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Physics

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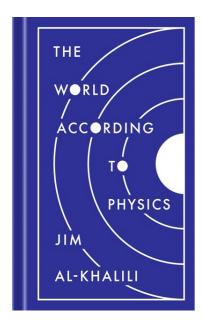


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The World According to Physics

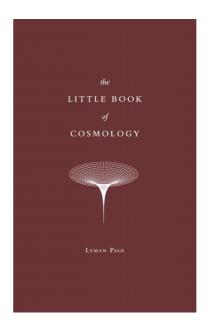
Jim Al-Khalili

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.



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.

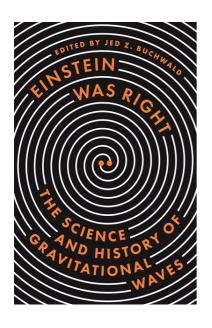
Blending the latest findings in cosmology with essential concepts from physics, Lyman Page first helps readers to grasp the sheer enormity of the universe, explaining how to understand the history of its formation and evolution in space and time. Then he sheds light on how spatial variations in the CMB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

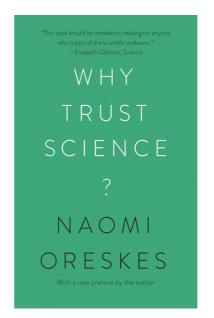
Not only does Page explain current observations and measurements, he describes how they can be woven together into a unified picture to form the Standard Model of Cosmology. Yet much remains unknown, and this incisive book also describes the search for ever deeper knowledge at the field's frontiers—from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

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

Science / Physics Princeton University Press 9780691195780 \$19.95 | £16.99 Hardback 152 pages | 139.7mm : 215.9mm 2020

Science / Cosmology Princeton University Press





Einstein Was Right

The Science and History of Gravitational Waves Alessandra Buonanno, Kip S. Thorne, Harry Collins, Don Howard, Jed Z. Buchwald, Diana K. Buchwald, Tilman Sauer, Barry C. Barish, Daniel Kennefick, Jürgen Renn

An authoritative interdisciplinary account of the historic discovery of gravitational waves

In 1915, Albert Einstein predicted the existence of gravitational waves—ripples in the fabric of spacetime caused by the movement of large masses—as part of the theory of general relativity. A century later, researchers with the Laser Interferometer Gravitational-Wave Observatory (LIGO) confirmed Einstein's prediction, detecting gravitational waves generated by the collision of two black holes. Shedding new light on the hundred-year history of this momentous achievement, *Einstein Was Right* brings together essays by two of the physicists who won the Nobel Prize for their instrumental roles in the discovery, along with contributions by leading scholars who offer unparalleled insights into one of the most significant scientific breakthroughs of our time.

This illuminating book features an introduction by Tilman Sauer and invaluable firsthand perspectives on the history and significance of the LIGO consortium by physicists Barry Barish and Kip Thorne. Theoretical physicist Alessandra Buonanno discusses the new possibilities opened by gravitational wave astronomy, and sociologist of science Harry Collins and historians of science Diana Kormos Buchwald, Daniel Kennefick, and Jürgen Renn provide further insights into the history of relativity and LIGO. The book closes with a reflection by philosopher Don Howard on the significance of Einstein's theory for the philosophy of science.

Edited by Jed Buchwald, *Einstein Was Right* is a compelling and thought-provoking account of one of the most thrilling scientific discoveries of the modern age.

9780691194547 \$35.00 | £30.00 Hardback 264 pages | 155.57mm : 234.95mm

Science / Relativity **Princeton University Press**

Why Trust Science?

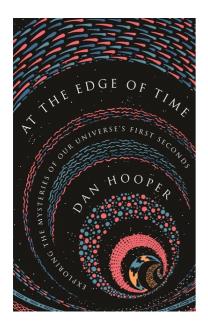
Naomi Oreskes

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.

9780691212265 \$18.95 | £15.99 Paperback 392 pages | 139.7mm : 215.9mm

Science / Philosophy & Social Aspects The University Center for Human Values Series Princeton University Press



At the Edge of Time

Exploring the Mysteries of Our Universe's First Seconds

Dan Hooper

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.



