

The University Press Group

# Physics

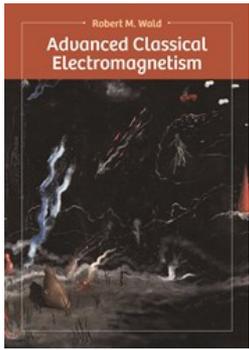
University of California Press

Columbia University Press

Princeton University Press

**New and Best of Backlist**

Autumn 2023



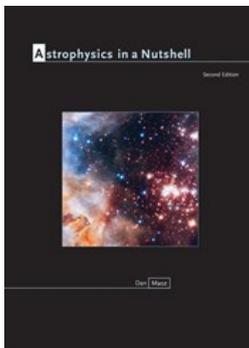
## Advanced Classical Electromagnetism

Robert Wald  
9780691220390  
£45.00 • \$53.00  
Hardcover  
Science / Physics / Electromagnetism  
March 2022  
Princeton University Press

### A modern approach to classical electromagnetism

Electromagnetism is one of the pillars of modern physics. Robert Wald provides graduate students with a clear, concise, and mathematically precise introduction to the subject, covering all the core topics while bringing the teaching of electromagnetism up to date with our modern understanding of the subject. Electromagnetism is usually taught in a quasi-historical fashion, starting from concepts formulated in the eighteenth and nineteenth centuries, but this tends to promote outdated ways of thinking about the theory. Wald begins with Maxwell's equations—the foundation of electromagnetism—together with the formulas for the energy density, momentum density, and stress tensor of the electromagnetic field. He then proceeds through all the major topics in classical electromagnetism, such as electrostatics, dielectrics, magnetostatics, electrodynamics and radiation, diffraction, and special relativity. The last two chapters discuss electromagnetism as a gauge theory and the notion of a point charge—topics not normally treated in electromagnetism texts.

- Completely rethinks how to teach electromagnetism to first-year graduate students
- Presents electromagnetism from a modern, mathematically precise perspective, formulating key conceptual ideas and results clearly and concisely
- Written by a world-class physicist and proven in the classroom
- Covers all the subjects found in standard electromagnetism textbooks as well as additional topics such as the derivation of the initial value formulation for Maxwell's equations
- Also ideal as a supplementary text or for self-study



## Astrophysics in a Nutshell

Dan Maoz  
9780691164793  
£75.00 • \$90.00  
Hardcover  
Science / Physics / Astrophysics  
February 2016  
Princeton University Press

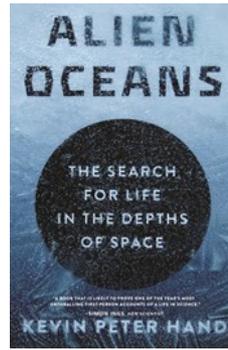
### The ideal one-semester astrophysics introduction for science undergraduates—now expanded and fully updated

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



## Alien Oceans

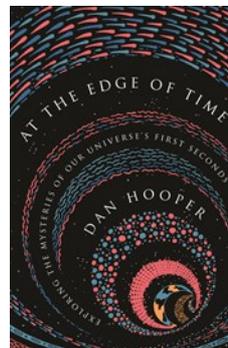
Kevin Hand  
9780691227283  
£16.99 • \$19.95  
Trade Paperback  
Science / Space Science  
September 2021  
Princeton University Press

### Inside the epic quest to find life on the water-rich moons at the outer reaches of the solar system

Where is the best place to find life beyond Earth? We often look to Mars as the most promising site in our solar system, but recent scientific missions have revealed that some of the most habitable real estate may actually lie farther away. Beneath the frozen crusts of several of the small, ice-covered moons of Jupiter and Saturn lurk vast oceans that may have existed for as long as Earth, and together may contain more than fifty times its total volume of liquid water. Could there be organisms living in their depths? *Alien Oceans* reveals the science behind the thrilling quest to find out.

Kevin Peter Hand is one of today's leading NASA scientists, and his pioneering research has taken him on expeditions around the world. In this captivating account of scientific discovery, he brings together insights from planetary science, biology, and the adventures of scientists like himself to explain how we know that oceans exist within moons of the outer solar system, like Europa, Titan, and Enceladus. He shows how the exploration of Earth's oceans is informing our understanding of the potential habitability of these icy moons, and draws lessons from what we have learned about the origins of life on our own planet to consider how life could arise on these distant worlds.

*Alien Oceans* describes what lies ahead in our search for life in our solar system and beyond, setting the stage for the transformative discoveries that may await us.

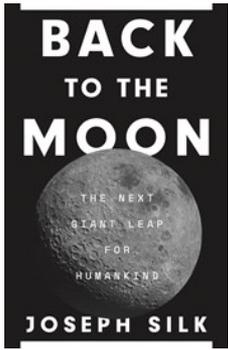


## At the Edge of Time

Dan Hooper  
9780691206424  
£14.99 • \$17.95  
Trade Paperback  
Science / Space Science / Cosmology  
April 2021  
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.



## Back to the Moon

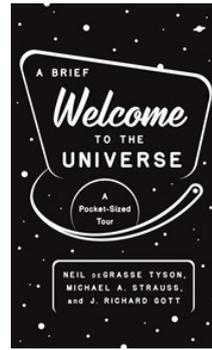
Joseph Silk  
9780691215235  
£25.00 • \$29.95  
Hardcover  
Science / Space Science  
November 2022  
Princeton University Press

### A scientist's inspiring vision of our return to the Moon as humanity's next thrilling step in space exploration

Just over half a century since Neil Armstrong first stepped foot on the lunar surface, a new space race to the Moon is well underway and rapidly gaining momentum. Laying out a vision for the next fifty years, *Back to the Moon* is astrophysicist Joseph Silk's persuasive and impassioned case for putting scientific discovery at the forefront of lunar exploration.

The Moon offers opportunities beyond our wildest imaginings, and plans to return are rapidly gaining momentum around the world. NASA aims to build a habitable orbiting space station to coordinate lunar development and exploration, while European and Chinese space agencies are planning lunar villages and the mining of precious resources dwindling here on Earth. Powerful international and commercial interests are driving the race to revisit the Moon, but lunar infrastructures could also open breathtaking vistas onto the cosmos. Silk describes how the colonization of the Moon could usher in a thrilling new age of scientific exploration, and lays out what the next fifty years of lunar science might look like. With lunar telescopes of unprecedented size situated in permanently dark polar craters and on the far side of the Moon, we could finally be poised to answer some of the most profound questions confronting humankind, including whether we are alone in the Universe and what our cosmic origins are.

Addressing both the daunting challenges and the immense promise of lunar exploration and exploitation, *Back to the Moon* reveals how prioritizing science, and in particular lunar astronomy, will enable us to address the deepest cosmic mysteries.



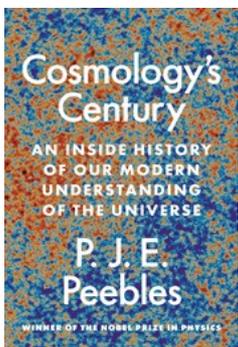
## A Brief Welcome to the Universe

Neil deGrasse Tyson  
9780691219943  
£9.99 • \$14.95  
Trade Paperback  
Science / Physics / Astrophysics  
September 2021  
Princeton University Press

### 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.



## Cosmology's Century

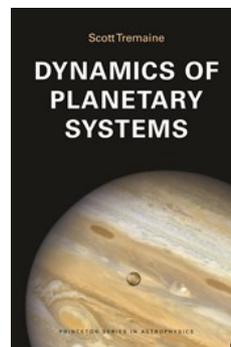
P. J. E. Peebles  
9780691234472  
£22.00 • \$26.95  
Trade Paperback  
Science / Space Science / Cosmology  
April 2022  
Princeton University Press

### 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.



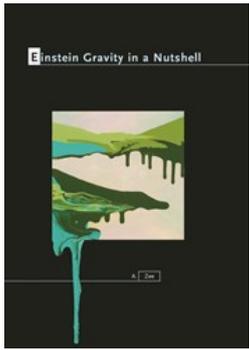
## Dynamics of Planetary Systems

Scott Tremaine  
9780691207117  
£62.00 • \$75.00  
Trade Paperback  
Science / Physics / Astrophysics  
February 2023  
Princeton University Press

### An introduction to celestial mechanics for advanced undergraduates, graduate students, and researchers new to the field

Celestial mechanics—the study of the movement of planets, satellites, and smaller bodies such as comets—is one of the oldest subjects in the physical sciences. Since the mid-twentieth century, the field has experienced a renaissance due to advances in space flight, digital computing, numerical mathematics, nonlinear dynamics, and chaos theory, and the discovery of exoplanets. This modern, authoritative introduction to planetary system dynamics reflects these recent developments and discoveries and is suitable for advanced undergraduate and graduate students as well as researchers. The book treats both traditional subjects, such as the two-body and three-body problems, lunar theory, and Hamiltonian perturbation theory, as well as a diverse range of other topics, including chaos in the solar system, comet dynamics, extrasolar planets, planetesimal dynamics, resonances, tidal friction and disruption, and more. The book provides readers with all the core concepts, tools, and methods needed to conduct research in the subject.

