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Subject: Physics Fundamentals

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Foundations of Physics. Mercury Learning & Information, 2019.

Abstract :

This book is designed as a self-teaching, calculus-based introduction to the concepts of physics. Numerous examples, applications, and figures provide readers with simple explanations. Standard topics include vectors, conservation of energy, Newton's Laws, momentum, motion, gravity, relativity, waves, fluid mechanics, circuits, nuclear physics, astrophysics, and more. Features: Designed as a calculus-based, introduction to the key concepts of physics Includes numerous examples, applications, and figures to provide readers with simple explanations of complex topics

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Art Hobson

Tales of the Quantum : Understanding Physics' Most Fundamental Theory. Oxford University Press, 2016.

Abstract :

Everybody has heard that we live in a world made of atoms. But far more fundamentally, we live in a universe made of quanta. Many things are not made of atoms: light, radio waves, electric current, magnetic fields, Earth's gravitational field, not to mention exotica such a neutron stars, black holes, dark energy, and dark matter. But everything, including atoms, is made of highly unified or 'coherent' bundles of energy called' quanta' that (like everything else) obey certain rules. In the case of the quantum, these rules are called' quantum physics. 'This is a book about quanta and their unexpected, some would say peculiar, behavior--tales, if you will, of the quantum. The quantum has developed the reputation of being capricious, bewildering, even impossible to understand. The peculiar habits of quanta are certainly not what we would have expected to find at the foundation of physical reality, but these habits are not necessarily bewildering and not at all impossible or paradoxical. This book explains those habits--the quantum rules--in everyday language, without mathematics or unnecessary technicalities. While most popular books about quantum physics follow the topic's scientific history from 1900 to today, this book follows the phenomena: wave-particle duality, fundamental randomness, quantum states, super positions (being in two places at once), entanglement, non-locality, Schrodinger's cat, and quantum jumps, and presents the history and the scientists only to the extent that they illuminate the phenomena.

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Chaddha, Gurbachan S.

University Physics: For Engineering and Science Students. Alpha Science Internation Limited, 2015.

Abstract :

University Physics comprises of five chapters (1-3 and 11-12) on waves, seven chapters (4-10) on electricity and magnetism and twelve chapters (13-24) on modern physics (Appendix deals with a chapter on elements of crystallography). The book also comprises two courses for undergraduate students in science, one on electricity and magnetism and the other on modern physics. Its exhaustiveness makes it suitable as a text book for engineering colleges'--Page 4 of cover.

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Chandra, Suresh; Sharma, M.K

Introduction to Mathematical Physics, An. Alpha Science Internation Limited, 2013.

Abstract :

An Introduction to Mathematical Physics discusses the Curvilinear Coordinates, Vector Space, Matrices, Tensors, Beta Function, Gamma Function, Error Function, Dirac Delta Function, Green Function Method, Complex Analysis, Differential Equations, Bessel Function, Legendre Function, Laguerre Function, Hermite Function, Fourier Series, Fourier Transform and Laplace Transform. Each topic is explained with the help of simple exercises using simple language.

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Chun Wa Wong

Introduction to Mathematical Physics : Methods & Concepts. OUP Oxford, 2013.

Abstract :

Mathematical physics provides physical theories with their logical basis and the tools for drawing conclusions from hypotheses. Introduction to Mathematical Physics explains to the reader why and how mathematics is needed in the description of physical events in space. For undergraduates in physics, it is a classroom-tested textbook on vector analysis, linear operators, Fourier series and integrals, differential equations, special functions and functions of a complex variable. Strongly correlated with core undergraduate courses on classical and quantum mechanics and electromagnetism, it helps the student master these necessary mathematical skills. It contains advanced topics of interest to graduate students on relativistic square-root spaces and nonlinear systems. It contains many tables of mathematical formulas and references to useful materials on the Internet. It includes short tutorials on basic mathematical topics to help readers refresh their mathematical knowledge. An appendix on Mathematica encourages the reader to use computer-aided algebra to solve problems in mathematical physics. A free Instructor's Solutions Manual is available to instructors who order the book for course adoption.

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Jirák, Daniel; Vítek, František

Basics of Medical Physics. Charles University in Prague, Karolinum Press, 2018.