It's About Time

Understanding Einstein's Relativity **N. David Mermin**

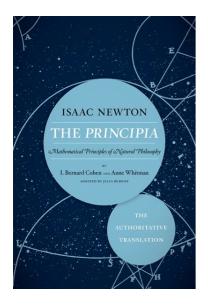
A readable and entertaining look at how Einstein's special theory of relativity gives us a new understanding of the nature of time

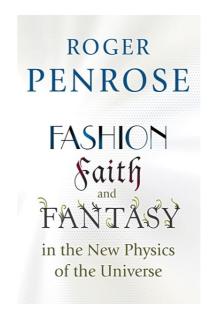
Relativity ought to be an important part of everyone's education. Its subject is time, with which we all think we are familiar. Einstein's special theory of relativity reveals that some of our most intuitive notions about time are shockingly wrong. This clear, lively, and informal exposition of special 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.

9780691206424 \$17.95 | £14.99 Paperback 248 pages | 139.7mm : 215.9mm 2021

Science / Cosmology Science Essentials **Princeton University Press** 9780691218779 \$16.95 | £13.99 Paperback 208 pages | 139.7mm : 215.9mm 2021

Science / Relativity Princeton Science Library **Princeton University Press**





The Principia: The Authoritative Translation

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

9780520290747 \$19.95 | £16.99 Paperback 616 pages | 7in : 10in

Science / Mathematical Physics University of California 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

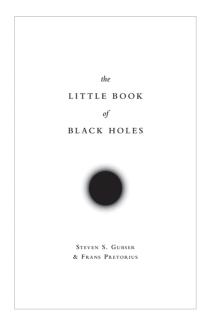
What can fashionable ideas, blind faith, or pure fantasy possibly have to do with the scientific quest to understand the universe? Surely, theoretical physicists are immune to mere trends, dogmatic beliefs, or flights of fancy? In fact, acclaimed physicist and bestselling author Roger Penrose argues 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.

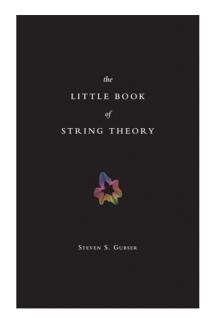
Arguing that string theory has veered away from physical reality by positing six extra hidden dimensions, Penrose cautions that the fashionable nature of a theory can cloud our judgment of its plausibility. In the case of quantum mechanics, its stunning success in explaining the atomic universe has led 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.

9780691178530 \$17.95 | £14.99 Paperback 520 pages | 127mm : 203.2mm

Science / Philosophy & Social Aspects 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 realitya 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.

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

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

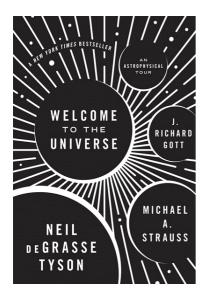
9780691163727 \$19.95 | £16.99 Hardback 200 pages | 139.7mm : 215.9mm

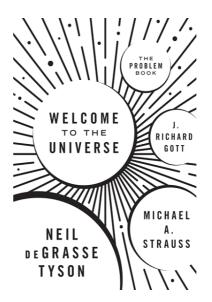
Science / Astrophysics & Space Science Science Essentials

Princeton University Press

9780691142890 \$19.95 | £16.99 Hardback 184 pages | 145mm : 274mm

Science / Physics Science Essentials **Princeton University Press**





Welcome to the Universe

An Astrophysical Tour

Neil deGrasse Tyson, Michael 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 | £34.00 Hardback 480 pages | 177.8mm : 254mm 2016

Science / Astrophysics & Space Science Princeton University Press

Welcome to the Universe

The Problem Book

Neil deGrasse Tyson, Michael Strauss, J. Richard Gott

An essential companion to the $\it New York Times$ bestseller $\it Welcome to$ the $\it Universe$

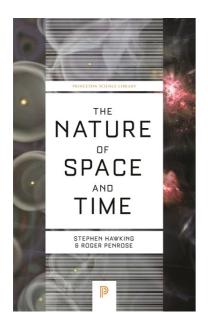
Here is the essential companion to Welcome to the Universe, a New York Times bestseller that was inspired by the enormously popular introductory astronomy course for non science majors that Neil deGrasse Tyson, Michael A. Strauss, and J. Richard Gott taught together at Princeton. This problem book features more than one hundred problems and exercises used in the original course—ideal for anyone who wants to deepen their understanding of the original material and to learn to think like an astrophysicist.

