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*This lively textbook differs from
others on the subject by its*

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usefulness as a conceptual and mathematical preparation for the study of quantum mechanics, by its emphasis on a variety of learning tools aimed at fostering the student's self-awareness of learning, and by

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its frequent connections to current research.

The main theme of this highly successful book is that the transmission of energy by wave propagation is fundamental to almost every branch of physics.

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Therefore, besides giving students a thorough grounding in the theory of waves and vibrations, the book also demonstrates the pattern and unity of a large part of physics. This new edition has been

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thoroughly revised and has been redesigned to meet the best contemporary standards. It includes new material on electron waves in solids using the Kronig-Penney model to show how their allowed

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energies are limited to Brillouin zones, The role of phonons is also discussed. An Optical Transform is used to demonstrate the modern method of lens testing. In the last two chapters the sections

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on chaos and solitons have been reduced but their essential contents remain. As with earlier editions, the book has a large number of problems together with hints on how to solve them. The Physics of Vibrations

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and Waves, 6th Edition will prove invaluable for students taking a first full course in the subject across a variety of disciplines particularly physics, engineering and mathematics.

'Et mai - ... - si j'avait su

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comment en revenir. One service mathematics has rendered the je n'y semis point aUe.' human race. It has put common sense back Jules Verne where it belongs, on the topmost sheJf next to the dusty

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in a world where both feedback and non linearities abound.

Similarly, all kinds of parts of mathematics serve as tools for other parts and for other sciences. Applying a simple rewriting rule to the quote on

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Units (the Green Book) of which this is the direct successor, was published in 1969, with the object of 'securing clarity and precision, and wider agreement in the use of symbols, by chemists in different countries,

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among physicists, chemists and engineers, and by editors of scientific journals'. Subsequent revisions have taken account of many developments in the field, culminating in the major extension and revision

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represented by the 1988 edition under the simplified title Quantities, Units and Symbols in Physical Chemistry. This 2007, Third Edition, is a further revision of the material which reflects the experience of the

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contributors with the previous editions. The book has been systematically brought up to date and new sections have been added. It strives to improve the exchange of scientific information among

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This book is devoted to research in the actual field of mathematical modeling in modern problems of plasma physics associated with vibrations and wake waves excited by a short high-power laser pulse. The author explores the hydrodynamic model of the wake

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wave in detail and from different points of view, within the framework of its regular propagation, a development suitable for accelerating electrons, and the final tipping effect resulting in unregulated energy transfer to plasma particles. Key selling

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features: Presents research directly related to the propagation of super-power short laser pulses (subject of the 2018 Nobel Prize in Physics). Presents mathematical modeling of plasma physics associated with vibrations and wake waves excited by a short high-power laser pulse.

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Includes studies of large-amplitude plasma oscillations. Most of the presented results are of original nature and have not appeared in the domestic and foreign scientific literature. Written at a level accessible for researchers, academia, and engineers.

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Written by two well-known researchers in the field, this useful reference takes an applied approach to high frequency processes including oscillations and waves in ferromagnets, antiferromagnets, and ferrimagnets. Problems evaluated include ferromagnetic and

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antiferromagnetic resonances, spin waves, nonlinear processes, and high frequency manifestations of interactions between the magnetic system and other systems of magnetically ordered substances as elastic waves and charge carriers. Unlike previous monographs on this

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subject, which are highly theoretical and written for very advanced readers, this book requires only an average college background in mathematics and experimental physics. It will be a valuable addition to the library of engineers and scientists in research and

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development for communications applications, and scientists interested in nonlinear magnetic phenomena. It also serves as an excellent introduction to the topic for newcomers in the field.

Magnetization Oscillations and Waves not only presents results but

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also shows readers how to obtain them; most formulas are derived with so many details that readers can reproduce them. The book includes many summaries and tables and detailed references to significant work in the area by European researchers.