- Provides an authoritative introduction that reflects recent advances in the field
- Topics treated include Andoyer variables, co-orbital satellites and quasi-satellites, Hill's problem, the Milankovich equations, Colombo's top and Cassini states, the Yarkovsky and YORP effects, orbit determination for extrasolar planets, and more
- More than 100 end-of-book problems elaborate on concepts not fully covered in the main text
- Appendixes summarize the necessary background material
- Suitable for advanced undergraduates and graduate students; some knowledge of Hamiltonian mechanics and methods of mathematical physics (vectors, matrices, special functions, etc.) required
- Solutions manual available on request for instructors who adopt the book for a course



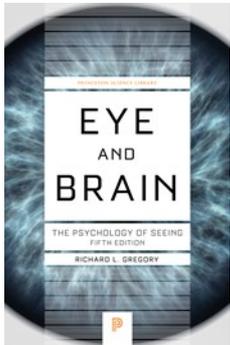
## Einstein Gravity in a Nutshell

Anthony Zee  
9780691145587  
£88.00 • \$105.00  
Hardcover  
Science / Physics / Relativity  
May 2013  
Princeton University Press

### 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)

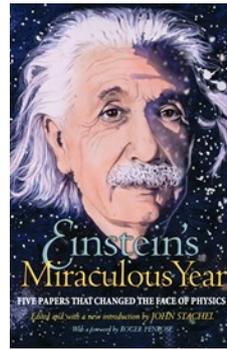


## Eye and Brain

Richard L. Gregory  
9780691165165  
£17.99 • \$20.95  
Trade Paperback  
Science / Physics / Optics & Light  
September 2015  
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.



## Einstein's Miraculous Year

Albert Einstein  
9780691122281  
£30.00 • \$37.00  
Trade Paperback  
Science / Physics / Relativity  
April 2005  
Princeton University Press

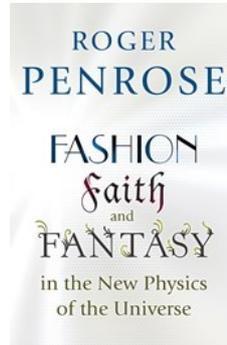
### Five extraordinary papers by Albert Einstein that transformed physics, edited and introduced by John Stachel and with a foreword by Nobel laureate Roger Penrose

After 1905, Einstein's miraculous year, physics would never be the same again. In those twelve months, Einstein shattered many cherished scientific beliefs with five extraordinary papers that would establish him as the world's leading physicist. This book brings those papers together in an accessible format. The best-known papers are the two that founded special relativity: *On the Electrodynamics of Moving Bodies* and *Does the Inertia of a Body Depend on Its Energy Content?* In the former, Einstein showed that absolute time had to be replaced by a new absolute: the speed of light. In the second, he asserted the equivalence of mass and energy, which would lead to the famous formula  $E = mc^2$ .

The book also includes *On a Heuristic Point of View Concerning the Production and Transformation of Light*, in which Einstein challenged the wave theory of light, suggesting that light could also be regarded as a collection of particles. This helped to open the door to a whole new world—that of quantum physics. For ideas in this paper, he won the Nobel Prize in 1921.

The fourth paper also led to a Nobel Prize, although for another scientist, Jean Perrin. *On the Movement of Small Particles Suspended in Stationary Liquids Required by the Molecular-Kinetic Theory of Heat* concerns the Brownian motion of such particles. With profound insight, Einstein blended ideas from kinetic theory and classical hydrodynamics to derive an equation for the mean free path of such particles as a function of the time, which Perrin confirmed experimentally. The fifth paper, *A New Determination of Molecular Dimensions*, was Einstein's doctoral dissertation, and remains among his most cited articles. It shows how to calculate Avogadro's number and the size of molecules.

These papers, presented in a modern English translation, are essential reading for any physicist, mathematician, or astrophysicist. Far more than just a collection of scientific articles, this book



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

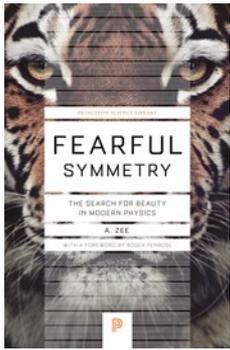
Roger Penrose  
9780691178530  
£15.99 • \$18.95  
Trade Paperback  
Science / Philosophy & Social Aspects  
September 2017  
Princeton University Press

### 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.

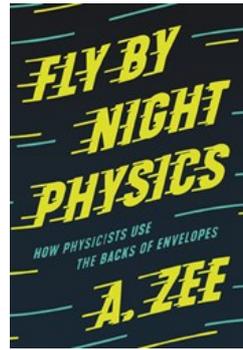


### Fearful Symmetry

Anthony Zee  
9780691173269  
£18.99 • \$22.95  
Trade Paperback  
Science / Physics  
October 2016  
Princeton University Press

#### An engaging exploration of beauty in physics, with a foreword by Nobel Prize-winning physicist Roger Penrose

The concept of symmetry has widespread manifestations and many diverse applications—from architecture to mathematics to science. Yet, as twentieth-century physics has revealed, symmetry has a special, central role in nature, one that is occasionally and enigmatically violated. *Fearful Symmetry* brings the incredible discoveries of the juxtaposition of symmetry and asymmetry in contemporary physics within everyone's grasp. A. Zee, a distinguished physicist and skillful expositor, tells the exciting story of how contemporary theoretical physicists are following Einstein in their search for the beauty and simplicity of Nature. Animated by a sense of reverence and whimsy, *Fearful Symmetry* describes the majestic sweep and accomplishments of twentieth-century physics—one of the greatest chapters in the intellectual history of humankind.



### Fly by Night Physics

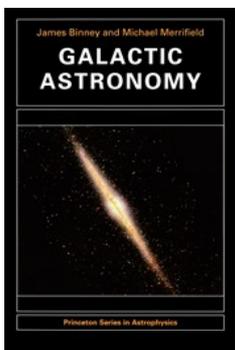
Anthony Zee  
9780691182544  
£42.00 • \$51.00  
Hardcover  
Science / Physics  
October 2020  
Princeton University Press

#### 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.

In reality, physics is replete with back of the envelope estimates, order of magnitude guesses, and fly by night leaps of logic. Including exciting problems related to cutting-edge topics in physics, from Hawking radiation to gravity waves, this indispensable book will help students more deeply understand the equations they have learned and develop the confidence to start flying by night to arrive at the answers they seek. For instructors, a solutions manual is available upon request.



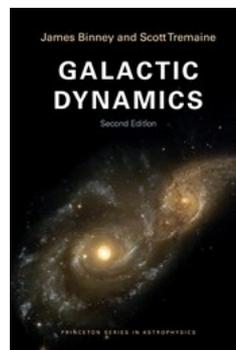
### Galactic Astronomy

James Binney  
9780691025650  
£95.00 • \$115.00  
Trade Paperback  
Science / Physics / Astrophysics  
September 1998  
Princeton University Press

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.



### Galactic Dynamics

James Binney  
9780691130279  
£95.00 • \$115.00  
Trade Paperback  
Science / Physics / Astrophysics  
January 2008  
Princeton University Press

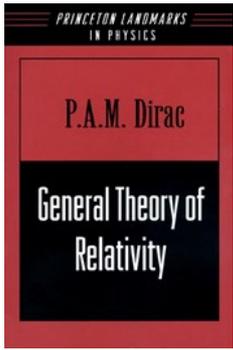
Since it was first published in 1987, *Galactic Dynamics* has become the most widely used advanced textbook on the structure and dynamics of galaxies and one of the most cited references in astrophysics. Now, in this extensively revised and updated edition, James Binney and Scott Tremaine describe the 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.

