Death By Black Hole Other Cosmic Quandaries

"[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.

The New York Times bestseller: "You gotta read this. It is the most exciting book about Pluto you will ever read in your life." —Jon Stewart When the Rose Center for Earth and Space at the American Museum of Natural History reclassified Pluto as an icy comet, the New York Times proclaimed on page one, "Pluto Not a Planet? Only in New York." Immediately, the public, professionals, and press were choosing sides over Pluto's planethood. Pluto is entrenched in our cultural and emotional view of the cosmos, and Neil deGrasse Tyson, award-winning author and director of the Rose Center, is on a quest to discover why. He stood at the heart of the controversy over Pluto's demotion, and consequently Plutophiles have freely shared their opinions with him, including endless hate mail from third-graders. With his inimitable wit, Tyson delivers a minihistory of planets, describes the oversized characters of the people who study them, and recounts how America's favorite planet was ousted from the cosmic hub.

From the author of Astrophysics for People in a Hurry and the host of Cosmos: A Spacetime Odyssey, a memoir about growing up and a young man's budding scientific curiosity. This is the absorbing story of Neil deGrasse Tyson’s lifelong fascination with the night sky, a restless wonder that began some thirty years ago on the roof of his Bronx apartment building and eventually led him to become the director of the Hayden Planetarium. A unique chronicle of a young man who at one time was both nerd and jock, Tyson’s memoir could well inspire other similarly curious youngsters to pursue their dreams. Like many athletic kids he played baseball, won medals in track and swimming, and was captain of his high school wrestling team. But at the same time he was setting up a telescope on winter nights, taking an advanced astronomy course at the Hayden Planetarium, and spending a summer vacation at an astronomy camp in the Mojave Desert. Eventually, his scientific curiosity prevailed, and he went on to graduate in physics from Harvard and to earn a Ph.D. in astrophysics from Columbia. There followed postdoctoral research at Princeton. In 1996, he became the director of the Hayden Planetarium, where some twenty-five years earlier he had been awed by the spectacular vista in the sky theater. Tyson pays tribute to the key teachers and mentors who recognized his precocious interests and abilities, and helped him succeed. He intersperses personal reminiscences with thoughts on scientific literacy, careful science vs. media hype, the possibility that a meteor could someday hit the Earth, dealing with society’s racial stereotypes, what science can and cannot say about the existence of God, and many other interesting insights about science, society, and the nature of the universe. Now available in paperback with a new preface and other additions, this engaging memoir will enlighten and inspire an appreciation of astronomy and the wonders of our universe.

“Remarkably upbeat, and imbued with wit, wisdom and a palpable sense of awe over our universe.”—Tucson Weekly Most of us are aware of our own mortality, but few among us know what science, with insights yielded from groundbreaking new research, has to say about endings on a larger scale. Enter astronomer Chris Impey, who chronicles the death of the whole shebang: individual, species, bio- sphere, Earth, Sun, Milky Way, and, finally, the entire universe. With a healthy dose of humor, How It Ends illuminates everything from the technologies of human life extension and the evolutionary arms race between microbes and men to the inescapable dimming of the Sun and the ultimate “big rip,” giving us a rare glimpse into a universe without us.

A fascinating and thought-provoking investigation into the nature of black holes—a blend of the spiritual, the philosophical, and the scientific—from the premier German astrophysicist who made history in 2019, capturing the first one on film. A Light in the Darkness is the story of one of the greatest astrological achievements of all time: the first photographic evidence of black holes in April 2019, and its significance for humanity, told by the scientist who accomplished it. A man of faith ordained in the Protestant tradition, Heino Falcke wrestles with the ways in which black holes force us to confront the boundary where human life ends and the celestial begins. He also ponders why black holes are difficult for most of us to understand—comparing it to our inability to envisage our own inevitable death. Black holes develop in outer space when a massive star dies, and its matter is condensed. That extreme amount of mass contained in a small space generates a gigantic amount of gravitational force, allowing the black hole to suck up everything that comes near, including light. These astronomical wonders are the subject of our greatest scientific and philosophical theorizing—the journey to a black hole would be the journey to the end of time itself. In this way, Falcke regards them as the most exquisite representations of fear, death . . . and, surprisingly, the divine. Empirical and profound, A Light in the Darkness is the first work to examine both the physical nature and spiritual meaning of black holes, those astrophysical mysteries Falcke, calls “the epitome of merciless destruction.”

