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Complete Catalogue

Spring 2022

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press.princeton.edu

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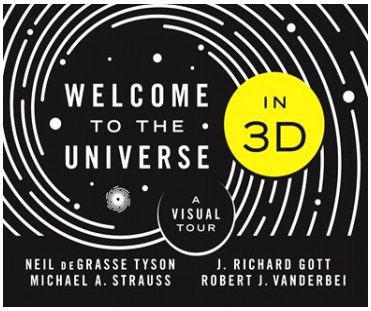
Catalogue Contents



Welcome to the Universe in 3D

A Visual Tour

Neil Degrasse Tyson, Michael A. Strauss, J. Richard Gott, Robert J. Vanderbei

Journey into the universe through the most spectacular sights in astronomy in stereoscopic 3D

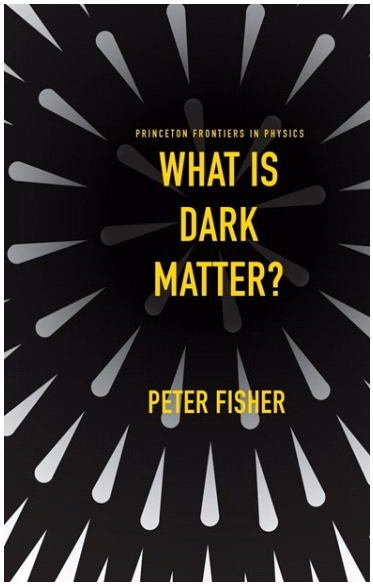
Welcome to the Universe in 3D takes you on a grand tour of the observable universe, guiding you through the most spectacular sights in the cosmos—in breathtaking 3D. Presenting a rich array of stereoscopic color images, which can be viewed in 3D using a special stereo viewer that folds easily out of the cover of the book, this book reveals your cosmic environment as you have never seen it before.

Astronomy is the story of how humankind's perception of the two-dimensional dome of the sky evolved into a far deeper comprehension of an expanding three-dimensional cosmos. This book invites you to take part in this story by exploring the universe in depth, as revealed by cutting-edge astronomical research and observations. You will journey from the Moon through the solar system, out to exoplanets, distant nebulas, and galaxy clusters, until you finally reach the cosmic microwave background radiation (or CMB), the most distant light we can observe. The distances to these celestial wonders range from 1.3 light-seconds to 13.8 billion light-years. Along the way, the authors explain the fascinating features of what you are seeing, including how the 3D images were made using the same technique that early astronomers devised to measure distances to objects in space.

The dramatic 3D images in this one-of-a-kind book will astonish you, extending your vision out to the farthest reaches of the universe. You will never look up into the night sky the same way again.

9780691194073
$24.95 | £20.00
Hardback
208 pages | 171mm : 205mm
2022

Science / Astrophysics & Space Science
Princeton University Press



What Is Dark Matter?

Peter Fisher

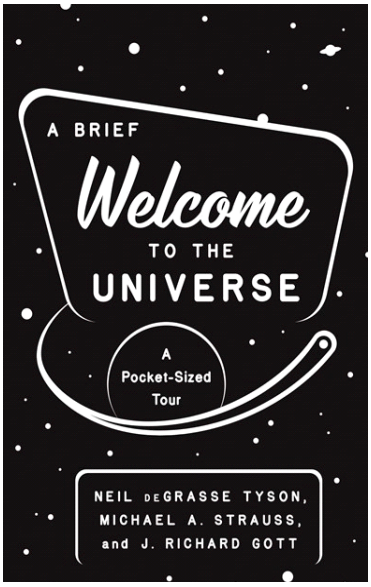
What we know about dark matter and what we have yet to discover

Astronomical observations have confirmed dark matter's existence, but what exactly is dark matter? In *What Is Dark Matter?*, particle physicist Peter Fisher introduces readers to one of the most intriguing frontiers of physics. We cannot actually see dark matter, a mysterious, nonluminous form of matter that is believed to count for about 27 percent of the mass-energy balance in the universe. But we know dark matter is present by observing its ghostly gravitational effects on the behavior and evolution of galaxies. Fisher brings readers quickly up to speed regarding the current state of the dark matter problem, offering relevant historical context as well as a close look at the cutting-edge research focused on revealing dark matter's true nature.

Could dark matter be a new type of particle—an axion or a Weakly Interacting Massive Particle (WIMP)—or something else? What have physicists ruled out so far—and why? What experimental searches are now underway and planned for the near future, in hopes of detecting dark matter on Earth or in space? Fisher explores these questions and more, illuminating what is known and unknown, and what a triumph it will be when scientists discover dark matter's identity at last.

9780691148342
$35.00 | £28.00
Hardback
200 pages | 127mm : 203.2mm
2022

Science / Solid State Physics
Princeton Frontiers in Physics
Princeton University Press



A Brief Welcome to the Universe

A Pocket-Sized Tour

Neil deGrasse Tyson, Michael A. Strauss, J. Richard Gott

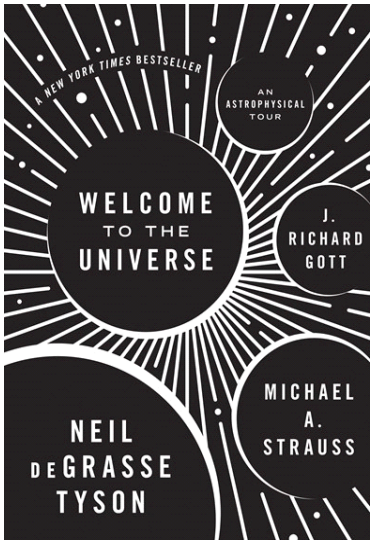
A pocket-style edition based on the *New York Times* bestseller

A Brief Welcome to the Universe offers a breathtaking tour of the cosmos, from planets, stars, and galaxies to black holes and time loops. Bestselling authors and acclaimed astrophysicists Neil deGrasse Tyson, Michael A. Strauss, and J. Richard Gott take readers on an unforgettable journey of exploration to reveal how our universe actually works.

Propelling you from our home solar system to the outermost frontiers of space, this book builds your cosmic insight and perspective through a marvelously entertaining narrative. How do stars live and die? What are the prospects of intelligent life elsewhere in the universe? How did the universe begin? Why is it expanding and accelerating? Is our universe alone or part of an infinite multiverse? Exploring these and many other questions, this pocket-friendly book is your passport into the wonders of our evolving cosmos.

9780691219943
$14.95 | £9.99
Paperback
248 pages | 107.95mm : 177.8mm
2021

Science / Astrophysics & Space Science
Princeton University Press



Welcome to the Universe

An Astrophysical Tour

Neil deGrasse Tyson, Michael A. Strauss, J. Richard Gott

The *New York Times* bestselling tour of the cosmos from three of today's leading astrophysicists

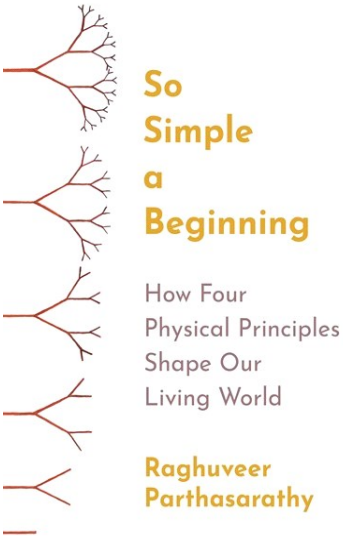
Welcome to the Universe is a personal guided tour of the cosmos by three of today's leading astrophysicists. Inspired by the enormously popular introductory astronomy course that Neil deGrasse Tyson, Michael A. Strauss, and J. Richard Gott taught together at Princeton, this book covers it all—from planets, stars, and galaxies to black holes, wormholes, and time travel.

Describing the latest discoveries in astrophysics, the informative and entertaining narrative propels you from our home solar system to the outermost frontiers of space. How do stars live and die? Why did Pluto lose its planetary status? What are the prospects of intelligent life elsewhere in the universe? How did the universe begin? Why is it expanding and why is its expansion accelerating? Is our universe alone or part of an infinite multiverse? Answering these and many other questions, the authors open your eyes to the wonders of the cosmos, sharing their knowledge of how the universe works.

Breathtaking in scope and stunningly illustrated throughout, *Welcome to the Universe* is for those who hunger for insights into our evolving universe that only world-class astrophysicists can provide.

9780691157245
$39.95 | £30.00
Hardback
480 pages | 177.8mm : 254mm
2016

Science / Astrophysics & Space Science
Princeton University Press



So Simple a Beginning

How Four Physical Principles Shape Our Living World

Raghuveer Parthasarathy

A biophysicist reveals the hidden unity behind nature's breathtaking complexity

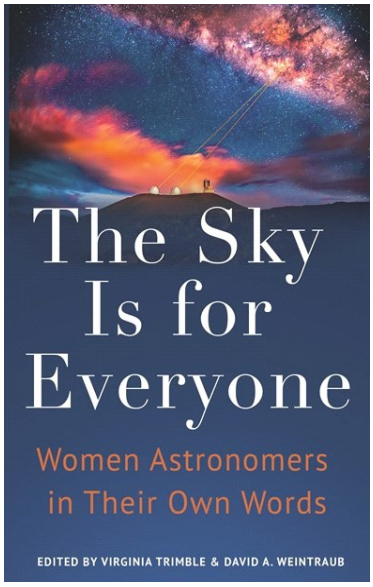
The form and function of a sprinting cheetah are quite unlike those of a rooted tree. A human being is very different from a bacterium or a zebra. The living world is a realm of dazzling variety, yet a shared set of physical principles shapes the forms and behaviors of every creature in it. *So Simple a Beginning* shows how the emerging new science of biophysics is transforming our understanding of life on Earth and enabling potentially lifesaving but controversial technologies such as gene editing, artificial organ growth, and ecosystem engineering.

Raghuveer Parthasarathy explains how four basic principles—self-assembly, regulatory circuits, predictable randomness, and scaling—shape the machinery of life on scales ranging from microscopic molecules to gigantic elephants. He describes how biophysics is helping to unlock the secrets of a host of natural phenomena, such as how your limbs know to form at the proper places, and why humans need lungs but ants do not. Parthasarathy explores how the cutting-edge biotechnologies of tomorrow could enable us to alter living things in ways both subtle and profound.

Featuring dozens of original watercolors and drawings by the author, this sweeping tour of biophysics offers astonishing new perspectives on how the wonders of life can arise from so simple a beginning.

9780691200408
$35.00 | £28.00
Hardback
336 pages | 155.57mm : 234.95mm
2022

Science / Life Sciences
Princeton University Press



The Sky Is for Everyone

Women Astronomers in Their Own Words

Virginia Trimble, David A. Weintraub

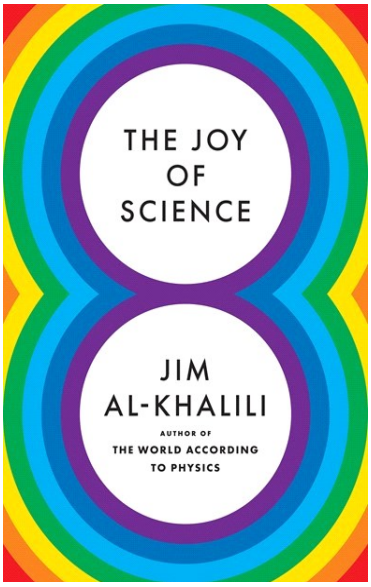
An inspiring anthology of writings by trailblazing women astronomers from around the globe

The Sky Is for Everyone is an internationally diverse collection of autobiographical essays by women who broke down barriers and changed the face of modern astronomy. Virginia Trimble and David Weintraub vividly describe how, before 1900, a woman who wanted to study the stars had to have a father, brother, or husband to provide entry, and how the considerable intellectual skills of women astronomers were still not enough to enable them to pry open doors of opportunity for much of the twentieth century. After decades of difficult struggles, women are closer to equality in astronomy than ever before. Trimble and Weintraub bring together the stories of the tough and determined women who flung the doors wide open. Taking readers from 1960 to today, this triumphant anthology serves as an inspiration to current and future generations of women scientists while giving voice to the history of a transformative era in astronomy.

With contributions by Neta A. Bahcall, Beatriz Barbuy, Ann Merchant Boesgaard, Jocelyn Bell Burnell, Catherine Cesarsky, Poonam Chandra, Xuefei Chen, Yilen Gómez Maqueo Chew, Cathie Clarke, Judith Gamora Cohen, France Anne Córdova, Anne Pyne Cowley, Bozena Czerny, Wendy L. Freedman, Gabriela González, Saeko S. Hayashi, Martha P. Haynes, Roberta M. Humphreys, Vicky Kalogera, Gillian Knapp, Shazrene S. Mohamed, Carole Mundell, Priyamvada Natarajan, Dara J. Norman, Hiranya Peiris, Judith Lynn Pipher, Dina Prialnik, Anneila I. Sargent, Sara Seager, Gražina Tautvaišiene, Silvia Torres-Peimbert, Virginia Trimble, Meg Urry, Ewine F. van Dishoeck, Patricia Ann Whitelock, Sidney Wolff, and Rosemary F. G. Wyse.

