1 Introduction To Special Relativity Springer

Collaboration on the First Edition of Spacetime Physics began in the mid-1960s when Edwin Taylor took a junior faculty sabbatical at Princeton University where John Wheeler was a professor. The resulting text emphasized the unity of spacetime and those quantities (such as proper time, proper distance, mass) that are invariant, the same for all observers, rather than those quantities (such as space and time separations) that are relative, different for different observers. The book has become a standard introduction to relativity. The Second Edition of Spacetime Physics embodies what the authors have learned during an additional quarter century of teaching and research. They have updated the text to reflect the immense strides in physics during the same period and modernized and increased the number of exercises, for which the First Edition was famous. Enrichment boxes provide expanded coverage of intriguing topics. An enlarged final chapter on general relativity includes new material on gravity waves, black holes, and cosmology. The Second Edition of Spacetime Physics provides a new generation of readers with a deep and simple overview of the principles of relativity.
Relativity, apart from quantum mechanics, is the greatest wonder in science, unfolded single-handedly in the 20th century by Albert Einstein. The scientist developed general relativity as a logical sequel to special relativity. This comprehensive book presents explication of the conceptual evolution and mathematical derivations of the theories of special and general relativity. The book follows an Einsteinian approach while explaining the concepts and the theories of relativity. Divided into 14 chapters, the revised edition of the book covers elementary concepts of Special relativity, as well as the advanced studies on General relativity. The recent theories like Kerr geometry, Sagnac effect, Vaidya geometry, Raychaudhuri equation and Gravitation physics vis-à-vis Quantum physics are presented in easy-to-understand language and simple style. In addition to it, the book gives an in-depth analysis on the applications of advanced theories like Vaidya-Krori-Barua solution from author’s own research works. Apart from that, the book also discusses some of the isotropic and anisotropic cosmological models, in detail. The salient topics discussed in the revised edition of the book are extrinsic curvature, detection of gravitational waves, early universe, evolution of a dead star into a white dwarf or a neutron star or a black hole, dark matter and dark energy. This book is intended for the undergraduate and postgraduate students of Physics and Mathematics. KEY FEATURES • Step-by-step derivation of equations • Easy demagogic approach • Review questions to widen the analytical understanding of the students
This excellent textbook offers a unique take on relativity theory, setting it in its historical context. Ideal for those interested in relativity and the history of physics, the book contains a complete account of special relativity that begins with the historical analysis of the reasons that led to a change in our view of space and time. Its aim is to foster a deep understanding of relativistic spacetime and its consequences for Dynamics.
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.
Relativity: A Very Short Introduction
The Geometry of Spacetime
Introductory Special Relativity
What Is Relativity?
Special, General, and Cosmological

Comprehensive coverage of special theory (frames of reference, Lorentz transformation, more), general theory (principle of equivalence, more) and unified theory (Weyl's gauge-invariant geometry, more.) Foreword by Albert Einstein.

"Special Relativity is a superb text for students to begin or continue a serious study of physics. Describing the most accessible of the 20th-century revolutions, it also illustrates the fact that nature is stranger than one imagines. The book evolved through years of teaching a highly-successful course to thousands of first-year students in science and engineering. It is appropriate as part of an introductory physics course, as a supplement to a "modern physics" course, as a text for a special topics or advanced placement course, or even as a supplement in an advanced undergraduate course. Numerous illustrations, examples, and problems are presented throughout, with the concise mathematical description postponed until after the reader has built up some physical intuition for what is going on. The book contains many applications, from particle decays, colliding-beam experiments and photon rockets to a brief introduction to relativistic gravitation, including the Principle of Equivalence, the effect of altitude on clocks, and the Global Positioning System. Ten appendices can be taken up as interest and time allow, including The "Cosmic Speed Limit." The book is a serious introduction, praised for its clarity, accessibility, and informal, light-hearted style."--pub. desc.

Introduction to General Relativity and Cosmology gives undergraduate students an overview of the fundamental ideas behind the geometric theory of gravitation and spacetime. Through pointers on how to modify and generalise Einstein's theory to enhance understanding, it provides a link between standard textbook content and current research in the field.Chapters present complicated material practically and concisely, initially dealing with the mathematical foundations of the theory of relativity, in particular differential geometry. This is followed by a discussion of the Einstein field equations and their various properties. Also given is analysis of the important Schwarzschild solutions, followed by application of general relativity to cosmology. Questions with fully worked answers are provided at the

end of each chapter to aid comprehension and guide learning. This pared down textbook is specifically designed for new students looking for a workable, simple presentation of some of the key theories in modern physics and mathematics.

