The Edge Of Physics A Journey To Earths Extremes Unlock Secrets Universe Anil Ananthaswamy

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The Edge of Physics Red Wheel/Weiser

“A compelling, enjoyable, and widely accessible exploration of one of the most fundamental scientific issues of our age” (Brian Greene, author of The Elegant Universe). In The Hole in the Universe, an award-winning science writer “provides an illuminating slant on physics and mathematics by exploring the concept of nothing” (Scientific American). Welcome to the world of cutting-edge math, physics, and neuroscience, where the search for the ultimate vacuum, the point of nothingness, the ground zero of theory, has rendered the universe deep, rich, and juicy. Every time scientists and mathematicians think they have reached the ultimate void, something new appears: a black hole, an undulating string, an additional dimension of space or time, repulsive anti-gravity, universes that breed like bunnies. Cole’s exploration at the edge of everything is “as playfully entertaining as it is informative” (San Jose Mercury News). “A strong and sometimes mind-blowing introduction to the edges of modern physics.” —Salon.com “Comprising an expansive set of topics from the history of numbers to string theory, the big bang, even Zen, the book’s chapters are broken into bite-sized portions that allow the author to revel in the puns and awkwardness that comes with trying to describe a concept that no one has fully grasped. It is an amorphous, flowing, mind-bending discussion, written in rich, graceful prose. As clear and accessible as Hawking’s A Brief History of Time, this work deserves wide circulation, not just among science buffs.” —Publishers Weekly, starred review “Here we have the definitive book about nothing, and who would think that nothing could be so interesting . . . not only accessible but compelling reading.” —St. Louis Post-Dispatch

Life's Edge Princeton University Press

Winner of the prestigious 2013 Royal Society Winton Prize for Science Books “A modern voyage of discovery.” —Frank Wilczek, Nobel Laureate, author of The Lightness of Being The Higgs boson is one of our era’s most fascinating scientific frontiers and the key to understanding why mass exists. The most recent book on the subject, The God Particle, was a bestseller. Now, Caltech physicist Sean Carroll documents the doorway that is opening—after billions of dollars and the efforts of thousands of researchers at the Large Hadron Collider in Switzerland—into the mind-boggling world of dark matter. The Particle at the End of the Universe has it all: money and politics, jealousy and self-sacrifice, history and cutting-edge physics—all grippingly told by a rising star of science writing.

Life on the Edge Knopf

Quantum physicist, New York Times bestselling author, and BBC host Jim Al-Khalili offers a fascinating and illuminating look at what physics reveals about the world Shining a light on the most profound insights revealed by modern physics, Jim Al-Khalili invites us all to understand what this crucially important science tells us about the universe and the nature of reality itself. Al-Khalili begins by introducing the fundamental concepts of space, time, energy, and matter, and then describes the three pillars of modern physics—quantum theory, relativity, and thermodynamics—showing how all three must come together if we are ever to have a full understanding of reality. Using wonderful examples and thought-provoking analogies, Al-Khalili illuminates the physics of the extreme cosmic and quantum scales, the speculative frontiers of the field, and the physics that underpins our everyday experiences and technologies, bringing the reader up to speed with the biggest ideas in physics in just a few sittings. Physics is revealed as an intrepid human quest for ever more foundational principles that accurately explain the natural world we see around us, an undertaking guided by core values such as honesty and doubt. The knowledge discovered by physics both empowers and humbles us, and still, physics continues to delve valiantly into the unknown. Making even the most enigmatic scientific ideas accessible and captivating, this deeply insightful book illuminates why physics matters to everyone and calls one and all to share in the profound adventure of seeking truth in the world around us.