A New York Times bestseller! “Lively and absorbing. . ." — The New York Times Book Review "Engrossing." —Wall Street Journal “Entertaining and well-researched . . . ” —Houston Chronicle Three noted Texan writers combine forces to tell the real story of the Alamo, dispelling the myths, exploring why they had their day for so long, and explaining why the ugly fight about its meaning is now coming to a head. Every nation needs its creation myth, and since Texas was a nation before it was a state, it's no surprise that its myths bite deep. There's no piece of history more important to Texans than the Battle of the Alamo, when Davy Crockett and a band of rebels went down in a blaze of glory fighting for independence from Mexico, losing the battle but setting Texas up to win the war. However, that version of events, as Forget the Alamo definitively shows, owes more to fantasy than reality. Just as the site of the Alamo was left in ruins for decades, its story was forgotten and twisted over time, with the contributions of Tejanos--Texans of Mexican origin, who fought alongside the Anglo rebels--scrubbed from the record, and the origin of the conflict over Mexico's push to abolish slavery papered over. Forget the Alamo provocatively explains the true story of the battle against the backdrop of Texas's struggle for independence, then shows how the sausage of myth got made in the Jim Crow South of the late nineteenth and early twentieth century. As uncomfortable as it may be to hear for some, celebrating the Alamo has long had an echo of celebrating whiteness. In the past forty-some years, waves of revisionists have come at this topic, and at times have made real progress toward a more nuanced and inclusive story that doesn't alienate anyone. But we are not living in one of those times; the fight over the Alamo's meaning has become more pitched than ever in the past few years, even violent, as Texas's future begins to look more and more different from its past. It's the perfect time for a wise and generous-spirited book that shines the bright light of the truth into a place that's gotten awfully dark.

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. 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.

When Siraj, the ruler of Bengal, overran the British settlement of Calcutta in 1756, he allegedly jailed 146 European prisoners overnight in a cramped prison. Of the group, 123 died of suffocation. While this episode was never independently confirmed, the story of "the black hole of Calcutta" was widely circulated and seen by the British public as an atrocity committed by savage colonial subjects. The Black Hole of Empire follows the ever-changing representations of this historical event and founding myth of the British Empire in India, from the eighteenth century to the present. Partha Chatterjee explores how a supposed tragedy paved the ideological foundations for the "civilizing" force of British imperial rule and territorial control in India. Chatterjee takes a close look at the justifications of modern empire by liberal thinkers, international lawyers, and conservative traditionalists, and examines the intellectual and political responses of the colonized, including those of Bengali nationalists. The two sides of empire's entwined history are brought together in the story of the Black Hole memorial: set up in Calcutta in 1760, demolished in 1821, restored by Lord Curzon in 1902, and removed in 1940 to a neglected churchyard. Challenging conventional truisms of imperial history, nationalist scholarship, and liberal visions of globalization, Chatterjee argues that empire is a necessary and continuing part of the history of the modern state. Some images inside the book are unavailable due to digital copyright restrictions.

Budding astronomers and scientists will love this humorous introduction to the extremely complex concept of black holes. With space facts and answers about the galaxies (ours, and others) A Black Hole is NOT a Hole takes readers on a ride that will stretch their minds around the phenomenon known as a black hole. In lively and text, the book starts off with a thorough explanation of gravity and the role it plays in the formation of black holes. Paintings by Michael Carroll, coupled with real telescopic images, help readers visualize the facts and ideas presented in the text, such as how light bends, and what a supernova looks like. Back matter includes a timeline which sums up important findings discussed throughout, while the glossary and index provide a quick point of reference for readers. Children and adults alike will learn a ton of spacey facts in this far-out book that’s sure to excite even the youngest of astrophiles.

“Who can ask for better cosmic tour guides to the universe than Drs. Tyson and Goldsmith?” —Michio Kaku, author of Hyperspace and Parallel Worlds Our true origins are not just human, or even terrestrial, but in fact cosmic. Drawing on recent scientific breakthroughs and the current cross-pollination among geology, biology, astrophysics, and cosmology, ?Origins? explains the soul-stirring leaps in our understanding of the cosmos. From the first image of a galaxy birth to Spirit Rover's exploration of Mars, to the discovery of water on one of Jupiter's moons, coauthors Neil deGrasse Tyson and Donald Goldsmith conduct a galvanizing tour of the cosmos with clarity and exuberance.