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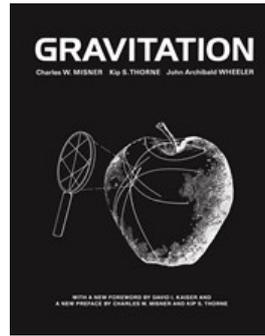
- A complete revision and update of one of the most cited references in astrophysics
- Provides a comprehensive description of the dynamical structure and evolution of galaxies and other stellar systems



## General Theory of Relativity

P. A.M. Dirac  
9780691011462  
£30.00 • \$37.00  
Trade Paperback  
Science / Physics / Relativity  
January 1996  
Princeton University Press

Einstein's general theory of relativity requires a curved space for the description of the physical world. If one wishes to go beyond superficial discussions of the physical relations involved, one needs to set up precise equations for handling curved space. The well-established mathematical technique that accomplishes this is clearly described in this classic book by Nobel Laureate P.A.M. Dirac. Based on a series of lectures given by Dirac at Florida State University, and intended for the advanced undergraduate, *General Theory of Relativity* comprises thirty-five compact chapters that take the reader point-by-point through the necessary steps for understanding general relativity.



## Gravitation

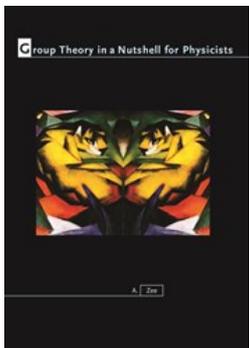
Charles W. Misner  
9780691177793  
£58.00 • \$68.00  
Hardcover  
Science / Physics / Gravity  
October 2017  
Princeton University Press

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



## Group Theory in a Nutshell for Physicists

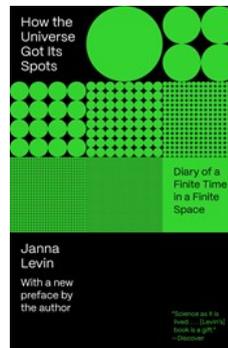
Anthony Zee  
9780691162690  
£84.00 • \$99.95  
Hardcover  
Science / Physics  
March 2016  
Princeton University Press

### 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)

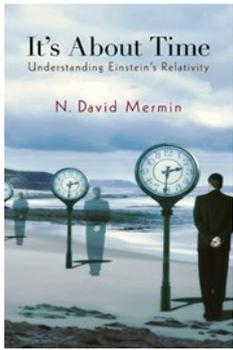


## How the Universe Got Its Spots

Janna Levin  
9780691232270  
£14.99 • \$17.95  
Trade Paperback  
Science / Physics  
January 2023  
Princeton University Press

### Mixing memoir and visionary science, a leading astrophysicist's groundbreaking personal account of her life and ideas

*Is the universe infinite or just really big?* With this question, cosmologist Janna Levin announces the central theme of this book, which established her as one of the most direct, unorthodox, and creative voices in contemporary science. As Levin sets out to determine how big "really big" may be, she offers a rare intimate look at the daily life of an innovative physicist, complete with jet lag and the tensions between personal relationships and the extreme demands of scientific exploration. Nimble explaining geometry, topology, chaos, and string theory, Levin shows how the pattern of hot and cold spots left over from the big bang may one day reveal the size of the cosmos. The result is a thrilling story of cosmology by one of its leading thinkers.



## It's About Time

N. David Mermin

9780691141275

£22.00 • \$27.95

Trade Paperback

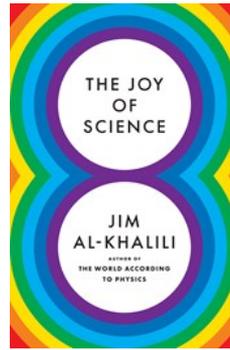
Science / Physics / Relativity

July 2009

Princeton University Press

In *It's About Time*, N. David Mermin asserts that relativity ought to be an important part of everyone's education—after all, it is largely about time, a subject with which all are familiar. The book reveals that some of our most intuitive notions about time are shockingly wrong, and that the real nature of time discovered by Einstein can be rigorously explained without advanced mathematics. This readable exposition of the nature of time as addressed in Einstein's theory of relativity is accessible to anyone who remembers a little high school algebra and elementary plane geometry.

The book evolved as Mermin taught the subject to diverse groups of undergraduates at Cornell University, none of them science majors, over three and a half decades. Mermin's approach is imaginative, yet accurate and complete. Clear, lively, and informal, the book will appeal to intellectually curious readers of all kinds, including even professional physicists, who will be intrigued by its highly original approach.



## The Joy of Science

Jim Al-Khalili

9780691211572

£12.99 • \$16.95

Hardcover

Science / Philosophy & Social Aspects

April 2022

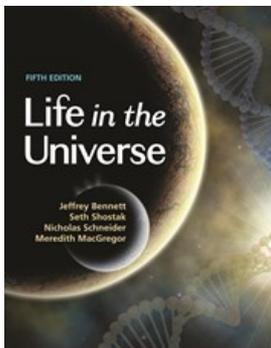
Princeton University Press

**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.



## Life in the Universe, 5th Edition

Jeffrey Bennett

9780691241784

£88.00 • \$105.00

Trade Paperback

Science / Space Science

August 2022

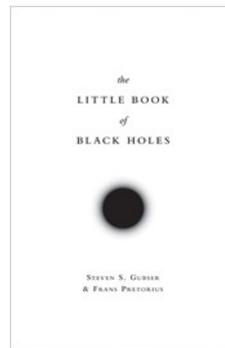
Princeton University Press

**The world's leading textbook on astrobiology—ideal for an introductory one-semester course and now fully revised and updated**

Are we alone in the cosmos? How are scientists seeking signs of life beyond our home planet? Could we colonize other planets, moons, or even other star systems? This introductory textbook, written by a team of four renowned science communicators, educators, and researchers, tells the amazing story of how modern science is seeking the answers to these and other fascinating questions. They are the questions that are at the heart of the highly interdisciplinary field of astrobiology, the study of life in the universe.

Written in an accessible, conversational style for anyone intrigued by the possibilities of life in the solar system and beyond, *Life in the Universe* is an ideal place to start learning about the latest discoveries and unsolved mysteries in the field. From the most recent missions to Saturn's moons and our neighboring planet Mars to revolutionary discoveries of thousands of exoplanets, from the puzzle of life's beginning on Earth to the latest efforts in the search for intelligent life elsewhere, this book captures the imagination and enriches the reader's understanding of how astronomers, planetary scientists, biologists, and other scientists make progress at the cutting edge of this dynamic field. Enriched with a wealth of engaging features, this textbook brings any citizen of the cosmos up to speed with the scientific quest to discover whether we are alone or part of a universe full of life.

- An acclaimed text designed to inspire students of all backgrounds to explore foundational questions about life in the cosmos
- Completely revised and updated to include the latest developments in the field, including recent exploratory space missions to Mars, frontier exoplanet science, research on the origin of life on Earth, and more
- Enriched with helpful learning aids, including in-chapter Think about It questions, optional Do the Math and Special Topic boxes, Movie Madness boxes, end-of-chapter



## The Little Book of Black Holes

Steven S. Gubser

9780691163727

£16.99 • \$19.95

Hardcover

Science / Physics / Astrophysics

October 2017

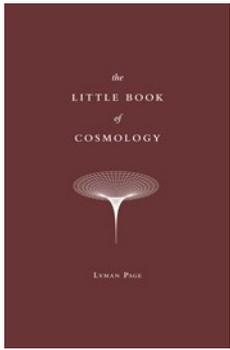
Princeton University Press

**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.



## The Little Book of Cosmology

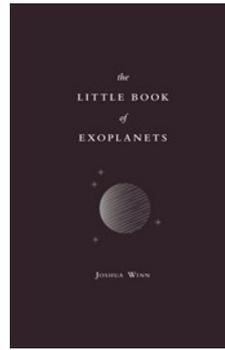
Lyman Page  
9780691195780  
£16.99 • \$19.95  
Hardcover  
Science / Space Science / Cosmology  
April 2020  
Princeton University Press

### 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.



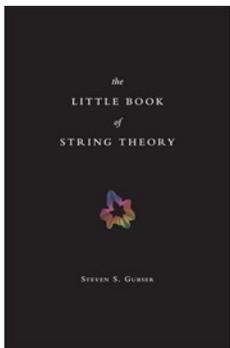
## The Little Book of Exoplanets

Joshua N. Winn  
9780691215471  
£18.99 • \$22.95  
Hardcover  
Science / Physics / Astrophysics  
July 2023  
Princeton University Press

### A concise and accessible introduction to exoplanets that explains the cutting-edge science behind recent discoveries

For centuries, people have speculated about the possibility of planets orbiting distant stars, but only since the 1990s has technology allowed astronomers to detect them. At this point, more than five thousand such exoplanets have been identified, with the pace of discovery accelerating after the launch of NASA's Transiting Exoplanet Survey Satellite and the Webb Space Telescope. In *The Little Book of Exoplanets*, Princeton astrophysicist Joshua Winn offers a brief and engaging introduction to the search for exoplanets and the cutting-edge science behind recent findings. In doing so, he chronicles the dawn of a new age of discovery—one that has rapidly transformed astronomy and our broader understanding of the universe.