Fusion Plasma Physics HMH

A NEW YORK TIMES NOTABLE BOOK OF 2020 NAMED A BEST BOOK OF THE YEAR BY * THE WASHINGTON POST * THE ECONOMIST * NEW SCIENTIST * PUBLISHERS WEEKLY * THE GUARDIAN From one of the most dynamic rising stars in astrophysics, an “ engrossing, elegant ” (The New York Times) look at five ways the universe could end, and the mind-blowing lessons each scenario reveals about the most important concepts in cosmology. We know the universe had a beginning. With the Big Bang, it expanded from a state of unimaginable density to an all-encompassing cosmic fireball to a simmering fluid of matter and energy, laying down the seeds for everything from black holes to one rocky planet orbiting a star near the edge of a spiral galaxy that happened to develop life as we know it. But what happens to the universe at the end of the story? And what does it mean for us now? Dr. Katie Mack has been contemplating these questions since she was a young student, when her astronomy professor informed her the universe could end at any moment, in an instant. This revelation set her on the path toward theoretical astrophysics. Now, with lively wit and humor, she takes us on a mind-bending tour through five of the cosmos ’ s possible finales: the Big Crunch, Heat Death, the Big Rip, Vacuum Decay (the one that could happen at any moment!), and the Bounce. Guiding us through cutting-edge science and major concepts in quantum mechanics, cosmology, string theory, and much more, The End

of Everything is a wildly fun, surprisingly upbeat ride to the farthest reaches of all that we know.

For the Love of Physics Penguin

New York Times bestseller • Life on the Edge alters our understanding of our world's fundamental dynamics through the use of quantum mechanics. Life is the most extraordinary phenomenon in the known universe; but how did it come to be? Even in an age of cloning and artificial biology, the remarkable truth remains: nobody has ever made anything living entirely out of dead material. Life remains the only way to make life. Are we still missing a vital ingredient in its creation? Using first-hand experience at the cutting edge of science, Jim Al-Khalili and Johnjoe Macfadden reveal that missing ingredient to be quantum mechanics. Drawing on recent ground-breaking experiments around the world, each chapter in Life on the Edge illustrates one of life's puzzles: How do migrating birds know where to go? How do we really smell the scent of a rose? How do our genes copy themselves with such precision? Life on the Edge accessibly reveals how quantum mechanics can answer these probing questions of the universe. Guiding the reader through the rapidly unfolding discoveries of the last few years, Al-Khalili and McFadden describe the explosive new field of quantum biology and its potentially revolutionary applications, while offering insights into the biggest puzzle of all: what is life? As they brilliantly demonstrate in these groundbreaking pages, life exists on the quantum edge. Winner, Stephen Hawking Medal for Science Communication

Spooky Action at a Distance Basic Books (AZ)

Examines the effort to discover the Higgs boson particle by tracing the development and use of the Large Hadron Collider and how its findings are dramatically shaping scientific understandings while enabling world-changing innovations.

Through Two Doors at Once The Edge of Physics

From Brian Greene, one of the world ' s leading physicists and author of the Pulitzer Prize finalist The Elegant Universe, comes a grand tour of the universe that makes us look at reality in a completely different way. Space and time form the very fabric of the cosmos. Yet they remain among the most mysterious of concepts. Is space an entity? Why does time have a direction? Could the universe exist without space and time? Can we travel to the past? Greene has set himself a daunting task: to explain non-intuitive, mathematical concepts like String Theory, the Heisenberg Uncertainty Principle, and Inflationary Cosmology with analogies drawn from common experience. From Newton ' s unchanging realm in which space and time are absolute, to Einstein ' s fluid conception of spacetime, to quantum mechanics ' entangled arena where vastly distant objects can instantaneously coordinate their behavior, Greene takes us all, regardless of our scientific backgrounds, on an irresistible and revelatory journey to the new layers of reality that modern physics has discovered lying just beneath the surface of our everyday world.

The Secret of the Universe Deep Democracy Exchange

Wouldn't it be great if there were a physics book that showed you how things work instead of telling you how? Finally, with Head First Physics, there is. This comprehensive book takes the stress out of learning mechanics and practical physics by providing a fun and engaging experience, especially for students who "just don't get it." Head First Physics offers a format that's rich in visuals and full of activities, including pictures, illustrations, puzzles, stories, and quizzes -- a mixed-media style proven to stimulate learning and retention. One look will convince you: This isn't mere theory, this is physics brought to life through real-world scenarios, simple experiments, and hypothetical projects. Head First Physics is perfect for anyone who's intrigued by how things work in the natural world. You'll quickly discover that physics isn't a dry subject. It's all about the world we live in, encompassing everything from falling objects and speeding cars, to conservation of energy and gravity and weightlessness, and orbital behavior. This book: Helps you think like a physicist so you can understand why things really work the way they do Gives you relevant examples so you can fully grasp the principles before moving on to more complex concepts Designed to be used as a supplement study guide for the College Board's Advanced Placement Physics B Exam Introduces principles for the purpose of solving real-world problems, not memorization Teaches you how to measure, observe, calculate -- and yes -- how to do the math Covers scientific notation, SI units, vectors, motion, momentum conservation, Newton's Laws, energy conservation, weight and mass, gravitation and orbits, circular motion and simple harmonic motion, and much more If "Myth Busters" and other TV programs make you curious about our physical world -- or if you're a student forced to take a physics course -- now you can pursue the subject without the dread of boredom or the fear that it will be over your head. Head First Physics comes to rescue with an innovative, engaging, and inspirational way to learn physics!

