Black Holes And Time Warps Einsteins Outrageous Legacy Commonwealth Fund Program

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Black Holes, Gravitational Radiation and the Universe - B.R. Iyer 2013-06-29
Our esteemed colleague C. V. Vishveshwara, popularly known as Vishu, turned sixty on 6th March 1998. His colleagues and well wishers felt that it would be appropriate to celebrate the occasion by bringing out a volume in his honour. Those of us who have had the good fortune to know Vishu, know that he is unique, in a class by himself. Having been given the privilege to be the volume's editors, we felt that we should attempt something different in this endeavour. Vishu is one of the well known relativists from India whose pioneer ing contributions to the studies of black holes is universally recognised. He was a student of Charles Misner. His Ph. D. thesis on the stability of the Schwarzschild black hole, coordinate invariant characterisation of the sta tionary limit and event horizon for Kerr black holes and subsequent seminal work on quasi-normal modes of black holes have passed on to become the starting points for detailed mathematical investigations on the nature of black holes. He later worked on other aspects related to black holes and compact objects. Many of these topics have matured over the last thirty years. New facets have also developed and become current areas of vigorous research interest. No longer are black holes, ultracompact objects or event horizons mere idealisations of mathematical physicists but concrete entities that astrophysicists detect, measure and look for. Astrophysical evidence is mounting up steadily for black holes.
Black Hole - Marcia Bartusiak 2015-04-28
The award-winning science writer “packs a lot of learning into a deceptively light and enjoyable read” exploring the contentious history of the black hole (New Scientist). For more than half a century, physicists and astronomers engaged in heated dispute over the possibility of black holes in the universe. The strange notion of a space-time abyss from which not even light escapes seemed to confound all logic. Now Marcia Bartusiak, author of Einstein’s Unfinished Symphony and The Day We Found the Universe, recounts the frustrating, exhilarating, and at times humorous battles over one of history’s most dazzling ideas. Bartusiak shows how the black hole helped revive Einstein’s greatest achievement, the general theory of relativity, after decades of languishing in obscurity. Not until astronomers discovered such surprising new phenomena as neutron stars and black holes did the once-sedate universe transform into an Einsteinian cosmos, filled with sources of titanic energy that can be understood only in the light of relativity. Black Hole explains how Albert Einstein, Stephen Hawking, and other leading thinkers completely changed the way we see the universe.
Die Planeten - Dava Sobel 2007