Scientists now know that many Sun-like stars host their own systems of planets, some of which may resemble our solar system and include planets similar to the Earth. But, Winn tells us, the most remarkable discoveries so far have been of planets with unexpected and decidedly un-Earth-like properties, which have upended what we thought we knew about the origins of planetary systems. Winn provides an inside view of the sophisticated detective work astronomers perform as they find and study exoplanets and describes the surprising—sometimes downright bizarre—planets and systems they have found. He explains how these discoveries are revolutionizing astronomy, and he explores the current status and possible future of the search for another Earth. Finally, drawing on his own and other scientists' work, he considers how the discovery of exoplanets and their faraway solar systems changes our perspectives on the universe and our place in it.



## The Little Book of String Theory

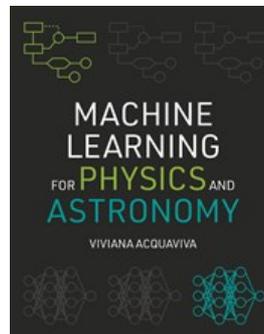
Steven S. Gubser  
9780691142890  
£16.99 • \$19.95  
Hardcover  
Science / Physics  
February 2010  
Princeton University Press

### 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  $E = mc^2$ , 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 *Fantasia-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.



## Machine Learning for Physics and Astronomy

Viviana Acquaviva  
9780691206417  
£38.00 • \$45.00  
Trade Paperback  
Science / Physics / Mathematical & Computational  
August 2023  
Princeton University Press

### A hands-on introduction to machine learning and its applications to the physical sciences

As the size and complexity of data continue to grow exponentially across the physical sciences, machine learning is helping scientists to sift through and analyze this information while driving breathtaking advances in quantum physics, astronomy, cosmology, and beyond. This incisive textbook covers the basics of building, diagnosing, optimizing, and deploying machine learning methods to solve research problems in physics and astronomy, with an emphasis on critical thinking and the scientific method. Using a hands-on approach to learning, *Machine Learning for Physics and Astronomy* draws on real-world, publicly available data as well as examples taken directly from the frontiers of research, from identifying galaxy morphology from images to identifying the signature of standard model particles in simulations at the Large Hadron Collider.

- Introduces readers to best practices in data-driven problem-solving, from preliminary data exploration and cleaning to selecting the best method for a given task
- Each chapter is accompanied by Jupyter Notebook worksheets in Python that enable students to explore key concepts
- Includes a wealth of review questions and quizzes
- Ideal for advanced undergraduate and early graduate students in STEM disciplines such as physics, computer science, engineering, and applied mathematics
- Accessible to self-learners with a basic knowledge of linear algebra and calculus
- Slides and assessment questions (available only to instructors)



## Mathematical Foundations of Quantum Mechanics

John von Neumann

9780691028934

£92.00 • \$110.00

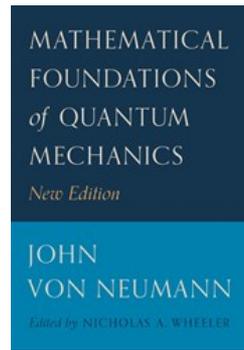
Trade Paperback

Science / Physics / Quantum Theory

November 1996

Princeton University Press

*Mathematical Foundations of Quantum Mechanics* was a revolutionary book that caused a sea change in theoretical physics. Here, John von Neumann, one of the leading mathematicians of the twentieth century, shows that great insights in quantum physics can be obtained by exploring the mathematical structure of quantum mechanics. He begins by presenting the theory of Hermitean operators and Hilbert spaces. These provide the framework for transformation theory, which von Neumann regards as the definitive form of quantum mechanics. Using this theory, he attacks with mathematical rigor some of the general problems of quantum theory, such as quantum statistical mechanics as well as measurement processes. Regarded as a tour de force at the time of publication, this book is still indispensable for those interested in the fundamental issues of quantum mechanics.



## Mathematical Foundations of Quantum Mechanics

John von Neumann

9780691178578

£88.00 • \$105.00

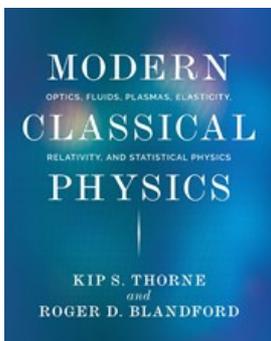
Trade Paperback

Science / Physics / Quantum Theory

February 2018

Princeton University Press

Quantum mechanics was still in its infancy in 1932 when the young John von Neumann, who would go on to become one of the greatest mathematicians of the twentieth century, published *Mathematical Foundations of Quantum Mechanics*—a revolutionary book that for the first time provided a rigorous mathematical framework for the new science. Robert Beyer's 1955 English translation, which von Neumann reviewed and approved, is cited more frequently today than ever before. But its many treasures and insights were too often obscured by the limitations of the way the text and equations were set on the page. In this new edition of this classic work, mathematical physicist Nicholas Wheeler has completely reset the book in TeX, making the text and equations far easier to read. He has also corrected a handful of typographic errors, revised some sentences for clarity and readability, provided an index for the first time, and added prefatory remarks drawn from the writings of Léon Van Hove and Freeman Dyson. The result brings new life to an essential work in theoretical physics and mathematics.



## Modern Classical Physics

Kip S. Thorne

9780691159027

£117.00 • \$140.00

Hardcover

Science / Physics

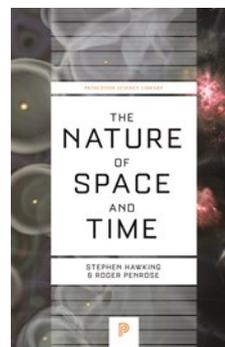
September 2017

Princeton University Press

**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



## The Nature of Space and Time

Stephen Hawking

9780691168449

£12.99 • \$15.95

Trade Paperback

Science / Physics

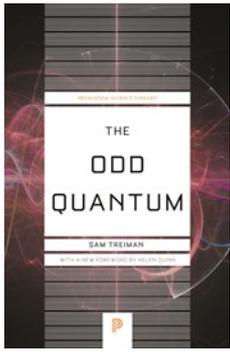
September 2015

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.



## The Odd Quantum

Sam Treiman

9780691254364

£17.99 • \$21.95

Trade Paperback

Science / Physics

January 2024

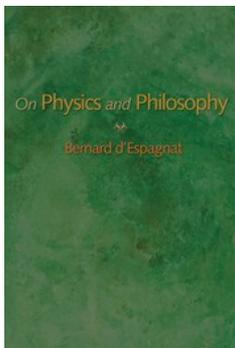
Princeton University Press

### An acclaimed physicist's accessible yet rigorous introduction to quantum mechanics for nonspecialists

This is a rare and much-needed book: a concise but comprehensive account of quantum mechanics for popular science readers written by a respected physicist. Sam Treiman—who was internationally renowned for his work in particle physics—makes quantum mechanics accessible to nonspecialists. Combining mastery of the material with clear, elegant prose and infectious enthusiasm, he conveys the substance, methods, and profound oddities of the field.

Treiman begins with an overview of quantum mechanics. He sketches the early development of the field by Einstein, Bohr, Heisenberg, Schrödinger, and others, and he makes clear how the quantum outlook flies in the face of common sense. As he explains, the quantum world is intrinsically probabilistic. For example, a particle is not in general in some particular place at a given instant, nor does it have a definite momentum. According to the Heisenberg uncertainty principle, there is a limit to how well both location and momentum can be specified simultaneously. In addition, particles can move through barriers and otherwise move in regions of space that are forbidden by classical mechanics. If a particle has a choice of different paths, it pursues all of them at once. Particles display wave-like characteristics and waves show particle-like characteristics. Treiman pays special attention to the more fundamental wave outlook and its expression in quantum field theory. He deals here with the remarkable fact that all the particles of a given species are strictly identical, and with the unnerving fact that particles can be created and destroyed. As Treiman introduces us to these and other wonders, he also touches—without resolution—on some of the deep philosophical problems of quantum mechanics, notably how probabilities become facts.