The Fabric of the Cosmos Ballantine Books

The monograph is based on a series of earlier published articles of author those have proposed one complete new model of Unified Theory for everything having quantized as well as real (i.e. non-zero & non-infinity) values in 10-dimensions. But all those 10-dimensions are identified as no more 'hidden' or 'folded' in types as are now assumed in String Theory or in similar other theories. Moreover, all those non-hidden type of 10-dimensions are inversely co-related within any 'event'. Subsequently, there emerged total seven numbers of new universal inverse constants out of those 10-dimensions which are mostly unknown in current physics. But one of such universal inverse constant can be deduced from the known de Broglie's wave-corpuscular law. That wave-corpuscular law is basically one such universal inverse relation in-between mass-energy and wavelength common to all scales of particles or systems-of-particles. However, in practical sense, the proposed Unified Theory has initiated primarily from quantized extension of Special Relativity Theory. Where it assumes that the 'constancy' in inertial speed of light as a 'quantized' value of motion for a free moving photon-particle similar to its quantized value of mass-energy. This assumption would not oppose anything in foundation of Special Relativity Theory. But such a tiny (quantize) addition in todays notion for constant value in speed of light might have huge impact in current physics. So, another basic idea in this monograph is the hypothesis of quantized values in free motions of all bosons and fermions. That derives a long expected common equation for everything as 'quantum-real' in physical nature. Consequently, the Special & General Relativity Theories become unified with Quantum Mechanics in unfolded 10-dimensions. Also as a new Theory, it predicts further so many new consequences and resolves various observational inconsistencies in present physics. It has revealed entire quantum-reality as mirror-imaged symmetric, deterministic & objective in such unfolded 10-dimensions with all non-zero & non-infinity discrete values. But beyond that quantum-real edge, there appears a 'continuum' of all zero & infinity values for those same 10-dimensions with all broken-causality forboccurrence & destruction of any 'event'. A continuum of no causality and no quantum-reality. That is a state of 'no matter', 'no space' and 'no time' but of a 'infinite motion'. A beyond quantum-real exchangeable territory of all Non-causal 'Wills' rather than any conventional Causal 'Laws'. But that's the Wills of what or whom? Is that God?

Physics from the Edge Simon and Schuster

Edge begins with a massive and catastrophic shifting of the San Andreas fault. The fears of California someday tumbling into the sea--that have become the stuff of parody--become real. But even the terror resulting from this catastrophe pales in comparison to the understanding behind its happening, a cataclysm extending beyond mankind's understanding of horror as it had previously been known. The world is falling apart because things are out of joint at the quantum level, about which of course there's never been any guarantee that everything has to remain stable. Koji Suzuki returns to the genre he's most famous for after many years of "not wanting to write any more horror." As expected from Suzuki, the chills are of a more cerebral, psychological sort, arguably more unsettling and scary than the slice-and-dice gore fests that horror has become known in the U.S. Never content to simply do "Suzuki"--as it were--but rather push the envelope on what horror is in general and for which readers have come to know him, Edge City borders on being cutting-edge science fiction. The author himself terms this novel, which he has worked on for some years, a work of "quantum horror."

Icarus at the Edge of Time "O'Reilly Media, Inc."

A futuristic reimaging of the classic Greek myth, as a boy ventures through deep space and challenges the awesome power of black holes. The beauty of the book lies in the images, provided by NASA and the Hubble Space telescope, and printed on board rather than paper. On board pages.