Das Universum – Was unsere Welt zusammenhält - Lucy Hawking 2020-11-23
Der Schlüssel zum Universum Wie ist unser Universum entstanden? Und wie unser Planet Erde? Gibt es da draußen in fernen Galaxien Lebewesen? Sind Zeitreisen möglich? Und wie wird das Leben auf unserem Planeten in der Zukunft aussehen? Nie waren diese Fragen von größerer Brisanz als heute. Dieser Band versammelt spannende Essays von führenden Wissenschaftlern, darunter Stephen Hawking selbst, die genau diese großen Fragen präzise und leicht verständlich beantworten. Mit zahlreichen faszinierenden Farbfotos, Schaubildern und Info-Kästen ist dies ein großartiges Kompendium, das junge Naturwissenschaftler*innen, und solche die es werden wollen, von der ersten bis zur letzten Seite fesselt. Herausgegeben von Lucy Hawking, der Tochter des berühmten Astrophysikers. Alle Bänder der »Das Universum«-Reihe: Der geheime Schlüssel zum Universum (Band 1) Die unglaubliche Reise ins Universum (Band 2) Zurück zum Urknall. Die große Verschwörung (Band 3, nur als Hörbuch zum Download verfügbar) Das Universum – Was unsere Welt zusammenhält (Band 4) Alle Bücher können unabhängig voneinander gelesen werden.
Was sind Raum und Zeit? - Roger Penrose 2021-10-20
Ein Klassiker der Physik des 20. Jahrhunderts Warum sind Raum und Zeit so fundamental für das Verständnis des Weltalls und unseres Lebens? Zwei Genies verdeutlichen, warum wir das Universum und die Schwarzen Löcher ganz anders begreifen müssen als bisher, wenn wir das Weltall und die Welt der Quanten als eine Wirklichkeit verstehen wollen. Zwei der renommiertesten Wissenschaftler des 20. Jahrhunderts erörtern, wie das Universum entstanden sein könnte, welche Entwicklung es genommen hat und welches Schicksal ihm und uns – in einigen Milliarden Jahren – bevorsteht. Stephen Hawking ist einer der wichtigsten Kosmologen aller Zeiten, eine Ikone des 20. und 21. Jahrhunderts und war Schüler von Roger Penrose, einem genialen Mathematiker, Nobelpreisträger für Physik 2020 und Vordenker der Schwarzen Löcher. Die beiden brillanten Theoretiker stellen sich den Grundfragen der Physik und Kosmologie und bestimmen die Dimensionen von Raum und Zeit völlig neu. Ohne Raum und Zeit gäbe es kein Universum und kein Atom, weder den Urknall noch die Schwarzen Löcher. Wer mehr über Raum und Zeit wissen will, muss diesen erstmals im Jahr 1996 erschienenen Klassiker der Physik lesen.
Hawking Hawking - Charles Seife 2021-04-06
Stephen Hawking was widely recognized as the world's best physicist and even the most brilliant man alive–but what if his true talent was self-promotion? When Stephen Hawking died, he was widely recognized as the world's best physicist, and even its smartest person. He was neither. In Hawking Hawking, science journalist Charles Seife explores how Stephen Hawking came to be thought of as humanity's greatest genius. Hawking spent his career grappling with deep questions in physics, but his renown didn't rest on his science. He was a master of self-promotion, hosting parties for time travelers, declaring victory over problems he had not solved, and wooing billionaires. In a wheelchair and physically dependent on a cadre of devotees, Hawking still managed to captivate the people around him—and use them for his own purposes. A brilliant exposé and powerful biography, Hawking Hawking uncovers the authentic Hawking buried underneath the fake. It is the story of a man whose brilliance in physics was matched by his genius for building his own myth.
Tod in Kitchawank - T.C. Boyle 2014-10-01
Das Leben einer Familie in der jüdischen Kolonie Kitchawank. Auf ewige Winter folgen Sommer voller Zukunft: Lagerfeuer und Cocktails, die Männer spielen Volleyball auf dem jährlich aufgeschütteten Seestrand. Miriam sieht, wie Kinder Erwartungen enttäuschen, wie unerwünschte Ehen geschlossen werden und Freundschaften zerbrechen. T. C. Boyle setzt die Gesetze der Zeit außer Kraft und erzählt in Momentaufnahmen ein ganzes Leben. Eine von Boyles brillantesten Erzählungen.
Relativity in Curved Spacetime - Eric Baird 2007
Relativity theory has become one of the icons of Twentieth Century science. It's reckoned to be a difficult subject, taught as a layered series of increasingly difficult mathematics and increasingly abstract concepts. We're told that relativity theory is supposed to be this complicated and counter-intuitive. But how much of this historical complexity is really necessary? Can we bypass the interpretations and paradoxes and pseudoparadoxes of Einstein's special theory and jump directly to a deeper and more intuitive description of reality? What if curvature is a fundamental part of physics, and a final theory of relativity shouldn't reduce to Einstein's "flat" 1905 theory //on principle//? "Relativity..." takes us on a whistlestop tour of Twentieth Century physics - from black holes, quantum mechanics, wormholes and the Big Bang to the workings of the human mind, and asks: what would physics look like without

special relativity? 394 printed pages, 234156 mm, ~200 figures and illustrations, includes bibliography and index www.relativitybook.com
Critical issues in the history of spaceflight - Steven J. Dick 2018