Weaving together impeccable science, engaging writing, and a talent for clear explanation honed over Treiman's distinguished career as a physicist and teacher, *The Odd Quantum* is a remarkable survey of a field that changed the course of modern scientific and philosophical thought.



## On Physics and Philosophy

Bernard d'Espagnat

9780691119649

£65.00 • \$79.00

Hardcover

Science / Physics / Quantum Theory

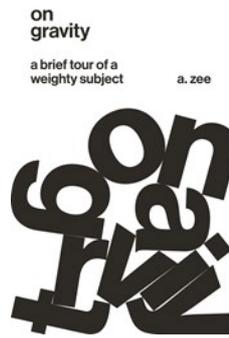
October 2006

Princeton University Press

Among the great ironies of quantum mechanics is not only that its conceptual foundations seem strange even to the physicists who use it, but that philosophers have largely ignored it. Here, Bernard d'Espagnat argues that quantum physics—by casting doubts on once hallowed concepts such as space, material objects, and causality—demands serious reconsideration of most of traditional philosophy.

*On Physics and Philosophy* is an accessible, mathematics-free reflection on the philosophical meaning of the quantum revolution, by one of the world's leading authorities on the subject. D'Espagnat presents an objective account of the main guiding principles of contemporary physics—in particular, quantum mechanics—followed by a look at just what consequences these should imply for philosophical thinking.

The author begins by describing recent discoveries in quantum physics such as nonseparability, and explicating the significance of contemporary developments such as decoherence. Then he proceeds to set various philosophical theories of knowledge—such as materialism, realism, Kantism, and neo-Kantism—against the conceptual problems quantum theory raises. His overall conclusion is that while the physical implications of quantum theory suggest that scientific knowledge will never truly describe mind-independent reality, the notion of such an ultimate reality—one we can never access directly or rationally and which he calls "veiled reality"—remains conceptually necessary nonetheless.



## On Gravity

Anthony Zee

9780691202662

£12.99 • \$15.95

Trade Paperback

Science / Physics / Gravity

March 2020

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.



## Philosophy of Physics

Tim Maudlin

9780691165714

£20.00 • \$24.95

Trade Paperback

Science / Philosophy & Social Aspects

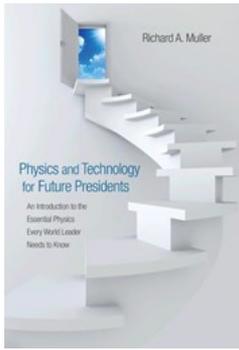
May 2015

Princeton University Press

### 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



## Physics and Technology for Future Presidents

Richard A. Muller

9780691135045

£68.00 • \$81.00

Hardcover

Science / Physics

May 2010

Princeton University Press

### Physics for future world leaders

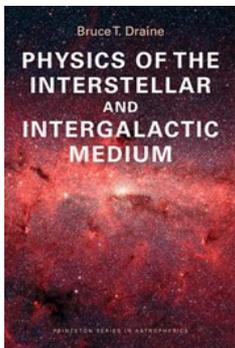
*Physics and Technology for Future Presidents* contains the essential physics that students need in order to understand today's core science and technology issues, and to become the next generation of world leaders. From the physics of energy to climate change, and from spy technology to quantum computers, this is the only textbook to focus on the modern physics affecting the decisions of political leaders and CEOs and, consequently, the lives of every citizen. How practical are alternative energy sources? Can satellites really read license plates from space? What is the quantum physics behind iPods and supermarket scanners? And how much should we fear a terrorist nuke? This lively book empowers students possessing any level of scientific background with the tools they need to make informed decisions and to argue their views persuasively with anyone—expert or otherwise.

Based on Richard Muller's renowned course at Berkeley, the book explores critical physics topics: energy and power, atoms and heat, gravity and space, nuclei and radioactivity, chain reactions and atomic bombs, electricity and magnetism, waves, light, invisible light, climate change, quantum physics, and relativity. Muller engages readers through many intriguing examples, helpful facts to remember, a fun-to-read text, and an emphasis on real-world problems rather than mathematical computation. He includes chapter summaries, essay and discussion questions, Internet research topics, and handy tips for instructors to make the classroom experience more rewarding.

Accessible and entertaining, *Physics and Technology for Future Presidents* gives students the scientific fluency they need to become well-rounded leaders in a world driven by science and technology.

A restricted instructor's manual is available to teachers. Contact the publisher for more information.

Leading universities that have adopted this book include:



## Physics of the Interstellar and Intergalactic Medium

Bruce T. Draine

9780691122144

£80.00 • \$95.00

Trade Paperback

Science / Physics / Astrophysics

January 2011

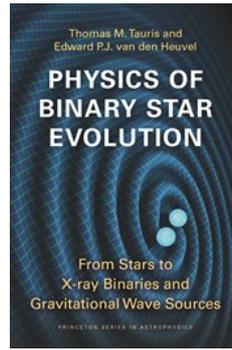
Princeton University Press

### An essential resource for graduate students and astrophysicists

This is a comprehensive and richly illustrated textbook on the astrophysics of the interstellar and intergalactic medium—the gas and dust, as well as the electromagnetic radiation, cosmic rays, and magnetic and gravitational fields, present between the stars in a galaxy and also between galaxies themselves.

Topics include radiative processes across the electromagnetic spectrum; radiative transfer; ionization; heating and cooling; astrochemistry; interstellar dust; fluid dynamics, including ionization fronts and shock waves; cosmic rays; distribution and evolution of the interstellar medium; and star formation. While it is assumed that the reader has a background in undergraduate-level physics, including some prior exposure to atomic and molecular physics, statistical mechanics, and electromagnetism, the first six chapters of the book include a review of the basic physics that is used in later chapters. This graduate-level textbook includes references for further reading, and serves as an invaluable resource for working astrophysicists.

- Essential textbook on the physics of the interstellar and intergalactic medium
- Based on a course taught by the author for more than twenty years at Princeton University
- Covers radiative processes, fluid dynamics, cosmic rays, astrochemistry, interstellar dust, and more
- Discusses the physical state and distribution of the ionized, atomic, and molecular phases of the interstellar medium
- Reviews diagnostics using emission and absorption lines
- Features color illustrations and detailed reference materials in appendices
- Instructor's manual with problems and solutions (available only to teachers)



## Physics of Binary Star Evolution

Thomas M Tauris

9780691179087

£80.00 • \$95.00

Trade Paperback

Science / Physics / Astrophysics

June 2023

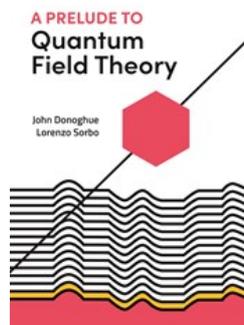
Princeton University Press

### A graduate-level textbook on the astrophysics of binary star systems and their evolution

*Physics of Binary Star Evolution* is an up-to-date textbook on the astrophysics and evolution of binary star systems. Theoretical astrophysicists Thomas Tauris and Edward van den Heuvel cover a wide range of phenomena and processes, including mass transfer and ejection, common envelopes, novae and supernovae, X-ray binaries, millisecond radio pulsars, and gravitational wave (GW) sources, and their links to stellar evolution.

The authors walk through the observed properties and evolution of different types of binaries, with special emphasis on those containing compact objects (neutron stars, black holes, and white dwarfs). Attention is given to the formation mechanisms of GW sources—merging double neutron stars and black holes as well as ultra-compact GW binaries hosting white dwarfs—and to the progenitors of these sources and how they are observed with radio telescopes, X-ray satellites, and GW detectors (LIGO, Virgo, KAGRA, Einstein Telescope, Cosmic Explorer, and LISA). Supported by illustrations, equations, and exercises, *Physics of Binary Star Evolution* combines theory and observations to guide readers through the wonders of a field that will play a central role in modern astrophysics for decades to come.