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Completely revised text applies spectral methods to boundary value, eigenvalue, and time-dependent problems, but also covers cardinal functions, matrix-solving methods, coordinate transformations, much more. Includes 7 appendices and over 160 text figures.

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Except for digressions in Chapters 8 and 17, this book is a highly unified treatment of simple oscillations and waves. The phenomena treated are "simple" in that they are describable by linear equations, almost all occur in one dimension, and the dependent variables are scalars instead of

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vectors or something else (such as electromagnetic waves) with geometric complications. The book omits such complicated cases in order to deal thoroughly with properties shared by all linear oscillations and waves. The first seven chapters are a sequential treatment

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of electrical and mechanical oscillating systems, starting with the simplest and proceeding to systems of coupled oscillators subjected to arbitrary driving forces. Then, after a brief discussion of nonlinear oscillations in Chapter 8, the concept of normal modes of motion is

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introduced and used to show the relationship between oscillations and waves. After Chapter 12, properties of waves are explored by whatever mathematical techniques are applicable. The book ends with a short discussion of three-dimensional problems (in Chapter

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16), and a study of a few aspects of non linear waves (in Chapter 17).

Physics of Oscillations and Waves

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Waves and Oscillations

The Principles of Quantum

Mechanics

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Of Problems Of Different Types. The Book Will Be Of Great Help Not Only To Undergraduate Students, But Also To Those Preparing For Various Competitive Examinations. The physics of waves and

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Oscillations New Age
International*

*Shallow water acoustics (SWA),
the study of how low and
medium frequency sound*

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propagates and scatters on the continental shelves of the worlds oceans, has both technical interest and a large number of practical applications. Technically, shallow water poses an

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interesting medium for the study of acoustic scattering, inverse theory, and propagation physics in a complicated oceanic waveguide. Practically, shallow water acoustics has interest for

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geophysical exploration, marine mammal studies, and naval applications. Additionally, one notes the very interdisciplinary nature of shallow water acoustics, including acoustical physics,

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physical oceanography, marine geology, and marine biology. In this specialized volume the authors, all of whom have extensive at-sea experience in US and Russian research efforts, have tried to

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summarize the main experimental, theoretical, and computational results in shallow water acoustics, with an emphasis on providing physical insight into the topics presented.

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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

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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

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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

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enable students not just to recognize 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

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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

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4: Motion in Two and Three Dimensions Chapter 5:

Newton's Laws of Motion

Chapter 6: Applications of

Newton's Laws Chapter 7:

Work and Kinetic Energy

Chapter 8: Potential Energy

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*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:*

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Gravitation Chapter 14: Fluid Mechanics Unit 2: Waves and Acoustics Chapter 15: Oscillations Chapter 16: Waves Chapter 17: Sound In Linear and Nonlinear Systems

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Waves and Oscillations in Plasmas

The Physics of Vibrations and Waves

Theory of Plasmas

PHYSICS FOR ENGINEERS

Newtonian mechanics : dynamics of

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a point mass (1001-1108) -
Dynamics of a system of point
masses (1109-1144) - Dynamics of
rigid bodies (1145-1223) - Dynamics
of deformable bodies (1224-1272) -
Analytical mechanics : Lagrange's
equations (2001-2027) - Small
oscillations (2028-2067) - Hamilton's

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canonical equations (2068-2084) -
Special relativity (3001-3054).

This volume contains two papers that review certain theoretical problems that have been studied in the Laboratory of Plasma Accelerators and Plasma Physics of the P. N. Lebedev Physics Institute

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of the Academy of Sciences of the USSR. The review of R. R. Kikvidze and A. A. Rukhadze, "Theory of oscillations and stability of a semiconductor plasma with low carrier density in a strong electric field," is devoted to a solid-state plasma. The main attention is

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devoted to the fact that in such a plasma electro magnetic waves are effectively generated if there is a negative current-voltage characteristic in the carrier current; this effect can compete in importance with the well-known Gunn effect. In their fundamental

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review paper "Nonlinear theory of the interaction of waves in a plasma," V. V. Pustovalov and V. P. SHin set forth the fundamentals of the theory of nonlinear interaction of waves in a hot rarefied plasma. Besides a systematic exposition of the procedure for deriving the

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equations that describe the nonlinear interaction of waves in an isotropic or an anisotropic (magnetized) plasma, they study many concrete examples relating to the interaction of definite types of waves under different conditions.