Black Holes and Time Warps - Kip S Thorne 1995-03-07
Winner of the 2017 Nobel Prize in Physics Ever since Albert Einstein's general theory of relativity burst upon the world in 1915 some of the most brilliant minds of our century have sought to decipher the mysteries bequeathed by that theory, a legacy so unthinkable in some respects that even Einstein himself rejected them. Which of these bizarre phenomena, if any, can really exist in our universe? Black holes, down which anything can fall but from which nothing can return; wormholes, short spacewarps connecting regions of the cosmos; singularities, where space and time are so violently warped that time ceases to exist and space becomes a kind of foam; gravitational waves, which carry symphonic accounts of collisions of black holes billions of years ago; and time machines, for traveling backward and forward in time. Kip Thorne, along with fellow theorists Stephen Hawking and Roger Penrose, a cadre of Russians, and earlier scientists such as Oppenheimer, Wheeler and Chandrasekhar, has been in the thick of the quest to secure answers. In this masterfully written and brilliantly informed work of scientific history and explanation, Dr. Thorne, a Nobel Prize-winning physicist and the Feynman Professor of Theoretical Physics Emeritus at Caltech, leads his readers through an elegant, always human, tapestry of interlocking themes, coming finally to a uniquely informed answer to the great question: what principles control our universe and why do physicists think they know the things they think they know? Stephen Hawking's A Brief History of Time has been one of the greatest best-sellers in publishing history. Anyone who struggled with that book will find here a more slowly paced but equally mind-stretching experience, with the added fascination of a rich historical and human component. Winner of the Phi Beta Kappa Award in Science.
Cosmology - Edward Harrison 2000-03-16
Cosmology: The Science of the Universe is an introduction to past and present cosmological theory. For much of the world's history, cosmological thought was formulated in religious or philosophical language and was thus theological or metaphysical in nature. However, cosmological speculation and theory has now become a science in which the empirical discoveries of the astronomer, theoretical physicist, and biologist are woven into intricate models that attempt to account for the universe as a whole. Professor Harrison draws on the discoveries and speculations of these scientists to provide a comprehensive survey of man's current understanding of the universe and its history. Tracing the rise of the scientific method, the major aim of this book is to provide an elementary understanding of the physical universe of modern times. Thoroughly revised and updated, this second edition extends the much acclaimed first edition taking into account the many developments that have occurred.
Schwarze Löcher, Wurmlöcher und Zeitmaschinen - Jim Al-Khalili 2004-06-14
3-8274-1567-5, Al Khalili, Schwarze Löcher (HL) Jim Al-Khalili Schwarze Löcher, Wurmlöcher und Zeitmaschinen (copy) "Die Entstehung des Weltalls, die Konzepte von Raum und Zeit, beziehungsweise der so genannten Raumzeit sind zweifelsohne keine leicht verständlichen Themen. Umso beeindruckender ist das Buch des Wissenschaftspublizisten Jim Al-Khalili, dem es gelingt, über diese Dinge mit einer verblüffenden Leichtigkeit zu schreiben und den Boden des soliden Sachbuchs zu verlassen. Auch Laien werden von diesem Buch profitieren." Die Welt (Biblio) 2004. 336 S., 25 Abb., kt., € 15,-. ISBN 3-8274-1567-5 (Störer) neu
Encyclopedia of Time - H. James Birx 2009-01-07
"With a strong interdisciplinary approach to a subject that does not lend itself easily to the reference format, this work may not seem to support directly academic programs beyond general research, but it is a more thorough and up-to-date treatment than Taylor and Francis's 1994 Encyclopedia of Time. Highly recommended." —Library Journal STARRED Review Surveying the major facts, concepts, theories, and speculations that infuse our present comprehension of time, the Encyclopedia of Time: Science, Philosophy, Theology, & Culture explores the contributions of scientists, philosophers, theologians, and creative artists from ancient times to the present. By drawing together into one collection ideas from scholars around the globe and in a wide range of disciplines, this Encyclopedia will provide readers with a greater understanding of and appreciation for the elusive phenomenon experienced as time. Features Surveys historical thought about time, including those ideas that emerged in ancient Greece, early Christianity, the Italian Renaissance, the Age of Enlightenment, and other periods Covers the original and lasting insights of evolutionary biologist Charles Darwin, physicist Albert Einstein, philosopher Alfred North Whitehead, and theologian Pierre Teilhard de Chardin Discusses the significance of time in the writings of Isaac Asimov, Samuel Taylor Coleridge, Fyodor M. Dostoevsky, Francesco Petrarch, H. G. Wells, and numerous other authors Contains the contributions of naturalists and religionists, including astronomers, cosmologists, physicists, chemists, geologists, paleontologists, anthropologists, psychologists, philosophers, and theologians Includes artists' portrayals of the fluidity of time, including painter Salvador Dali's The Persistence of Memory and The Discovery of America by Christopher Columbus, and writers Gustave Flaubert's The Temptation of Saint Anthony and Henryk Sienkiewicz's Quo Vadis Provides a truly interdisciplinary approach, with discussions of Aztec, Buddhist, Christian, Egyptian, Ethiopian, Hindu, Islamic, Navajo, and many other cultures' conceptions of time Key Themes Biography Biology/Evolution Culture/History Geology/Paleontology Philosophy Physics/Chemistry Psychology/Literature Religion/Theology Theories/Concepts
Black Hole Blues and Other Songs from Outer Space - Janna Levin 2016-03-29
The authoritative story of the headline-making discovery of gravitational waves—by an eminent theoretical astrophysicist and award-winning writer. From the author of How the Universe Got Its Spots and A Madman Dreams of Turing Machines, the epic story of the scientific campaign to record the soundtrack of our universe. Black holes are dark. That is their essence. When black holes collide, they will do so unilluminated. Yet the black hole collision is an event more powerful than any since the origin of the universe. The profusion of energy will emanate as waves in the shape of spacetime: gravitational waves. No telescope will ever record the event; instead, the only evidence would be the sound of spacetime ringing. In 1916, Einstein predicted the existence of gravitational waves, his top priority after he proposed his theory of curved spacetime. One century later, we are recording the first sounds from space, the soundtrack to accompany astronomy’s silent movie. In Black Hole Blues and Other Songs from Outer Space, Janna Levin recounts the fascinating story of the obsessions, the aspirations, and the trials of the scientists who embarked on an arduous, fifty-year endeavor to capture these elusive waves. An experimental ambition that began as an amusing thought experiment, a mad idea, became the object of fixation for the original architects—Rai Weiss, Kip Thorne, and Ron Drever. Striving to make the ambition a reality, the original three gradually accumulated an international team of hundreds. As this book was written, two massive instruments of remarkably delicate sensitivity were brought to advanced capability. As the book draws to a close, five decades after the experimental ambition began, the team races to intercept a wisp of a sound with two colossal machines, hoping to succeed in time for the centenary of Einstein’s most radical idea. Janna Levin’s absorbing account of the surprises, disappointments, achievements, and risks in this unfolding story offers a portrait of modern science that is unlike anything we’ve seen before.
An Introduction to Modern Astrophysics - Bradley W. Carroll 2017-09-07
An Introduction to Modern Astrophysics is a comprehensive, well-organized and engaging text covering every major area of modern astrophysics, from the solar system and stellar astronomy to galactic and extragalactic astrophysics, and cosmology. Designed to provide students with a working knowledge of modern astrophysics, this textbook is suitable for astronomy and physics majors who have had a first-year introductory physics course with calculus. Featuring a brief summary of the main scientific discoveries that have led to our current understanding of the universe; worked examples to facilitate the understanding of the concepts presented in the book; end-of-chapter problems to practice the skills acquired; and computational exercises to numerically model astronomical systems, the second edition of An Introduction to Modern Astrophysics is the go-to textbook for learning the core astrophysics curriculum as well as the many advances in the field.
Time Travel and Warp Drives - Allen Everett 2012
Discusses what people understand about space and time and how science fiction is becoming less fictional as time goes on.
Isaac oder Die Entdeckung der Raumzeit - Martin Bäker 2018-12-30
Die künstliche Intelligenz Isaac hat ein Ziel: die Gesetze von Raum und Zeit zu verstehen. Dieses Buch erzählt das Abenteuer von Isaac und

