Black Holes And Baby Universes Stephen Hawking

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Stephen Hawking's A Brief History of Time Bantam
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.

Black Holes and Baby Universes (Cover Baru) Bantam
In the years since its publication in 1988, Stephen Hawking's A Brief History Of Time has established itself as a landmark volume in scientific writing. It has become an international publishing phenomenon, translated into forty languages and selling over nine million copies. The book was on the cutting edge of what was then known about the nature of the universe, but since that time there have been extraordinary advances in the technology of macrocosmic worlds. These observations have confirmed many of Professor Hawkin's theoretical predictions in the first edition of his book, including the recent discoveries of the Cosmic Background Explorer satellite (COBE), which probed back in time to within 300,000 years of the fabric of space-time that he had projected. Eager to bring to his original text the new knowledge revealed by these many observations, as well as his recent research, for this expanded edition Professor Hawking has prepared a new introduction to the book, written an entirely new chapter on the fascinating subject of wormholes and time travel, and updated the original chapters. In addition, to heighten understanding of complex concepts that readers may have found difficult to grasp despite the clarity and wit of Professor Hawking's writing, this edition is enhanced throughout with more than 240 full-color illustrations, including satellite images, photographs made made possible by spectacular technological advance such as the Hubble Space Telescope, and computer generated images of three and four-dimensional realities. Detailed captions clarify these illustrations, enable readers to experience the vastness of intergalactic space, the nature of black holes, and the microcosmic world of particle physics in which matters and antimatter collide. A classic work that now brings to the reader the latest understanding of cosmology, A Brief History Of Time is the story of the ongoing search for t he tantalizing secrets at the heart of time and space.

Light in the Darkness Gramedia Pustaka Utama
Cosmological Koans invites the reader into an intellectual adventure of the highest order. Through more than fifty Koans—pleasingly paradoxical vignettes following the ancient Zen tradition—leading physicist Anthony Aguirre takes the reader across the world from West to East, and through ideas spanning the age, breadth, and depth of the Universe. Using these beguiling Koans (Could there be a civilization on a mote of dust? How much of your fate have you made? Who cleans the universe?) and a flair for explaining complex science, Aguirre covers cosmic questions that scientific giants from Aristotle to Galileo to Heisenberg have grappled with, from the meaning of quantum theory and the nature of time to the origin of multiple universes. A playful and enlightening book, Cosmological Koans explores the strange hinterland between the deep structure of the physical world and our personal experience of it, giving readers what Einstein himself called "the most beautiful and deepest experience" anyone can have: a sense of the mysterious.