University Physics is designed for the two- or three-semester calculus-based physics course. The text has been developed to meet the scope and sequence of most university physics courses and provides a foundation for a career in mathematics, science, or engineering. The book provides an important opportunity for students to learn the core concepts of physics and understand how those concepts apply to their lives and to the world around them. Due to the comprehensive nature of the material, we are offering the book in three volumes for flexibility and efficiency. Coverage and Scope Our University Physics textbook adheres to the scope and sequence of most two- and three-semester physics courses nationwide. We have worked to make physics interesting and accessible to students while maintaining the mathematical rigor inherent in the subject. With this objective in mind, the content of this textbook has been developed and arranged to provide a logical progression from fundamental to more advanced concepts, building upon what students have already learned and emphasizing connections between topics and between theory and applications. The goal of each section is to enable students not just to recognize concepts, but to work with them in ways that will be useful in later courses and future careers. The organization and pedagogical features were developed and vetted with feedback from science educators dedicated to the project. VOLUME III Unit 1: Optics Chapter 1: The Nature of Light Chapter 2: Geometric Optics and Image Formation Chapter 3: Interference Chapter 4: Diffraction Unit 2: Modern Physics Chapter 5: Relativity Chapter 6: Photons and Matter Waves Chapter 7: Quantum Mechanics Chapter 8: Atomic Structure Chapter 9: Condensed Matter Physics Chapter 10: Nuclear Physics Chapter 11: Particle Physics and Cosmology

From Einstein to Strings

An Intuitive Introduction to Einstein's Ideas, and Why They Matter

Einstein's Space-Time

Special Theory of Relativity

The Special Theory of Relativity

Student-friendly, well illustrated textbook for advanced undergraduate and beginning graduate students in physics and mathematics.

Introduction to General Relativity is an introductory text on the concepts and modes of calculation used in general relativity. Topics covered range from Newton's laws of motion and the Galilean transformation to tensor analysis, equations of motion of free particles, electromagnetism, and gravitational fields and waves. Solutions of the field equations are also

given. The emphasis is on the actual performance of relativistic calculations, rather than on mathematical rigor or exhaustive completeness. This volume is comprised of nine chapters and begins with an overview of the theory of relativity, which includes special relativity and general relativity. The discussion then turns to Newton's laws of motion and the Galilean transformation, electromagnetism and the Galilean transformation, and the Lorentz transformation. Subsequent chapters explore tensor analysis; equations of motion of free particles; gravitational fields and waves; relativity in cosmology; and unified theories and quantized theories of general relativity. The final chapter is devoted to Minkowski's coordinates and orthogonal transformations. This book will be a valuable resource for students of physics.

"Wald's book is clearly the first textbook on general relativity with a totally modern point of view; and it succeeds very well where others are only partially successful. The book includes full discussions of many problems of current interest which are not treated in any extant book, and all these matters are considered with perception and understanding."—S. Chandrasekhar "A tour de force: lucid, straightforward, mathematically rigorous, exacting in the analysis of the theory in its physical aspect."—L. P. Hughston, Times Higher Education Supplement "Truly excellent. . . . A sophisticated text of manageable size that will probably be read by every student of relativity, astrophysics, and field theory for years to come."—James W. York, Physics Today

Hermann Minkowski recast special relativity as essentially a new geometric structure for spacetime. This book looks at the ideas of both Einstein and Minkowski, and then introduces the theory of frames, surfaces and intrinsic geometry, developing the main implications of Einstein's general relativity theory.

Special Relativity and Classical Field Theory

An Introduction to Spacetime and Gravitation

Special Relativity

It's About Time

Theoretical Physics 4

This text brings the challenge and excitement of modern relativity and cosmology at rigorous mathematical level within reach of advanced undergraduates and beginning graduates.