- 465 equations, 47 tables, and 350+ figures
- More than 80 exercises (analytical, numerical, and computational)
- Over 2,500 extensive, up-to-date references



## A Prelude to Quantum Field Theory

John Donoghue

9780691223483

£28.00 • \$31.95

Trade Paperback

Science / Physics / Quantum Theory

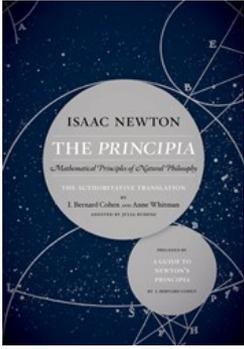
March 2022

Princeton University Press

### A concise, beginner-friendly introduction to quantum field theory

Quantum field theory is a powerful framework that extends quantum mechanics in ways that are essential in many modern applications. While it is the fundamental formalism for the study of many areas of physics, quantum field theory requires a different way of thinking, and many newcomers to the subject struggle with the transition from quantum mechanics. *A Prelude to Quantum Field Theory* introduces the key concepts of quantum field theory in a brief and accessible manner while never sacrificing mathematical rigor. The result is an easy-to-use textbook that distills the most general properties of the theory without overwhelming beginning students with more advanced applications.

- Bridges quantum mechanics and quantum field theory, emphasizing analogies and differences
- Emphasizes a “quantum field theoretical mindset” while maintaining mathematical rigor
- Obtains quantum fields as the continuum limit of a quantized system of many particles
- Highlights the correspondence between wave function—fundamental in quantum mechanics—and the formalism of second quantization used in quantum field theory
- Provides a step-by-step derivation of Feynman rules for the perturbative study of interacting theories
- Introduces students to renormalization, path integrals techniques, and more
- Discusses more modern topics like effective field theories
- Ideal for both undergraduate and graduate students
- Proven in the classroom



## The Principia: The Authoritative Translation and Guide

Isaac Newton

9780520290884

£30.00 • \$34.95

Trade Paperback

Science / Physics / Mathematical &

Computational

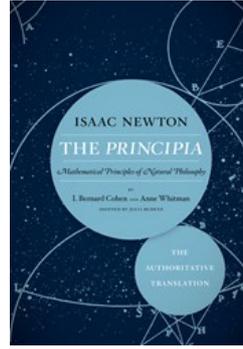
February 2016

In his monumental 1687 work, *Philosophiæ 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.



## The Principia: The Authoritative Translation

Isaac Newton

9780520290747

£16.99 • \$19.95

Trade Paperback

Science / Physics / Mathematical &

Computational

February 2016

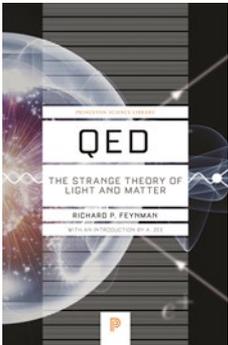
University of California Press

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



## QED

Richard P. Feynman

9780691164090

£16.99 • \$19.95

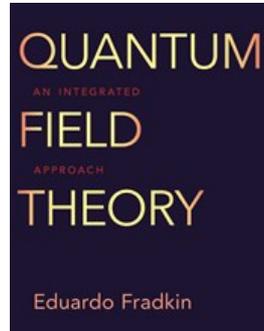
Trade Paperback

Science / Physics / Quantum Theory

October 2014

Princeton University Press

Celebrated for his brilliantly quirky insights into the physical world, Nobel laureate Richard Feynman also possessed an extraordinary talent for explaining difficult concepts to the general public. Here Feynman provides a classic and definitive introduction to QED (namely, quantum electrodynamics), that part of quantum field theory describing the interactions of light with charged particles. Using everyday language, spatial concepts, visualizations, and his renowned "Feynman diagrams" instead of advanced mathematics, Feynman clearly and humorously communicates both the substance and spirit of QED to the layperson. A. Zee's introduction places Feynman's book and his seminal contribution to QED in historical context and further highlights Feynman's uniquely appealing and illuminating style.



## Quantum Field Theory

Eduardo Fradkin

9780691149080

£75.00 • \$91.00

Hardcover

Science / Physics / Quantum Theory

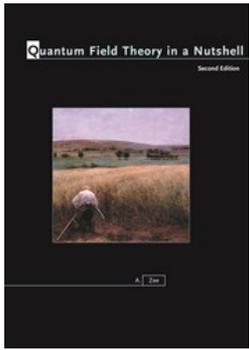
March 2021

Princeton University Press

**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



## Quantum Field Theory in a Nutshell

Anthony Zee

9780691140346

£80.00 • \$95.00

Hardcover

Science / Physics / Quantum Theory

February 2010

Princeton University Press

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

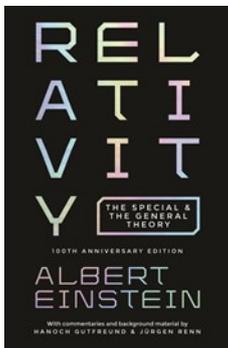
Since it was first published, *Quantum Field Theory in a Nutshell* has quickly established itself as the most accessible and comprehensive introduction to this profound and deeply fascinating area of theoretical physics. Now in this fully revised and expanded edition, A. Zee covers the latest advances 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



## Relativity

Albert Einstein

9780691191812

£14.99 • \$17.95

Trade Paperback

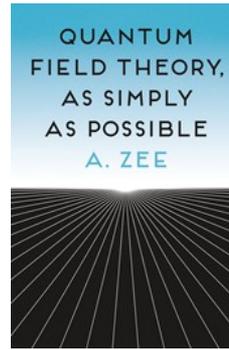
Science / Physics / Relativity

March 2019

Princeton University Press

### 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.



## Quantum Field Theory, as Simply as Possible

Anthony Zee

9780691174297

£35.00 • \$39.95

Hardcover

Science / Physics / Quantum Theory

January 2023

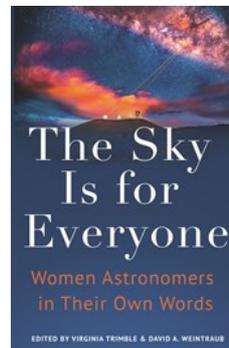
Princeton University Press

### An exceptionally accessible introduction to quantum field theory

Quantum field theory is by far the most spectacularly successful theory in physics, but also one of the most mystifying. *Quantum Field Theory, as Simply as Possible* provides an essential primer on the subject, giving readers the conceptual foundations they need to wrap their heads around one of the most important yet baffling subjects in physics.

Quantum field theory grew out of quantum mechanics in the late 1930s and was developed by a generation of brilliant young theorists, including Julian Schwinger and Richard Feynman. Their predictions were experimentally verified to an astounding accuracy unmatched by the rest of physics. Quantum field theory unifies quantum mechanics and special relativity, thus providing the framework for understanding the quantum mysteries of the subatomic world. With his trademark blend of wit and physical insight, A. Zee guides readers from the classical notion of the field to the modern frontiers of quantum field theory, covering a host of topics along the way, including antimatter, Feynman diagrams, virtual particles, the path integral, quantum chromodynamics, electroweak unification, grand unification, and quantum gravity.

A unique and valuable introduction for students and general readers alike, *Quantum Field Theory, as Simply as Possible* explains how quantum field theory informs our understanding of the universe, and how it can shed light on some of the deepest mysteries of physics.



## The Sky Is for Everyone

Virginia Trimble

9780691207100

£25.00 • \$29.95

Hardcover

Science / Space Science / Astronomy

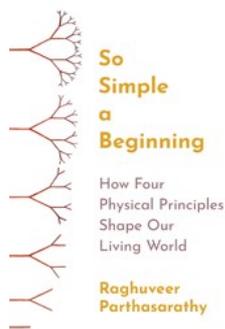
June 2022

Princeton University Press

### 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, Cathie Clarke, Judith Gamora Cohen, France Anne Córdova, Anne Pyne Cowley, Bożena Czerny, Wendy L. Freedman, Yilen Gómez Maqueo Chew, 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 Tautvaišienė, Silvia Torres-Peimbert, Virginia Trimble, Meg Urry, Ewine F. van Dishoeck, Patricia Ann Whitelock, Sidney Wolff, and Rosemary F. G. Wyse.



## So Simple a Beginning

Raghuveer Parthasarathy

9780691200408

£30.00 • \$35.00

Hardcover

Science / Life Sciences / Biophysics

February 2022

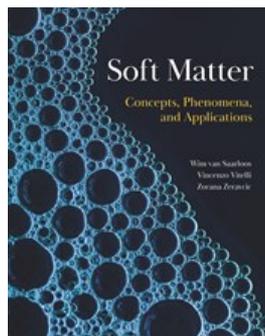
Princeton University Press

### 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.



## Soft Matter

Wim van Saarloos

9780691191300

£75.00 • \$90.00

Hardcover

Science / Physics

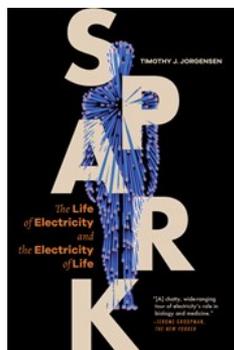
March 2024

Princeton University Press

### A comprehensive, modern introduction to soft matter physics

Soft matter science is an interdisciplinary field at the interface of physics, biology, chemistry, engineering, and materials science. It encompasses colloids, polymers, and liquid crystals as well as rapidly emerging topics such as metamaterials, memory formation and learning in matter, bioactive systems, and artificial life. This textbook introduces key phenomena and concepts in soft matter from a modern perspective, marrying established knowledge with the latest developments and applications. The presentation integrates statistical mechanics, dynamical systems, and hydrodynamic approaches, emphasizing conservation laws and broken symmetries as guiding principles while paying attention to computational and machine learning advances.

