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A First Course in General Relativity
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The Structure and Function of Plastids
Science Between Myth and History
Bioregenerative Life-Support Systems for Crewed Missions to the Moon and Mars
Space Life Sciences: Gravity Perception and Transduction in Plants, Fungi and Unicellular Organisms
The Cognitive Unconscious
Communicating Science and Technology in Society
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JEFFERSON MARISA

Plant Tropisms Frontiers Media SA
A fascinating account, written in real time, of the unfolding of a scientific discovery: the first detection of gravitational waves. Scientists have been trying to confirm the existence of gravitational waves for fifty years. Then, in September 2015, came a "very interesting event" (as the cautious subject line in a physicist's email read) that proved to be the first detection of gravitational waves. In Gravity's Kiss, Harry Collins--who has been watching the science of gravitational wave detection for forty-three of those fifty years and has written three previous books about it--offers a final, fascinating account, written in real time, of the unfolding of one of the most remarkable scientific discoveries ever made. Predicted by Einstein in his theory of general relativity, gravitational waves carry energy from the collision or explosion of stars. Dying binary stars, for example, rotate faster and faster around each other until they merge, emitting a burst of gravitational waves. It is only with the development of extraordinarily sensitive, highly sophisticated detectors that physicists can now confirm Einstein's prediction. This is the story that Collins tells. Collins, a sociologist of science who has been embedded in the gravitational wave community since 1972, traces the detection, the analysis, the confirmation, and the public presentation and the reception of the discovery--from the first email to the final published paper and the response of professionals and the public. Collins shows that science today is collaborative, far-flung (with the physical location of the participants hardly mattering), and sometimes secretive, but still one of the few institutions that has integrity built into it.
The Renaissance of General Relativity in Context Oxford University Press
This book focuses on the development and implementation of the longitudinal, angular and frequency controls of the Advanced Virgo detector, both from the simulation and experimental point of view, which contributed to Virgo reaching a sensitivity that enabled it to join the LIGO-Virgo O2 run in August 2017. This data taking was very successful, with the first direct detection of a binary black hole merger (GW170814) using the full network of three interferometers, and the first detection and localization of a binary neutron star merger (GW170817). The second generation of gravitational wave detector, Advanced Virgo, is capable of detecting differential displacements of the order of 10–21m. This means that it is highly sensitive to any disturbance, including the seismic movement of the Earth. For this reason an active control is necessary to keep the detector in place with sufficient accuracy.
Signaling in Plants University of Pittsburgh Press
A fascinating account, written in real time, of the unfolding of a scientific discovery: the first detection of gravitational

waves. Scientists have been trying to confirm the existence of gravitational waves for fifty years. Then, in September 2015, came a “very interesting event” (as the cautious subject line in a physicist's email read) that proved to be the first detection of gravitational waves. In Gravity's Kiss, Harry Collins—who has been watching the science of gravitational wave detection for forty-three of those fifty years and has written three previous books about it—offers a final, fascinating account, written in real time, of the unfolding of one of the most remarkable scientific discoveries ever made. Predicted by Einstein in his theory of general relativity, gravitational waves carry energy from the collision or explosion of stars. Dying binary stars, for example, rotate faster and faster around each other until they merge, emitting a burst of gravitational waves. It is only with the development of extraordinarily sensitive, highly sophisticated detectors that physicists can now confirm Einstein's prediction. This is the story that Collins tells. Collins, a sociologist of science who has been embedded in the gravitational wave community since 1972, traces the detection, the analysis, the confirmation, and the public presentation and the reception of the discovery—from the first email to the final published paper and the response of professionals and the public. Collins shows that science today is collaborative, far-flung (with the physical location of the participants hardly mattering), and sometimes secretive, but still one of the few institutions that has integrity built into it.

The Search for Gravity Waves Morgan & Claypool Publishers

A fascinating account, written in real time, of the unfolding of a scientific discovery: the first detection of gravitational waves.

Artificial Experts World Scientific

The stochastic gravitational-wave background (SGWB) is by far the most difficult source of gravitational radiation detect. At the same time, it is the most interesting and intriguing one. This book describes the initial detection of the SGWB and describes the underlying mathematics behind one of the most amazing discoveries of the 21st century. On the experimental side it would mean that interferometric gravitational wave detectors work even better than expected. On the observational side, such a detection could give us information about the very early Universe, information that could not be obtained otherwise. Even negative results and improved upper bounds could put constraints on many cosmological and particle physics models.