Publisher Description

The third volume in the bestselling physics series cracks open Einstein's special relativity and field theory Physicist Leonard Susskind and data engineer Art Friedman are back. This time, they introduce readers to Einstein's special relativity and Maxwell's classical field theory. Using their typical brand of real math, enlightening drawings, and humor, Susskind and Friedman walk us through the complexities of waves, forces, and particles by exploring special relativity and electromagnetism. It's a must-read for both devotees of the series and any armchair physicist who wants to improve their knowledge of physics' deepest truths.

Introduction to Special RelativityWiley

Meson Theory Of Nuclear Forces

A Textbook for Undergraduates

General Relativity for Babies
General Relativity
Understanding Einstein's Relativity

This book is based on a set of 18 class-tested lectures delivered to fourth-year physics undergraduates at Griffith University in Brisbane, and the book presents new discoveries by the Nobel-prize winning LIGO collaboration. The author begins with a review of special relativity and tensors and then develops the basic elements of general relativity (a beautiful theory that unifies special relativity and gravitation via geometry) with applications to the gravitational deflection of light, global positioning systems, black holes, gravitational waves, and cosmology. The book provides readers with a solid understanding of the underlying physical concepts; an ability to appreciate and in many cases derive important applications of the theory; and a solid grounding for those wishing to pursue their studies further. General Relativity: An Introduction to Black Holes, Gravitational Waves, and Cosmology also connects general relativity with broader topics. There is no doubt that general relativity is an active and exciting field of physics, and this book successfully transmits that excitement to readers.

This book offers a comprehensive, university-level introduction to Einstein's Special Theory of Relativity. In addition to the purely theoretical aspect, emphasis is also given to its historical development as well as to the experiments that preceded the theory and those performed in order to test its validity.The main body of the book consists of chapters on Relativistic Kinematics and Dynamics and their applications, Optics and Electromagnetism. These could be covered in a one-semester course. A more advanced course might include the subjects examined in the other chapters of the book and its appendices.As a textbook, it has some unique characteristics: It provides detailed proofs of the theorems, offers abundant figures and discusses numerous examples. It also includes a number of problems for readers to solve, the complete solutions of which are given at the end of the book.It is primarily intended for use by university students of physics, mathematics and engineering. However, as the mathematics needed is of an upper-intermediate level, the book will also appeal to a

more general readership.

This book provides a concise introduction to both the special theory of relativity and the general theory of relativity. The format is chosen to provide the basis for a single semester course which can take the students all the way from the foundations of special relativity to the core results of general relativity: the Einstein equation and the equations of motion for particles and light in curved spacetime. To facilitate access to the topics of special and general relativity for science and engineering students without prior training in relativity or geometry, the relevant geometric notions are also introduced and developed from the ground up. Students in physics, mathematics or engineering with an interest to learn Einstein's theories of relativity should be able to use this book already in the second semester of their third year. The book could also be used as the basis of a graduate level introduction to relativity for students who did not learn relativity as part of their undergraduate training.

It is now nearly a century since special relativity reconciled seventeenth century dynamics and nineteenth century electromagnetism, yet physics students are almost invariably introduced to the subject as "MODERN PHYSICS" – and something of a mystery. This book, instead, treats special relativity as a useful branch of physics rather than as an astounding novelty. The emphasis is on its dynamical consequences, its effect on quantum mechanics (with all that this implies for chemistry and biology), the new insights that it provides in electromagnetism and its utility in problems such as calculating radiation from fast-moving charged particles. To avoid giving the impression that relativity somehow eliminates the distinction between time and space, 4-vector notation is not used until the latter part of the book. Since all the consequences of relativity arise from the Lorentz transformation, more than usual care is taken to show how it arises from simple notions about the uniformity of space and time, and the absence of any universal reference system at absolute rest. Recent studies in dynamics stress the critical difference between linearity and nonlinearity and so there is a proof that the transformation must be linear, something ignored by almost every other book on the subject.