Partial Differential Equations

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presents a balanced and comprehensive introduction to the concepts and techniques required to solve problems containing unknown functions of multiple variables. While focusing on the three most classical partial differential equations (PDEs)—the

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wave, heat, and Laplace equations—this detailed text also presents a broad practical perspective that merges mathematical concepts with real-world application in diverse areas including molecular structure, photon and electron interactions,

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radiation of electromagnetic waves, vibrations of a solid, and many more. Rigorous pedagogical tools aid in student comprehension; advanced topics are introduced frequently, with minimal technical jargon, and a wealth of exercises reinforce vital skills and invite

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additional self-study. Topics are presented in a logical progression, with major concepts such as wave propagation, heat and diffusion, electrostatics, and quantum mechanics placed in contexts familiar to students of various fields in science and engineering. By

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understanding the properties and applications of PDEs, students will be equipped to better analyze and interpret central processes of the natural world.

This monograph aims at presenting a unified approach to numerical modeling of tsunami as long waves

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based on finite difference methods for 1D, 2D and 3D generation processes, propagation, and runup. Many practical examples give insight into the relationship between long wave physics and numerical solutions and allow readers to quickly pursue and

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develop specific topics in greater depth. The aim of this book is to start from basics and then continue into applications. This approach should serve well the needs of researchers and students of physics, physical oceanography, ocean/civil engineers, computer

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science, and emergency management staff. Chapter 2 is particularly valuable as it fully describes the application of finite-difference methods to the study of long waves by demonstrating how physical properties of water waves, especially phase velocity, are

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connected to the chosen numerical algorithm. Basic notions of numerical methods, i.e. approximation of the relevant differential equations, stability of the numerical scheme, and computational errors are explained through application to long waves.

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Finite-difference methods are further developed in major chapters to deal with complex problems that arise in the study of recent tsunamis.

Optical Properties of Solids
in Linear and Nonlinear Systems
Fundamentals of Waves and

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Oscillations

Magnetization Oscillations and Waves

Oscillations and Waves

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network theory. General microwave circuit theorems. Waveguide circuit elements. Resonant cavities as microwave circuit elements. Radial transmission lines. Waveguide junctions with several arms.

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Mode transformations.

Dielectrics in waveguides. The symmetry of waveguide junctions.

“Why do you always write magic in the sand of every beach you go to?” he asked as he watched

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her finger move through the sand in a rhythm writing the word. She smiled and said, “Because there is magic in the sand.” “What do you mean?” he further asked. “When you feel the sand under your feet,” she

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scrunched up her toes in the sand as she spoke. “And feel every granule of it, the noise of your thoughts suddenly sound like the waves. Just like magic.”

Me

This is a complete introduction

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to the theory of waves and oscillations as encountered by physics and engineering students. It discusses both the mathematical theory and the physics of phenomena such as waves in fluids, electromagnetic

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waves, and discrete coupled oscillators in mechanics and electronics. The author gives a description of the mathematics of complex amplitudes and introduces forced and free oscillations and normal modes

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of resonance. Chapters cover wave guides, barrier penetration, and electromagnetic transmission. One section, devoted solely to surface waves, includes a discussion on light scattering and the determination

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of surface tension and viscosity, plasma oscillations, and feedback oscillations. Ideas and equations are displayed for easy reference, and sets of exercises follow each chapter.

