Mathematische Methoden der klassischen Mechanik

The scientific study of energy and matter and the process of interaction with each other is known as physics. The energy could be gravity, light, motion, radiation or electricity as matter of fact it could be anything from the universe. It studies matter and could be anything from sub-particles (the particles which make up an atom and the particles which further make those particles) to galaxy or stars. Physics aims in understanding the universal behaviour. Physics can be dated to
thousands of years; it is the oldest academic disciplines. Earlier physics had always been a part of biology, chemistry, natural philosophy and even in some branches of mathematics. Since the revolution of the 17th century, natural sciences came out as a separate research program. Physics intercedes with many interdisciplinary researches that are not strictly defined. Physics often gives rise to many new ideas which at times explain the fundamental mechanism of sciences other than physics and opening up new possibilities of study in fields like philosophy and mathematics. Physics plays a vital role in the offerings through developments in new technologies that happen because of hypothetical discoveries. Like, developments while understanding nuclear physics or electromagnetism showed the way to production of products like computers, television, nuclear weapons, domestic products etc. have helped in bringing about a drastic change in today’s society. Progress in mechanics inspired the growth of calculus whereas progress in thermodynamics helped in the growth of industrialization.

FUNDAMENTALS OF PHYSICS - Volume I A groundbreaking text and reference book on twenty-first-century classical physics and its applications This first-year graduate-level text and reference book covers the fundamental concepts and twenty-first-century applications of six major areas of classical physics that every masters- or PhD-level physicist should be exposed to, but often isn't: statistical physics, optics (waves of all sorts), elastodynamics, fluid mechanics, plasma physics, and special and general relativity and cosmology. Growing out of a full-year course that the eminent researchers Kip Thorne and Roger Blandford taught at Caltech for almost three decades, this book is designed to broaden the training of physicists. Its six main topical sections are also designed so they can be used in separate courses, and the book provides an invaluable reference for researchers. Presents all the major fields of classical physics except three prerequisites: classical mechanics, electromagnetism, and elementary thermodynamics Elucidates the interconnections between diverse fields and explains their shared concepts and tools Focuses on fundamental concepts and modern, real-world applications Takes applications from fundamental, experimental, and applied physics;
astrophysics and cosmology; geophysics, oceanography, and meteorology; biophysics and chemical physics; engineering and optical science and technology; and information science and technology Emphasizes the quantum roots of classical physics and how to use quantum techniques to elucidate classical concepts or simplify classical calculations Features hundreds of color figures, some five hundred exercises, extensive cross-references, and a detailed index An online illustration package is available

PRINCIPLES OF PHYSICS DIVProfessor R. Shankar, a well-known physicist and contagiously enthusiastic educator, was among the first to offer a course through the innovative Open Yale Course program. His popular online video lectures on introductory physics have been viewed over a million times. In this concise and self-contained book based on his online Yale course, Shankar explains the fundamental concepts of physics from Galileo’s and Newton’s discoveries to the twentieth-century’s revolutionary ideas on relativity and quantum mechanics. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics. It provides an ideal introduction for college-level students of physics, chemistry, and engineering, for motivated AP Physics students, and for general readers interested in advances in the sciences.

Physics, Structure, and Reality This volume is the first extensive study of the historical and philosophical connections between technology and mathematics. Coverage includes the use of mathematics in ancient as well as modern technology, devices and machines for computation, cryptology, mathematics in technological education, the epistemology of computer-mediated proofs, and the relationship between technological and mathematical computability. The book also examines the work of such historical figures as Gottfried Wilhelm Leibniz, Charles Babbage, Ada Lovelace, and Alan Turing.

Discovering the Principles of Mechanics 1600-1800 Was sind die Prinzipien der Quantenmechanik? Wie funktioniert Verschränkung?
Was besagt das Bellsche Theorem? Mit diesem Buch gehen Leonard Susskind und Art Friedman eine Herausforderung an, die jeder Physik-Fan bewältigen will: die Quantenmechanik. Begeisterte Physik-Amateure bekommen die notwendige Mathematik und die Formeln an die Hand, die sie für ein wirkliches Verständnis benötigen. Mit glasklaren Erklärungen, witzigen und hilfreichen Dialogen und grundlegenden Übungen erklären die Autoren nicht alles, was es über Quantenmechanik zu wissen gibt – sondern alles Wichtige.

Fundamental This book aims to provide solid bases for the study of physics for the university and it is divided into four parts, each dedicated to a fundamental branch of physics: quantum mechanics, theoretical physics, particle physics and condensed matter physics. In the first part we start with the concept of wave function, until the Heisenberg uncertainty principle. In the second part, after recalling the basic concepts of relativity, we treat the elementary particles and the hadrons, arriving to the notions of scattering and cross section. The third part is dedicated to the theoretical physics, where we analyze the field theory and the concepts of Lagrangian and Hamiltonian, introducing the quantum electrodynamics (QED), passing through the Klein-Gordon, Dirac and Maxwell fields. In the last part of the book we expose the basics of the condensed matter physics, including diffusion and Brownian motion, Drude and Sommerfeld models, the calculation of specific heat and the principal mechanical properties of solids, with references to lattice defects and semiconductors.