From Newton's Attractive Gravity to the Repulsive Gravity of Vacuum Energy
Introduction to the Theory of Relativity
An Introduction to Black Holes, Gravitational Waves, and Cosmology
Spacetime Physics
International Series of Monographs in Natural Philosophy

This book provides a thorough introduction to Einstein's special theory of relativity, suitable for anyone with a minimum of one year's university physics with calculus. It is divided into fundamental and advanced topics. The first section starts by recalling the Pythagorean rule and its relation to the geometry of space, then covers every aspect of special relativity, including the history. The second section covers the impact of relativity in quantum theory, with an introduction to relativistic quantum mechanics and quantum field theory. It also goes over the group theory of the Lorentz group, a simple introduction to supersymmetry, and ends with cutting-edge topics such as general relativity, the standard model of elementary particles and its extensions, superstring theory, and a survey of important unsolved problems. Each chapter comes with a set of exercises. The book is accompanied by a CD-ROM illustrating, through interactive animation, classic problems in relativity involving motion.

This work has been selected by scholars as being culturally important and is part of the knowledge base of civilization as we know it. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. To ensure a quality reading experience, this work has been proofread and republished using a format that seamlessly blends the original graphical elements with text in an easy-to-read typeface. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant.

This book, first appearing in German in 2004 under the title Spezielle Relativit„tstheorie f•r Studienanf„nger, offers access to the special theory of relativity for readers with a background in mathematics and physics comparable to a high school honors degree. All mathematical and physical competence required beyond that level is gradually developed through the book, as more advanced topics are introduced. The full tensor formalism, however, is dispensed with as it would only be a burden for the problems to be dealt with. Eventually, a substantial and comprehensive treatise on special relativity emerges which, with its gray-shaded formulary, is an invaluable reference manual for students and scientists alike.Some crucial results are derived more than once with different approaches: the Lorentz transformation in one spatial direction three times, the Doppler formula four times, the Lorentz transformation in two directions twice; also twice the unification of electric and magnetic forces, the velocity addition formula, as well as the aberration formula. Beginners will be grateful to find

several routes to the goal; moreover, for a theory like relativity, it is of fundamental importance to demonstrate that it is self-contained and without contradictions.Author's website: www.relativity.ch.

The book opens with a description of the smooth transition from Newtonian to Einsteinian behaviour from electrons as their energy is progressively increased, and this leads directly to the relativistic expressions for mass, momentum and energy of a particle.

An Introduction to the Special Theory

The Theoretical Minimum

Relativity

Foundations, Theory, Verification, Applications

Introduction To General Relativity And Cosmology

This book gives an excellent introduction to the theory of special relativity. Professor Resnick presents a fundamental and unified development of the subject with unusually clear discussions of the aspects that usually trouble beginners. He includes, for example, a section on the common sense of relativity. His presentation is lively and interspersed with historical, philosophical and special topics (such as the twin paradox) that will arouse and hold the reader's interest. You'll find many unique features that help you grasp the material, such as worked-out examples,summary tables,thought questions and a wealth of excellent problems. The emphasis throughout the book is physical. The experimental background, experimental confirmation of predictions, and the physical interpretation of principles are stressed. The book treats relativistic kinematics, relativistic dynamics, and relativity and electromagnetism and contains special appendices on the geometric representation of space-time and on general relativity. Its organization permits an instructor to vary the length and depth of his treatment and to use the book either with or following classical physics. These features make it an ideal companion for introductory courses.

The book presents the theory of relativity as a unified whole. By showing that the concepts of this theory are interrelated to form a unified totality David Bohm supplements some of the more specialist courses which have tended to give students a fragmentary impression of the logical and conceptual nature of physics as a whole.

An astrophysicist offers an entertaining introduction to Einstein's theories, explaining how well they have held up to rigorous testing over the years, and even describing the amazing phenomena readers would actually experience if they took a trip through a black hole.

Der Grundkurs Theoretische Physik deckt in 7 Bänden alle für das Diplom und für Bachelor/Master-Studiengänge maßgeblichen Gebiete ab. Jeder Band vermittelt das im jeweiligen Semester notwendige theoretisch-physikalische Rüstzeug. Übungsaufgaben mit ausführlichen Lösungen dienen der Vertiefung des Stoffs. Der 4. Band behandelt die Gebiete Thermodynamik und Relativitätstheorie. Für die Neuauflage wurde er grundlegend überarbeitet und um 24 Aufgaben ergänzt. Durch die zweifarbige Gestaltung ist der Stoff jetzt noch übersichtlicher gegliedert.