9780691207100
$29.95 | £25.00
Hardback
504 pages | 155.57mm : 234.95mm
2022

Science / Astronomy
Princeton University Press



The Joy of Science

Jim Al-Khalili

Quantum physicist, *New York Times* bestselling author, and BBC host Jim Al-Khalili reveals how 8 lessons from the heart of science can help you get the most out of life

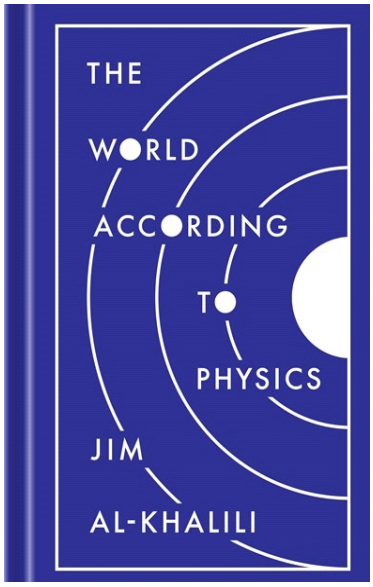
Today's world is unpredictable and full of contradictions, and navigating its complexities while trying to make the best decisions is far from easy. *The Joy of Science* presents 8 short lessons on how to unlock the clarity, empowerment, and joy of thinking and living a little more scientifically.

In this brief guide to leading a more rational life, acclaimed physicist Jim Al-Khalili invites readers to engage with the world as scientists have been trained to do. The scientific method has served humankind well in its quest to see things as they really are, and underpinning the scientific method are core principles that can help us all navigate modern life more confidently. Discussing the nature of truth and uncertainty, the role of doubt, the pros and cons of simplification, the value of guarding against bias, the importance of evidence-based thinking, and more, Al-Khalili shows how the powerful ideas at the heart of the scientific method are deeply relevant to the complicated times we live in and the difficult choices we make.

Read this book and discover the joy of science. It will empower you to think more objectively, see through the fog of your own preexisting beliefs, and lead a more fulfilling life.

9780691211572
$16.95 | £12.99
Hardback
224 pages | 114.3mm : 177.8mm
2022

Science / Philosophy & Social Aspects
Princeton University Press



The World According to Physics

Jim Al-Khalili

Quantum physicist, *New York Times* bestselling author, and BBC host Jim Al-Khalili offers a fascinating and illuminating look at what physics reveals about the world

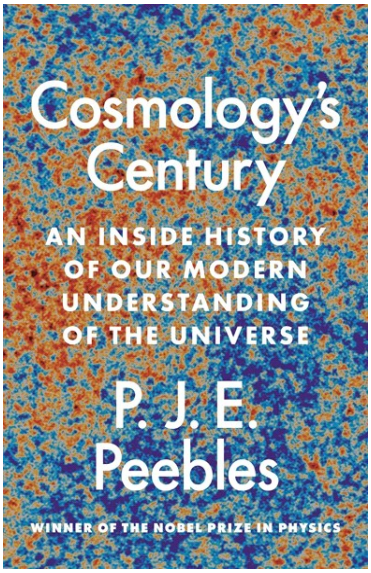
Shining a light on the most profound insights revealed by modern physics, Jim Al-Khalili invites us all to understand what this crucially important science tells us about the universe and the nature of reality itself.

Al-Khalili begins by introducing the fundamental concepts of space, time, energy, and matter, and then describes the three pillars of modern physics—quantum theory, relativity, and thermodynamics—showing how all three must come together if we are ever to have a full understanding of reality. Using wonderful examples and thought-provoking analogies, Al-Khalili illuminates the physics of the extreme cosmic and quantum scales, the speculative frontiers of the field, and the physics that underpins our everyday experiences and technologies, bringing the reader up to speed with the biggest ideas in physics in just a few sittings. Physics is revealed as an intrepid human quest for ever more foundational principles that accurately explain the natural world we see around us, an undertaking guided by core values such as honesty and doubt. The knowledge discovered by physics both empowers and humbles us, and still, physics continues to delve valiantly into the unknown.

Making even the most enigmatic scientific ideas accessible and captivating, this deeply insightful book illuminates why physics matters to everyone and calls one and all to share in the profound adventure of seeking truth in the world around us.

9780691182308
$16.95 | £12.99
Hardback
336 pages | 114.3mm : 177.8mm
2020

Science / Physics
Princeton University Press



Cosmology's Century

An Inside History of Our Modern Understanding of the Universe

P. J. E. Peebles

From Nobel Prize–winning physicist P. J. E. Peebles, the story of cosmology from Einstein to today

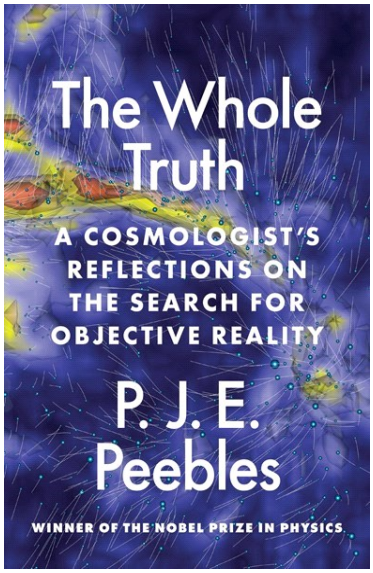
Modern cosmology began a century ago with Albert Einstein's general theory of relativity and his notion of a homogenous, philosophically satisfying cosmos. *Cosmology's Century* is the story of how generations of scientists built on these thoughts and many new measurements to arrive at a well-tested physical theory of the structure and evolution of our expanding universe.

In this landmark book, one of the world's most esteemed theoretical cosmologists offers an unparalleled personal perspective on how the field developed. P. J. E. Peebles was at the forefront of many of the greatest discoveries of the past century, making fundamental contributions to our understanding of the presence of helium and microwave radiation from the hot big bang, the measures of the distribution and motion of ordinary matter, and the new kind of dark matter that allows us to make sense of these results. Taking readers from the field's beginnings, Peebles describes how scientists working in independent directions found themselves converging on a theory of cosmic evolution interesting enough to warrant the rigorous testing it passes so well. He explores the major advances—some inspired by remarkable insights or perhaps just lucky guesses—as well as the wrong turns taken and the roads not explored. He shares recollections from major players in this story and provides a rare, inside look at how science is really done.

A monumental work, *Cosmology's Century* also emphasizes where the present theory is incomplete, suggesting exciting directions for continuing research.

9780691234472
$24.95 | £20.00
Paperback
440 pages | 155.57mm : 234.95mm
2022

Science / Cosmology
Princeton University Press



The Whole Truth

A Cosmologist's Reflections on the Search for Objective Reality

P. J. E. Peebles

From the Nobel Prize–winning physicist, a personal meditation on the quest for objective reality in natural science

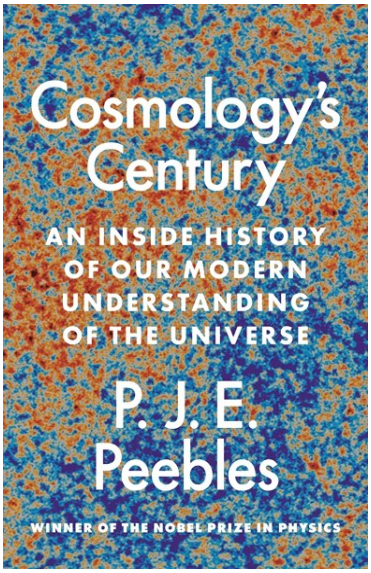
A century ago, thoughtful people questioned how reality could agree with physical theories that keep changing, from a mechanical model of the ether to electric and magnetic fields, and from homogeneous matter to electrons and atoms. Today, concepts like dark matter and dark energy further complicate and enrich the search for objective reality. *The Whole Truth* is a personal reflection on this ongoing quest by one of the world's most esteemed cosmologists.

What lies at the heart of physical science? What are the foundational ideas that inform and guide the enterprise? Is the concept of objective reality meaningful? If so, do our established physical theories usefully approximate it? P. J. E. Peebles takes on these and other big questions about the nature of science, drawing on a lifetime of experience as a leading physicist and using cosmology as an example. He traces the history of thought about the nature of physical science since Einstein, and succinctly lays out the fundamental working assumptions. Through a careful examination of the general theory of relativity, Einstein's cosmological principle, and the theory of an expanding universe, Peebles shows the evidence that we are discovering the nature of reality in successive approximations through increasingly rigorous scrutiny.

A landmark work, *The Whole Truth* is essential reading for anyone interested in the practice of science.

9780691231358
$27.95 | £22.00
Hardback
272 pages | 155.57mm : 234.95mm
2022

Science / Cosmology
Princeton University Press



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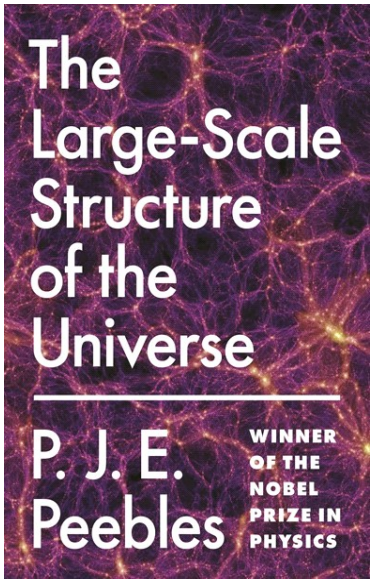
A monumental work, *Cosmology's Century* also emphasizes where the present theory is incomplete, suggesting exciting directions for continuing research.

9780691196022
$35.00 | £28.00
Hardback
440 pages | 155.57mm : 234.95mm
2020

Science / Cosmology
Princeton University Press



The Large-Scale Structure of the Universe

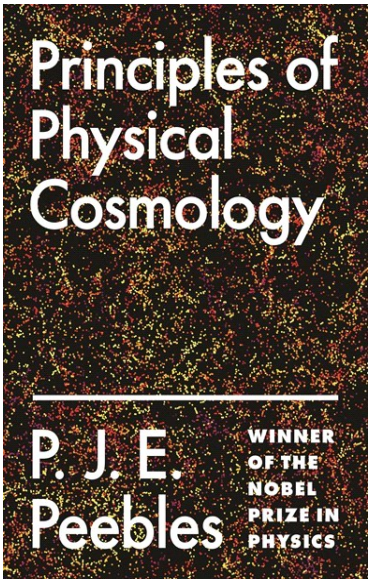
P. J. E. Peebles

The classic account of the structure and evolution of the early universe from Nobel Prize–winning physicist P. J. E. Peebles

An instant landmark on its publication, *The Large-Scale Structure of the Universe* remains the essential introduction to this vital area of research. Written by one of the world's most esteemed theoretical cosmologists, it provides an invaluable historical introduction to the subject, and an enduring overview of key methods, statistical measures, and techniques for dealing with cosmic evolution. With characteristic clarity and insight, P. J. E. Peebles focuses on the largest known structures—galaxy clusters—weighing the empirical evidence of the nature of clustering and the theories of how it evolves in an expanding universe. A must-have reference for students and researchers alike, this edition of *The Large-Scale Structure of the Universe* introduces a new generation of readers to a classic text in modern cosmology.

9780691209838
$60.00 | £48.00
Paperback
448 pages | 155.57mm : 234.95mm
2020

Science / Astrophysics & Space Science
Princeton Series in Physics
Princeton University Press



Principles of Physical Cosmology

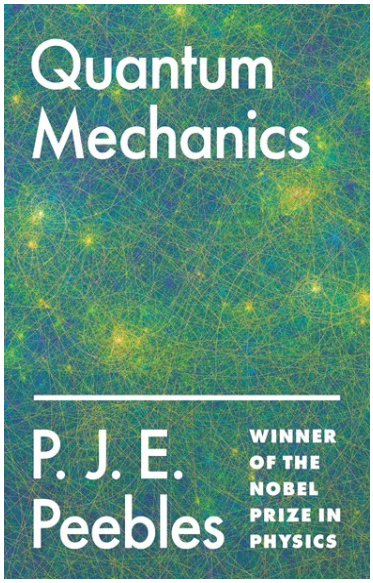
P. J. E. Peebles

The classic introduction to physical cosmology from Nobel Prize–winning physicist P. J. E. Peebles

Principles of Physical Cosmology is the essential introduction to this critical area of modern physics, written by a leading pioneer who has shaped the course of the field for decades. P. J. E. Peebles provides an authoritative overview of the field, showing how observation has combined with theory to establish the science of physical cosmology. He presents the elements of physical cosmology, including the history of the discovery of the expanding universe; surveys the cosmological tests that measure the geometry of space-time, with a discussion of general relativity as the basis for these tests; and reviews the origin of galaxies and the large-scale structure of the universe. Now featuring Peebles's 2019 Nobel lecture, *Principles of Physical Cosmology* remains an indispensable reference for students and researchers alike.