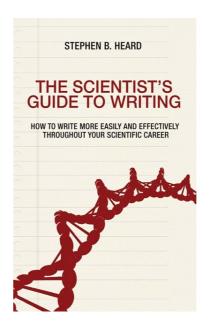
Whether you're a student or teacher, citizen scientist or science enthusiast, your guided tour of the cosmos just got even more hands-on with *Welcome to the Universe: The Problem Book*.

- · The essential companion book to the acclaimed bestseller
- Features the problems used in the original introductory astronomy course for non science majors at Princeton University
- Organized according to the structure of Welcome to the Universe, empowering readers to explore real astrophysical problems that are conceptually introduced in each chapter
- Problems are designed to stimulate physical insight into the frontier of astrophysics
- Problems develop quantitative skills, yet use math no more advanced than high school algebra
- Problems are often multipart, building critical thinking and quantitative skills and developing readers' insight into what astrophysicists do
- Ideal for course use—either in tandem with Welcome to the Universe
 or as a supplement to courses using standard astronomy textbooks—or
 self-study
- · Tested in the classroom over numerous semesters for more than a

9780691177816 \$35.00 | £30.00 Paperback 264 pages | 177.8mm : 254mm

Science / Astrophysics & Space Science **Princeton University Press**





The Nature of Space and Time Stephen Hawking, Roger Penrose

From two of the world's great physicists-Stephen Hawking and Nobel laureate Roger Penrose-a lively debate about the nature of space and throughout Your Scientific Career

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.

The Scientist's Guide to **Writing**

How to Write More Easily and Effectively Stephen B. Heard

A concise and accessible primer on the scientific writer's craft

The ability to write clearly is critical to any scientific career. The Scientist's Guide to Writing provides practical advice to help scientists become more effective writers so that their ideas have the greatest possible impact.

Drawing on his own experience as a scientist, graduate adviser, and editor, Stephen Heard emphasizes that the goal of all scientific writing should be absolute clarity; that good writing takes deliberate practice; and that what many scientists need are not long lists of prescriptive rules but rather direct engagement with their behaviors and attitudes when they write. He combines advice on such topics as how to generate and maintain writing momentum with practical tips on structuring a scientific paper, revising a first draft, handling citations, responding to peer reviews, managing coauthorships, and more.

In an accessible, informal tone, The Scientist's Guide to Writing explains essential techniques that students, postdoctoral researchers, and early-career scientists need to write more clearly, efficiently, and easily.

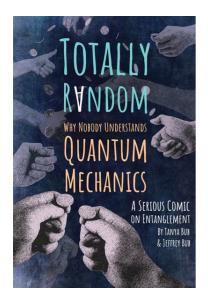
- · Emphasizes writing as a process, not just a product
- · Encourages habits that improve motivation and productivity
- Explains the structure of the scientific paper and the function of each
- Provides detailed guidance on submission, review, revision, and publication
- Addresses issues related to coauthorship, English as a second language, and more

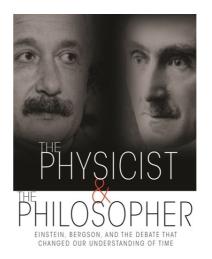
9780691168449 \$14.95 | £12.99 Paperback 160 pages | 139.7mm : 215.9mm

Science / Physics Isaac Newton Institute Series of Lectures **Princeton University Press**

9780691170220 \$21.95 | £18.99 Paperback 320 pages | 152.4mm : 234.95mm

Science / Reference **Princeton University Press**





JIMENA CANALES

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 paradigmshaking 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 | £18.99 Paperback 272 pages | 177.8mm : 254mm