seiner menschlichen Begleitung San auf ihrer Reise durch das Sonnensystem. In seinem Raumschiff erforscht Isaac Schwarze Löcher und Zeitreisen, misst Gravitationswellen und versucht, die Physik der Wurmlöcher zu begreifen. San hilft ihm, die richtigen Fragen zu stellen und sich auf das Wesentliche zu fokussieren. Im Dialog der beiden unterschiedlichen Gesprächspartner kann der Leser die Entdeckung der Newtonschen Gesetze bis zu Einsteins Relativitätstheorie verfolgen. Jede Unterhaltung von Isaac und San wird von einem Abschnitt begleitet, in dem der Autor gut verständlich die physikalischen Hintergründe zu Isaacs Entdeckungen beschreibt. ISAAC: Guten Tag, San. Ich habe eine interessante Überlegung angestellt, die ich Ihnen gern präsentieren würde. SAN: Worum geht es? Der Autor Martin Bäker hat Physik studiert und in der Elementarteilchenphysik promoviert. Seit 1996 lehrt und forscht er an der TU Braunschweig über die Mechanik moderner Werkstoffe. Er ist Autor des Wissenschaftsblogs Hier wohnen Drachen, mag Physik und Dinosaurier.

Das hässliche Universum - Sabine Hossenfelder 2018-09-26

Eine ketzerische Position: Was läuft falsch in der gegenwärtigen Physik? Physiker glauben häufig, dass die besten Theorien schön, natürlich und elegant sind. Was schön ist, muss wahr sein, Schönheit unterscheidet erfolgreiche Theorien von schlechten. Sabine Hossenfelder zeigt jedoch, dass die Physik sich damit verrannt hat: Durch das Festhalten am Primat der Schönheit gibt es seit mehr als vier Jahrzehnten keinen Durchbruch in der Grundlagenphysik. Schlimmer noch, der Glaube an Schönheit ist so dogmatisch geworden, dass er nun in Konflikt mit wissenschaftlicher Objektivität gerät: Beobachtungen können nicht mehr länger die kühnsten Theorien wie z.B. Supersymmetrie bestätigen. Um aus dieser Sackgasse herauszukommen, muss die Physik ihre Methoden überdenken. Nur wenn Realität als das akzeptiert wird, was sie ist, kann Wissenschaft die Wahrheit erkennen.