A Briefer History of Time Ten Speed Press
The International Bestseller On April 10, 2019, award-winning astrophysicist Heino Falcke presented the first image ever captured of a black hole at an international press conference—a turning point in astronomy that Science magazine called the scientific breakthrough of the year. That photo was captured with the unthinkable commitment of an intercontinental team of astronomers who transformed the world into a global telescope. While this image achieved Falcke's goal in making a black hole "visible" for the first time, he recognizes that the photo itself asks more questions for humanity than it answers. Light in the Darkness takes us on Falcke's extraordinary journey to the darkest corners of the universe. From the first humans looking up at the night sky to modern astrophysics, from the study of black holes to the still-unsolved mysteries of the universe, Falcke asks, in even the greatest triumphs of science, is there room for doubts, faith, and a God? A plea for curiosity and humility, Light in the Darkness sees one of the great minds shaping the world today as he ponders the big, pressing questions that present themselves when we look up at the stars.
When You Reach Me Bantam
In the past, they were recognized as the most destructive force in nature. Now, following a cascade of astonishing discoveries, supermassive black holes have undergone a dramatic shift in paradigm. Astronomers are finding out that these objects may have been critical to the formation of structure in the early universe, spawning bursts of star formation, planets, and even life itself. They may have contributed as much as half of all the radiation produced after the Big Bang, and as many as 200 million of them may now be lurking through the vast expanses of the observable cosmos. In this elegant, non-technical account, Melia conveys for the general reader the excitement generated by the quest to expose what these giant distortions in the fabric of space and time have to say about our origin and ultimate destiny.
An Introduction to Black Holes, Information and the String Theory Revolution World Scientific
- A unique exposition of the foundations of the quantum theory of black holes including the impact of string theory, the idea of black hole complementarily and the holographic principle bull; Aims to educate the physicist or student of physics who is not an expert on string theory, on the revolution that has grown out of black hole physics and string theory
Death by Black Hole: And Other Cosmic Quandaries Cambridge University Press
All the matter and light we can see in the universe makes up a trivial 5 per cent of everything. The rest is hidden. This could be the biggest puzzle that science has ever faced. Since the 1970s, astronomers have been aware that galaxies have far too little matter in them to account for the way they spin around: they should fly apart, but something concealed holds them together. That 'something' is dark matter – invisible material in five times the quantity of the familiar stuff of stars and planets. By the 1990s we also knew that the expansion of the universe was accelerating. Something, named dark energy, is pushing it to expand faster and faster. Across the universe, this requires enough energy that the equivalent mass would be nearly fourteen times greater than all the visible material in existence. Brian Clegg explains this major conundrum in modern science and looks at how scientists are beginning to find solutions to it.
Stephen Hawking Bantam
Stephen Hawking's phenomenal, multimillion-copy bestseller, A Brief History of Time, introduced the ideas of this brilliant theoretical physicist to readers all over the world. Now, in a major publishing event, Hawking returns with a lavishly illustrated sequel that unravels the mysteries of the major breakthroughs that have occurred in the years since the release of his acclaimed first book. The Universe in a Nutshell • Quantum mechanics • M-theory • General relativity • 11-dimensional supergravity • 10-dimensional membranes • Superstrings • P-branes • Black holes One of the most influential thinkers of our time, Stephen Hawking is an intellectual icon, known not only for the adventurousness of his ideas but for the clarity and wit with which he expresses them. In this new book Hawking takes us to the cutting edge of theoretical physics, where truth is often stranger than fiction, to explain in laymen's terms the principles that control our universe. Like many in the community of theoretical physicists, Professor Hawking is seeking to uncover the grail of science – the elusive Theory of Everything that lies at the heart of the cosmos. In his accessible and often playful style, he guides us on his search to uncover the secrets of the universe – from supergravity to supersymmetry, from quantum theory to M-theory, from holography to duality. He takes us to the wild frontiers of science, where superstring theory and p-branes may hold the final clue to the puzzle. And he lets us behind the scenes of one of his most exciting intellectual adventures as he seeks "to combine Einstein's General Theory of Relativity and Richard Feynman's idea of multiple histories into one complete unified theory that will describe everything that happens in the universe." With characteristic exuberance, Professor Hawking invites us to be fellow travelers on this extraordinary voyage through space-time. Copious four-color illustrations help clarify this journey into a surreal wonderland where particles, sheets, and strings move in eleven dimensions; where black holes evaporate and disappear, taking their secret with them; and where the original cosmic seed from which our own universe sprang was a tiny nut. The Universe in a Nutshell is essential reading for all of us who want to understand the universe in which we live. Like its companion volume, A Brief History of Time, it conveys the excitement felt within the scientific community as the secrets of the cosmos reveal themselves.
The Little Book of Black Holes Springer
NEW YORK TIMES BESTSELLER • Thirteen extraordinary essays shed new light on the mystery of the universe—and on one of the most brilliant thinkers of our time. In his phenomenal bestseller A Brief History of Time, Stephen Hawking literally transformed the way we think about physics, the universe, reality itself. In these thirteen essays and one remarkable extended interview, the man widely regarded as the most brilliant theoretical physicist since Einstein returns to reveal an amazing array of possibilities for understanding our universe. Building on his earlier work, Hawking discusses imaginary time, how black holes can give birth to baby universes, and scientists' efforts to find a complete unified theory that would predict everything in the universe. With his characteristic mastery of language, his sense of humor and commitment to plain speaking, Stephen Hawking invites us to know him better—and to share his passion for the voyage of intellect and imagination that has opened new ways to understanding the very nature of the cosmos.
Black Holes and Baby Universes Princeton University Press
What happens when something is sucked into a black hole? Does it disappear? Three decades ago, a young physicist named Stephen Hawking claimed it did-and in doing so put at risk everything we know about physics and the fundamental laws of the universe. Most scientists didn't recognize the import of Hawking's claims, but Leonard Susskind and Gerard t'Hooft realized the threat, and responded with a counterattack that changed the course of physics. THE BLACK HOLE WAR is the thrilling story of their united effort to reconcile Hawking's revolutionary theories of black holes with

their own sense of reality-effort that would eventually result in Hawking admitting he was wrong, paying up, and Susskind and t'Hooft realizing that our world is a hologram projected from the outer boundaries of space. A brilliant book about modern physics, quantum mechanics, the fate of stars and the deep mysteries of black holes, Leonard Susskind's account of the Black Hole War is mind-bending and exhilarating reading.