Detecting the Stochastic Gravitational-Wave Background Cambridge University Press

The decade since the publication of the third edition of this volume has been an era of great progress in biology in general and the plant sciences in particular. This is especially true with the advancements brought on by the sequencing of whole genomes of model organisms and the development of "omics" techniques. This fourth edition of Plant Roots: The Hidden Half reflects these developments that have transformed not only the field of biology, but also the many facets of root science. Highlights of this new edition include: The basics of root research and their evolution and

role in the global context of soil development and atmosphere composition New understandings about roots gained in the post-genomic era, for example, how the development of roots became possible, and the genetic basis required for this to occur The mechanisms that determine root structure, with chapters on cellular patterning, lateral root and vascular development, the molecular basis of adventitious roots, and other topics Plant hormone action and signaling pathways that control root development, including new chapters on strigolactones and brassinosteroids Soil resource acquisition from agricultural and ecological perspectives Root response to stress, with chapters that address the impact of the genomic revolution on this topic Root-rhizosphere interactions, from beneficial microorganisms to detrimental nematodes Modern research techniques for the field and the lab Each chapter not only presents a clear summation of the topic under discussion, but also includes a vision of what is to be expected in the years to come. The wide coverage of themes in this volume continues the tradition that makes this work recognized as a fundamental source of information for root scientists at all levels.

Plant Roots CUP Archive

LIGO's recent discovery of gravitational waves was headline news around the world. Many people will want to understand more about what a gravitational wave is, how LIGO works, and how LIGO functions as a detector of gravitational waves.This book aims to communicate the basic logic of interferometric gravitational wave detectors to students who are new to the field. It assumes that the reader has a basic knowledge of physics, but no special familiarity with gravitational waves, with general relativity, or with the special techniques of experimental physics. All of the necessary ideas are developed in the book.The first edition was published in 1994. Since the book is aimed at explaining the physical ideas behind the design of LIGO, it stands the test of time. For the second edition, an Epilogue has been added; it brings the treatment of technical details up to date, and provides references that would allow a student to become proficient with today's designs.

Higher Plants, Algae and Cyanobacteria in Space Environments Princeton University Press

An authoritative interdisciplinary account of the historic discovery of gravitational waves In 1915, Albert Einstein predicted the existence of gravitational waves—ripples in the fabric of spacetime caused by the movement of large masses—as part of the theory of general relativity. A century later, researchers with the Laser Interferometer Gravitational-Wave Observatory (LIGO) confirmed Einstein's prediction, detecting gravitational waves generated by the collision of two black holes. Shedding new light on the hundred-year history of this momentous achievement, Einstein Was Right brings together essays by two of the physicists who won the Nobel Prize for their instrumental roles in the discovery, along with contributions by leading scholars who offer unparalleled insights into one of the most significant scientific breakthroughs of our time. This illuminating

book features an introduction by Tilman Sauer and invaluable firsthand perspectives on the history and significance of the LIGO consortium by physicists Barry Barish and Kip Thorne. Theoretical physicist Alessandra Buonanno discusses the new possibilities opened by gravitational wave astronomy, and sociologist of science Harry Collins and historians of science Diana Kormos Buchwald, Daniel Kennefick, and Jürgen Renn provide further insights into the history of relativity and LIGO. The book closes with a reflection by philosopher Don Howard on the significance of Einstein's theory for the philosophy of science. Edited by Jed Buchwald, Einstein Was Right is a compelling and thought-provoking account of one of the most thrilling scientific discoveries of the modern age.

Gravity's Rainbow Springer

The search for and possible discovery of gravity waves for the non specialist reader. No advanced knowledge of astronomy or mathematics is needed.

Science, Technology and Society MIT Press

The Structure and Function of Plastids provides a comprehensive look at the biology of plastids, the multifunctional biosynthetic factories that are unique to plants and algae. Fifty-nine international experts have contributed 28 chapters that cover all aspects of this large and diverse family of plant and algal organelles.