9780691209814
$80.00 | £62.00
Paperback
774 pages | 155.57mm : 234.95mm
2020

Science / Astrophysics & Space Science
Princeton Series in Physics
Princeton University Press



Quantum Mechanics

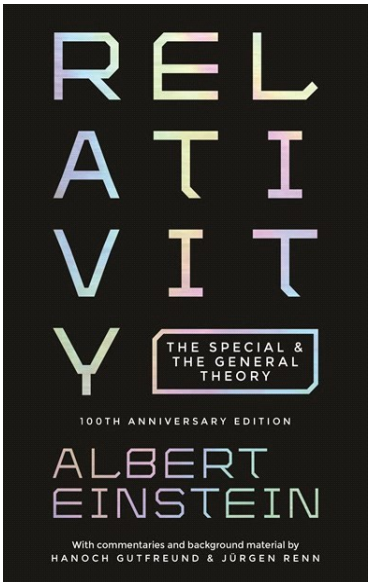
P. J. E. Peebles

The classic textbook on quantum mechanics from Nobel Prize–winning physicist P. J. E. Peebles

This book explains the often counterintuitive physics of quantum mechanics, unlocking this key area of physics for students by enabling them to work through detailed applications of general concepts and ideas. P. J. E. Peebles states general principles first in terms of wave mechanics and then in the standard abstract linear space formalism. He offers a detailed discussion of measurement theory—an essential feature of quantum mechanics—and emphasizes the art of numerical estimates. Along the way, Peebles provides a wealth of physical examples together with numerous problems, some easy, some challenging, but all of them selected because they are physically interesting. *Quantum Mechanics* is an essential resource for advanced undergraduates and beginning graduate students in physics.

9780691209821
$80.00 | £62.00
Paperback
432 pages | 155.57mm : 234.95mm
2020

Science / Quantum Theory
Princeton University Press



Relativity

The Special and the General Theory - 100th Anniversary Edition

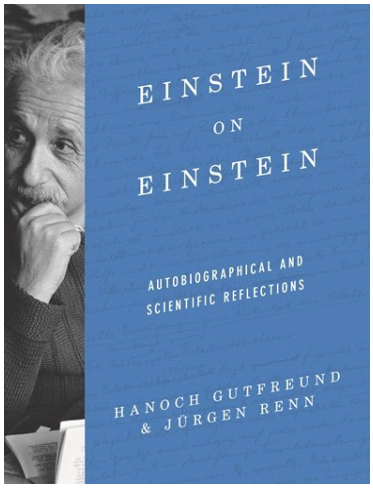
Albert Einstein, Hanoch Gutfreund, Jürgen Renn

A handsome annotated edition of Einstein's celebrated book on relativity

After completing the final version of his general theory of relativity in November 1915, Albert Einstein wrote *Relativity*. Intended for a popular audience, the book remains one of the most lucid explanations of the special and general theories ever written. This edition of Einstein's celebrated book features an authoritative English translation of the text along with commentaries by Hanoch Gutfreund and Jürgen Renn that examine the evolution of Einstein's thinking and cast his ideas in a modern context. Providing invaluable insight into one of the greatest scientific minds of all time, the book also includes a unique survey of the introductions from past editions, covers from selected early editions, a letter from Walther Rathenau to Einstein discussing the book, and a revealing sample from Einstein's original handwritten manuscript.

9780691191812
$16.95 | £12.99
Paperback
328 pages | 139.7mm : 215.9mm
2019

Science / Relativity
Princeton University Press



Einstein on Einstein

Autobiographical and Scientific Reflections

Hanoch Gutfreund, Jürgen Renn

New perspectives on the iconic physicist's scientific and philosophical formation

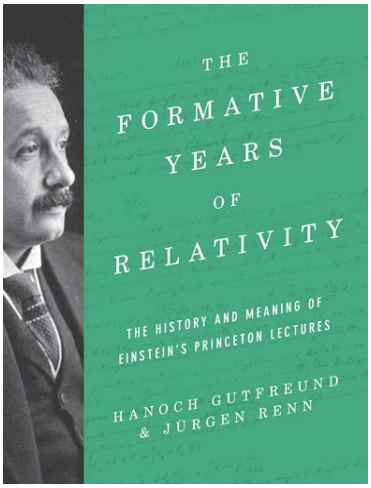
At the end of World War II, Albert Einstein was invited to write his intellectual autobiography for the Library of Living Philosophers. The resulting book was his uniquely personal *Autobiographical Notes*, a classic work in the history of science that explains the development of his ideas with unmatched warmth and clarity. Hanoch Gutfreund and Jürgen Renn introduce Einstein's scientific reflections to today's readers, tracing his intellectual formation from childhood to old age and offering a compelling portrait of the making of a philosopher-scientist.

Einstein on Einstein features the full English text of *Autobiographical Notes* along with incisive essays that place Einstein's reflections in the context of the different stages of his scientific life. Gutfreund and Renn draw on Einstein's writings, personal correspondence, and critical writings by Einstein's contemporaries to provide new perspectives on his greatest discoveries. Also included are Einstein's responses to his critics, which shed additional light on his scientific and philosophical worldview. Gutfreund and Renn quote extensively from Einstein's initial, unpublished attempts to formulate his response, and also look at another brief autobiographical text by Einstein, written a few weeks before his death, which is published here for the first time in English.

Complete with evocative drawings by artist Laurent Taudin, *Einstein on Einstein* illuminates the iconic physicist's journey to general relativity while situating his revolutionary ideas alongside other astonishing scientific breakthroughs of the twentieth century.

9780691183602
$35.00 | £28.00
Hardback
216 pages | 203.2mm : 254mm
2020

Science / History
Princeton University Press



The Formative Years of Relativity

The History and Meaning of Einstein's Princeton Lectures

Hanoch Gutfreund, Jürgen Renn

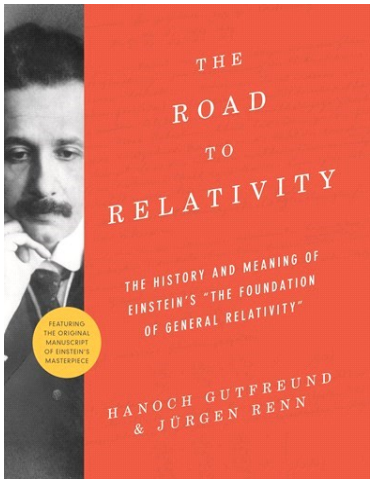
First published in 1922 and based on lectures delivered in May 1921, Albert Einstein's *The Meaning of Relativity* offered an overview and explanation of the then new and controversial theory of relativity. The work would go on to become a monumental classic, printed in numerous editions and translations worldwide. Now, *The Formative Years of Relativity* introduces Einstein's masterpiece to new audiences. This beautiful volume contains Einstein's insightful text, accompanied by important historical materials and commentary looking at the origins and development of general relativity. Hanoch Gutfreund and Jürgen Renn provide fresh, original perspectives, placing Einstein's achievements into a broader context for all readers.

In this book, Gutfreund and Renn tell the rich story behind the early reception, spread, and consequences of Einstein's ideas during the formative years of general relativity in the late 1910s and 1920s. They show that relativity's meaning changed radically throughout the nascent years of its development, and they describe in detail the transformation of Einstein's work from the esoteric pursuit of one individual communicating with a handful of colleagues into the preoccupation of a growing community of physicists, astronomers, mathematicians, and philosophers.

This handsome edition quotes extensively from Einstein's correspondence and reproduces historical documents such as newspaper articles and letters. Inserts are featured in the main text giving concise explanations of basic concepts, and short biographical notes and photographs of some of Einstein's contemporaries are included. The first-ever English translations of two of Einstein's popular Princeton lectures are featured at the book's end.

9780691174631
$35.00 | £28.00
Hardback
432 pages | 203.2mm : 254mm
2017

Science / Relativity
Princeton University Press



The Road to Relativity

The History and Meaning of Einstein's "The Foundation of General Relativity", Featuring the Original Manuscript of Einstein's Masterpiece

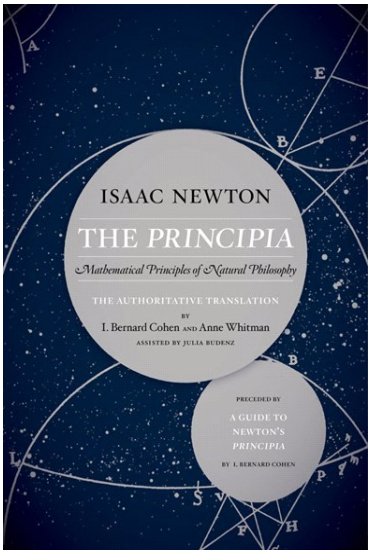
Hanoch Gutfreund, Jürgen Renn, John Stachel

An annotated facsimile edition of Einstein's handwritten manuscript on the foundations of general relativity

This richly annotated facsimile edition of "The Foundation of General Relativity" introduces a new generation of readers to Albert Einstein's theory of gravitation. Written in 1915, this remarkable document is a watershed in the history of physics and an enduring testament to the elegance and precision of Einstein's thought. Presented here is a beautiful facsimile of Einstein's original handwritten manuscript, along with its English translation and an insightful page-by-page commentary that places the work in historical and scientific context. Hanoch Gutfreund and Jürgen Renn's concise introduction traces Einstein's intellectual odyssey from special to general relativity, and their essay "The Charm of a Manuscript" provides a delightful meditation on the varied afterlife of Einstein's text. Featuring a foreword by John Stachel, this handsome edition also includes a biographical glossary of the figures discussed in the book, a comprehensive bibliography, suggestions for further reading, and numerous photos and illustrations throughout.

9780691175812
$22.95 | £17.99
Paperback
264 pages | 203.2mm : 254mm
2017

Science / Relativity
Princeton University Press



The Principia: The Authoritative Translation and Guide

Mathematical Principles of Natural Philosophy

Isaac Newton, I. Bernard Cohen, Anne Whitman, Julia Budenz

In his monumental 1687 work, *Philosophiae Naturalis Principia Mathematica*, known familiarly as the *Principia*, Isaac Newton laid out in mathematical terms the principles of time, force, and motion that have guided the development of modern physical science. Even after more than three centuries and the revolutions of Einsteinian relativity and quantum mechanics, Newtonian physics continues to account for many of the phenomena of the observed world, and Newtonian celestial dynamics is used to determine the orbits of our space vehicles.

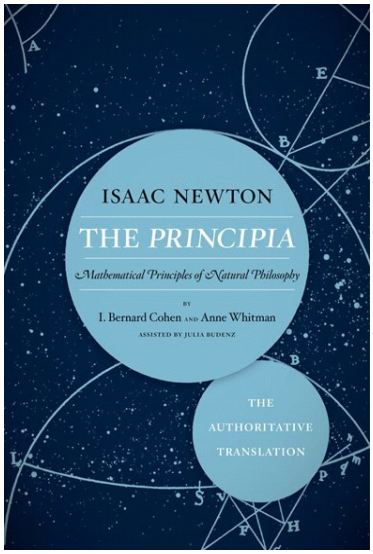
This authoritative, modern translation by I. Bernard Cohen and Anne Whitman, the first in more than 285 years, is based on the 1726 edition, the final revised version approved by Newton; it includes extracts from the earlier editions, corrects errors found in earlier versions, and replaces archaic English with contemporary prose and up-to-date mathematical forms.

Newton's principles describe acceleration, deceleration, and inertial movement; fluid dynamics; and the motions of the earth, moon, planets, and comets. A great work in itself, the *Principia* also revolutionized the methods of scientific investigation. It set forth the fundamental three laws of motion and the law of universal gravity, the physical principles that account for the Copernican system of the world as emended by Kepler, thus effectively ending controversy concerning the Copernican planetary system.

The illuminating Guide to Newton's *Principia* by I. Bernard Cohen makes this preeminent work truly accessible for today's scientists, scholars, and students.

9780520290884
$34.95 | £27.00
Paperback
992 pages | 7in : 10in
2016

Science / Mathematical Physics
University of California Press



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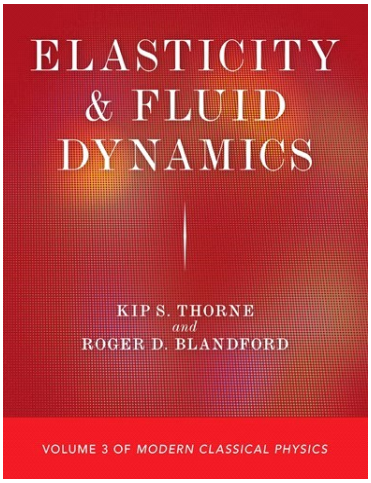
The translation-only edition of this preeminent work is truly accessible for today's scientists, scholars, and students.