Any theory – any theory at all – that begins with false assumptions will produce false results. Therefore, the most fundamental task of all is to examine and get right the assumptions that underlie a theory. How do science’s fundamental assumptions stand up to scrutiny? Science falls apart at a particular aspect of existence that can be defined exactly – at singularities. The whole logic of science collapses when singularities are encountered. This is fantastically problematic for science given that black holes are centred on singularities, photons are singularities, and the whole of the Big Bang Universe came from a Singularity. What, ontologically, are singularities? Descartes gave us the answer hundreds of years ago. Singularities are minds, and from that single fact, science is turned on its head. Mind does not come from matter; matter comes from mind.

The murder of a world-famous physicist raises fears that the Illuminati are operating again after centuries of silence, and religion professor Robert Langdon is called in to assist with the case.

In Black Holes and warped spacetime you'll discover a world of science fact stranger than science fiction.

It's only a matter of time before a cosmic disaster spells the end of the Earth. But how concerned should we about about any of these catastrophic scenarios? And if they do post a danger, can anything be done to stop them?

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.

“Extraordinary…. A feast of history, an expert tour through thousands of years of war and conquest.” —Jennifer Carson, New York Times Book Review In this far-reaching foray into the millennia-long relationship between science and military power, acclaimed astrophysicist Neil deGrasse Tyson and co-author Avis Lang examine how the methods and tools of astrophysics have been enlisted in the service of war. Spanning early celestial navigation to satellite-enabled warfare, Accessory to War is a richly researched and provocative examination of the intersection of science, technology, industry, and power that will introduce Tyson’s millions of fans to yet another dimension of how the universe has shaped our lives and our world.

In Black Hole Chasers, award-winning investigative journalist Anna Crowley Redding presents the riveting true story of one of the most inspiring scientific breakthroughs of our lifetime—the Event Horizon Telescope team's reveal of the first image of a super massive black hole. In April 2019, the Event Horizon Telescope Team unveiled the first ever image of a super massive black hole. This inspiring scientific breakthrough took years of hard work, innovative thinking, and a level of global cooperation never seen before. The challenge was immense. The goal was impossible. They would need a telescope as big as the earth itself. The technology simply didn’t exist. And yet, a multi-national team of scientists was able to show the world an image of something previously unseeable. Based off extensive research and hours interviews with many of the team's ground-breaking scientist, physicists, and mathematicians, Black Hole Chasers is a story of unique technological innovation and scientific breakthroughs, but more importantly, it's a story of human curiosity and triumph.

New York Times Bestseller A luminous companion to the phenomenal bestseller Astrophysics for People in a Hurry. Astrophysicist Neil deGrasse Tyson has attracted one of the world’s largest online followings with his fascinating, widely accessible insights into science and our universe. Now, Tyson invites us to go behind the scenes of his public fame by revealing his correspondence with people across the globe who have sought him out in search of answers. In this hand-picked collection of 101 letters, Tyson draws upon cosmic perspectives to address a vast array of questions about science, faith, philosophy, life, and of course, Pluto. His succinct, opinionated, passionate, and often funny responses reflect his popularity and standing as a leading educator. Tyson’s

2017 bestseller Astrophysics for People in a Hurry offered more than one million readers an insightful and accessible understanding of the universe. Tyson’s most candid and heartfelt writing yet, Letters from an Astrophysicist introduces us to a newly personal dimension of Tyson’s quest to explore our place in the cosmos.

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.