- An all-in-one textbook for advanced undergraduates and graduate students and an invaluable reference for practitioners
- Features introductory chapters on fluid mechanics, elasticity, and stochastic phenomena
- Covers advanced topics such as pattern formation and active matter
- Discusses technological applications as well as relevant phenomena in the life sciences
- Offers perspectives on emerging research directions
- Includes more than a hundred step-by-step problems suitable for active learning and flipped-classroom settings
- Accompanied by a website with additional material such as movies of experimental systems
- Solutions manual (available only to instructors)



## Spark

Timothy J. Jorgensen

9780691248158

£18.99 • \$22.95

Trade Paperback

Science / Physics / Electricity

June 2023

Princeton University Press

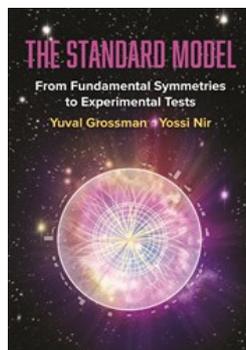
### A fresh look at electricity and its powerful role in life on Earth

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.



## The Standard Model

Yuval Grossman

9780691239101

£58.00 • \$70.00

Hardcover

Science / Physics

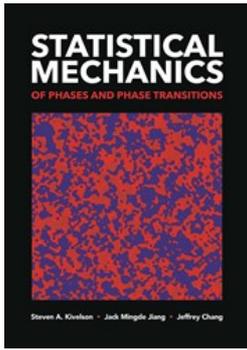
October 2023

Princeton University Press

### An authoritative, hands-on introduction to the foundational theory and experimental tests of particle physics

The Standard Model is an elegant and extremely successful theory that formulates the laws of fundamental interactions among elementary particles. This incisive textbook introduces students to the physics of the Standard Model while providing an essential overview of modern particle physics, with a unique emphasis on symmetry principles as the starting point for constructing models. *The Standard Model* equips students with an in-depth understanding of this impressively predictive theory and an appreciation of its beauty, and prepares them to interpret future experimental results.

- Describes symmetry principles of growing complexity, including Abelian symmetries and their application in QED, the theory of electromagnetic interactions, non-Abelian symmetries and their application in QCD, the theory of strong interactions, and spontaneously broken symmetries and their application in the theory of weak interactions
- Derives the Lagrangian that implements these symmetry principles and extracts the phenomenology that follows from it, such as elementary particles and accidental symmetries
- Explains how the Standard Model has been experimentally tested, emphasizing electroweak precision measurements, flavor-changing neutral current processes, neutrino oscillations, and cosmology
- Demonstrates how to extend the model to address experimental and observational puzzles, such as neutrino masses, dark matter, and the baryon asymmetry of the universe
- Features a wealth of problems drawing from the latest research
- Ideal for a one-semester graduate course and an invaluable resource for practitioners
- Online solutions manual (available only to instructors)



## Statistical Mechanics of Phases and Phase Transitions

Steven A. Kivelson

9780691249735

£62.00 • \$75.00

Trade Paperback

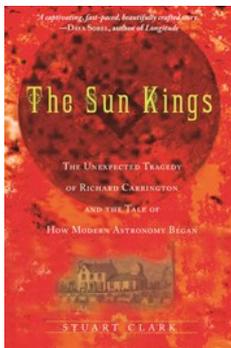
Science / Physics / Mathematical & Computational

March 2024

### An engaging undergraduate introduction to the statistical mechanics of phase transitions

Statistical mechanics deploys a powerful set of mathematical approaches for studying the thermodynamic properties of complex physical systems. This textbook introduces students to the statistical mechanics of systems undergoing changes of state, focusing on the basic principles for classifying distinct thermodynamic phases and the critical phenomena associated with transitions between them. Uniquely designed to promote active learning, *Statistical Mechanics of Phases and Phase Transitions* presents some of the most beautiful and profound concepts in physics, enabling students to obtain an essential understanding of a computationally challenging subject without getting lost in the details.

- Provides a self-contained, conceptually deep introduction to the statistical mechanics of phases and phase transitions from a modern perspective
- Carefully leads students from spontaneously broken symmetries to the universality of phase transitions and the renormalization group
- Encourages student-centric active learning suitable for both the classroom and self-study
- Features a wealth of guided worksheets with full solutions throughout the book that help students learn by doing
- Includes informative appendices that cover key mathematical concepts and methods
- Ideal for undergraduate physics majors and beginning graduate students
- Solutions manual for all end-of-chapter problems (available only to instructors)



## The Sun Kings

Stuart Clark

9780691141268

£22.00 • \$27.95

Trade Paperback

Science / Space Science / Astronomy

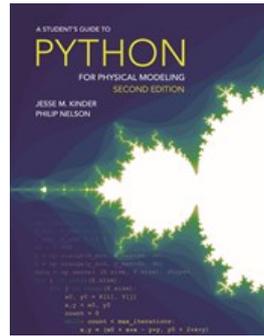
April 2009

Princeton University Press

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.



## A Student's Guide to Python for Physical Modeling

Jesse M. Kinder

9780691223650

£22.00 • \$26.95

Trade Paperback

Science / Physics

August 2021

Princeton University Press

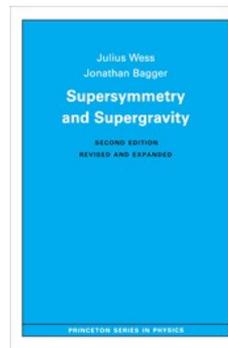
### A fully updated tutorial on the basics of the Python programming language for science students

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.



## Supersymmetry and Supergravity

Julius Wess

9780691025308

£80.00 • \$95.00

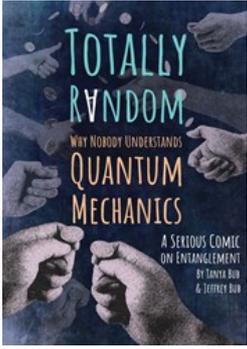
Trade Paperback

Science / Physics

March 1992

Princeton University Press

This widely acclaimed introduction to  $N = 1$  supersymmetry and supergravity is aimed at readers familiar with relativistic quantum field theory who wish to learn about the supersymmetry algebra. In this new volume *Supersymmetry and Supergravity* has been greatly expanded to include a detailed derivation of the most general coupling of super-symmetric gauge theory to supergravity. The final result is the starting point for phenomenological studies of supersymmetric theories. The book is distinguished by its pedagogical approach to supersymmetry. It develops several topics in advanced field theory as the need arises. It emphasizes the logical coherence of the subject and should appeal to physicists whose interests range from the mathematical to the phenomenological. In praise of the first edition: "A beautiful exposition of the original ideas of Wess and Zumino in formulating  $N = 1$  supersymmetry and supergravity theories, couched in the language of superfields introduced by Strathdee and the reviewer.... [All] serious students of particle physics would do well to acquire a copy."--Abdus Salam, *Nature* "An excellent introduction to this exciting area of theoretical physics."--C. J. Isham, *Physics Bulletin*



### Totally Random

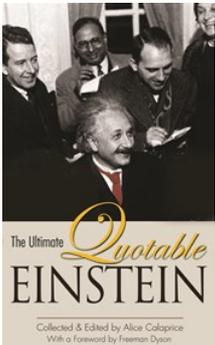
Tanya Bub  
9780691176956  
£18.99 • \$22.95  
Trade Paperback  
Science / Physics / Quantum Theory  
June 2018  
Princeton University Press

#### 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.



### The Ultimate Quotable Einstein

Albert Einstein  
9780691160146  
£14.99 • \$17.95  
Trade Paperback  
Science / Physics  
September 2013  
Princeton University Press

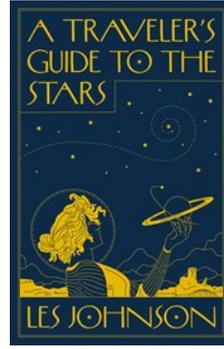
#### The most comprehensive collection of Einstein quotations ever published

Here is the definitive new 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 400 additional quotes, bringing the total to roughly 1,600 in all. This ultimate edition includes new sections—"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 new commentary by Alice Calaprice.