Science / Quantum Theory Princeton University Press

The Physicist and the Philosopher

Einstein, Bergson, and the Debate That Changed Our Understanding of Time **Jimena Canales**

The explosive debate that transformed our views about time and scientific truth

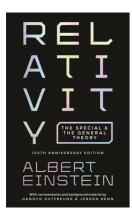
On April 6, 1922, in Paris, Albert Einstein and Henri Bergson publicly debated the nature of time. Einstein considered Bergson's theory of time to be a soft, psychological notion, irreconcilable with the quantitative realities of physics. Bergson, who gained fame as a philosopher by arguing that time should not be understood exclusively through the lens of science, criticized Einstein's theory of time for being a metaphysics grafted on to science, one that ignored the intuitive aspects of time. *The Physicist and the Philosopher* tells the remarkable story of how this explosive debate transformed our understanding of time and drove a rift between science and the humanities that persists today.

Jimena Canales introduces readers to the revolutionary ideas of Einstein and Bergson, describes how they dramatically collided in Paris, and traces how this clash of worldviews reverberated across the twentieth century. She shows how it provoked responses from figures such as Bertrand Russell and Martin Heidegger, and carried repercussions for American pragmatism, logical positivism, phenomenology, and quantum mechanics. Canales explains how the new technologies of the period—such as wristwatches, radio, and film—helped to shape people's conceptions of time and further polarized the public debate. She also discusses how Bergson and Einstein, toward the end of their lives, each reflected on his rival's legacy—Bergson during the Nazi occupation of Paris and Einstein in the context of the first hydrogen bomb explosion.

The Physicist and the Philosopher is a magisterial and revealing account that shows how scientific truth was placed on trial in a divided century marked by a new sense of time.

9780691173177 \$24.95 | £20.00 Paperback 488 pages | 152.4mm : 234.95mm 2016

Science / History **Princeton University Press**

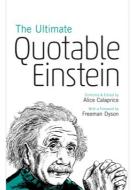


Relativity

The Special and the General Theory -100th Anniversary Edition

Albert Einstein. Hanoch Gutfreund, Jürgen Renn

9780691191812 \$16.95 | £13.99 Paperback | 2019 Science **Princeton University Press**

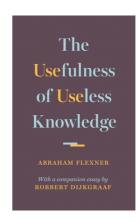


The Ultimate Quotable **Einstein**

Albert Einstein, Alice Calaprice, Freeman Dyson

9780691160146 \$16.95 | £13.99 Paperback | 2013 Science

Princeton University Press

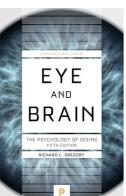


The Usefulness of **Useless** Knowledge

Abraham Flexner, Robbert Dijkgraaf

9780691174761 \$9.95 | £8.99 Hardback | 2017 Science

Princeton University Press

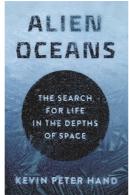


Eye and **Brain**

The Psychology of Seeing - Fifth Edition

Richard L. Gregory

9780691165165 \$19.95 | £16.99 Paperback | 2015 Science Princeton Science Library Princeton **University Press**



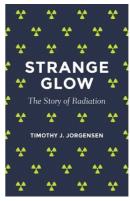
Alien Oceans

The Search for Life in the Depths of Space

Kevin Hand

9780691179513 \$27.95 | £22.00 Hardback | 2020 SCIENCE

Princeton **University Press**

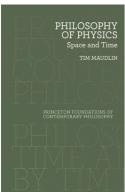


Strange Glow The Story of Radiation

Timothy J. Jorgensen

9780691178349 \$19.95 | £16.99 Paperback | 2017 Science Princeton

University Press



Philosophy of **Physics**

Space and Time

Tim Maudlin

9780691165714 \$20.95 | £17.99 Paperback | 2015 Science Princeton Foundations of Contemporary Philosophy **Princeton University Press**



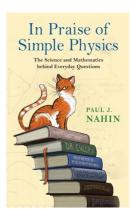
Physics and **Technology** for Future **Presidents**

An Introduction to the Essential Physics Every World Leader Needs to Know

Richard A. Muller

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Princeton **University Press**