Third Culture Penguin

A largely autobiographical account of the author's life as one who fell in love first with physics and then with teaching physics to students.

Particle Physics: A Very Short Introduction World Scientific

“ [Czerski ’ s] quest to enhance humanity ’ s everyday scientific literacy is timely and imperative. ” —Science Storm in a Teacup is Helen Czerski ’ s lively, entertaining, and richly informed introduction to the world of physics. Czerski provides the tools to alter the way we see everything around us by linking ordinary objects and occurrences, like popcorn popping, coffee stains, and fridge magnets, to big ideas like climate change, the energy crisis, or innovative medical testing. She provides answers to vexing questions: How do ducks keep their feet warm when walking on ice? Why does it take so long for ketchup to come out of a bottle? Why does milk, when added to tea, look like billowing storm clouds? In an engaging voice at once warm and witty, Czerski shares her stunning breadth of knowledge to lift the veil of familiarity from the ordinary.

W H Freeman & Company

For millennia, shamans and philosophers, believers and nonbelievers, artists and scientists have tried to make sense of our existence by suggesting that everything is connected, that a mysterious Oneness binds us to everything else. People go to temples, churches, mosques, and synagogues to pray to their divine incarnation of Oneness. Following a surprisingly similar notion, scientists have long asserted that under Nature ’ s apparent complexity there is a simpler underlying reality. In its modern incarnation, this Theory of Everything would unite the physical laws governing very large bodies (Einstein ’ s theory of relativity) and those governing tiny ones (quantum mechanics) into a single framework. But despite the brave efforts of many powerful minds, the Theory of Everything remains elusive. It turns out that the universe is not elegant. It is gloriously messy. Overturning more than twenty-five centuries of scientific thought, award-winning physicist Marcelo Gleiser argues that this quest for a Theory of Everything is fundamentally misguided, and he explains the volcanic implications this ideological shift has for humankind. All the evidence points to a scenario in which everything emerges from fundamental imperfections, primordial asymmetries in matter and time, cataclysmic accidents in Earth ’ s early life, and duplication errors in the genetic code. Imbalance spurs creation. Without asymmetries and imperfections, the universe would be filled with nothing but smooth radiation. A Tear at the Edge of Creation calls for nothing less than a new "humancentrism" to reflect our position in the universal order. All life, but intelligent life in particular, is a rare and precious accident. Our presence here has no meaning outside of itself, but it does have meaning. The unplanned complexity of humankind is all the more beautiful for its improbability. It ’ s time for science to let go of the old aesthetic that labels perfection beautiful and holds that "beauty is truth." It ’ s time to look at the evidence without centuries of monotheistic baggage. In this lucid, down-to-earth narrative, Gleiser walks us through the basic and cutting-edge science that fueled his own transformation from unifier to doubter—a fascinating scientific quest that led him to a new understanding of what it is to be human.

This Way to the Universe John Wiley & Sons

In this compelling introduction to the fundamental particles that make up the universe, Frank Close takes us on a journey into the atom to examine known particles such as quarks, electrons, and the ghostly neutrino. Along the way he provides fascinating insights into how discoveries in particle physics have actually been made, and discusses how our picture of the world has been radically revised in the light of these developments. He concludes by looking ahead to new ideas about the mystery of antimatter, the number of dimensions that there might be in the universe, and to what the next 50 years of research might reveal. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

The Edge Of Reason Simon and Schuster

What is space? It isn't a question that most of us normally stop to ask. Space is the venue of physics; it's where things exist, where they move and take shape. Yet over the past few decades, physicists have discovered a phenomenon that operates outside the confines of space and time. The phenomenon-the ability of one particle to affect another instantly across the vastness of space-appears to be almost magical. Einstein grappled with this oddity and couldn't quite resolve it, describing it as "spooky action at a distance." But

this strange occurrence has direct connections to black holes, particle collisions, and even the workings of gravity. If space isn't what we thought it was, then what is it?In Spooky Action at a Distance, George Musser sets out to answer that question, offering a provocative exploration of nonlocality and a celebration of the scientists who are trying to understand it. Musser guides us on an epic journey of scientific discovery into the lives of experimental physicists observing particles acting in tandem, astronomers discovering galaxies that look statistically identical, and cosmologists hoping to unravel the paradoxes surrounding the big bang. Their conclusions challenge our understanding not only of space and time but of the origins of the universe-and their insights are spurring profound technological innovation and suggesting a new grand unified theory of physics.