9780520290747
$19.95 | £15.99
Paperback
616 pages | 7in : 10in
2016

Science / Mathematical Physics
University of California Press



Elasticity and Fluid Dynamics

Volume 3 of Modern Classical Physics

Kip S. Thorne, Roger D. Blandford

A groundbreaking textbook on twenty-first-century fluids and elastic solids and their applications

Kip Thorne and Roger Blandford's monumental *Modern Classical Physics* is now available in five stand-alone volumes that make ideal textbooks for individual graduate or advanced undergraduate courses on statistical physics; optics; elasticity and fluid dynamics; plasma physics; and relativity and cosmology. Each volume teaches the fundamental concepts, emphasizes modern, real-world applications, and gives students a physical and intuitive understanding of the subject.

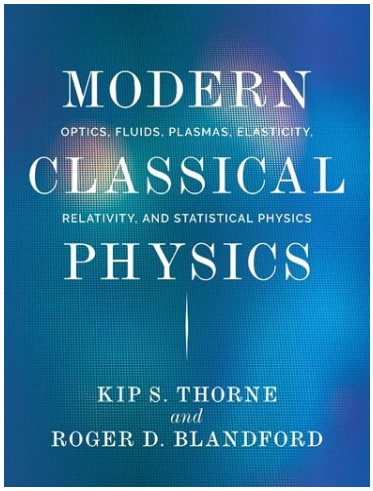
Elasticity and Fluid Dynamics provides an essential introduction to these subjects. Fluids and elastic solids are everywhere—from Earth's crust and skyscrapers to ocean currents and airplanes. They are central to modern physics, astrophysics, the Earth sciences, biophysics, medicine, chemistry, engineering, and technology, and this centrality has intensified in recent years—so much so that a basic understanding of the behavior of elastic solids and fluids should be part of the repertoire of every physicist and engineer and almost every other natural scientist. While both elasticity and fluid dynamics involve continuum physics and use similar mathematical tools and modes of reasoning, each subject can be readily understood without the other, and the book allows them to be taught independently, with the first two chapters introducing and covering elasticity and the last six doing the same for fluid dynamics. The book also can serve as supplementary reading for many other courses, including in astrophysics, geophysics, and aerodynamics.

- Includes many exercise problems
- Features color figures, suggestions for further reading, extensive cross-references, and a detailed index
- Optional "Track 2" sections make this an ideal book for a one-quarter or one-semester course in elasticity, fluid dynamics, or continuum physics
- An online illustration package is available to professors

The five volumes, which are available individually as paperbacks and ebooks, are *Statistical Physics*; *Optics*; *Elasticity and Fluid Dynamics*; *Plasma Physics*; and *Relativity and Cosmology*.

9780691207346
$50.00 | £40.00
Paperback
480 pages | 203.2mm : 254mm
2021

Science / Physics
Princeton University Press



Modern Classical Physics

Optics, Fluids, Plasmas, Elasticity, Relativity, and Statistical Physics

Kip S. Thorne, Roger D. Blandford

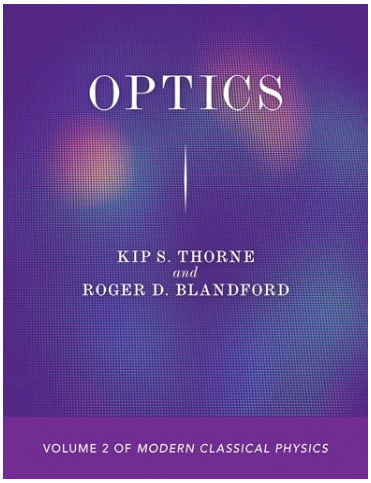
A groundbreaking text and reference book on twenty-first-century classical physics and its applications

This first-year graduate-level text and reference book covers the fundamental concepts and twenty-first-century applications of six major areas of classical physics that every masters- or PhD-level physicist should be exposed to, but often isn't: statistical physics, optics (waves of all sorts), elastodynamics, fluid mechanics, plasma physics, and special and general relativity and cosmology. Growing out of a full-year course that the eminent researchers Kip Thorne and Roger Blandford taught at Caltech for almost three decades, this book is designed to broaden the training of physicists. Its six main topical sections are also designed so they can be used in separate courses, and the book provides an invaluable reference for researchers.

- Presents all the major fields of classical physics except three prerequisites: classical mechanics, electromagnetism, and elementary thermodynamics
- Elucidates the interconnections between diverse fields and explains their shared concepts and tools
- Focuses on fundamental concepts and modern, real-world applications
- Takes applications from fundamental, experimental, and applied physics; astrophysics and cosmology; geophysics, oceanography, and meteorology; biophysics and chemical physics; engineering and optical science and technology; and information science and technology
- Emphasizes the quantum roots of classical physics and how to use quantum techniques to elucidate classical concepts or simplify classical calculations
- Features hundreds of color figures, some five hundred exercises, extensive cross-references, and a detailed index
- An online illustration package is available

9780691159027
$130.00 | £100.00
Hardback
1,552 pages | 203.2mm : 254mm
2017

Science / Physics
Princeton University Press



Optics

Volume 2 of Modern Classical Physics

Kip S. Thorne, Roger D. Blandford

A groundbreaking textbook on twenty-first-century waves of all sorts and their applications

Kip Thorne and Roger Blandford's monumental *Modern Classical Physics* is now available in five stand-alone volumes that make ideal textbooks for individual graduate or advanced undergraduate courses on statistical physics; optics; elasticity and fluid dynamics; plasma physics; and relativity and cosmology. Each volume teaches the fundamental concepts, emphasizes modern, real-world applications, and gives students a physical and intuitive understanding of the subject.

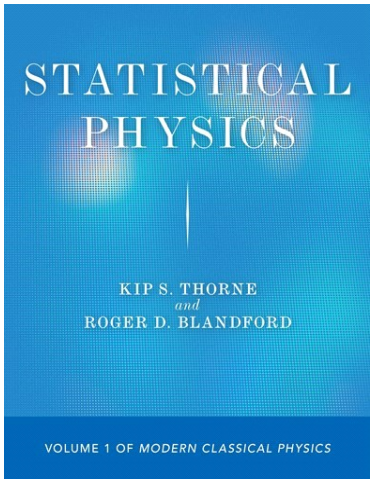
Optics is an essential introduction to a resurgent subject. "Optics" originally referred to the study of light, but today the field encompasses all types of waves, including electromagnetic waves, from gamma rays to radio waves; gravitational waves; waves in solids, fluids, and plasmas; and quantum waves. The past few decades have seen revolutions in optics—amazing advances in nonlinear optics technology, a growing understanding of optical phenomena throughout the natural world, and an increasing appreciation of the wide-ranging applicability of optics' central principles. *Optics* shows how and why this subject—which was once a standard part of physics curricula—should again be routinely taught to physics students, as well as to students in engineering, computer science, and the natural sciences.

- Includes many exercise problems
- Features color figures, suggestions for further reading, extensive cross-references, and a detailed index
- Optional "Track 2" sections make this an ideal book for a one-quarter, half-semester, or full-semester course
- An online illustration package is available to professors

The five volumes, which are available individually as paperbacks and ebooks, are *Statistical Physics*; *Optics*; *Elasticity and Fluid Dynamics*; *Plasma Physics*; and *Relativity and Cosmology*.

9780691207360
$45.00 | £35.00
Paperback
272 pages | 203.2mm : 254mm
2021

Science / Physics
Princeton University Press



Statistical Physics

Volume 1 of Modern Classical Physics

Kip S. Thorne, Roger D. Blandford

A groundbreaking textbook on twenty-first-century statistical physics and its applications

Kip Thorne and Roger Blandford's monumental *Modern Classical Physics* is now available in five stand-alone volumes that make ideal textbooks for individual graduate or advanced undergraduate courses on statistical physics; optics; elasticity and fluid dynamics; plasma physics; and relativity and cosmology. Each volume teaches the fundamental concepts, emphasizes modern, real-world applications, and gives students a physical and intuitive understanding of the subject.

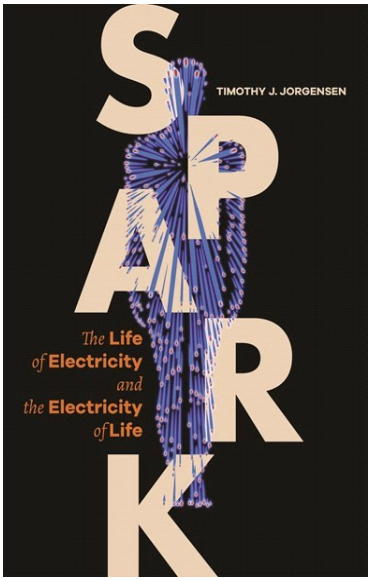
Statistical Physics is an essential introduction that is different from others on the subject because of its unique approach, which is coordinate-independent and geometric; embraces and elucidates the close quantum-classical connection and the relativistic and Newtonian domains; and demonstrates the power of statistical techniques—particularly statistical mechanics—by presenting applications not only to the usual kinds of things, such as gases, liquids, solids, and magnetic materials, but also to a much wider range of phenomena, including black holes, the universe, information and communication, and signal processing amid noise.

- Includes many exercise problems
- Features color figures, suggestions for further reading, extensive cross-references, and a detailed index
- Optional "Track 2" sections make this an ideal book for a one-quarter, half-semester, or full-semester course
- An online illustration package is available to professors

The five volumes, which are available individually as paperbacks and ebooks, are *Statistical Physics*; *Optics*; *Elasticity and Fluid Dynamics*; *Plasma Physics*; and *Relativity and Cosmology*.

9780691206127
$50.00 | £40.00
Paperback
408 pages | 203.2mm : 254mm
2021

Science / Physics
Princeton University Press



Spark

The Life of Electricity and the Electricity of Life

Timothy J. Jorgensen

A fresh look at electricity and its powerful role in life on Earth

When we think of electricity, we likely imagine the energy humming inside our home appliances or lighting up our electronic devices—or perhaps we envision the lightning-streaked clouds of a stormy sky. But electricity is more than an external source of power, heat, or illumination. Life at its essence is nothing if not electrical.

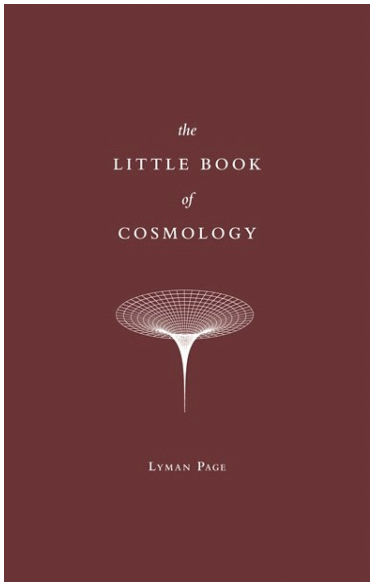
The story of how we came to understand electricity's essential role in all life is rooted in our observations of its influences on the body—influences governed by the body's central nervous system. *Spark* explains the science of electricity from this fresh, biological perspective. Through vivid tales of scientists and individuals—from Benjamin Franklin to Elon Musk—Timothy Jorgensen shows how our views of electricity and the nervous system evolved in tandem, and how progress in one area enabled advancements in the other. He explains how these developments have allowed us to understand—and replicate—the ways electricity enables the body's essential functions of sight, hearing, touch, and movement itself.

Throughout, Jorgensen examines our fascination with electricity and how it can help or harm us. He explores a broad range of topics and events, including the Nobel Prize–winning discoveries of the electron and neuron, the history of experimentation involving electricity's effects on the body, and recent breakthroughs in the use of electricity to treat disease.

Filled with gripping adventures in scientific exploration, *Spark* offers an indispensable look at electricity, how it works, and how it animates our lives from within and without.

9780691197838
$29.95 | £25.00
Hardback
456 pages | 155.57mm : 234.95mm
2022

Science / Electricity
Princeton University Press



The Little Book of Cosmology

Lyman Page

The cutting-edge science that is taking the measure of the universe

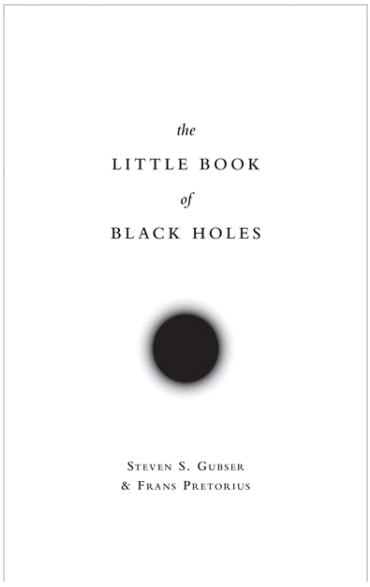
The Little Book of Cosmology provides a breathtaking look at our universe on the grandest scales imaginable. Written by one of the world's leading experimental cosmologists, this short but deeply insightful book describes what scientists are revealing through precise measurements of the faint thermal afterglow of the Big Bang—known as the cosmic microwave background, or CMB—and how their findings are transforming our view of the cosmos.