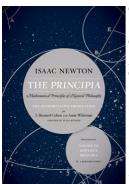


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The Science and Mathematics behind **Everyday Questions**

Paul J. Nahin

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Mathematical Principles of Natural Philosophy

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

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Our Cosmic Habitat

New Edition

Martin Rees

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on

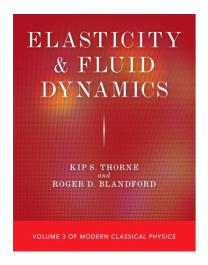
gravity

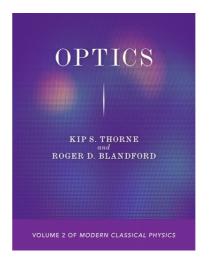
On Gravity

A Brief Tour of a Weighty Subject

A. Zee

9780691202662 \$14.95 | £12.99 Paperback | 2020 Science **Princeton University 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 crossreferences, 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

9780691207346 \$50.00 | £42.00 Paperback 480 pages | 203.2mm : 254mm

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 $% \left(1\right) =\left(1\right) +\left(1\right)$

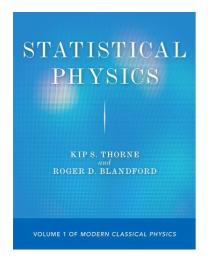
Kip Thorne and Roger Blandford's monumental *Modern Classical Physics* is now available in five stand-alone volumes that make ideal textbooks for individual graduate or advanced undergraduate courses on statistical physics; optics; elasticity and fluid dynamics; plasma physics; and relativity and cosmology.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

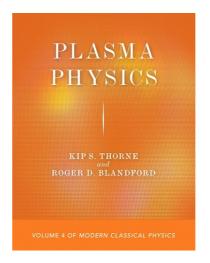
Optics is an essential introduction to a resurgent subject. "Optics" originally referred to the study of light, but today the field encompasses all types of waves, including electromagnetic waves, from gamma rays to radio waves; gravitational waves; and quantum waves. The past few decades have seen revolutions 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 crossreferences, 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

9780691207360 \$45.00 | £38.00 Paperback 272 pages | 203.2mm : 254mm

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 crossreferences, 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

Plasma Physics

Volume 4 of Modern Classical Physics **Kip S. Thorne, Roger D. Blandford**

A groundbreaking textbook on twenty-first-century plasma 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.

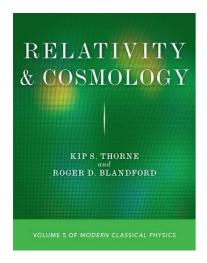
Plasma Physics provides an essential introduction to the subject. A gas that is significantly ionized, usually by heating or photons, a plasma is composed of electrons and ions and sometimes has an embedded or confining magnetic field. Plasmas play a major role in many contemporary applications, phenomena, and fields, including attempts to achieve controlled thermonuclear fusion using magnetic or inertial confinement; in explanations of radio wave propagation in the ionosphere and the behavior of the solar corona and wind; and in astrophysics, where plasmas are responsible for emission throughout the electromagnetic spectrum, including from black holes, highly magnetized neutron stars, and ultrarelativistic outflows. The book also can serve as supplementary reading for many other courses, including in astrophysics, geophysics, and controlled fusion.

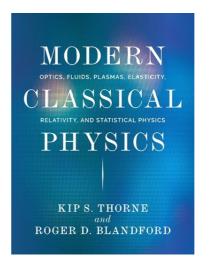
- · Includes many exercise problems
- Features color figures, suggestions for further reading, extensive crossreferences, and a detailed index
- Optional "Track 2" sections make this an ideal book for a one-quarter or one-semester course
- · An online illustration package is available to professors

9780691206127 \$50.00 | £42.00 Paperback 408 pages | 203.2mm : 254mm

Science / Physics Princeton University Press 9780691215501 \$50.00 | £42.00 Paperback 304 pages | 203.2mm : 254mm 2021

Science / Reference Princeton University Press





Relativity and Cosmology

Volume 5 of Modern Classical Physics **Kip S. Thorne, Roger D. Blandford**

A groundbreaking textbook on twenty-first-century general relativity and cosmology

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.