The Theory of Everything World Scientific
The bestselling follow-up to Hawking's phenomenal million-copy hardcover bestseller A Brief History of Time is now available in trade paperback. These 14 pieces reveal Hawking variously as the scientist, the man, the concerned world citizen, and--always--the rigorous and imaginative thinker.

Dark Matter in the Universe Bantam Press
From the acclaimed author of Black Hole Blues and Other Songs from Outer Space—an authoritative and accessible guide to the most alluring and challenging phenomena of contemporary science. "[Levin will] take you on a safe black hole trip, an exciting travel story enjoyed from your chair’s event horizon.” —Boston Globe Through her writing, astrophysicist Janna Levin has focused on making the science she studies not just comprehensible but also, and perhaps more important, intriguing to the nonscientist. In this book, she helps us to understand and find delight in the black hole—perhaps the most opaque theoretical construct ever imagined by physicists—illustrated with original artwork by American painter and photographer Lia Halloran. Levin takes us on an evocative exploration of black holes, provoking us to imagine the visceral experience of a black hole encounter. She reveals the influence of black holes as they populate the universe, sculpt galaxies, and even infuse the whole expanse of reality that we inhabit. Lively, engaging, and utterly unique, Black Hole Survival Guide is not just informative—it is, as well, a wonderful read from first to last.

Stephen Hawking Deluxe Set Icon Books
#1 NEW YORK TIMES BESTSELLING AUTHORS The science classic made more accessible • More concise • Illustrated FROM ONE OF THE MOST BRILLIANT MINDS OF OUR TIME COMES A BOOK THAT CLARIFIES HIS MOST IMPORTANT IDEAS Stephen Hawking’s worldwide bestseller A Brief History of Time remains a landmark volume in scientific writing. But for years readers have asked for a more accessible formulation of its key concepts—the nature of space and time, the role of God in creation, and the history and future of the universe. A Briefer History of Time is Professor Hawking’s response. Although “briefer,” this book is much more than a mere explanation of Hawking’s earlier work. A Briefer History of Time both clarifies and expands on the great subjects of the original, and records the latest developments in the field—from string theory to the search for a unified theory of all the forces of physics. Thirty-seven full-color illustrations enhance the text and make A Briefer History of Time an exhilarating and must-have addition in its own right to the great literature of science and ideas.

The Road to Reality Entrepreneur Press
"[Tyson] tackles a great range of subjects…with great humor, humility, and—most important—humanity." —Entertainment Weekly Loyal readers of the monthly "Universe" essays in Natural History magazine have long recognized Neil deGrasse Tyson's talent for guiding them through the mysteries of the cosmos with clarity and enthusiasm. Bringing together more than forty of Tyson's favorite essays, Death by Black Hole explores a myriad of cosmic topics, from what it would be like to be inside a black hole to the movie industry's feeble efforts to get its night skies right. One of America's best-known astrophysicists, Tyson is a natural teacher who simplifies the complexities of astrophysics while sharing his infectious fascination for our universe.

Space at the Speed of Light Turtleback Books
Stephen Hawking, the Lucasian Professor of Mathematics at Cambridge University, has made important theoretical contributions to gravitational theory and has played a major role in the development of cosmology and black hole physics. Hawking's early work, partly in collaboration with Roger Penrose, showed the significance of spacetime singularities for the big bang and black holes. His later work has been concerned with a deeper understanding of these two issues. The work required extensive use of the two great intellectual achievements of the first half of the Twentieth Century: general relativity and quantum mechanics; and these are reflected in the reprinted articles. Hawking's key contributions on black hole radiation and the no-boundary condition on the origin of the universe are included. The present compilation of Stephen Hawking's most important work also includes an introduction by him, which guides the reader though the major highlights of the volume. This volume is thus an essentialitem in any library and will be an important reference source for those interested in theoretical physics and applied mathematics. It is an excellent thing to have so many of Professor Hawking's most important contributions to the theory of black holes and space-time singularities all collected together in one handy volume. I am very glad to have them". Roger Penrose (Oxford) "This was an excellent idea to put the best papers by Stephen Hawking together. Even his papers written many years ago remain extremely useful for those who study classical and quantum gravity. By watching the evolution of his ideas one can get a very clear picture of the development of quantum cosmology during thelast quarter of this century". Andrei Linde (Stanford) "This review could have been quite short: 'The book contains a selection of 21 of Stephen Hawking's most significant papers with an overview written by the author'. This w

Einstein's Monsters: The Life and Times of Black Holes Wendy Lamb Books
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.