In *The Ultimate Quotable Einstein*, readers will also find quotes by others about Einstein along with quotes attributed to him. Every quotation in this informative and entertaining collection is fully documented, and Calaprice has carefully selected new photographs and cartoons to introduce each section.

- Features 400 additional quotations
- Contains roughly 1,600 quotations in all
- Includes new sections on children, race and prejudice, and Einstein's poetry
- Provides new commentary
- Beautifully illustrated
- The most comprehensive collection of Einstein quotes ever published



### A Traveler's Guide to the Stars

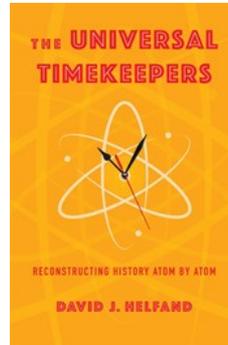
Paolo Mauro  
9780691212371  
£22.00 • \$27.95  
Hardcover  
Science / Space Science  
October 2022  
Princeton University Press

#### A brief guide to the real science of interstellar travel

With known exoplanets now numbering in the thousands and initiatives like 100 Year Starship and Breakthrough Starshot advancing the idea of interstellar travel, the age-old dream of venturing forth into the cosmos and perhaps even colonizing distant worlds may one day become a reality. *A Traveler's Guide to the Stars* reveals how.

Les Johnson takes you on a thrilling tour of the physics and technologies that may enable us to reach the stars. He discusses the latest exoplanet discoveries, promising interstellar missions on the not-so-distant horizon, and exciting new developments in space propulsion, power, robotics, communications, and more. But interstellar travel will not be easy, and it is not for the faint of heart. Johnson describes the harsh and forbidding expanse of space that awaits us, and he addresses the daunting challenges—both human and technological—that we will need to overcome in order to realize tomorrow's possibilities.

*A Traveler's Guide to the Stars* is your passport to the next great frontier of human discovery, providing a rare inside look at the remarkable breakthroughs in science and technology that will help tomorrow's space travelers chart a course for the stars.



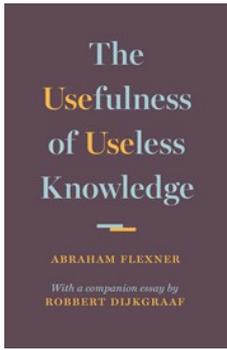
### The Universal Timekeepers

David Helfand  
9780231210980  
£20.00 • \$24.95  
Hardcover  
Science / Physics / Atomic & Molecular  
September 2023  
Columbia University Press

Atoms are unfathomably tiny. It takes fifteen million trillion of them to make up a single poppy seed—give or take a few billion. And there's hardly anything to them: atoms are more than 99.9999999999 percent empty space. Yet scientists have learned to count these slivers of near nothingness with precision and to peer into their internal states. In looking so closely, we have learned that atoms, because of their inimitable signatures and imperturbable internal clocks, are little archives holding the secrets of the past.

David J. Helfand reconstructs the history of the universe—back to its first microsecond 13.8 billion years ago—with the help of atoms. He shows how, by using detectors and reactors, microscopes and telescopes, we can decode the tales these infinitesimal particles tell, answering questions such as: Is a medieval illustrated prayer book real or forged? How did maize cultivation spread from the highlands of central Mexico to New England? What was Earth's climate like before humans emerged? Where can we find clues to identify the culprit in the demise of the dinosaurs? When did our planet and solar system form? Can we trace the births of atoms in the cores of massive stars or even glimpse the origins of the universe itself?

A lively and inviting introduction to the building blocks of everything we know, *The Universal Timekeepers* demonstrates the power of science to unveil the mysteries of unreachably remote times and places.



## The Usefulness of Useless Knowledge

Abraham Flexner

9780691174761

£8.99 • \$10.95

Hardcover

Science / Philosophy & Social Aspects

February 2017

Princeton University Press

### 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 Robert 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.



## Welcome to the Universe

Neil deGrasse Tyson

9780691157245

£35.00 • \$39.95

Hardcover

Science / Physics / Astrophysics

September 2016

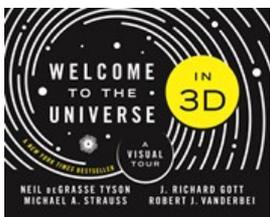
Princeton University Press

### 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.



## Welcome to the Universe in 3D

Neil deGrasse Tyson

9780691194073

£22.00 • \$29.95

Hardcover

Science / Physics / Astrophysics

April 2022

Princeton University Press

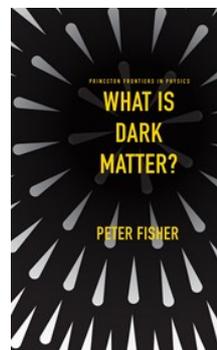
### *New York Times* bestseller

#### 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.



## What Is Dark Matter?

Peter Fisher

9780691148342

£30.00 • \$35.00

Hardcover

Science / Physics / Condensed Matter

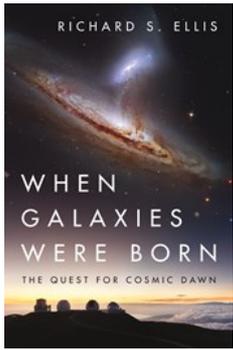
July 2022

Princeton University Press

### 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 account 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.



## When Galaxies Were Born

Richard S. Ellis

9780691211305

£28.00 • \$33.00

Hardcover

Science / Space Science / Astronomy

November 2022

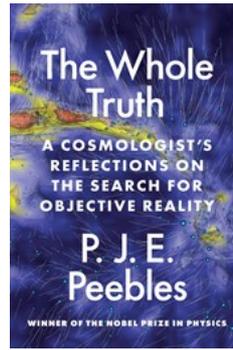
Princeton University Press

**One of today's leading astronomers takes readers inside the decades-long search for the first galaxies and the origin of starlight**

Astronomers are like time travelers, scanning the night sky for the outermost galaxies that first came into being when our universe was a mere fraction of its present age. *When Galaxies Were Born* is Richard Ellis's firsthand account of how a pioneering generation of scientists harnessed the world's largest telescopes to decipher the history of the universe and witness cosmic dawn, the time when starlight first bathed the cosmos and galaxies emerged from darkness.

In a remarkable career spanning more than forty years, Ellis has made some of the most spectacular discoveries in modern cosmology. He has traveled the world to conduct observations in locales as beautiful and remote as the Australian outback, the Canary Islands, Hawaii, and the Chilean desert. In this book, he brings to life a golden age of astronomy, describing the triumphs and the technical setbacks, the rivalries with competing teams, and the perennial challenge of cloudy nights. Ellis reveals the astonishing progress we have made in building ever larger and more powerful telescopes, and provides a tantalizing glimpse of cosmic dawn.

Stunningly illustrated with a wealth of dramatic photos, *When Galaxies Were Born* is a bold scientific adventure enlivened by personal insights and anecdotes that enable readers to share in the thrill of discovery at the frontiers of astronomy.



## The Whole Truth

P. J. E. Peebles

9780691231358

£22.00 • \$27.95

Hardcover

Science / Space Science / Cosmology

August 2022

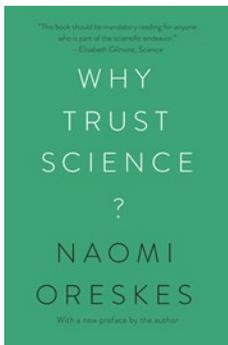
Princeton University Press

**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.



## Why Trust Science?

Naomi Oreskes

9780691212265

£15.99 • \$18.95

Trade Paperback

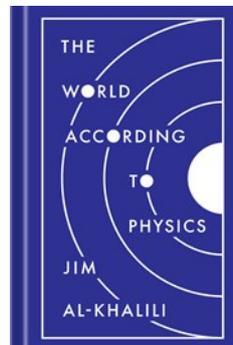
Science / Philosophy & Social Aspects

April 2021

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.



## The World According to Physics

Jim Al-Khalili

9780691182308

£12.99 • \$17.95

Hardcover

Science / Physics

March 2020

Princeton University Press

**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.

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<b>Astrophysics in a Nutshell</b>	Page 1	<b>At the Edge of Time</b>	Page 1
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