On July 23, 1999, the Chandra X-Ray Observatory, the most powerful X-ray telescope ever built, was launched aboard the space shuttle Columbia. Since then, Chandra has given us a view of the universe that is largely hidden from telescopes sensitive only to visible light. In Chandra's Cosmos, the Smithsonian Astrophysical Observatory's Chandra science spokesperson Wallace H. Tucker uses a series of short, connected stories to describe the telescope's exploration of the hot, high-energy face of the universe. The book is organized in three parts: "The Big," covering the cosmic web, dark energy, dark matter, and massive clusters of galaxies; "The Bad," exploring neutron stars, stellar black holes, and supermassive black holes; and "The Beautiful," discussing stars, exoplanets, and life. Chandra has imaged the spectacular, glowing remains of exploded stars and taken spectra showing the dispersal of their elements. Chandra has observed the region around the supermassive black hole in the center of our Milky Way and traced the separation of dark matter from normal matter in the collision of galaxies, contributing to both dark matter and dark energy studies. Tucker explores the implications of these observations in an entertaining, informative narrative aimed at space buffs and general readers alike.

This illustrated companion to the popular podcast and National Geographic Channel show is an eye-opening journey for anyone curious about our universe, space, astronomy and the complexities of the cosmos. For decades, beloved astrophysicist Neil deGrasse Tyson has interpreted science with a combination of brainpower and charm that resonates with fans everywhere. This pioneering, provocative book brings together the best of StarTalk, his beloved podcast and television show devoted to solving the most confounding mysteries of Earth, space, and what it means to be human. Filled with brilliant sidebars, vivid photography, and unforgettable quotes from Tyson and his brilliant cohort of science and entertainment luminaries, StarTalk will help answer all of your most pressing questions about our world—from how the brain works to the physics of comic book superheroes. Fun, smart, and laugh-out-loud funny, this book is the perfect guide to everything you ever wanted to know about the universe—and beyond.

“Alive with intensity, gut-wrenching honesty, moments of humor, and—of course—heart. Not to be missed.”—Nova Ren Suma, author of Imaginary Girls and The Walls Around Us A stunning novel about the transformative power of love, perfect for fans of Jay Asher and Laurie Halse Anderson. Sixteen-year-old physics nerd Aysel is obsessed with plotting her own death. With a mother who can barely look at her without wincing, classmates who whisper behind her back, and a father whose violent crime rocked her small town, Aysel is ready to turn her potential energy into nothingness. There’s only one problem: she’s not sure she has the courage to do it alone. But once she discovers a website with a section called Suicide Partners, Aysel’s convinced she’s found her solution—Roman, a teenage boy who’s haunted by a family tragedy, is looking for a partner. Even though Aysel and Roman have nothing in common, they slowly start to fill in each other’s broken lives. But as their suicide pact becomes more concrete, Aysel begins to question whether she really wants to go through with it. Ultimately, she must choose between wanting to die or trying to convince Roman to live so they can discover the potential of their energy together.

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.

Accessible and essential coverage of today's challenging, speculative, cutting-edge science from Quanta Magazine. If you're a science and data nerd like me, you may be interested in "Alice and Bob Meet the Wall of Fire" and "The Prime Number Conspiracy" from Quanta Magazine and Thomas Lin. - Bill Gates These stories reveal the latest efforts to untangle the mysteries of the universe. Bringing together the best and most interesting science stories appearing in Quanta Magazine over the past five years, Alice and Bob Meet the Wall of Fire reports on some of the greatest scientific minds as they test the limits of human knowledge. Quanta, under editor-in-chief Thomas Lin, is the only popular publication that offers in-depth coverage of today's challenging, speculative, cutting-edge science. It communicates science by taking it seriously, wrestling with difficult concepts and clearly explaining them in a way that speaks to our innate curiosity about our world and ourselves. In the title story, Alice and Bob—beloved characters of various thought experiments in physics—grapple with gravitational forces, possible spaghettification, and a massive wall of fire as Alice jumps into a black hole. Another story considers whether the universe is impossible, in light of experimental results at the Large Hadron Collider. We learn about quantum reality and the mystery of quantum entanglement; explore the source of time's arrow; and witness a eureka moment when a quantum physicist exclaims: “Finally, we can understand

why a cup of coffee equilibrates in a room." We reflect on humans' enormous skulls and the Brain Boom; consider the evolutionary benefits of loneliness; peel back the layers of the newest artificial-intelligence algorithms; follow the "battle for the heart and soul of physics"; and mourn the disappearance of the "diphoton bump," revealed to be a statistical fluctuation rather than a revolutionary new particle. These stories from Quanta give us a front-row seat to scientific discovery. Contributors Philip Ball, K. C. Cole, Robbert Dijkgraaf, Dan Falk, Courtney Humphries, Ferris Jabr, Katia Moskvitch, George Musser, Michael Nielsen, Jennifer Ouellette, John Pavlus, Emily Singer, Andreas von Bubnoff, Frank Wilczek, Natalie Wolchover, Carl Zimmer