For the Enthusiastic Beginner
Special Relativity for Beginners
Special and General Relativity
Introduction to Einstein’s Theory of Relativity
An Introduction to Special and General Relativity

* A comprehensive introduction to special relativity for undergraduate study * Based on the highly regarded textbook Relativity and High Energy Physics * Includes numerous worked examples * Now thoroughly revised and expanded * Fully meets the needs of first year physics undergraduates

Writing a new book on the classic subject of Special Relativity, on which numerous important physicists have contributed and many books have already been written, can be like adding another epicycle to the Ptolemaic cosmology. Furthermore, it is our belief that if a book has no new elements, but simply repeats what is written in the existing literature, perhaps with a different style, then this is not enough to justify its publication. However, after having spent a number of years, both in class and research with relativity, I have come to the conclusion that there exists a place for a new book. Since it appears that somewhere along the way, mathem- ics may have obscured and prevailed to the degree that we tend to teach relativity (and I believe, theoretical physics) simply using “heavier” mathematics without the inspiration and the mastery of the classic physicists of the last century. Moreover current trends encourage the application of techniques in producing quick results and not tedious conceptual approaches resulting in long-lasting reasoning. On the other hand, physics cannot be done a ? la carte stripped from philosophy, or, to put it in a simple but dramatic context A building is not an accumulation of stones! As a result of the above, a major aim in the writing of this book has been the distinction between the mathematics of Minkowski space and the physics of r- ativity.

This book introduces the modern field of 3+1 numerical relativity. The book has been written in a way as to be as self-contained as possible, and only assumes a basic knowledge of special relativity. Starting from a brief introduction to general relativity, it discusses the different concepts and tools necessary for the fully consistent numerical simulation of relativistic astrophysical systems, with strong and dynamical gravitational fields. Among the topics discussed in detail are the following: the initial data problem, hyperbolic reductions of the field equations, gauge conditions, the evolution of black hole space-times, relativistic hydrodynamics, gravitational wave extraction and numerical methods. There is also a final chapter with examples of some simple numerical space-times. The book is

aimed at both graduate students and researchers in physics and astrophysics, and at those interested in relativistic astrophysics.

This book is written for high school and college students learning about special relativity for the first time. It will appeal to the reader who has a healthy level of enthusiasm for understanding how and why the various results of special relativity come about. All of the standard introductory topics in special relativity are covered: historical motivation, loss of simultaneity, time dilation, length contraction, velocity addition, Lorentz transformations, Minkowski diagrams, causality, Doppler effect, energy/momentum, collisions/decays, force, and 4-vectors. Additionally, the last chapter provides a brief introduction to the basic ideas of general relativity, including the equivalence principle, gravitational time dilation, and accelerating reference frames. The book features more than 100 worked-out problems in the form of examples in the text and solved problems at the end of each chapter. These problems, along with the discussions in the text, will be a valuable resource in any course on special relativity. The numerous examples also make this book ideal for self-study. Very little physics background is assumed (essentially none in the first half of the book). An intriguing aspect of special relativity is that it is challenging due to its inherent strangeness, as opposed to a heavy set of physics prerequisites. Likewise for the math prerequisite: calculus is used on a few occasions, but it is not essential to the overall flow of the book.

Introduction to Special Relativity

FUNDAMENTALS OF SPECIAL AND GENERAL RELATIVITY, Revised Edition

Introduction to General Relativity

An Introduction with 200 Problems and Solutions

Fans of Chris Ferrie's ABCs of Science, Organic Chemistry for Babies, and Quantum Physics for Babies will love this introduction to Einstein's most famous theory! Help your future genius become the smartest baby in the room! It only takes a small spark to ignite a child's mind. Written by an expert, General Relativity for Babies is a colorfully simple introduction to Einstein's most famous theory. Babies (and grownups!) will learn all about black holes, gravitational waves, and more. With a tongue-in-cheek approach that adults will love, this installment of the Baby University board book series is the perfect way to introduce basic concepts to even the youngest scientists. After all, it's never too

early to become a quantum physicist! If you're looking for books similar to Baby Loves Science by Ruth Spiro, quantum information for babies, or infant science books, look no further! General Relativity for Babies offers fun early learning for your little quantum physicist!