Physikalische Fingerübungen für Fortgeschrittene - Richard Phillips Feynman 2005

Critical Issues in the History of Spaceflight - Steven J. Dick 2006

In March 2005, the NASA History Division and the Division of Space History at the National Air and Space Museum brought together a distinguished group of scholars to consider the state of the discipline of space history. This volume is a collection of essays based on those deliberations. The meeting took place at a time of extraordinary transformation for NASA, stemming from the new Vision of Space Exploration announced by President George W. Bush in January 204: to go to the Moon, Mars, and beyond. This Vision, in turn, stemmed from a deep reevaluation of NASA?s goals in the wake of the Space Shuttle Columbia accident and the recommendations of the Columbia Accident Investigation Board. The new goals were seen as initiating a "New Age of Exploration" and were placed in the context of the importance of exploration and discovery to the American experiences. (Amazon).

Gravitation und Relativität - Holger Göbel 2014-10-14

Die Relativitätstheorie gehört zu den bekanntesten Theorien der Physik. Auch wenn ihre unmittelbaren Auswirkungen auf unser tägliches Leben praktisch vernachlässigbar sind, geht von ihr dennoch eine große Faszination aus. Das vorliegende Buch bahnt physikalisch interessierten Lesern mit grundlegenden Kenntnissen der höheren Mathematik einen anschaulichen und nachvollziehbaren Weg zum Verständnis der Relativitätstheorie.

Einsteins Vermächtnis - Marcia Bartusiak 2005

Marcia Bartusiak stellt in diesem Buch nicht nur Einsteins Relativitätstheorie in leicht fasslicher Form dar, von den Grundlagen bis zu ihren seltsamsten Konsequenzen wie den Gravitationswellen als Vibrationen des Raum-Zeit-Kontinuums selbst, sondern sie lässt auch den Forschungsalltag von Physikern und Astronomen lebendig werden. Sie zeigt die Hartnäckigkeit und die Verbohrtheit derjenigen, die Einsteins Theorie bestätigen wollten und es weitgehend konnten, und sie porträtiert die Unentwegten, die Wege suchten und fanden, das belächelte "Hirngespinst" der Gravitationswellen in experimentelle Realität zu verwandeln. Die Gravitationswellen sollen im hörbaren Bereich liegen, also buchstäblich das Geräusch sein, das der Kosmos in seiner Bewegung macht. Wenn Einstein Recht behält, bekäme das Universum erstmals eine Stimme, und wenn die Experimentatoren Recht behalten, werden wir sie bald hören können. Der Wettlauf um Einsteins Vermächtnis wird so zu einem wahren Forschungskrimi, in dem es um Zufall, Glück und viel Geld geht, und in dem nicht von vornherein feststeht, wer "Spinner" ist und wer Genie.

The New Time Travelers: A Journey to the Frontiers of Physics - David Toomey 2011-02-14

The story of physicists' quest to answer a mind-boggling question: How can we travel through time? Since H. G. Wells' 1895 classic The Time Machine, readers of science fiction have puzzled over the paradoxes of time travel. What would happen if a time traveler tried to change history? Would some force or law of nature prevent him? Or would his action produce a "new" history, branching away from the original?In the last decade of the twentieth century a group of theoretical physicists at the California Institute of Technology undertook a serious investigation of the possibility of pastward time travel, inspiring a serious and sustained study that engaged more than thirty physicists working at universities and institutes around the world.Many of the figures involved are familiar: Einstein, Stephen Hawking and Kip Thorne; others are names known mostly to physicists. These are the new time travelers, and this is the story of their work--a profoundly human endeavor marked by advances, retreats, and no small share of surprises. It is a fantastic journey to the frontiers of physics. Some images in the ebook are not displayed owing to permissions issues.

Alex im Wunderland der Zahlen - Alex Bellos 2015-01-19

Erinnern wir uns nicht alle mit Schrecken an die ratlosen Momente vor der Tafel im Matheunterricht? Mit Kurvendiskussionen und Dreisatz dürften jedenfalls nur wenige Spaß und Spannung verbinden... Bis jetzt! Denn nun wagt sich Alex Bellos in den Kaninchenbau der Mathematik: in das Reich von Geometrie und Algebra, von Wahrscheinlichkeitsrechnung, Statistik und logischen Paradoxa. Auf der anderen Seite des Erdballs, am Amazonas, zählen die Mitglieder des Indianerstammes der Munduruku nur bis fünf und halten die Vorstellung, dass dies nicht genügen solle, für reichlich lächerlich. Bei uns in Deutschland dagegen finden jährlich die Meisterschaften der besten Kopfrechner der Welt statt - 2010 wurde in Magdeburg eine elfjährige Inderin zur Nummer eins unter den "Mathleten" gekürt. Die Mathe-Weltmeisterin unter den Tieren ist hingegen die Schimpansin Ai, die Alex Bellos im japanischen Inuyama aufspürt und über deren Rechenkünste er nur staunen kann. Auch wenn er von den bahnbrechenden Überlegungen Euklids erzählt oder erklärt, warum man in Japan seine Visitenkarten keinesfalls zu Dodekaedern falten sollte - Bellos führt uns durch das wahrhaft erstaunliche Reich der Zahlen und bringt uns eine komplexe Wissenschaft spielerisch nahe. Mit seiner Mischung aus spannender Reportage, Wissenschaftsgeschichte und mathematischen Kabinettstückchen erbringt er souverän den Beweis, dass die Gleichung Mathematik = Langeweile eindeutig nicht wahr ist. Quod erat demonstrandum.