The New York Times bestselling tour of the cosmos from three of today's leading astrophysicists Welcome to the Universe is a personal guided tour of the cosmos by three of today's leading astrophysicists. Inspired by the enormously popular introductory astronomy course that Neil deGrasse Tyson, Michael A. Strauss, and J. Richard Gott taught together at Princeton, this book covers it all—from planets, stars, and galaxies to black holes, wormholes, and time travel. Describing the latest discoveries in astrophysics, the informative and entertaining narrative propels you from our home solar system to the outermost frontiers of space. How do stars live and die? Why did Pluto lose its planetary status? What are the prospects of intelligent life elsewhere in the universe? How did the universe begin? Why is it expanding and why is its expansion accelerating? Is our universe alone or part of an infinite multiverse? Answering these and many other questions, the authors open your eyes to the wonders of the cosmos, sharing their knowledge of how the universe works. Breathtaking in scope and stunningly illustrated throughout, Welcome to the Universe is for those who hunger for insights into our evolving universe that only world-class astrophysicists can provide.

A NEW YORK TIMES EDITOR'S CHOICE Einstein's Shadow follows a team of elite scientists on their historic mission to take the first picture of a black hole, putting Einstein's theory of relativity to its ultimate test and helping to answer our deepest questions about space, time, the origins of the universe, and the nature of reality Photographing a black hole sounds impossible, a contradiction in terms. But Shep Doeleman and a global coalition of scientists are on the cusp of doing just that. With exclusive access to the team, journalist Seth Fletcher spent five years following Shep and an extraordinary cast of characters as they assembled the Event Horizon Telescope, a virtual radio observatory the size of the Earth. He witnessed their struggles, setbacks, and breakthroughs, and along the way, he explored the latest thinking on the most profound questions about black holes. Do they represent a limit to our ability to understand reality? Or will they reveal the clues that lead to the long-sought Theory of Everything? Fletcher transforms astrophysics into something exciting, accessible, and immediate, taking us on an incredible adventure to better understand the complexity of our galaxy, the boundaries of human perception and knowledge, and how the messy human endeavor of science really works. Weaving a compelling narrative account of human ingenuity with excursions into cutting-edge science, Einstein's Shadow is a tale of great minds on a mission to change the way we understand our universe—and our place in it.

The authors present the most important facts about astronomy from a uniquely engaging viewpoint: how can we find other advanced civilizations? To address the question, Goldsmith and Owen provide a fascinating description of the history and structure of the universe, and then consider current ideas about the origin and cosmic distribution of life. Their book is an up-to-the-minute account of our understanding of the universe, of the likelihood of life throughout the cosmos, and of the ways in which advanced civilizations can make contact. World-renowned authority on extraterrestrial life Donald Goldsmith gives the reader a solid introduction to the subject, and the revision includes new information from all areas of current astronomical research. No science background is required, and the mathematics level is high-school algebra.

'If you feel you are in a black hole, don't give up. There's a way out'What is inside a black hole?Is time travel possible?Throughout his extraordinary career, Stephen Hawking expanded our understanding of the universe and unravelled some of its greatest mysteries. In What Is Inside a Black Hole? Hawking takes us on a journey to the outer reaches of our imaginations, exploring the science of time travel and black holes.'The best most mind-bending sort of physics' The TimesBrief Answers, Big Questions: this stunning paperback series offers electrifying essays from one of the greatest minds of our age, taken from the original text of the No. 1 bestselling Brief Answers to the Big Questions.

A collection of essays on the cosmos, written by an American Museum of Natural History astrophysicist, includes "Holy Wars," "Ends of the World," and "Hollywood Nights."

Neil deGrasse Tyson's #1 New York Times best-selling guide to the cosmos, adapted for young readers. From the basics of physics to big questions about the nature of space and time, celebrated astrophysicist and science communicator Neil deGrasse Tyson breaks down the mysteries of the cosmos into bite-sized pieces. Astrophysics for Young People in a Hurry describes the fundamental rules and unknowns of our universe clearly—and with Tyson's characteristic wit, there's a lot of fun thrown in, too. This adaptation by Gregory Mone includes full-color photos, infographics, and extra explanations to make even the trickiest concepts accessible. Building on the wonder inspired by outer space, Astrophysics for Young People in a Hurry introduces an exciting field and the principles of scientific inquiry to young readers.