The Many Voices of Modern Physics John Wiley & Sons

A concise, accessible, and engaging guide for students and practitioners of sociology. In Forms of Life, Harry Collins offers an introduction to social science methodology, drawing on his forty-plus years of conducting high-profile sociological research. In this concise, accessible, and engaging book, Collins explains not only how to do sociology (the method) but also how to think about sociology (the meaning). For example, he describes the three activities that are the foundations of sociological method (immersing oneself in a society; estranging oneself from that society; and explaining what has been discovered to those who have not been immersed) and goes on to consider broader questions of the meaning of science in relation to social science and the scientific authority of “subjective” methods. He explains that sociology is the study of social collectivities (often overlapping, subdividable, and embedded), and cites Wittgenstein's notion of “forms of life” in his definition of collectivity. Collins covers such methodological topics as participant comprehension; interview-based fieldwork (“expect plans to fail”); interactional expertise; alternation and methodological relativism; tangible and inferential experiments; tribalism and emotional loyalty; and how to communicate your findings. Finally, he offers recommendations for “saving the science of sociology,” considering, among other things, sociology's identity as a discipline and the perils of both “groupism” and being too afraid of it. Appendixes offer a code of conduct for interviews; a list of his relevant publications; and an account, in Q&A form, of a disastrous day in the life of a sociologist doing fieldwork.

Gravitational Biology I Harvard University Press

The Many Voices of Modern Physics follows a revolution that began in 1905 when Albert Einstein published papers on special relativity and quantum theory. Unlike Newtonian physics, this new physics often departs wildly from common sense, a radical divorce that presents a unique communicative challenge to physicists when writing for other physicists or for the general public, and to journalists and popular science writers as well. In their two long careers, Joseph Harmon and the late Alan Gross have explored how scientists communicate with each other and with the general public. Here, they focus not on the history of modern physics but on its communication. In their survey of physics communications and related persuasive practices, they move from peak to peak of scientific achievement, recalling how physicists use the communicative tools available—in particular, thought experiments, analogies, visuals, and equations—to convince others that what they say is not only true but significant, that it must be incorporated into the body of scientific and general knowledge. Each chapter includes a chorus of voices, from the many celebrated physicists who devoted considerable time and ingenuity to communicating their discoveries, to the science journalists who made those discoveries accessible to the public, and even to philosophers, sociologists, historians, an opera composer, and a patent lawyer. With their final collaboration, Harmon and Gross offer a tribute to the communicative practices of the physicists who convinced their peers and the general public that the universe is a far more bizarre and interesting place than their nineteenth-century predecessors imagined.

Biodiversity, Conservation and Sustainability in Asia Frontiers Media SA

Science, Technology and Society: An Introduction provides students with an accessible overview of the interdisciplinary field of Science and Technology Studies (STS). The discipline breaks down traditional conceptions of knowledge as universal, neutral and ahistorical, and takes a more critical approach to science and technology as social embedded phenomena. This comprehensive textbook makes use of unique examples and case studies to illustrate theoretical debates and concepts. In addition, the reader acquires a unique vision of contemporary issues (such as the power of algorithms, the mystification of fake news, the role of experts within the decision-making process, for example). Each chapter incorporates pedagogically rich features, including interactive discussion points to be used individually or in class as prompts for debate.

Control of the Gravitational Wave Interferometric Detector Advanced Virgo MIT Press

"The material in "TCU," as we've come to refer to this volume, began as a Master's Thesis that examined the manner in which knowledge of fairly complex, patterned material could be acquired without any conscious effort to learn it and with little to no awareness of what had been learned. It was dubbed implicit learning and, over a fifty-plus year span, became a vigorously researched area in the social sciences. TCU brings together several dozen scientists from a variety

of backgrounds and presents a broad (and deep) overview of how the exploration of the cognitive unconscious grew from that first study to a domain of research to which contributions have been made by sociologists, neuroscientists, evolutionary biologists, modelers, social and organizational psychologists, sport psychologists, primatologists, developmentalists, linguists, psychiatrists and psychotherapists, and measurement and assessment researchers. The core message seems fairly straightforward. Unconscious, implicit cognitive processes play a role in virtually everything interesting that human beings do. The implicit and explicit elements of cognition form a rich and complex interactive framework that make up who we are. The volume has contributions from over 30 distinguished authors from nine different countries and gives a balanced and thorough overview of where the field is today, a bit over a half-century since the first experiments were run"-- *Einstein Was Right* Springer Science & Business Media This volume addresses the engagement between science and society from multiple viewpoints. At a time when trust in experts is being questioned, misinformation is rife and scientific and technological development show growing social impact, the volume examines the challenges in involving the public in scientific debates and decisions. It takes into account societal needs and concerns in research, and analyses the interface between the roles of institutions and individuals. From environmental challenges to science communication, participatory technological design to animal experimentation, and transdisciplinarity to norms and values in science, the volume brings together research on areas in which scientists and citizens interact, across diverse, often understudied, socio-cultural contexts in Europe. It encompasses the natural sciences, engineering and the social sciences, and the chapters follow diverse theoretical frameworks and methodologies, including both quantitative and qualitative approaches. This volume contributes not just to scholarly knowledge on the topic of science and society relations, but also provides useful information for students, policy makers, journalists, and STEM (science, technology, engineering and mathematics) researchers keen on engaging with their publics and conducting responsible research and innovation. **Astronomy For Dummies, (+ Chapter Quizzes Online)** Elsevier Plant hormone signaling plays an important role in many physiological and developmental processes including stress response. With the advent of new post-genomic molecular techniques, the potential for increasing our understanding of the impact of hormone signaling on gene expression and adaptive processes has never been higher. Unlocking the molecular underpinnings of these processes shows great promise for the development of new plant biotechnologies and improved crop varieties. The topics included in this book emphasize on genomics and functional genomics aspects, to