Waves, Sand & Magic

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Vibrations and Waves

**The physics of waves and
oscillations**

**Seismic Wave Propagation in
Stratified Media**

**Introduction to Vibrations and
Waves**

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'Et mai si j'avait su comment en revenir. One service mathematics has rendered the je n'y semis point aUe.' human race. It has put common sense back Jules Verne where it belongs, on the topmost

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necessary tool in a world where both feedback and non linearities abound.

Similarly, all kinds of parts of mathematics serve as tools for other parts and for other sciences. Applying a simple rewriting rule to

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the quote on the right above one finds such statements as: 'One service topology has rendered mathematical physics .. .'; 'One service logic has rendered computer science .. .'; 'One service category theory has rendered

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An ideal text for advanced

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undergraduates, the book provides the foundations needed to understand the acoustics of rooms and musical instruments as well as the basics for scientists and engineers interested in noise and vibration. The new

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edition contains four new chapters devoted primarily to applications of acoustical principles in everyday life: Microphones and Other Transducers, Sound in Concert Halls and Studios, Sound and Noise

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Hydrodynamic Control of Wave Energy Devices

Mechanics and Thermodynamics

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Mechanics

Mathematical Aspects of

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Modelling Oscillations and Wake Waves in Plasma

Radiative Processes in Astrophysics: This clear, straightforward, and fundamental introduction is designed to present-from a

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physicist's point of view- radiation processes and their applications to astrophysical phenomena and space science. It covers such topics as radiative transfer theory, relativistic covariance and

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kinematics, bremsstrahlung radiation, synchrotron radiation, Compton scattering, some plasma effects, and radiative transitions in atoms.

Discussion begins with first

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principles, physically motivating and deriving all results rather than merely presenting finished formulae. However, a reasonably good physics background (introductory quantum

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mechanics, intermediate electromagnetic theory, special relativity, and some statistical mechanics) is required. Much of this prerequisite material is provided by brief reviews,

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making the book a self-contained reference for workers in the field as well as the ideal text for senior or first-year graduate students of astronomy, astrophysics, and related physics courses.

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Radiative Processes in Astrophysics also contains about 75 problems, with solutions, illustrating applications of the material and methods for calculating results. This important and

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integral section emphasizes physical intuition by presenting important results that are used throughout the main text; it is here that most of the practical astrophysical applications

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become apparent.

Physics for Engineers is designed to serve as a text for the first course in physics for engineering students of most of the technical universities in India. It can

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also be used as an introductory text for science graduates. This book, now in its Second Edition, is updated as per the feedback received from the students and faculties. Quite a

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number of topics have been either revised or updated, of course, maintaining flow and presentation of the book.

The present approach is more focused and provides a clear, precise and accessible

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coverage of fundamentals of physics through succinct presentation, logical organization, and sound pedagogical order. Extensive care has been taken to apprise the students

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regarding the applied aspects of the concepts in physics. Most of the complex ideas are supported by explanatory figures to make the underlying concepts easy to understand and grasp. At

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the end of each chapter, numerous short answer questions, multiple choice questions and solved problems are included to brush up the chapter fast, quickly and effectively

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especially before exams.

NEW TO THIS EDITION □

Several new Short Questions and Solved Problems are

added. □ Some of the

chapters are redesigned to

make it more comprehensive

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and informative. □ New topics have been added in Chapters 1, 3, 4, 9, 11, 17, 18 and 19. □ A new appendix on Lorentz Force Equation is also included.