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. Examines such phenomena as black holes, wormholes, singularities, gravitational waves, and time machines, exploring the fundamental principles that control the universe.

This self-contained textbook brings together many different branches of physics--e.g. nuclear physics, solid state physics, particle physics, hydrodynamics, relativity--to analyze compact objects. The latest astronomical data is assessed. Over 250 exercises.

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.

What is superstring theory and why is it important? Can superstrings offer the fulfilment of Einstein's lifelong dream of a Theory of Everything? Co-authored by one of the leading pioneers in superstrings, Michio Kaku, this book approaches scientific questions with the excitement of a detective story, looking at new scientific research that may make the impossible possible.

Death by Black HoleAnd Other Cosmic QuandariesW. W. Norton

Explores topics related to "black," examining aspects of fashion, philosophy, politics, and popular culture.

A new window opens onto the cosmos... Almost every day we are challenged by new information from the outermost reaches of space. Using straightforward language, One Universe explores the physical principles that govern the workings of our own world so that we can appreciate how they operate in the cosmos around us. Bands of color in a sunlit crystal and the spectrum of starlight in giant telescopes, the arc of a hard-hit baseball and the orbit of the moon, traffic patterns on a freeway and the spiral arms in a galaxy full of stars--they're all tied together in grand and simple ways. We can understand the vast cosmos in which we live by exploring three basic concepts: motion, matter, and energy. With these as a starting point, One Universe shows how the physical principles that operate in our kitchens and backyards are actually down-to-Earth versions of cosmic processes. The book then takes us to the limits of our knowledge, asking the ultimate questions about the origins and existence of life as we know it and where the universe came from--and where it is going. Glorious photographs--many seen for the first time in these pages--and original illustrations expand and enrich our understanding. Evocative and clearly written, One Universe explains complex ideas in ways that every reader can grasp and enjoy. This book captures the grandeur of the heavens while making us feel at home in the cosmos. Above all, it helps us realize that galaxies, stars, planets, and we ourselves all belong to One Universe.

As the twentieth century closed, Fred Adams and Greg Laughlin captured the attention of the world by identifying the five ages of time. In The Five Ages of the Universe, Adams and Laughlin demonstrate that we can now understand the complete life story of the cosmos from beginning to end. Adams and Laughlin have been hailed as the creators of the definitive long-term projection of the evolution of the universe. Their achievement is awesome in its scale and profound in its scientific breadth. But The Five Ages of the Universe is more than a handbook of the physical processes that guided our past and will shape our future; it is a truly epic story. Without leaving earth, here is a fantastic voyage to the physics of eternity. It is the only biography of the universe you will ever need.

The astonishing science of black holes and their role in understanding the history and future of our universe. Black holes are the most extreme objects in the universe, and yet they are ubiquitous. Every massive star leaves behind a black hole when it dies, and every galaxy harbors a supermassive black hole at its center. Frighteningly enigmatic, these dark giants continue to astound even the scientists who spend their careers studying them. Which came first, the galaxy or its central black hole? What happens if you travel into one—instant death or something weirder? And, perhaps most important, how can we ever know anything for sure about black holes when they destroy information by their very nature? In Einstein’s Monsters, distinguished astronomer Chris Impey takes readers on an exploration of these and other questions at the cutting edge of astrophysics, as well as the history of black holes’ role in theoretical physics—from confirming Einstein’s equations for general relativity to testing string theory. He blends this history with a poignant account of the phenomena scientists have witnessed while observing black holes: stars swarming like bees around the center of our galaxy; black holes performing gravitational waltzes with visible stars; the cymbal clash of two black holes colliding, releasing ripples in space-time. Clear, compelling, and profound, Einstein’s Monsters reveals how our comprehension of black holes is intrinsically linked to how we make sense of the universe and our place within it. From the small questions to the big ones—from the tiniest particles to the nature of space-time itself—black holes might be the key to a deeper understanding of the cosmos.