Blending the latest findings in cosmology with essential concepts from physics, Lyman Page first helps readers to grasp the sheer enormity of the universe, explaining how to understand the history of its formation and evolution in space and time. Then he sheds light on how spatial variations in the CMB formed, how they reveal the age, size, and geometry of the universe, and how they offer a blueprint for the formation of cosmic structure.

Not only does Page explain current observations and measurements, he describes how they can be woven together into a unified picture to form the Standard Model of Cosmology. Yet much remains unknown, and this incisive book also describes the search for ever deeper knowledge at the field's frontiers—from quests to understand the nature of neutrinos and dark energy to investigations into the physics of the very early universe.

9780691195780
$19.95 | £14.99
Hardback
152 pages | 139.7mm : 215.9mm
2020

Science / Cosmology
Princeton University Press



The Little Book of Black Holes

Steven S. Gubser, Frans Pretorius

Dive into a mind-bending exploration of the physics of black holes

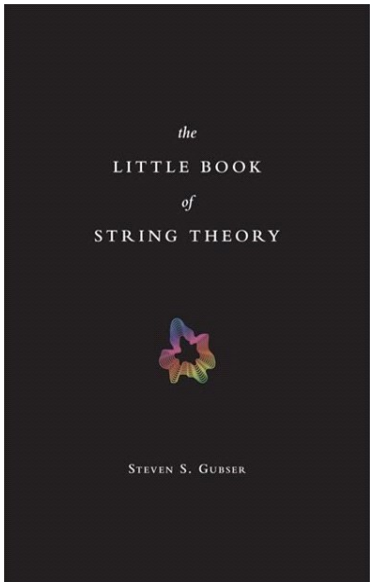
Black holes, predicted by Albert Einstein's general theory of relativity more than a century ago, have long intrigued scientists and the public with their bizarre and fantastical properties. Although Einstein understood that black holes were mathematical solutions to his equations, he never accepted their physical reality—a viewpoint many shared. This all changed in the 1960s and 1970s, when a deeper conceptual understanding of black holes developed just as new observations revealed the existence of quasars and X-ray binary star systems, whose mysterious properties could be explained by the presence of black holes. Black holes have since been the subject of intense research—and the physics governing how they behave and affect their surroundings is stranger and more mind-bending than any fiction.

After introducing the basics of the special and general theories of relativity, this book describes black holes both as astrophysical objects and theoretical "laboratories" in which physicists can test their understanding of gravitational, quantum, and thermal physics. From Schwarzschild black holes to rotating and colliding black holes, and from gravitational radiation to Hawking radiation and information loss, Steven Gubser and Frans Pretorius use creative thought experiments and analogies to explain their subject accessibly. They also describe the decades-long quest to observe the universe in gravitational waves, which recently resulted in the LIGO observatories' detection of the distinctive gravitational wave "chirp" of two colliding black holes—the first direct observation of black holes' existence.

The Little Book of Black Holes takes readers deep into the mysterious heart of the subject, offering rare clarity of insight into the physics that makes black holes simple yet destructive manifestations of geometric destiny.

9780691163727
$19.95 | £14.99
Hardback
200 pages | 139.7mm : 215.9mm
2017

Science / Astrophysics & Space Science
Science Essentials
Princeton University Press



The Little Book of String Theory

Steven S. Gubser

The essential beginner's guide to string theory

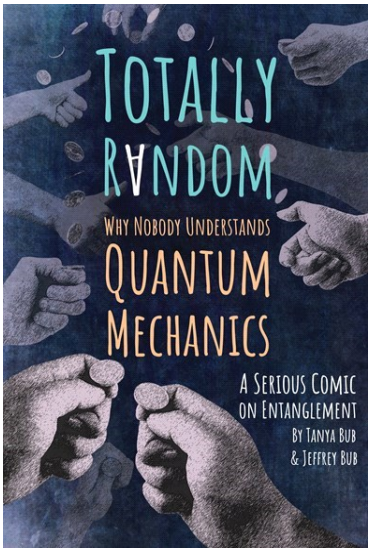
The Little Book of String Theory offers a short, accessible, and entertaining introduction to one of the most talked-about areas of physics today. String theory has been called the "theory of everything." It seeks to describe all the fundamental forces of nature. It encompasses gravity and quantum mechanics in one unifying theory. But it is unproven and fraught with controversy. After reading this book, you'll be able to draw your own conclusions about string theory.

Steve Gubser begins by explaining Einstein's famous equation $E = mc2$, quantum mechanics, and black holes. He then gives readers a crash course in string theory and the core ideas behind it. In plain English and with a minimum of mathematics, Gubser covers strings, branes, string dualities, extra dimensions, curved spacetime, quantum fluctuations, symmetry, and supersymmetry. He describes efforts to link string theory to experimental physics and uses analogies that nonscientists can understand. How does Chopin's Fantasie-Impromptu relate to quantum mechanics? What would it be like to fall into a black hole? Why is dancing a waltz similar to contemplating a string duality? Find out in the pages of this book.

The Little Book of String Theory is the essential, most up-to-date beginner's guide to this elegant, multidimensional field of physics.

9780691142890
$19.95 | £14.99
Hardback
184 pages | 139.7mm : 215.9mm
2010

Science / Physics
Science Essentials
Princeton University Press



Totally Random

Why Nobody Understands Quantum Mechanics (A Serious Comic on Entanglement)

Tanya Bub, Jeffrey Bub

An eccentric comic about the central mystery of quantum mechanics

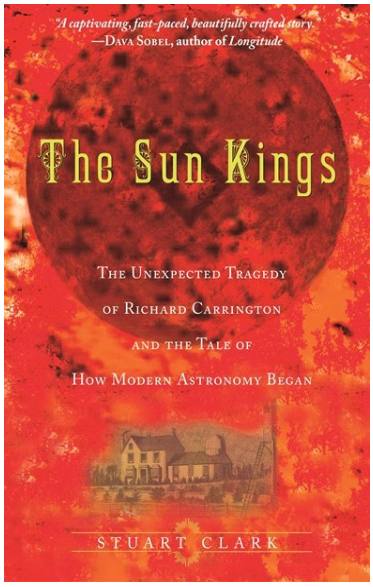
Totally Random is a comic for the serious reader who wants to really understand the central mystery of quantum mechanics--entanglement: what it is, what it means, and what you can do with it.

Measure two entangled particles separately, and the outcomes are totally random. But compare the outcomes, and the particles seem as if they are instantaneously influencing each other at a distance—even if they are light-years apart. This, in a nutshell, is entanglement, and if it seems weird, then this book is for you. *Totally Random* is a graphic experiential narrative that unpacks the deep and insidious significance of the curious correlation between entangled particles to deliver a gut-feel glimpse of a world that is not what it seems. See for yourself how entanglement has led some of the greatest thinkers of our time to talk about crazy-sounding stuff like faster-than-light signaling, many worlds, and cats that are both dead and alive. Find out why it remains one of science's most paradigm-shaking discoveries. Join Niels Bohr's therapy session with the likes of Einstein, Schrödinger, and other luminaries and let go of your commonsense notion of how the world works. Use your new understanding of entanglement to do the seemingly impossible, like beat the odds in the quantum casino, or quantum encrypt a message to evade the Sphinx's all-seeing eye. But look out, or you might just get teleported back to the beginning of the book!

A fresh and subversive look at our quantum world with some seriously funny stuff, *Totally Random* delivers a real understanding of entanglement that will completely change the way you think about the nature of physical reality.

9780691176956
$22.95 | £17.99
Paperback
272 pages | 177.8mm : 254mm
2018

Science / Quantum Theory
Princeton University Press



The Sun Kings

The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began

Stuart Clark

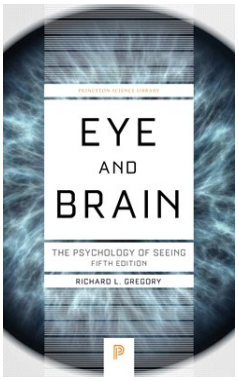
In September of 1859, the entire Earth was engulfed in a gigantic cloud of seething gas, and a blood-red aurora erupted across the planet from the poles to the tropics. Around the world, telegraph systems crashed, machines burst into flames, and electric shocks rendered operators unconscious. Compasses and other sensitive instruments reeled as if struck by a massive magnetic fist. For the first time, people began to suspect that the Earth was not isolated from the rest of the universe. However, nobody knew what could have released such strange forces upon the Earth--nobody, that is, except the amateur English astronomer Richard Carrington.

In this riveting account, Stuart Clark tells for the first time the full story behind Carrington's observations of a mysterious explosion on the surface of the Sun and how his brilliant insight--that the Sun's magnetism directly influences the Earth--helped to usher in the modern era of astronomy. Clark vividly brings to life the scientists who roundly rejected the significance of Carrington's discovery of solar flares, as well as those who took up his struggle to prove the notion that the Earth could be touched by influences from space. Clark also reveals new details about the sordid scandal that destroyed Carrington's reputation and led him from the highest echelons of science to the very lowest reaches of love, villainy, and revenge.

The Sun Kings transports us back to Victorian England, into the very heart of the great nineteenth-century scientific controversy about the Sun's hidden influence over our planet.

9780691141268
$26.95 | £20.00
Paperback
224 pages | 152.4mm : 234.95mm
2009

Science / Astronomy
Princeton University Press



Eye and Brain

The Psychology of Seeing - Fifth Edition

Richard L. Gregory

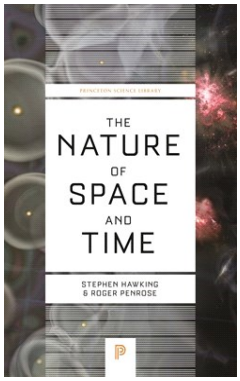
9780691165165
$19.95 : £14.99
Paperback

296 pages | 139.7mm : 215.9mm
2015

Science
Princeton Science Library
Princeton University Press

Since the publication of the first edition in 1966, *Eye and Brain* has established itself worldwide as an essential introduction to the basic phenomena of visual perception. Richard Gregory offers clear explanations of how we see brightness, movement, color, and objects, and he explores the phenomena of visual illusions to establish principles about how perception normally works and why it sometimes fails.

Illusion continues to be a major theme in the book, which provides a comprehensive classification system. There are also sections on what babies see and how they learn to see, on motion perception, the relationship between vision and consciousness, and on the impact of new brain imaging techniques.



The Nature of Space and Time

Stephen Hawking, Roger Penrose

9780691168449
$14.95 : £11.99
Paperback

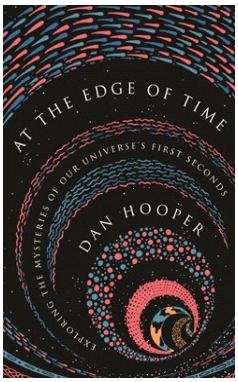
160 pages | 139.7mm : 215.9mm
2015

Science
Princeton Science Library
Princeton University Press

From two of the world's great physicists—Stephen Hawking and Nobel laureate Roger Penrose—a lively debate about the nature of space and time

Einstein said that the most incomprehensible thing about the universe is that it is comprehensible. But was he right? Can the quantum theory of fields and Einstein's general theory of relativity, the two most accurate and successful theories in all of physics, be united into a single quantum theory of gravity? Can quantum and cosmos ever be combined? In *The Nature of Space and Time*, two of the world's most famous physicists—Stephen Hawking (*A Brief History of Time*) and Roger Penrose (*The Road to Reality*)—debate these questions.

The authors outline how their positions have further diverged on a number of key issues, including the spatial geometry of the universe, inflationary versus cyclic theories of the cosmos, and the black-hole information-loss paradox. Though much progress has been made, Hawking and Penrose stress that physicists still have further to go in their quest for a quantum theory of gravity.



At the Edge of Time

Exploring the Mysteries of Our Universe's First Seconds

Dan Hooper

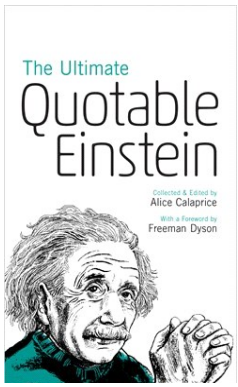
9780691206424
$17.95 : £14.99
Paperback

248 pages | 139.7mm : 215.9mm
2021

Science
Science Essentials
Princeton University Press

A new look at the first few seconds after the Big Bang—and how research into these moments continues to revolutionize our understanding of our universe

Scientists in recent decades have made crucial discoveries about how our cosmos evolved over the past 13.8 billion years. But we still know little about what happened in the first seconds after the Big Bang. *At the Edge of Time* focuses on what we have learned and are striving to understand about this mysterious period at the beginning of cosmic history. Delving into the remarkable science of cosmology, Dan Hooper describes many of the extraordinary questions that scientists are asking about the origin and nature of our world. Hooper examines how the Large Hadron Collider and other experiments re-create the conditions of the Big Bang, how we may finally discover the way dark matter was formed during our universe's first moments, and how, with new telescopes, we are lifting the veil on the era of cosmic inflation. *At the Edge of Time* presents an accessible investigation of our universe and its birth.