My Brief History Bantam
Was there a beginning of time? Could time run backwards? Is the universe infinite or does it have boundaries? These are just some of the questions considered in an internationally acclaimed masterpiece by one of the world's greatest thinkers. It begins by reviewing the great theories of the cosmos from Newton to Einstein, before delving into the secrets which still lie at the heart of space and time, from the Big Bang to black holes, via spiral galaxies and strong theory. To this day A Brief History of Time remains a staple of the scientific canon, and its succinct and clear language continues to introduce millions to the universe and its wonders.

The Life of the Cosmos Anchor
Readers worldwide have come to know the work of Stephen Hawking through his phenomenal bestseller, A Brief History of Time. Now, in his first collection of essays and other pieces - on subjects that range from the warmly personal to the wholly scientific - Stephen Hawking is revealed variously as the scientist, the man, the concerned world citizen, and - as always - the rigorous and imaginative thinker. Whether he is remembering his first experience of nursery school; puncturing the arrogance of those who think science can best be understood only by other scientists and should be left to them; exploring the origins and the future of the universe; or reflecting on the phenomenon of A Brief History of Time, Stephen Hawking's wit, directness of style and absence of pomp are vital characteristics at all times.

Black Holes and Baby Universes and Other Essays Bantam Dell Publishing Group
From the big bang to black holes, this fast-paced illustrated tour of time and space for the astro-curious unlocks the science of the stars to reveal fascinating theories, surprising discoveries, and ongoing mysteries in modern astronomy and astrophysics. Before the big bang, time, space, and matter didn't exist. In the 14 billion years since, scientists have pointed their telescopes upward, peering outward in space and backward in time, developing and refining theories to explain the weird and wonderful phenomena they observed. Through these observations, we now understand concepts like the size of the universe (still expanding), the distance to the next-nearest star from earth (Alpha Centauri, 26 trillion miles) and what drives the formation of elements (nuclear fusion), planets and galaxies (gravity), and black holes (gravitational collapse). But are these cosmological questions definitively answered or is there more to discover? Oxford University astrophysicist and popular YouTube personality Dr. Becky Smethurst presents everything you need to know about the universe in ten accessible and engagingly illustrated lessons. In Space at the Speed of Light: The History of 14 Billion Years for People Short on Time, she guides you through fundamental questions, both answered and unanswered, posed by space scientists. Why does gravity matter? How do we know the big bang happened? What is dark matter? Do aliens exist? Why is the sky dark at night? If you have ever looked up at night and wondered how it all works, you will find answers--and many more questions--in this pocket-sized tour of the universe!

Black Holes HarperCollins
The legendary physicist explores his favorite subject in a pair of enlightening, accessible, and cleverly illustrated essays for curious readers, originally delivered as BBC lectures. “It is said that fact is sometimes stranger than fiction, and nowhere is that more true than in the case of black holes. Black holes are stranger than anything dreamed up by science-fiction writers, but they are firmly matters of science fact.” For decades, Stephen Hawking has been fascinated by black holes. He believes that if we understood the challenges they pose to the very nature of space and time, we could unlock the secrets of the universe. In these conversational pieces, Hawking’s sense of wonder is infectious as he holds forth on what we know about black holes, what we still don’t know, and theoretical answers to more specific questions, such as: What would happen if you ever got sucked into one? Annotated and with an introduction by BBC News science editor David Shukman, featuring whimsical and illuminating illustrations, Black Holes offers a candid peek into one of the great scientific mysteries of all time. Praise for Stephen Hawking “[Hawking] can explain the complexities of cosmological physics with an engaging combination of clarity and wit. . . . His is a brain of extraordinary power.”—The New York Review of Books “Hawking clearly possesses a natural teacher’s gifts—easy, good-natured humor and an ability to illustrate highly complex propositions with analogies plucked from daily life.”—The New York Times “A high priest of physics, one of a handful of theorists who may be on the verge of reading God’s mind.”—Los Angeles Times