understand the global and whole genome level changes upon particular stress conditions. With the functional genomics tools, the mechanism of phytohormone signaling and their target genes can be defined in a more systematic manner. The integrated analysis of phytohormone signaling under single or multiple stress conditions may prove exceptional to design stress tolerant crop plants in the field conditions. Bringing together the latest advances, as well as the work being done to apply these findings to plant and crop science, Mechanism of Plant Hormone Signaling Under Stress will prove extremely useful to plant and stress biologists, plant biotechnology researchers, as well as students and teachers.

Mechanosensitive Ion Channels Academic Press

This contributed volume explores the renaissance of general relativity after World War II, when it transformed from a marginal theory into a cornerstone of modern physics. Chapters explore key historical processes related to the theory of general relativity, in addition to presenting a thorough treatment of the relevant science behind these episodes. A broad historiographical framework is introduced first, thus providing the broad context in which the given computational approaches and case studies occurred. Written by an international and interdisciplinary group of expert authors, these chapters will bring readers to a more complete understanding of Einstein's theory. Specific topics include: Social and citation networks The Fock-Infeld dispute Wheeler's turn to gravitation theory The position of general relativity in theories of fundamental interactions The pursuit of a quantum theory of gravity The emergence of dark matter in relation to cosmological models Institutional frameworks for gravitational wave search in Europe The Renaissance of General Relativity in Context is ideal for historians, philosophers, and sociologists of science. Students and researchers in physics will also be interested in the topics explored.

The Detection of Gravitational Waves Elsevier

This is the first comprehensive monograph on all emerging topics in plant signaling. The book addresses diverse aspects of signaling at all levels of plant organization. Emphasis is placed on the integrative aspects of signaling.

Ripples in Spacetime Springer Science & Business Media

The latest volume in this series continues as a detailed review in botanical science to a wide audience. The papers in this volume are of general interest and present fascinating updates of important aspects of plant growth, physiology, and reproduction.

The Gravity of a Kiss Penguin

Plants provide a source of survival for all life on this planet. They are able to capture solar energy and convert it into food, feed, wood and medicines. Though sessile in nature, over many millions of years, plants have diversified and evolved from lower to higher life forms, spreading from sea level to mountains, and adapting to different ecozones. They have learnt to cope with challenging environmental conditions and various abiotic and

biotic factors. Plants have also developed systems for monitoring the changing environment and efficiently utilizing resources for growth, flowering and reproduction, as well as mechanisms to counter the impact of pests and diseases and to communicate with other biological systems, like microbes and insects. This book discusses the “awareness” of plants and their ability to gather information through the perception of environmental cues, such as light, gravity, water, nutrients, touch and sound, and stresses. It also explores plants’ biochemical and molecular “computing” of the information to adjust their physiology and development to the advantage of the species. Further, it examines how plants communicate between their different organs and with other organisms, as well as the concepts of plant cognition, experience and memory, from both scientific and philosophical perspectives. Lastly, it addresses the phenomenon of death in plants. The epilogue presents an artist’s view of the beauty of the natural world, especially plant “architecture”. The book provides historical perspectives, comparisons with animal systems where needed, and general biochemical and molecular concepts and themes. Each chapter is selfcontained, but also includes cross talk with other chapters to offer an integrated view of plant life and allow readers to appreciate and admire the functioning of plant life from within and without. The book is a tribute by the Editor to his students, colleagues and co-workers and to those in whose labs he has worked.