the physics of shocks, supernova remnants, cosmic-ray acceleration, white dwarf properties, baryon acoustic oscillations, and more Contains instructive problem sets at the end of each chapter Solutions manual (available only to professors)

This book details the battle one must fight to be an independent thinker, showing how an honest reassessment of what it means to be a professional in today's corporate society can be remarkably liberating. Poignant examples from the world of work reveal the

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workplace as a battleground for the very identity of the individual. Schmidt contends that professional work is inherently political—that the unstated duty of professionals is to maintain strict "ideological discipline." Career dissatisfaction evolves as workers lose control over the political component of their creative work. After reading this insightful book, no one who works for a living will ever think the same way about their job. Jeff Schmidt lives in Washington, D.C., where he is an editor for *Physics Today*.

Few worlds are as tantalizing and enigmatic as Europa, whose complex icy surface intimates the presence of an ocean below. Europa beckons for our understanding and

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future exploration, enticing us with the possibilities of a water-rich environment and the potential for life beyond Earth. This new volume in the Space Science Series, with more than 80 contributing authors, reveals the discovery and current understanding of Europa's icy shell, subsurface ocean, presumably active interior, and myriad inherent interactions within the Jupiter environment. Europa is the foundation upon which the coming decades of scientific advancement and exploration of this world will be built, making it indispensable for researchers, students, and all who hold a passion for exploration.

University Physics

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Econophysics Approaches to Large-Scale Business Data
and Financial Crisis

From Atoms to Medicine

Europa

Space, Time and the Limits of Human Understanding

Mechanics of Fluids

In this compendium of essays, some of the world's leading thinkers discuss their conceptions of space and time, as viewed through the lens of their own discipline. With an epilogue on the limits of human understanding, this volume hosts contributions from six or more diverse fields. It presumes only rudimentary background

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knowledge on the part of the reader. Time and again, through the prism of intellect, humans have tried to diffract reality into various distinct, yet seamless, atomic, yet holistic, independent, yet interrelated disciplines and have attempted to study it contextually. Philosophers debate the paradoxes, or engage in meditations, dialogues and reflections on the content and nature of space and time. Physicists, too, have been trying to mold space and time to fit their notions concerning micro- and macro-worlds. Mathematicians focus on the abstract aspects of space, time and measurement. While cognitive

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scientists ponder over the perceptual and experiential facets of our consciousness of space and time, computer scientists theoretically and practically try to optimize the space-time complexities in storing and retrieving data/information. The list is never-ending. Linguists, logicians, artists, evolutionary biologists, geographers etc., all are trying to weave a web of understanding around the same duo. However, our endeavour into a world of such endless imagination is restrained by intellectual dilemmas such as: Can humans comprehend everything? Are there any limits? Can finite

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thought fathom infinity? We have sought far and wide among the best minds to furnish articles that provide an overview of the above topics. We hope that, through this journey, a symphony of patterns and tapestry of intuitions will emerge, providing the reader with insights into the questions: What is Space? What is Time? Chapter [15] of this book is available open access under a CC BY 4.0 license.

As in previous editions, this ninth edition of Massey's Mechanics of Fluids introduces the basic principles of fluid mechanics in a detailed and clear manner. This bestselling textbook provides

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the sound physical understanding of fluid flow that is essential for an honours degree course in civil or mechanical engineering as well as courses in aeronautical and chemical engineering.

Focusing on the engineering applications of fluid flow, rather than mathematical techniques, students are gradually introduced to the subject, with the text moving from the simple to the complex, and from the familiar to the unfamiliar. In an all-new chapter, the ninth edition closely examines the modern context of fluid mechanics, where climate change, new forms of energy generation, and fresh water conservation are

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pressing issues. SI units are used throughout and there are many worked examples. Though the book is essentially self-contained, where appropriate, references are given to more detailed or advanced accounts of particular topics providing a strong basis for further study. For lecturers, an accompanying solutions manual is available.

*A Textbook with Applications to the Retinal Rod
and to the Density of Prime Numbers
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Magneto-Fluid Dynamics

Mesons and Quarks