Relativity and Cosmology is an essential introduction to the subject, including remarkable recent advances. Written by award-winning physicists who have made fundamental contributions to the field and taught it for decades, the book differs from most others on the subject in important ways. It highlights recent transformations in our understanding of black holes, gravitational waves, and the cosmos; it emphasizes the physical interpretation of general relativity in terms of measurements made by observers; it explains the physics of the Riemann tensor in terms of tidal forces, differential frame dragging, and associated field lines; it presents an astrophysically oriented description of spinning black holes; it gives a detailed analysis of an incoming gravitational wave's interaction with a detector such as LIGO; and it provides a comprehensive, in-depth account of the universe's evolution, from its earliest moments to the present. While the book is designed to be used for a one-quarter or full-semester course, it goes deep enough to provide a foundation for understanding and participating in some areas of cutting-edge research.

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

9780691207391 \$60.00 | £50.00 Paperback 416 pages | 203.2mm : 254mm

Science / Reference Princeton University Press

Modern Classical Physics

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

Kip S. Thorne, Roger D. Blandford

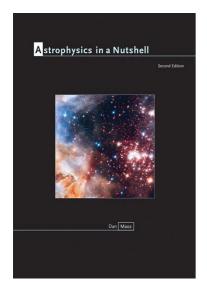
From Nobel Prize winner Kip Thorne and acclaimed physicist Roger Blandford, a groundbreaking textbook on twenty-first-century classical physics

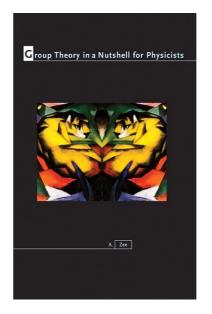
This first-year, graduate-level text and reference book covers the fundamental concepts and twenty-first-century applications of six major areas of classical physics that every masters- or PhD-level physicist should be exposed to, but often isn't: statistical physics, optics (waves of all sorts), elastodynamics, 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 to professors

9780691159027 \$125.00 | £104.00 Hardback 1,552 pages | 203.2mm : 254mm 2017

Science / Physics 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

9780691164793 \$85.00 | £70.00 Hardback 312 pages | 177.8mm : 254mm

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

Group Theory in a Nutshell for Physicists

A. Zee

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

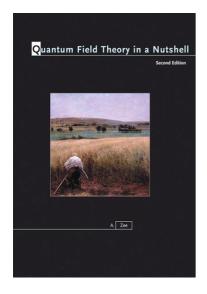
Although group theory is a mathematical subject, it is indispensable to many areas of modern theoretical physics, from atomic physics to condensed matter physics, particle physics to string theory. In particular, it is essential for an understanding of the fundamental forces. Yet until now, what has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

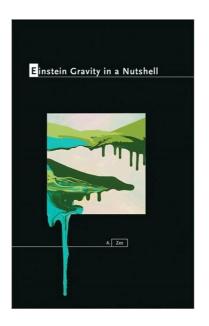
Group Theory in a Nutshell for Physicists fills this gap, providing a user-friendly and classroom-tested text that focuses on those aspects of group theory physicists most need to know. From the basic intuitive notion of a group, A. Zee takes readers all the way up to how theories based on gauge groups 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)

9780691162690 \$90.00 | £74.00 Hardback 608 pages | 177.8mm : 254mm 2016

Science / Physics In a Nutshell **Princeton University Press**





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:

- · Arizona State University
- · Boston University
- · Brandeis University
- · Brown University
- · California Institute of Technology
- · Carnegie Mellon

9780691140346 \$85.00 | £70.00 Hardback 608 pages | 177.8mm : 254mm 2010

Science / Quantum Theory In a Nutshell **Princeton University Press**

Einstein Gravity in a Nutshell A. Zee

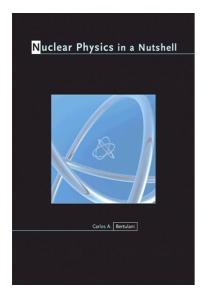
An ideal introduction to Einstein's general theory of relativity