Identified Flying Objects - Dr. Michael P. Masters 2019-03-22

Could “UFOs” and “Aliens” simply be us, but from the future? This provocative new book cautiously examines the premise that extraterrestrials may instead be our distant human descendants, using the anthropological tool of time travel to visit and study us in their own hominin evolutionary past. Dr. Michael P. Masters, a professor of biological anthropology specializing in human evolutionary anatomy, archaeology, and biomedicine, explores how the persistence of long-term biological and cultural trends in human evolution may ultimately result in us becoming the ones piloting these disc-shaped craft, which are likely the very devices that allow our future progeny to venture backward across the landscape of time. Moreover, these extratempestrials are ubiquitously described as bipedal, large-brained, hairless, human-like beings, who communicate with us in our own languages, and who possess technology advanced beyond, but clearly built upon, our own. These accounts, coupled with a thorough understanding of the past and modern human condition, point to the continuation of established biological and cultural trends here on Earth, long into the distant human future.

Science Between Myth and History - José G. Perillán 2021

Science Between Myth and History explores scientific storytelling and its implications on the teaching, practice, and public perception of science. In communicating their science, scientists tend to use historical narratives for important rhetorical purposes. This text explores the implications of doing this.

In Search of the True Universe - Martin Harwit 2013-11-18

Astrophysicist and scholar Martin Harwit examines how our understanding of the cosmos advanced rapidly during the twentieth century and identifies the factors contributing to this progress. Astronomy, whose tools were largely imported from physics and engineering, benefited mid-century from the US policy of coupling basic research with practical national priorities. This strategy, initially developed for military and industrial purposes, provided astronomy with powerful tools yielding access - at virtually no cost - to radio, infrared, X-ray, and gamma-ray observations. Today, astronomers are investigating

the new frontiers of dark matter and dark energy, critical to understanding the cosmos but of indeterminate socio-economic promise. Harwit addresses these current challenges in view of competing national priorities and proposes alternative new approaches in search of the true Universe. This is an engaging read for astrophysicists, policy makers, historians, and sociologists of science looking to learn and apply lessons from the past in gaining deeper cosmological insight.

Haben Schwarze Löcher keine Haare? - Stephen Hawking 2016-12-16

Das Geheimnis der Schwarzen Löcher Sie sind eines der größten Rätsel im Universum: Schwarze Löcher, kollabierte Sterne, deren Anziehungskraft so groß ist, dass sie alles in sich hineinziehen, was in ihren Einflussbereich gelangt. Stephen Hawking hat sich ein Leben lang mit ihnen beschäftigt. Denn sie sind eine Existenzfrage. Wenn an ihnen sogar Raum und Zeit enden und niemand sagen kann, was aus all dem wird, was sie verschlucken – was ist dann noch sicher, welche unserer Naturgesetze gelten dann noch? Oder geben sie am Ende doch wieder etwas her? In diesen kurzen Lektionen, im Rahmen der renommierten Reith Lectures von BBC Radio 4 vorgetragen, zieht der berühmteste Physiker der Welt eine kurze Bilanz seiner Beschäftigung mit den Schwarzen Löchern, die Bilanz eines Lebenswerkes.

Time -

An Ethics of Remembering - Edith Wyschogrod 1998-05-28

Through the figure of the "heterological historian", this text creates a framework for the understanding of history and the ethical duties of the historian. It also weighs the impact of modern archival methods, such as film and the Internet, which add new constraints to the writing of history.

Princeton Alumni Weekly - Jesse Lynch Williams 1994

Black Holes, Wormholes and Time Machines, Second Edition - Jim Al-Khalili 2011-12-08

Bringing the material up to date, Black Holes, Wormholes and Time Machines, Second Edition captures the new ideas and discoveries made in physics since the publication of the best-selling first edition. While retaining the popular format and style of its predecessor, this edition explores the latest developments in high-energy astroparticle physics and Big Bang cosmology. The book continues to make the ideas and theories of modern physics easily understood by anyone, from researchers to students to general science enthusiasts. Taking you on a journey through space and time, author Jim Al-Khalili covers some of the most fascinating topics in physics today, including: Black holes Space warps The Big Bang Time travel Wormholes Parallel universes Professor Al-Khalili explains often complex scientific concepts in simple, nontechnical terms and imparts an appreciation of the cosmos, helping you see how time traveling may not be so far-fetched after all.