The Ultimate Quotable Einstein

Albert Einstein, Alice Calaprice, Freeman Dyson

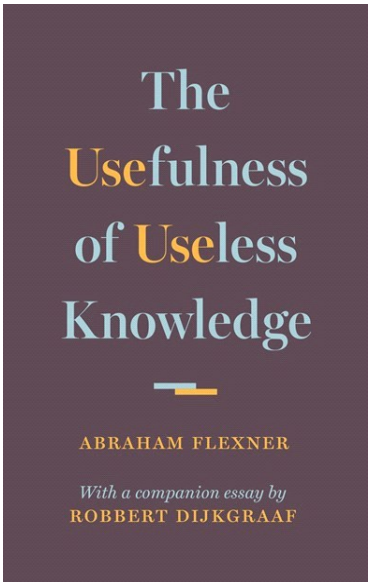
9780691160146
$16.95 : £12.99
Paperback

608 pages | 114.3mm : 190.5mm
2013

Science
Princeton University Press

This is the definitive edition of the hugely popular collection of Einstein quotations that has sold tens of thousands of copies worldwide and been translated into twenty-five languages.

The Ultimate Quotable Einstein features roughly 1,600 quotes in all. This paperback edition includes sections unique to the ultimate collection--"On and to Children," "On Race and Prejudice," and "Einstein's Verses: A Small Selection"--as well as a chronology of Einstein's life and accomplishments, Freeman Dyson's authoritative foreword, and commentary and descriptive source notes by Alice Calaprice.



The Usefulness of Useless Knowledge

Abraham Flexner, Robbert Dijkgraaf

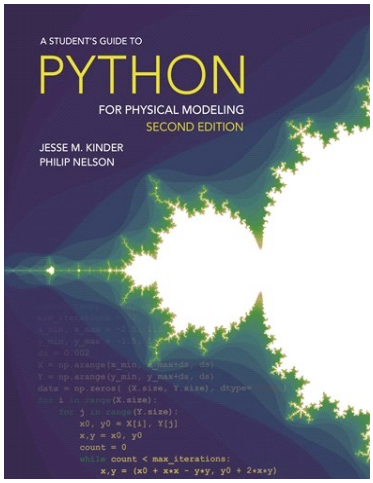
A short, provocative book about why "useless" science often leads to humanity's greatest technological breakthroughs

A forty-year tightening of funding for scientific research has meant that resources are increasingly directed toward applied or practical outcomes, with the intent of creating products of immediate value. In such a scenario, it makes sense to focus on the most identifiable and urgent problems, right? Actually, it doesn't. In his classic essay "The Usefulness of Useless Knowledge," Abraham Flexner, the founding director of the Institute for Advanced Study in Princeton and the man who helped bring Albert Einstein to the United States, describes a great paradox of scientific research. The search for answers to deep questions, motivated solely by curiosity and without concern for applications, often leads not only to the greatest scientific discoveries but also to the most revolutionary technological breakthroughs. In short, no quantum mechanics, no computer chips.

This brief book includes Flexner's timeless 1939 essay alongside a new companion essay by Robbert Dijkgraaf, the Institute's current director, in which he shows that Flexner's defense of the value of "the unobstructed pursuit of useless knowledge" may be even more relevant today than it was in the early twentieth century. Dijkgraaf describes how basic research has led to major transformations in the past century and explains why it is an essential precondition of innovation and the first step in social and cultural change. He makes the case that society can achieve deeper understanding and practical progress today and tomorrow only by truly valuing and substantially funding the curiosity-driven "pursuit of useless knowledge" in both the sciences and the humanities.

9780691174761
$9.95 | £7.99
Hardback
104 pages | 114.3mm : 177.8mm
2017

Science / Philosophy & Social Aspects
Princeton University Press



A Student's Guide to Python for Physical Modeling

Second Edition

Jesse M. Kinder, Philip Nelson

A fully updated tutorial on the basics of the Python programming language for science students

Python is a computer programming language that has gained popularity throughout the sciences. This fully updated second edition of *A Student's Guide to Python for Physical Modeling* aims to help you, the student, teach yourself enough of the Python programming language to get started with physical modeling. You will learn how to install an open-source Python programming environment and use it to accomplish many common scientific computing tasks: importing, exporting, and visualizing data; numerical analysis; and simulation. No prior programming experience is assumed.

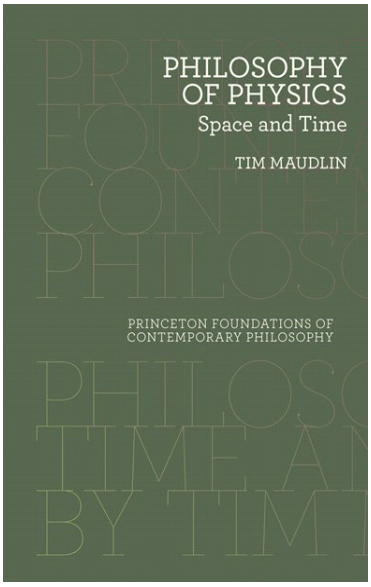
This guide introduces a wide range of useful tools, including:

- Basic Python programming and scripting
- Numerical arrays
- Two- and three-dimensional graphics
- Animation
- Monte Carlo simulations
- Numerical methods, including solving ordinary differential equations
- Image processing

Numerous code samples and exercises—with solutions—illustrate new ideas as they are introduced. This guide also includes supplemental online resources: code samples, data sets, tutorials, and more. This edition includes new material on symbolic calculations with SymPy, an introduction to Python libraries for data science and machine learning (pandas and sklearn), and a primer on Python classes and object-oriented programming. A new appendix also introduces command line tools and version control with Git.

9780691223650
$24.95 | £20.00
Paperback
240 pages | 203.2mm : 254mm
2021

Science / Physics
Princeton University Press



Philosophy of Physics

Space and Time

Tim Maudlin

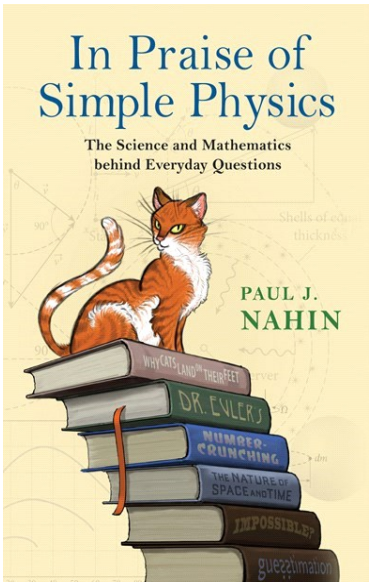
Philosophical foundations of the physics of space-time

This concise book introduces nonphysicists to the core philosophical issues surrounding the nature and structure of space and time, and is also an ideal resource for physicists interested in the conceptual foundations of space-time theory. Tim Maudlin's broad historical overview examines Aristotelian and Newtonian accounts of space and time, and traces how Galileo's conceptions of relativity and space-time led to Einstein's special and general theories of relativity. Maudlin explains special relativity with enough detail to solve concrete physical problems while presenting general relativity in more qualitative terms. Additional topics include the Twins Paradox, the physical aspects of the Lorentz-FitzGerald contraction, the constancy of the speed of light, time travel, the direction of time, and more.

- Introduces nonphysicists to the philosophical foundations of space-time theory
- Provides a broad historical overview, from Aristotle to Einstein
- Explains special relativity geometrically, emphasizing the intrinsic structure of space-time
- Covers the Twins Paradox, Galilean relativity, time travel, and more
- Requires only basic algebra and no formal knowledge of physics

9780691165714
$22.95 | £17.99
Paperback
200 pages | 139.7mm : 215.9mm
2015

Science / Philosophy & Social Aspects
Princeton Foundations of Contemporary Philosophy
Princeton University Press



In Praise of Simple Physics

The Science and Mathematics behind Everyday Questions

Paul J. Nahin

Fun puzzles that use physics to explore the wonders of everyday life

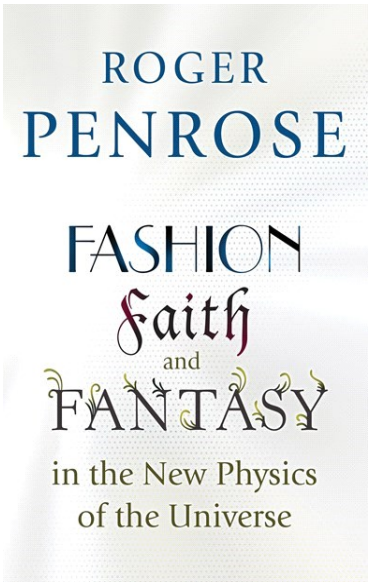
Physics can explain many of the things that we commonly encounter. It can tell us why the night is dark, what causes the tides, and even how best to catch a baseball. With *In Praise of Simple Physics*, popular math and science writer Paul Nahin presents a plethora of situations that explore the science and math behind the wonders of everyday life. Roaming through a diverse range of puzzles, he illustrates how physics shows us ways to wring more energy from renewable sources, to measure the gravity in our car garages, to figure out which of three light switches in the basement controls the light bulb in the attic, and much, much more.

How fast can you travel from London to Paris? How do scientists calculate the energy of an atomic bomb explosion? How do you kick a football so it stays in the air and goes a long way downfield? Nahin begins with simpler problems and progresses to more challenging questions, and his entertaining, accessible, and scientifically and mathematically informed explanations are all punctuated by his trademark humor. Readers are presumed to have some background in beginning differential and integral calculus. Whether you simply have a personal interest in physics' influence in the world or you're an engineering and science student who wants to gain more physics know-how, this book has an intriguing scenario for you.

In Praise of Simple Physics proves that if we look carefully at the world around us, physics has answers for the most astonishing day-to-day occurrences.

9780691178523
$17.95 | £14.99
Paperback
272 pages | 152.4mm : 234.95mm
2017

Science / Physics
Princeton Puzzlers
Princeton University Press



Fashion, Faith, and Fantasy in the New Physics of the Universe

Roger Penrose

Nobel Prize–winning physicist Roger Penrose questions some of the most fashionable ideas in physics today, including string theory

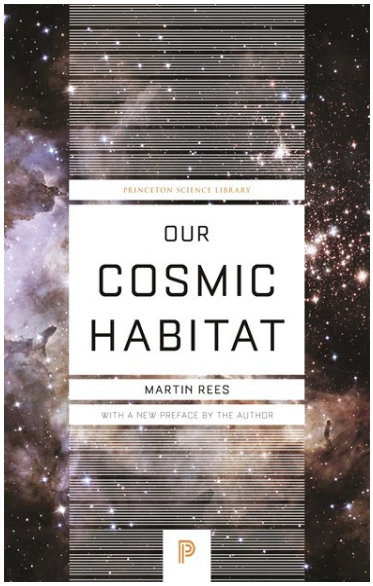
What can fashionable ideas, blind faith, or pure fantasy possibly have to do with the scientific quest to understand the universe? Surely, theoretical physicists are immune to mere trends, dogmatic beliefs, or flights of fancy? In fact, acclaimed physicist and bestselling author Roger Penrose argues that researchers working at the extreme frontiers of physics are just as susceptible to these forces as anyone else. In this provocative book, he argues that fashion, faith, and fantasy, while sometimes productive and even essential in physics, may be leading today's researchers astray in three of the field's most important areas—string theory, quantum mechanics, and cosmology.

Arguing that string theory has veered away from physical reality by positing six extra hidden dimensions, Penrose cautions that the fashionable nature of a theory can cloud our judgment of its plausibility. In the case of quantum mechanics, its stunning success in explaining the atomic universe has led to an uncritical faith that it must also apply to reasonably massive objects, and Penrose responds by suggesting possible changes in quantum theory. Turning to cosmology, he argues that most of the current fantastical ideas about the origins of the universe cannot be true, but that an even wilder reality may lie behind them. Finally, Penrose describes how fashion, faith, and fantasy have ironically also shaped his own work, from twistor theory, a possible alternative to string theory that is beginning to acquire a fashionable status, to "conformal cyclic cosmology," an idea so fantastic that it could be called "conformal crazy cosmology."

The result is an important critique of some of the most significant developments in physics today from one of its most eminent figures.