Abstract :

The textbook Basics of Medical Physics describes the basics of medical physics and the clinical and experimental methods which a physician can be frequently encountered with. Medical physics is specific in dealing with the application of physical methods on a living organism. Therefore, it represents an interdisciplinary scientific discipline that combines physics and biological sciences. The presented textbook covers a broad range of topics; it contains eight chapters: Structure of Matter; Molecular Biophysics; Thermodynamics; Biophysics of Electric Phenomena; Acoustics and Physical Principles of Hearing; Optics; X-ray Physics and Medical Application; Radioactivity and Ionizing Radiation. The text is supplemented by many figures, which help to facilitate the understanding of the phenomena. Methods, which are explained in the book, are based on the different physical principles. Some of these methods, e.g. using optical magnifying lenses or X-rays, have been known for more than 100 years, while others are more recent such as magnetic resonance imaging or positron emission tomography. After reading this book, the readers should get a comprehensive overview of the possibilities of using various physical methods in medicine. They should be able to understand to the mentioned physical relations in the broader context.

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Pang, Tao

An Introduction to Computational Physics. Cambridge University Press, 2006.

Abstract :

Thoroughly revised for its second edition, this advanced textbook provides an introduction to the basic methods of computational physics, and an overview of progress in several areas of scientific computing by relying on free software available from CERN. The book begins by dealing with basic computational tools and routines, covering approximating functions, differential equations, spectral analysis, and matrix operations. Important concepts are illustrated by relevant examples at each stage. The author also discusses more advanced topics, such as molecular dynamics, modeling continuous systems, Monte Carlo methods, genetic algorithm and programming, and numerical renormalization. It includes many more exercises. This can be used as a textbook for either undergraduate or first-year graduate courses on computational physics or scientific computation. It will also be a useful reference for anyone involved in computational research.

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Peter Rowlands

Zero To Infinity: The Foundations Of Physics. World Scientific, 2007.

Abstract :

Unique in its field, this book uses a methodology that is entirely new, creating the simplest and most abstract foundations for physics to date. The author proposes a fundamental description of process in a universal computational rewrite system, leading to an irreducible form of relativistic quantum mechanics from a single operator. This is not only simpler, and more fundamental, but also seemingly more powerful than any other quantum mechanics formalism available. The methodology finds immediate applications in particle physics, theoretical physics and theoretical computing. In addition, taking the rewrite structure more generally as a description of process, the book shows how it can be applied to large-scale structures beyond the realm of fundamental physics.

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R. Shankar

Fundamentals of Physics II : Electromagnetism, Optics, and Quantum Mechanics. Yale University Press, 2016.

Abstract :

R. Shankar, a well-known physicist and contagiously enthusiastic educator, was among the first to offer a course through the innovative Open Yale Course program. His popular online video lectures on introductory physics have been viewed over a million times. In this second book based on his online Yale course, Shankar explains essential concepts, including electromagnetism, optics, and quantum mechanics. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics. It provides an ideal introduction for college-level students of physics, chemistry, and engineering; for motivated AP Physics students; and for general readers interested in advances in the sciences.

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Raine, Derek

Mathematical Physics : An Introduction. Mercury Learning & Information, 2019.

Abstract :

This book is designed as an introduction to the mathematical concepts used to describe fundamental physics principles. Numerous examples and applications enable the reader to master complex mathematical concepts needed to define topics such as relativity, mechanics, and electromagnetics. Features. Covers all of the mathematical concepts needed to study physics. Includes applications in every chapter. Instructor ancillaries for use as a textbook

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Wade Allison

Fundamental Physics for Probing and Imaging. OUP Oxford, 2006.

Abstract :

Physics has reduced fear and increased safety for society, largely by extending the power to see. The methods used are magnetic resonance, ionizing radiation and sound, with their extensions. This textbook expounds the fundamental physics of these. It follows how they are applied by modern technology to 'seeing 'in clinical medicine including therapy and in other spheres of human activity such as archaeology, geophysics, security and navigation. By taking a broad view over the whole field, the book encourages comparisons, underlines the importance of public education and reaches fresh conclusions of some political importance concerning safety. This textbook has developed from a course given to third year students at Oxford and is written so that it can be used coherently as a basis for shorter courses by omitting certain chapters.

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