Black Holes & Time Warps: Einstein's Outrageous Legacy (Commonwealth Fund Book Program) - Kip Thorne 1995-01-17

Winner of the 2017 Nobel Prize in Physics Ever since Albert Einstein's general theory of relativity burst upon the world in 1915 some of the most brilliant minds of our century have sought to decipher the mysteries bequeathed by that theory, a legacy so unthinkable in some respects that even Einstein himself rejected them. Which of these bizarre phenomena, if any, can really exist in our universe? Black holes, down which anything can fall but from which nothing can return; wormholes, short spacewarps connecting regions of the cosmos; singularities, where space and time are so violently warped that time ceases to exist and space becomes a kind of foam; gravitational waves, which carry symphonic accounts of collisions of black holes billions of years ago; and time machines, for traveling backward and forward in time. Kip Thorne, along with fellow theorists Stephen Hawking and Roger Penrose, a cadre of Russians, and earlier scientists such as Oppenheimer, Wheeler and Chandrasekhar, has been in the thick of the quest to secure answers. In this masterfully written and brilliantly informed work of scientific history and explanation, Dr. Thorne, a Nobel Prize-winning physicist and the Feynman Professor of Theoretical Physics Emeritus at Caltech, leads his readers through an elegant, always human, tapestry of interlocking themes, coming finally to a uniquely informed answer to the great question: what principles control our universe and why do physicists think they know the things they think they know? Stephen Hawking's A Brief History of Time has been one of the greatest best-sellers in publishing history. Anyone who struggled with that book will find here a more slowly paced but equally mind-stretching experience, with the added fascination of a rich historical and human component. Winner of the Phi Beta Kappa Award in Science.

Mensch und Universum - Brian Cox 2017-10-05

Wer sind wir? Woher kommen wir? Sind wir allein im Universum? Ist unser Dasein reiner Zufall oder wurde der Kosmos für den Menschen geschaffen? – Dieses Buch stellt sie: Die großen Fragen unserer Ursprünge, unseres Schicksals und nach unserem Platz im All. In "Mensch und Universum" gehen Professor Brian Cox und Andrew Cohen den Lösungen dieser Rätsel mit wissenschaftlicher Detektivarbeit auf den Grund. Vom Faustkeil bis Einstein, vom Affen zum Astronauten – die Evolution menschlicher Erkenntnis ist Grund genug, ihre Antworten mit größter Hingabe zu erforschen. "Das Unverständlichste am Universum ist im Grunde, dass wir es verstehen." -- Albert Einstein "Physik ist besser als Rock'n'Roll" – Brian Cox Deutsche Ausgabe des Sunday-Times-Bestellers "Human Universe"

Black Hole Astrophysics - David L. Meier 2012-07-27

As a result of significant research over the past 20 years, black holes are now linked to some of the most spectacular and exciting phenomena in the Universe, ranging in size from those that have the same mass as stars to the super-massive objects that lie at the heart of most galaxies, including our own Milky Way. This book first introduces the properties of simple isolated holes, then adds in complications like rotation, accretion, radiation, and magnetic fields, finally arriving at a basic understanding of how these immense engines work. Black Hole Astrophysics • reviews our current knowledge of cosmic black holes and how they generate the most powerful observed pheonomena in the Universe; • highlights the latest, most up-to-date theories and discoveries in this very active area of astrophysical research; • demonstrates why we believe that black holes are responsible for important phenomena such as quasars, microquasars and gammaray bursts; • explains to the reader the nature of the violent and spectacular outfl ows (winds and jets) generated by black hole accretion.

Das bewusste Universum - Amit Goswami 2015-11-02

Die modernen Paradoxien der Wissenschaft lassen sich lösen - wenn man annimmt, dass das Universum nicht aus Materie, sondern aus Bewusstsein besteht. Amit Goswami zeigt in diesem längst zum Klassiker gewordenen Buch, dass die Verbindung zwischen den Erkenntnissen der modernen Wissenschaft, etwa der Quantenphysik, und den uralten spirituellen Traditionen des Ostens auf ein neues, revolutionäres Weltbild hinausläuft. Das Universum ist zielgerichtet, sinn- und zweckvoll.