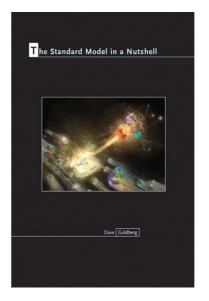
This unique textbook provides an accessible introduction to Einstein's general theory of relativity, a subject of breathtaking beauty and supreme importance in physics. With his trademark blend of wit and incisiveness, A. Zee guides readers from the fundamentals of Newtonian mechanics to the most exciting 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

9780691145587 \$99.95 | £82.00 Hardback 888 pages | 177.8mm : 254mm 2013

Science / Relativity In a Nutshell **Princeton University Press**





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.

The Standard Model in a Nutshell

Dave Goldberg

A concise and authoritative introduction to one of the central theories of modern physics

For a theory as genuinely elegant as the Standard Model—the current framework describing elementary particles and their forces—it can sometimes appear to students to be little more than a complicated collection of particles and ranked list of interactions. *The Standard Model in a Nutshell* provides a comprehensive and uncommonly accessible introduction to one of the most important subjects in modern physics, revealing why, despite initial appearances, the entire framework really is as elegant as physicists say.

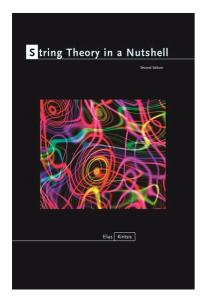
Dave Goldberg uses a "just-in-time" approach to instruction that enables students to gradually develop a deep understanding of the Standard Model even if this is their first exposure to it. He covers everything from relativity, group theory, and relativistic quantum mechanics to the Higgs boson, unification schemes, and physics beyond the Standard Model. The book also looks at new avenues of research that could answer still-unresolved questions and features numerous worked examples, helpful illustrations, and more than 120 exercises.

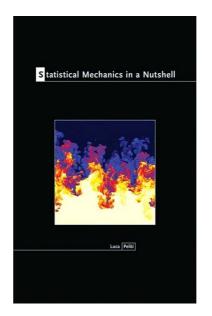
- Provides an essential introduction to the Standard Model for graduate students and advanced undergraduates across the physical sciences
- Requires no more than an undergraduate-level exposure to quantum mechanics, classical mechanics, and electromagnetism
- Uses a "just-in-time" approach to topics such as group theory, relativity, classical fields, Feynman diagrams, and quantum field theory
- · Couched in a conversational tone to make reading and learning easier
- · Ideal for a one-semester course or independent study
- · Includes a wealth of examples, illustrations, and exercises
- · Solutions manual (available only to professors)

9780691125053 \$99.95 | £82.00 Hardback 488 pages | 180mm : 265mm 2007

Science / Nuclear Physics In a Nutshell **Princeton University Press** 9780691167596 \$85.00 | £70.00 Hardback 320 pages | 177.8mm : 254mm 2017

Science / Physics In a Nutshell **Princeton University Press**





String Theory in a Nutshell

Second Edition Elias Kiritsis

The essential introduction to modern string theory—now fully expanded and revised

String Theory in a Nutshell is the definitive introduction to modern string theory. Written by one of the world's leading authorities on the subject, this concise and accessible book starts with basic definitions and guides readers from classic topics to the most exciting frontiers of research today. It covers perturbative string theory, the unity of string interactions, black holes and their microscopic entropy, the AdS/CFT correspondence and its applications, matrix model tools for string theory, and more. It also includes 600 exercises and serves as a self-contained guide to the literature.

This fully updated edition features an entirely new chapter on flux compactifications in string theory, and the chapter on AdS/CFT has been substantially expanded by adding many applications to diverse topics. In addition, the discussion of conformal field theory has been extensively revised to make it more student-friendly.

- The essential one-volume reference for students and researchers in theoretical high-energy physics
- · Now fully expanded and revised
- Provides expanded coverage of AdS/CFT and its applications, namely the holographic renormalization group, holographic theories for Yang-Mills and QCD, nonequilibrium thermal physics, finite density physics, and entanglement entropy
- Ideal for mathematicians and physicists specializing in theoretical cosmology, QCD, and novel approaches to condensed matter systems
- · An online illustration package is available to professors

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.