A Tear at the Edge of Creation Kodansha USA

From the big bang to black holes, from dark matter to dark energy, from the origins of the universe to its ultimate destiny, The Edge of the Sky tells the story of the most important discoveries and mysteries in modern cosmology—with a twist. The book ' s lexicon is limited to the thousand most common words in the English language, excluding physics, energy, galaxy, or even universe. Through the eyes of a fictional scientist (Student-People) hunting for dark matter with one of the biggest telescopes (Big-Seers) on Earth (Home-World), cosmologist Roberto Trotta explores the most important ideas about our universe (All-there-is) in language simple enough for anyone to understand. A unique blend of literary experimentation and science popularization, this delightful book is a perfect gift for any aspiring astronomer. The Edge of the Sky tells the story of the universe on a human scale, and the result is out of this world.

The World According to Physics Princeton University Press

More than fifty years ago, John Coltrane drew the twelve musical notes in a circle and connected them by straight lines, forming a five-pointed star. Inspired by Einstein, Coltrane put physics and geometry at the core of his music. Physicist and jazz musician Stephon Alexander follows suit, using jazz to answer physics' most vexing questions about the past and future of the universe. Following the great minds that first drew the links between music and physics-a list including Pythagoras, Kepler, Newton, Einstein, and Rakim-The Jazz of Physics reveals that the ancient poetic idea of the Music of the Spheres," taken seriously, clarifies confounding issues in physics. The Jazz of Physics will fascinate and inspire anyone interested in the mysteries of our universe, music, and life itself.

The End of Everything Macmillan

A global expansion of consciousness is underway. As predicted by ancient prophecy, old ways of thinking and of seeing the world are shifting. Mind-stretching new phenomena are challenging current reality. New frontiers of science are disclosing a connection between our consciousness and physical reality. As consciousness changes, so do our perceptions. The door is opening to a new reality. Join Colin and Synthia as they explore what is beyond this door. Examine the multitude of current changes—from the bases of society to the foundations of science—that indicate the unfolding of a new paradigm. Investigate non-ordinary reality and unexplained phenomena as interactions of consciousness. In this fascinating new title, you will explore and learn about: Parallel cases of inexplicable exchanges between lights in the sky and crop circles on the ground Strange sounds in the sky heard and recorded around the world Photographic orbs of light The Norway Spiral, a rotating spiral of light seen by hundreds of people in 2009 Unexplained RADAR interference patterns correlating with weather anomalies

God's Physics Basic Books

In the tradition of Oliver Sacks, science journalist Anil Ananthaswamy skillfully inspects the bewildering connections among brain, body, mind, self, and society by examining a range of neuropsychological ailments from autism and Alzheimer ' s to out-of-body experiences and body integrity identity disorder Award-winning science writer Anil Ananthaswamy smartly explores the concept of self by way of several mental conditions that eat away at patients ' identities, showing we learn a lot about being human from people with a fragmented or altered sense of self. Ananthaswamy travelled the world to meet those who suffer from " maladies of the self " interviewing patients, psychiatrists, philosophers and neuroscientists along the way. He charts how the self is affected by Asperger ' s, autism, Alzheimer ' s, epilepsy, schizophrenia, among many other mental conditions, revealing how the brain constructs our sense of self. Each chapter is anchored with stories of people who experience themselves differently from the norm. Readers meet individuals in various stages of Alzheimer ' s disease where the loss of memory and cognition results in the loss of some aspects of the self. We meet a woman who recalls the feeling of her first major encounter with schizophrenia which she describes as an outside force controlling her. Ananthaswamy also looks at several less familiar conditions, such as Cotard ' s syndrome, in which patients believe they are dead, and those with body integrity identity disorder, where the patient seeks to have a body part amputated because it " doesn ' t belong to them. " Moving nimbly back and forth from the individual stories to scientific analysis The Man Who Wasn ' t There is a wholly original exploration of the human self which raises fascinating questions about the mind-body connection.