Optical Properties of Solids

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covers the important concepts of intrinsic optical properties and photoelectric emission. The book starts by providing an introduction to the fundamental optical spectra of solids. The text

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then discusses Maxwell's equations and the dielectric function; absorption and dispersion; and the theory of free-electron metals. The quantum mechanical theory of direct and indirect

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transitions between bands; the applications of dispersion relations; and the derivation of an expression for the dielectric function in the self-consistent field approximation are also

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encompassed. The book further tackles current-current correlations; the fluctuation-dissipation theorem; and the effect of surface plasmons on optical properties and

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photoemission. People involved in the study of the optical properties of solids will find the book invaluable. With this self-contained and comprehensive text, students and researchers will

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gain a detailed understanding of the fundamental aspects of the hydrodynamic control of wave energy converters. Such control is necessary to maximise energy capture for

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a given device configuration and plays a major role in efforts to make wave energy economic. Covering a wide range of disciplines, the reader is taken from the mathematical and technical

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fundamentals, through the main pillars of wave energy hydrodynamic control, right through to state-of-the-art algorithms for hydrodynamic control. The various operating principles of wave

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energy converters are exposed and the unique aspects of the hydrodynamic control problem highlighted, with a variety of potential solutions discussed.

Supporting material on wave

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forecasting and the interaction of the hydrodynamic control problem with other aspects of wave energy device optimisation, such as device geometry optimisation and

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optimal device array layout, is also provided.

Principles of Microwave Circuits

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lectures in plasma sciences presented at universities in Denmark, Norway, and the United States, Waves and Oscillations in Plasmas addresses central issues

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in modern plasma sciences. The book covers fluid models as well as kinetic plasma models, including a detailed discussion of, for instance, collisionless Landau

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damping. Offering a clear separation of linear and nonlinear models, the book can be tailored for readers of varying levels of expertise. Designed to provide basic training in

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linear as well as nonlinear plasma dynamics, and practical in areas as diverse as the space sciences, laboratory experiments, plasma processing, and more, this

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practical introduction to more advanced methods as well. Including simple physical interpretations where possible, this comprehensive, classroom-tested book places plasma

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sciences in the logical context of general classical physics.

Throughout most of the twentieth century, electric propulsion was considered the technology

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of the future. Now, the future has arrived. This important new book explains the fundamentals of electric propulsion for spacecraft and describes in detail the physics and

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characteristics of the two major electric thrusters in use today, ion and Hall thrusters. The authors provide an introduction to plasma physics in order to allow readers to

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understand the models and derivations used in determining electric thruster performance. They then go on to present detailed explanations of:
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thruster plumes Flight ion
and Hall thrusters Based
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to study the process of instruction, aids thereto, and the learning process itself, with special reference to science teaching at the university level. Generous support from a number of foundations provided the means for assembling and maintaining an experienced

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propagation is a key concept that has applications in almost every branch of physics with transmitting mediums essentially acting as a continuum of coupled oscillators. The characterization of these simple oscillators in terms of three parameters related to the storage, exchange, and dissipation of energy forms

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the basis of this book. The text moves naturally on from a discussion of basic concepts such as damped oscillations, diffraction and interference to more advanced topics such as transmission lines and attenuation, wave guides, diffusion, Fourier series, and electromagnetic waves in dielectrics and conductors. Throughout

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Earth structure. The theoretical development is physically based and is closely tied to the nature of the seismograms observed across a wide range of distance scales - from a few kilometres as in shallow reflection work for geophysical prospecting, to many thousands of kilometres for major

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earthquakes. A unified framework is presented for all classes of seismic phenomena, for both body waves and surface waves. Since its first publication in 1983 this book has been an important resource for understanding the way in which seismic waves can be understood in terms of reflection and transmission

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properties of Earth models, and how complete theoretical seismograms can be calculated. The methods allow the development of specific approximations that allow concentration on different seismic arrivals and hence provide a direct tie to seismic observations.

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science, and engineering canmaster DFT calculations Density functional theory (DFT) is one of the most frequently used computational tools for studying and predicting the properties of isolated molecules, bulk solids, and material interfaces, including surfaces. Although the theoretical underpinnings of DFT are quite

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codes makes it possible for students and researchers to apply this important computational technique to a broad range of fundamental and applied problems. Density Functional Theory: A Practical Introduction offers a concise, easy-to-follow introduction to the key concepts and practical applications of DFT, focusing on

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