9780691119793
$29.95 | £25.00
Hardback
520 pages | 152.4mm : 234.95mm
2016

Science / Philosophy & Social Aspects
Princeton University Press



Our Cosmic Habitat

New Edition

Martin Rees

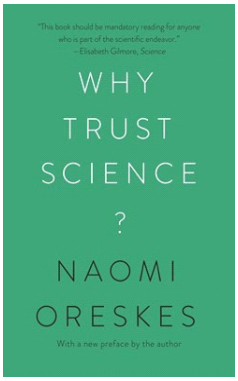
Our universe seems strangely "biophilic," or hospitable to life. Is this happenstance, providence, or coincidence? According to cosmologist Martin Rees, the answer depends on the answer to another question, the one posed by Einstein's famous remark: "What interests me most is whether God could have made the world differently." This highly engaging book explores the fascinating consequences of the answer being "yes." Rees explores the notion that our universe is just a part of a vast "multiverse," or ensemble of universes, in which most of the other universes are lifeless. What we call the laws of nature would then be no more than local bylaws, imposed in the aftermath of our own Big Bang. In this scenario, our cosmic habitat would be a special, possibly unique universe where the prevailing laws of physics allowed life to emerge.

Rees begins by exploring the nature of our solar system and examining a range of related issues such as whether our universe is or isn't infinite. He asks, for example: How likely is life? How credible is the Big Bang theory? Rees then peers into the long-range cosmic future before tracing the causal chain backward to the beginning. He concludes by trying to untangle the paradoxical notion that our entire universe, stretching 10 billion light-years in all directions, emerged from an infinitesimal speck.

As Rees argues, we may already have intimations of other universes. But the fate of the multiverse concept depends on the still-unknown bedrock nature of space and time on scales a trillion trillion times smaller than atoms, in the realm governed by the quantum physics of gravity. Expanding our comprehension of the cosmos, Our Cosmic Habitat will be read and enjoyed by all those--scientists and nonscientists alike--who are as fascinated by the universe we inhabit as is the author himself.

9780691178097
$17.95 | £14.99
Paperback
232 pages | 139.7mm : 215.9mm
2017

Science / Cosmology
Princeton Science Library
Princeton University Press



Why Trust Science?

Naomi Oreskes

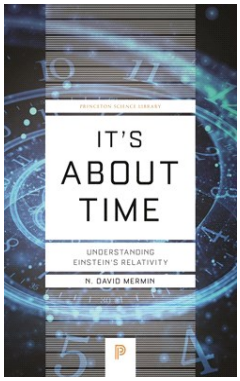
9780691212265
$18.95 : £14.99
Paperback

392 pages | 139.7mm : 215.9mm
2021

Science
The University Center for Human Values Series
Princeton University Press

Why the social character of scientific knowledge makes it trustworthy

Are doctors right when they tell us vaccines are safe? Should we take climate experts at their word when they warn us about the perils of global warming? Why should we trust science when so many of our political leaders don't? Naomi Oreskes offers a bold and compelling defense of science, revealing why the social character of scientific knowledge is its greatest strength—and the greatest reason we can trust it. Tracing the history and philosophy of science from the late nineteenth century to today, this timely and provocative book features a new preface by Oreskes and critical responses by climate experts Ottmar Edenhofer and Martin Kowarsch, political scientist Jon Krosnick, philosopher of science Marc Lange, and science historian Susan Lindee, as well as a foreword by political theorist Stephen Macedo.



It's About Time

Understanding Einstein's Relativity

N. David Mermin

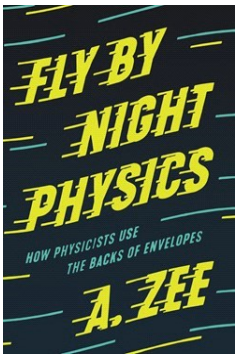
9780691218779
$16.95 : £12.99
Paperback

208 pages | 139.7mm : 215.9mm
2021

Science
Princeton Science Library
Princeton University Press

A readable and entertaining look at how Einstein's special theory of relativity gives us a new understanding of the nature of time

Relativity ought to be an important part of everyone's education. Its subject is time, with which we all think we are familiar. Einstein's special theory of relativity reveals that some of our most intuitive notions about time are shockingly wrong. This clear, lively, and informal exposition of special relativity takes a highly original approach to introduce readers to the true nature of time. It is accessible to anyone who remembers a little high school algebra and elementary geometry. *It's About Time* offers deep insights to curious readers who have no technical scientific background.



Fly by Night Physics

How Physicists Use the Backs of Envelopes

A. Zee

9780691182544
$48.00 : £38.00
Hardback

448 pages | 177.8mm : 254mm
2020

Science
Princeton University Press

The essential primer for physics students who want to build their physical intuition

Presented in A. Zee's incomparably engaging style, this book introduces physics students to the practice of using physical reasoning and judicious guesses to get at the crux of a problem. An essential primer for advanced undergraduates and beyond, *Fly by Night Physics* reveals the simple and effective techniques that researchers use to think through a problem to its solution—or failing that, to smartly guess the answer—before starting any calculations.

In typical physics classrooms, students seek to master an enormous toolbox of mathematical methods, which are necessary to do the precise calculations used in physics. Consequently, students often develop the unfortunate impression that physics consists of well-defined problems that can be solved with tightly reasoned and logical steps. Idealized textbook exercises and homework problems reinforce this erroneous impression. As a result, even the best students can find themselves completely unprepared for the challenges of doing actual research.

On Gravity

A Brief Tour of a Weighty Subject

A. Zee

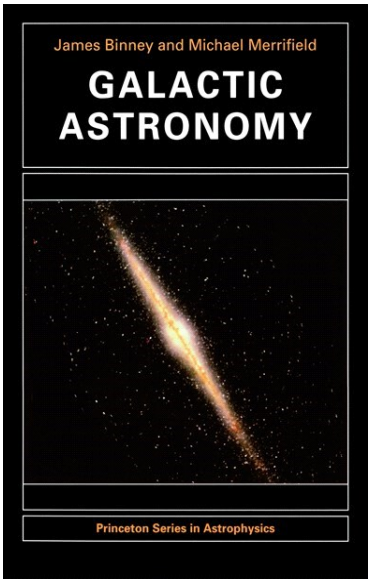
9780691202662
$14.95 : £11.99
Paperback

192 pages | 139.7mm : 215.9mm
2020

Science
Princeton University Press

A pithy yet deep introduction to Einstein's general theory of relativity

Of the four fundamental forces of nature, gravity might be the least understood and yet the one with which we are most intimate. *On Gravity* combines depth with accessibility to take us on a compelling tour of Einstein's general theory of relativity. A. Zee begins with the discovery of gravity waves, then explains how gravity can be understood in comparison to other classical field theories, presents the idea of curved spacetime, and explores black holes and Hawking radiation. Zee travels as far as the theory reaches, leaving us with tantalizing hints of the unknown, from the intransigence of quantum gravity to the mysteries of dark matter. Infused with Zee's signature warmth and fresh style, *On Gravity* opens a unique pathway to comprehending relativity, gravity, spacetime, and the workings of the universe.



Galactic Astronomy

James Binney, Michael Merrifield

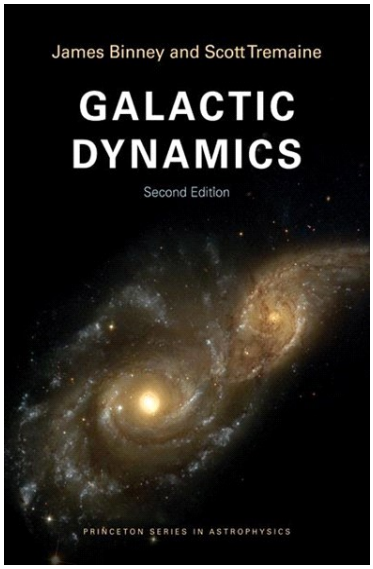
This is the definitive treatment of the phenomenology of galaxies--a clear and comprehensive volume that takes full account of the extraordinary recent advances in the field. The book supersedes the classic text Galactic Astronomy that James Binney wrote with Dimitri Mihalas, and complements Galactic Dynamics by Binney and Scott Tremaine. It will be invaluable to researchers and is accessible to any student who has a background in undergraduate physics.

The book draws on observations both of our own galaxy, the Milky Way, and of external galaxies. The two sources are complementary, since the former tends to be highly detailed but difficult to interpret, while the latter is typically poorer in quality but conceptually simpler to understand. Binney and Merrifield introduce all astronomical concepts necessary to understand the properties of galaxies, including coordinate systems, magnitudes and colors, the phenomenology of stars, the theory of stellar and chemical evolution, and the measurement of astronomical distances. The book's core covers the phenomenology of external galaxies, star clusters in the Milky Way, the interstellar media of external galaxies, gas in the Milky Way, the structure and kinematics of the stellar components of the Milky Way, and the kinematics of external galaxies.

Throughout, the book emphasizes the observational basis for current understanding of galactic astronomy, with references to the original literature. Offering both new information and a comprehensive view of its subject, it will be an indispensable source for professionals, as well as for graduate students and advanced undergraduates.

9780691025650
$110.00 | £85.00
Paperback
816 pages | 152.4mm : 234.95mm
1998

Science / Astrophysics & Space Science
Princeton Series in Astrophysics
Princeton University Press



Galactic Dynamics

Second Edition

James Binney, Scott Tremaine

Since it was first published in 1987, *Galactic Dynamics* has become the most widely used advanced textbook on the structure and dynamics of galaxies and one of the most cited references in astrophysics. Now, in this extensively revised and updated edition, James Binney and Scott Tremaine describe the dramatic recent advances in this subject, making *Galactic Dynamics* the most authoritative introduction to galactic astrophysics available to advanced undergraduate students, graduate students, and researchers.

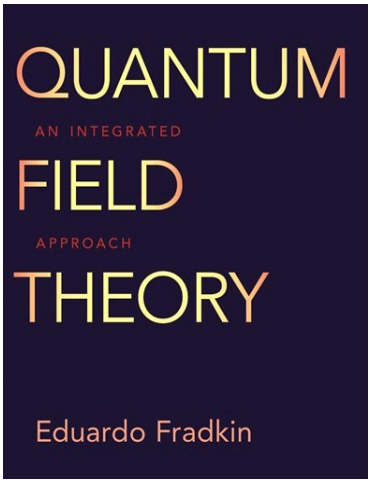
Every part of the book has been thoroughly overhauled, and many sections have been completely rewritten. Many new topics are covered, including N-body simulation methods, black holes in stellar systems, linear stability and response theory, and galaxy formation in the cosmological context. Binney and Tremaine, two of the world's leading astrophysicists, use the tools of theoretical physics to describe how galaxies and other stellar systems work, succinctly and lucidly explaining theoretical principles and their applications to observational phenomena. They provide readers with an understanding of stellar dynamics at the level needed to reach the frontiers of the subject.

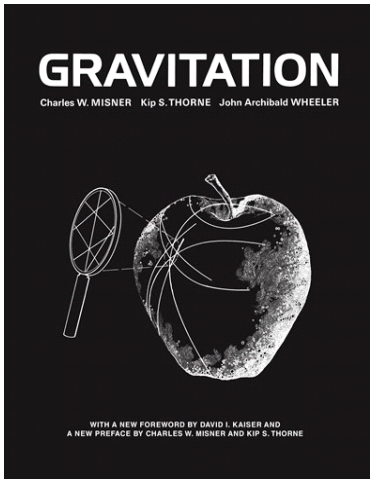
This new edition of the classic text is the definitive introduction to the field.

- A complete revision and update of one of the most cited references in astrophysics
- Provides a comprehensive description of the dynamical structure and evolution of galaxies and other stellar systems
- Serves as both a graduate textbook and a resource for researchers
- Includes 20 color illustrations, 205 figures, and more than 200 problems
- Covers the gravitational N-body problem, hierarchical galaxy

9780691130279
$110.00 | £85.00
Paperback
920 pages | 152mm : 242mm
2008

Science / Astrophysics & Space Science
Princeton Series in Astrophysics
Princeton University Press





Quantum Field Theory

An Integrated Approach

Eduardo Fradkin

The only graduate-level textbook on quantum field theory that fully integrates perspectives from high-energy, condensed-matter, and statistical physics

Quantum field theory was originally developed to describe quantum electrodynamics and other fundamental problems in high-energy physics, but today has become an invaluable conceptual and mathematical framework for addressing problems across physics, including in condensed-matter and statistical physics. With this expansion of applications has come a new and deeper understanding of quantum field theory—yet this perspective is still rarely reflected in teaching and textbooks on the subject. Developed from a year-long graduate course Eduardo Fradkin has taught for years to students of high-energy, condensed-matter, and statistical physics, this comprehensive textbook provides a fully "multicultural" approach to quantum field theory, covering the full breadth of its applications in one volume.