Einstein Relatively Simple - Ira Mark Egdall 2014-01-06

"Outstanding Academic Title for 2014" by CHOICE Einstein Relatively Simple brings together for the first time an exceptionally clear explanation of both special and general relativity. It is for people who always wanted to understand Einstein's ideas but never thought they could. Told with humor, enthusiasm, and rare clarity, this entertaining book reveals how a former high school drop-out revolutionized our understanding of space and time. From E=mc2 and everyday time travel to black holes and the big bang, Einstein Relatively Simple takes us all, regardless of our scientific backgrounds, on a mind-boggling journey through the depths of Einstein's universe. Along the way, we track Einstein through the perils and triumphs of his life — follow his thinking, his logic, and his insights — and chronicle the audacity, imagination, and sheer genius of the man recognized as the greatest scientist of the modern era. In Part I on special relativity we learn how time slows and space shrinks with motion, and how mass and energy are equivalent. Part II on general relativity reveals a cosmos where black holes trap light and stop time, where wormholes form gravitational time machines, where space itself is continually expanding, and where some 13.7 billion years ago our universe was born in the ultimate cosmic event — the Big Bang. Contents:Einstein Discovered: Special Relativity, E = mc2,and Spacetime:From Unknown to RevolutionaryThe Great ConflictThe Two PostulatesA New RealityThe Shrinking of TimeSimultaneity and the Squeezing of SpaceThe World's Most Famous EquationSpacetimeEinstein Revealed: General Relativity, Gravity, and the Cosmos:Einstein's Dream“The Happiest Thought of My Life”The Warping of Space and TimeStitching SpacetimeWhat is Spacetime Curvature?Einstein's MasterpieceThe Universe RevealedIn the Beginning Readership: Adults and young people all over the world who are curious about Einstein and how the universe works. Keywords:Einstein;Relativity;Special Relativity;General Relativity;Spacetime;Big Bang;Black Holes;Expansion of Space;Time Travel;E=mc2;Universe;Cosmos;Time Dilation;Length Contraction;Wormholes;Light Postulate;Length Contraction;Gravitational Time Dilation;Time Warp;Space Warp;Relativity Postulate;Lorentz Transformation;Light Clock;Relativity of Simultaneity;Twins

Paradox;Equivalence Principle;Gravity;Spacetime Curvature;Spacetime Interval;Gaussian Co-Ordinates;Geodesic;Momenergy;The Einstein Equation;Schwarzschild Geometry;Bending of Starlight;Frame Dragging;Cosmic Microwave Background;Geometry of Universe;Flat Universe;Critical Density;Dark Matter;Dark Energy;Future of UniverseKey Features:Einstein Relatively Simple is the definitive book on Einstein's theories for the lay reader — one that is fun to read, comprehensive, and most important, understandableEinstein's ideas are explained in everyday languageThe book devotes eight chapters to special and a full eight chapters to general relativity. Most popular science books give general relativity only a brief mention or ignore it altogetherReviews: “This general relativity theory changed our views on the origin and on the ending (if any) of the universe … all topics that tickle the imagination of a general public and Egdall, bringing the reader to the point beyond general relativity, does not miss the opportunity to end his guided tour with a sparkling firework of these issues … it is an entertaining introduction for the layman, that brings the reader a very long way.” The European Mathematical Society “He covers the main topics of special and general relativity in a refreshing, personal way. This is a well-crafted, well-documented text with extensive endnotes, in which a bibliography is embedded. He introduces readers to his own unique entry into this very populous genre. Valuable for inquisitive nonscientists.” CHOICE “I'm crazy about it. It's the best presentation of relativity for non-scientists that I've seen.” Art Hobson Professor Emeritus of Physics University of Arkansas "The writing is jovial and energetic and holds the reader's attention. This book is a nice introduction to modern physics, with a great biography of Einstein included. This book is recommended for a lay reader with basic algebra skills; high school and beginning college physics students would find it easily accessible." Zentralblatt MATH

Judaism, Physics and God - David W. Nelson 2006

This provocative fusion of religion and science offers new ways to express spiritual beliefs, harmonizes Judaism with modern scientific thinking, and introduces a new expression of our relationship with God in the exciting context of contemporary science.

Quanten - Manjit Kumar 2011

Das kleine Buch der Stringtheorie - Steven S. Gubser 2011-08-26

Das kleine Buch der Stringtheorie bietet eine knappe und unterhaltsame Einführung in eines der meistdiskutierten Gebiete der modernen Physik. Die Stringtheorie gilt als eine „Theorie für Alles“, mit der sich sämtliche Grundkräfte der Natur beschreiben lassen. Bisher allerdings konnte sie experimentell nicht bestätigt werden, und unter Physikern wird sie sehr kontrovers diskutiert. Dieses Buch gibt Ihnen die Gelegenheit, sich ein eigenes Bild zu machen!