The most important feature in this book is the simple presentation with details of calculations. It is very easy to follow. Fairly sophisticated calculations are developed very rapidly. The presentation is logical and the detailed coverage makes this book very readable and useful. The contents develop Relativity as a modern theory of motion, starting by placing it in historical perspective and proceeding to show its logical necessity. The development of the Lorentz transformation is given using only one assumption rather than two. Right away in Chapter 3, geometry as required in Special Relativity for extension to General Relativity is introduced. This enables the use of the four-vector formalism of Minkowski. By the end of Chapter 4, the general Lorentz transformations for three-dimensional motion and their relation to four-dimensional boosts have already been explained. In Chapter 5 applications of relevance in Physics are provided. After a brief introduction to elementary electromagnetic theory, it is reformulated as a theory in four-dimensions using tensors in Chapter 6. Finally in Chapter 7, the theory is extended to deal with accelerated motion as ?corrections? to Special Relativity.

Albert Einstein, a Nobel laureate, has changed the world with his research and theories. He is regarded as the founder of modern physics. Besides 'Relativity', he worked on Photoelectric effect, Brownian motion, Special relativity, and Mass-Energy equivalence (E=mc2). They reformed the views on time, space and matter. Allert Einstein developed the general theory of 'Relativity'. He published 'Relativity: The Special and the General Theory' in German. Its first English translation was published in 1920. The book deals with the special theory of relativity, the general theory of relativity, and the considerations on the universe as a whole The book gives an exact insight into the theory of Relativity. It covers, the system of Co-ordinates; The Lorentz Transformation; The experiment of Fizeau; Minkowski's four dimensional space; The Gravitational Field; Gaussian Co-ordinates; The structure of

space, and lot many other scientific concepts thus will be highly beneficial to the Readers. A must have book for everyone related to modern physics.

By the year 1900, most of physics seemed to be encompassed in the two great theories of Newtonian mechanics and Maxwell's theory of electromagnetism. Unfortunately, there were inconsistencies between the two theories that seemed irreconcilable. Although many physicists struggled with the problem, it took the genius of Einstein to see that the inconsistencies were concerned not merely with mechanics and electromagnetism, but with our most elementary ideas of space and time. In the special theory of relativity, Einstein resolved these difficulties and profoundly altered our conception of the physical universe. Readers looking for a concise, well-written explanation of one of the most important theories in modern physics need search no further than this lucid undergraduate-level text. Replete with examples that make it especially suitable for self-study, the book assumes only a knowledge of algebra. Topics include classical relativity and the relativity postulate, time dilation, the twin paradox, momentum and energy, particles of zero mass, electric and magnetic fields and forces, and more.

Introduction to 3+1 Numerical Relativity

An Introduction to Special Relativity and Its Applications

University Physics

Relativity: The Special and General Theory

The revised and updated 2nd edition of this established textbook provides a self-contained introduction to the general theory of relativity, describing not only the physical principles and applications of the theory, but also the mathematics needed, in particular the calculus of differential forms. Updated throughout, the book contains more detailed explanations and extended discussions of several conceptual points, and strengthened mathematical deductions where required. It includes examples of work conducted in the ten years since the first edition of the book was published, for example the pedagogically helpful concept of a "river of space" and a more detailed discussion of how far the principle of relativity is contained in the general theory of relativity. Also presented is a discussion of the concept of the 'gravitational field' in Einstein's theory, and some new material concerning the 'twin paradox' in the theory of relativity. Finally, the book

contains a new section about gravitational waves, exploring the dramatic progress in this field following the LIGO observations. Based on a long-established masters course, the book serves advanced undergraduate and graduate level students, and also provides a useful reference for researchers.

100 years ago, Einstein's theory of relativity shattered the world of physics. Our comforting Newtonian ideas of space and time were replaced by bizarre and counterintuitive conclusions: if you move at high speed, time slows down, space squashes up and you get heavier; travel fast enough and you could weigh as much as a jumbo jet, be squashed thinner than a CD without feeling a thing - and live for ever. And that was just the Special Theory. With the General Theory came even stranger ideas of curved space-time, and changed our understanding of gravity and the cosmos. This authoritative and entertaining Very Short Introduction makes the theory of relativity accessible and understandable. Using very little mathematics, Russell Stannard explains the important concepts of relativity, from E=mc2 to black holes, and explores the theory's impact on science and on our understanding of the universe. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.