- Brings together perspectives from high-energy, condensed-matter, and statistical physics in both the main text and exercises
- Takes students from basic techniques to the frontiers of physics
- Pays special attention to the relation between measurements and propagators and the computation of cross sections and response functions
- Focuses on renormalization and the renormalization group, with an emphasis on fixed points, scale invariance, and their role in quantum field theory and phase transitions
- Other topics include non-perturbative phenomena, anomalies, and conformal invariance
- Features numerous examples and extensive problem sets
- Also serves as an invaluable resource for researchers

9780691149080
$85.00 | £66.00
Hardback
760 pages | 203.2mm : 254mm
2021

Science / Quantum Theory
Princeton University Press

Gravitation

Charles W. Misner, Kip S. Thorne, John Archibald Wheeler, David I. Kaiser

First published in 1973, *Gravitation* is a landmark graduate-level textbook that presents Einstein's general theory of relativity and offers a rigorous, full-year course on the physics of gravitation. Upon publication, *Science* called it "a pedagogic masterpiece," and it has since become a classic, considered essential reading for every serious student and researcher in the field of relativity. This authoritative text has shaped the research of generations of physicists and astronomers, and the book continues to influence the way experts think about the subject.

With an emphasis on geometric interpretation, this masterful and comprehensive book introduces the theory of relativity; describes physical applications, from stars to black holes and gravitational waves; and portrays the field's frontiers. The book also offers a unique, alternating, two-track pathway through the subject. Material focusing on basic physical ideas is designated as Track 1 and formulates an appropriate one-semester graduate-level course. The remaining Track 2 material provides a wealth of advanced topics instructors can draw on for a two-semester course, with Track 1 sections serving as prerequisites.

This must-have reference for students and scholars of relativity includes a new preface by David Kaiser, reflecting on the history of the book's publication and reception, and a new introduction by Charles Misner and Kip Thorne, discussing exciting developments in the field since the book's original publication.

- The book teaches students to:
- Grasp the laws of physics in flat and curved spacetime
- Predict orders of magnitude
- Calculate using the principal tools of modern geometry
- Understand Einstein's geometric framework for physics
- Explore applications, including neutron stars, Schwarzschild and Kerr black holes, gravitational collapse, gravitational waves, cosmology, and so much more

9780691177793
$63.00 | £50.00
Hardback
1,280 pages | 203.2mm : 254mm
2017

Science / Gravity
Princeton University Press

Astrophysics in a Nutshell

Second Edition

Dan Maoz

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 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.

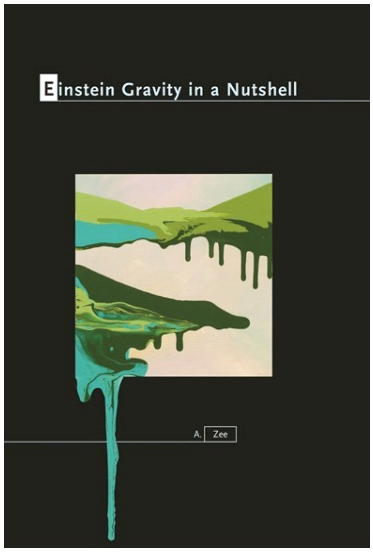
Written by Dan Maoz, a leading active researcher, and designed for advanced undergraduate science majors, Astrophysics in a Nutshell is a brief but thorough introduction to the observational data and theoretical concepts underlying modern astronomy. Generously illustrated, it covers the essentials of modern astrophysics, emphasizing the common physical principles that govern astronomical 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 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

9780691164793
$85.00 | £66.00
Hardback
312 pages | 177.8mm : 254mm
2016

Science / Astrophysics & Space Science
In a Nutshell
Princeton University Press



Einstein Gravity in a Nutshell

A. Zee

An ideal introduction to Einstein's general theory of relativity

This unique textbook provides an accessible introduction to Einstein's general theory of relativity, a subject of breathtaking beauty and supreme importance in physics. With his trademark blend of wit and incisiveness, A. Zee guides readers from the fundamentals of Newtonian mechanics to the most exciting frontiers of research today, including de Sitter and anti-de Sitter spacetimes, Kaluza-Klein theory, and brane worlds. Unlike other books on Einstein gravity, this book emphasizes the action principle and group theory as guides in constructing physical theories. Zee treats various topics in a spiral style that is easy on beginners, and includes anecdotes from the history of physics that will appeal to students and experts alike. He takes a friendly approach to the required mathematics, yet does not shy away from more advanced mathematical topics such as differential forms. The extensive discussion of black holes includes rotating and extremal black holes and Hawking radiation. The ideal textbook for undergraduate and graduate students, *Einstein Gravity in a Nutshell* also provides an essential resource for professional physicists and is accessible to anyone familiar with classical mechanics and electromagnetism. It features numerous exercises as well as detailed appendices covering a multitude of topics not readily found elsewhere.

- Provides an accessible introduction to Einstein's general theory of relativity
- Guides readers from Newtonian mechanics to the frontiers of modern research
- Emphasizes symmetry and the Einstein-Hilbert action
- Covers topics not found in standard textbooks on Einstein gravity
- Includes interesting historical asides
- Features numerous exercises and detailed appendices
- Ideal for students, physicists, and scientifically minded lay readers
- Solutions manual (available only to teachers)

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888 pages | 177.8mm : 254mm
2013

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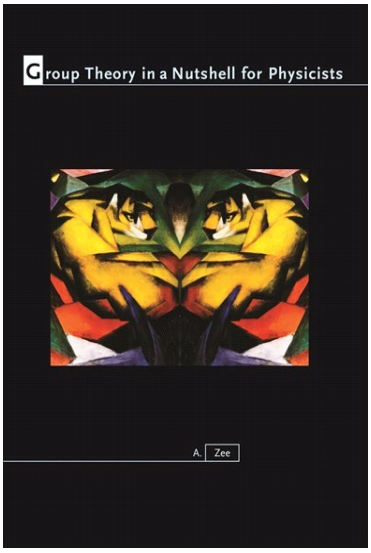

Group Theory in a Nutshell for Physicists

A. Zee

A concise, modern textbook on group theory written especially for physicists

Although group theory is a mathematical subject, it is indispensable to many areas of modern theoretical physics, from atomic physics to condensed matter physics, particle physics to string theory. In particular, it is essential for an understanding of the fundamental forces. Yet until now, what has been missing is a modern, accessible, and self-contained textbook on the subject written especially for physicists.

Group Theory in a Nutshell for Physicists fills this gap, providing a user-friendly and classroom-tested text that focuses on those aspects of group theory physicists most need to know. From the basic intuitive notion of a group, A. Zee takes readers all the way up to how theories based on gauge groups could unify three of the four fundamental forces. He also includes a concise review of the linear algebra needed for group theory, making the book ideal for self-study.

- Provides physicists with a modern and accessible introduction to group theory
- Covers applications to various areas of physics, including field theory, particle physics, relativity, and much more
- Topics include finite group and character tables; real, pseudoreal, and complex representations; Weyl, Dirac, and Majorana equations; the expanding universe and group theory; grand unification; and much more
- The essential textbook for students and an invaluable resource for researchers
- Features a brief, self-contained treatment of linear algebra
- An online illustration package is available to professors
- Solutions manual (available only to professors)

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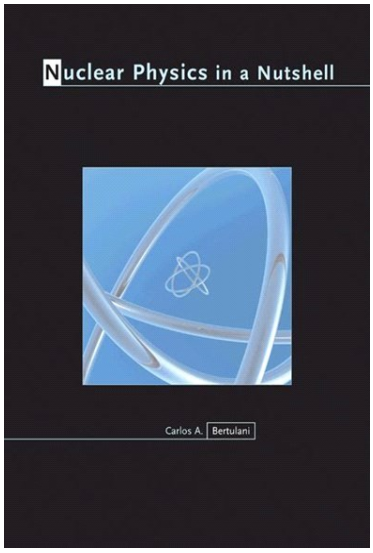

Nuclear Physics in a Nutshell

Carlos A. Bertulani

Nuclear Physics in a Nutshell provides a clear, concise, and up-to-date overview of the atomic nucleus and the theories that seek to explain it. Bringing together a systematic explanation of hadrons, nuclei, and stars for the first time in one volume, Carlos A. Bertulani provides the core material needed by graduate and advanced undergraduate students of physics to acquire a solid understanding of nuclear and particle science. *Nuclear Physics in a Nutshell* is the definitive new resource for anyone considering a career in this dynamic field.

The book opens by setting nuclear physics in the context of elementary particle physics and then shows how simple models can provide an understanding of the properties of nuclei, both in their ground states and excited states, and also of the nature of nuclear reactions. It then describes: nuclear constituents and their characteristics; nuclear interactions; nuclear structure, including the liquid-drop model approach, and the nuclear shell model; and recent developments such as the nuclear mean-field and the nuclear physics of very light nuclei, nuclear reactions with unstable nuclear beams, and the role of nuclear physics in energy production and nucleosynthesis in stars.

Throughout, discussions of theory are reinforced with examples that provide applications, thus aiding students in their reading and analysis of current literature. Each chapter closes with problems, and appendixes address supporting technical topics.

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2007

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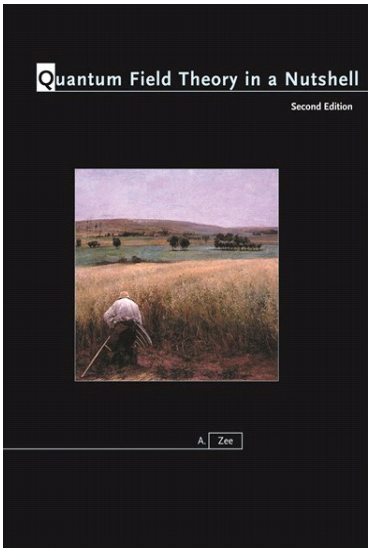

Quantum Field Theory in a Nutshell

Second Edition

A. Zee

A fully updated edition of the classic text by acclaimed physicist A. Zee

Since it was first published, *Quantum Field Theory in a Nutshell* has quickly established itself as the most accessible and comprehensive introduction to this profound and deeply fascinating area of theoretical physics. Now in this fully revised and expanded edition, A. Zee covers the latest advances while providing a solid conceptual foundation for students to build on, making this the most up-to-date and modern textbook on quantum field theory available.

This expanded edition features several additional chapters, as well as an entirely new section describing recent developments in quantum field theory such as gravitational waves, the helicity spinor formalism, on-shell gluon scattering, recursion relations for amplitudes with complex momenta, and the hidden connection between Yang-Mills theory and Einstein gravity. Zee also provides added exercises, explanations, and examples, as well as detailed appendices, solutions to selected exercises, and suggestions for further reading.

- The most accessible and comprehensive introductory textbook available
- Features a fully revised, updated, and expanded text
- Covers the latest exciting advances in the field
- Includes new exercises
- Offers a one-of-a-kind resource for students and researchers

Leading universities that have adopted this book include:

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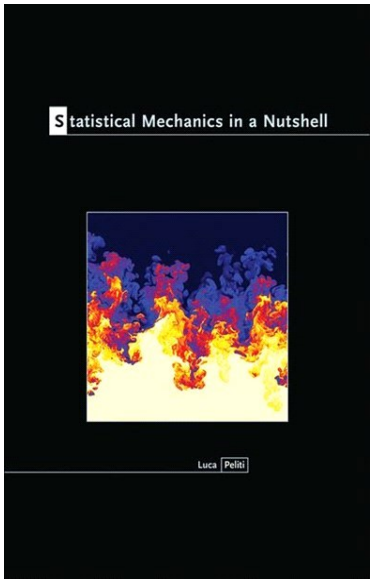

Statistical Mechanics in a Nutshell

Luca Peliti

A concise introduction to statistical mechanics

Statistical mechanics is one of the most exciting areas of physics today, and it also has applications to subjects as diverse as economics, social behavior, algorithmic theory, and evolutionary biology. *Statistical Mechanics in a Nutshell* offers the most concise, self-contained introduction to this rapidly developing field. Requiring only a background in elementary calculus and elementary mechanics, this book starts with the basics, introduces the most important developments in classical statistical mechanics over the last thirty years, and guides readers to the very threshold of today's cutting-edge research.

Statistical Mechanics in a Nutshell zeroes in on the most relevant and promising advances in the field, including the theory of phase transitions, generalized Brownian motion and stochastic dynamics, the methods underlying Monte Carlo simulations, complex systems—and much, much more. The essential resource on the subject, this book is the most up-to-date and accessible introduction available for graduate students and advanced undergraduates seeking a succinct primer on the core ideas of statistical mechanics.

- Provides the most concise, self-contained introduction to statistical mechanics
- Focuses on the most promising advances, not complicated calculations
- Requires only elementary calculus and elementary mechanics
- Guides readers from the basics to the threshold of modern research
- Highlights the broad scope of applications of statistical mechanics

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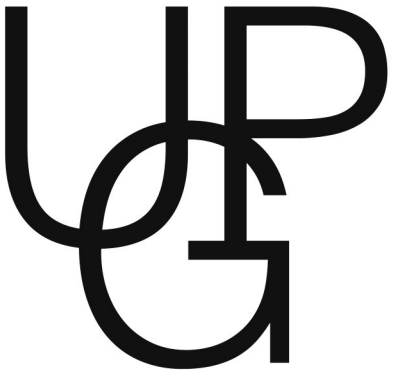

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