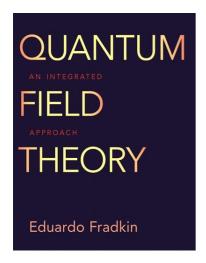
Statistical Mechanics in a Nutshell zeroes in on the most relevant and promising advances in the field, including the theory of phase transitions, generalized Brownian motion and stochastic dynamics, the methods underlying Monte Carlo simulations, complex systems—and much, much more. The essential resource 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.

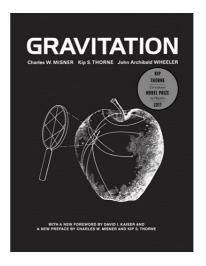
- Provides the most concise, self-contained introduction to statistical mechanics
- Focuses on the most promising advances, not complicated calculations
- Requires only elementary calculus and elementary mechanics
- · Guides readers from the basics to the threshold of modern research
- Highlights the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

9780691155791 \$95.00 | £78.00 Hardback 888 pages | 177.8mm : 254mm 2019

Science / Physics In a Nutshell **Princeton University Press** 9780691145297 \$99.95 | £82.00 Hardback 416 pages | 177.8mm : 254mm 2011

Science / Quantum Theory In a Nutshell **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

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.

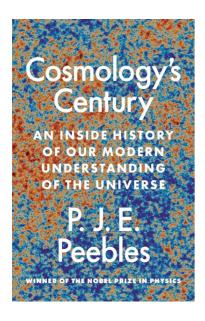
This must-have reference for students and scholars of relativity includes a new preface by David Kaiser, reflecting on the history of the book's publication and reception, and a new introduction by Charles Misner and Kip Thorne, discussing exciting developments in the field since the book's original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

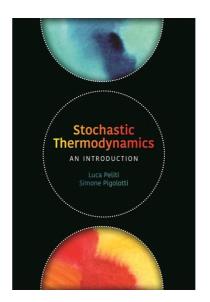
- The book teaches students to:
- Grasp the laws of physics in flat and curved spacetime
- · Predict orders of magnitude
- · Calculate using the principal tools of modern geometry
- · Understand Einstein's geometric framework for physics
- Explore applications, including neutron stars, Schwarzschild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

9780691149080 \$85.00 | £70.00 Hardback 760 pages | 203.2mm : 254mm 2021

Science / Quantum Theory Princeton University Press 9780691177793 \$60.00 | £50.00 Hardback 1,280 pages | 203.2mm : 254mm 2017

Science / Gravity **Princeton University Press**





Cosmology's Century

An Inside History of Our Modern Understanding of An Introduction 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 advancessome 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 natural science is really done.

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

Stochastic Thermodynamics

Luca Peliti, Simone Pigolotti

The first comprehensive graduate-level introduction to stochastic thermodynamics

Stochastic thermodynamics is a well-defined subfield of statistical physics that aims to interpret thermodynamic concepts for systems, ranging in size from a few to hundreds of nanometers, the behavior of which is inherently random due to thermal fluctuations. This growing field therefore describes the nonequilibrium dynamics of small systems, such as artificial nanodevices and biological molecular machines, which are of increasing scientific and technological relevance.

This textbook provides an up-to-date pedagogical introduction to stochastic thermodynamics, guiding readers from basic concepts in statistical physics, probability theory, and thermodynamics to the most recent developments in the field. Gradually building up to more advanced material, the authors consistently prioritize simplicity and clarity over exhaustiveness and focus on the development of readers' physical insight over mathematical formalism. This approach allows the reader to grow as the book proceeds, helping interested young scientists to enter the field with less effort and to contribute to its ongoing vibrant development. Chapters provide exercises to complement and reinforce learning.

Appropriate for graduate students in physics and biophysics, as well as researchers, Stochastic Thermodynamics serves as an excellent initiation to this rapidly evolving field.

- Emphasizes a pedagogical approach to the subject
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