Fundamentals of Electromagnetism This unique textbook offers a mathematically rigorous presentation of the theory of relativity, emphasizing the need for a critical analysis of the foundations of general relativity in order to best study the theory and its implications. The transitions from classical mechanics to special relativity and then to general relativity are explored in detail as well, helping readers to gain a more profound and nuanced understanding of the theory as a whole. After reviewing the fundamentals of differential geometry and classical mechanics, the text introduces
special relativity, first using the physical approach proposed by Einstein and then via Minkowski’s mathematical model. The authors then address the relativistic thermodynamics of continua and electromagnetic fields in matter – topics which are normally covered only very briefly in other treatments – in the next two chapters. The text then turns to a discussion of general relativity by means of the authors’ unique critical approach, underlining the difficulty of recognizing the physical meaning of some statements, such as the physical meaning of coordinates and the derivation of physical quantities from those of space-time. Chapters in this section cover the model of space-time proposed by Schwarzschild; black holes; the Friedman equations and the different cosmological models they describe; and the Fermi-Walker derivative. Well-suited for graduate students in physics and mathematics who have a strong foundation in real analysis, classical mechanics, and general physics, this textbook is appropriate for a variety of graduate-level courses that cover topics in relativity. Additionally, it will interest physicists and other researchers who wish to further study the subtleties of these theories and understand the contemporary scholarly discussions surrounding them.

Fundamental Causation You never knew theoretical physics could be so simple! In this exciting and significant book, Andrew Thomas clearly illustrates the simplicity which lies behind nature at its fundamental level. It is revealed how all unifications in physics have been based on incredibly simple ideas. Using a logical approach, it is explained how the great 20th century theories of relativity and quantum mechanics share a common base, and how they can be linked using an idea so simple that anyone can understand it. An idea which is so simple it has been hidden in plain sight.

Fundamentals of Physics Jill North offers answers to questions at the heart of the project of interpreting physics. How do we figure out the nature of the world from a mathematically formulated theory? What do we infer about the world when a physical theory can be mathematically formulated in different ways? The notion of structure is crucial to North's answers.
Online Library Fundamentals Of Physics
Mechanics Relativity And Thermodynamics R Shankar

Quantenmechanik: Das Theoretische Minimum This textbook integrates the classic fields of mechanics—statics, dynamics, and strength of materials—using examples from biology and medicine. The book is excellent for teaching either undergraduates in biomedical engineering programs or health care professionals studying biomechanics at the graduate level. Extensively revised from a successful third edition, Fundamentals of Biomechanics features a wealth of clear illustrations, numerous worked examples, and many problem sets. The book provides the quantitative perspective missing from more descriptive texts, without requiring an advanced background in mathematics. It will be welcomed for use in courses such as biomechanics and orthopedics, rehabilitation and industrial engineering, and occupational or sports medicine. This book:
Introduces the fundamental concepts, principles, and methods that must be understood to begin the study of biomechanics Reinforces basic principles of biomechanics with repetitive exercises in class and homework assignments given throughout the textbook Includes over 100 new problem sets with solutions and illustrations

A New Revolution In Physics

Epidemics and Society This textbook is a revised and enlarged version of notes for a one-semester course on electromagnetism. It covers the theory of electromagnetic phenomena in vacuum and in material media. The book includes a CD-ROM with didactic software, to solve boundary value problems in electrostatics and magnetostatics.


Fundamentals of Physics Many in the United States feel that the nation’s current level of economic inequality is unfair and that capitalism is not working for 90% of the population. Yet some inequality is inevitable. The question is: What level of inequality is fair? Mainstream economics has offered little guidance on fairness and the ideal distribution of income. Political philosophy, meanwhile, has much to say about fairness yet relies on qualitative theories that cannot be verified by empirical data. To address inequality, we need to know what the goal is—and for this, we need a quantitative, testable theory of fairness for free-market capitalism. How Much Inequality Is Fair? synthesizes concepts from economics, political philosophy, game theory, information theory, statistical mechanics, and systems engineering into a mathematical framework for a fair free-market society. The key to this framework is the insight that maximizing fairness means maximizing entropy, which makes it possible to determine the fairest possible level of pay inequality. The framework therefore provides a moral justification for capitalism in mathematical terms. Venkat Venkatasubramanian also compares his theory’s predictions to actual inequality data from various
countries—showing, for instance, that Scandinavia has near-ideal fairness, while the United States is markedly unfair—and discusses the theory’s implications for tax policy, social programs, and executive compensation.

Warum ist E = mc²? This book assembles 21 essays on the history of mechanics and mathematical physics written by David Speiser. Covering a period from the beginning of the seventeenth century to the eighteenth, the essays discuss developments in elasticity, rigid bodies, gravitation, the principle of relativity, optics, and first principles. They examine the work of Galileo, Huygens, Newton, Leibniz, the Bernoullis, Euler, Maupertuis, and Lambert.

Modern Physics for Engineers Fundamental Causation addresses issues in the metaphysics of deterministic singular causation, the metaphysics of events, property instances, facts, preventions, and omissions, as well as the debate between causal reductionists and causal anti-reductionists. The book also pays special attention to causation and causal structure in physics. Weaver argues that causation is a multigrade obtaining relation that is transitive, irreflexive, and asymmetric. When causation is singular, deterministic and such that it relates purely contingent events, the relation is also universal, intrinsic, and well-founded. He shows that proper causal relata are events understood as states of substances at ontological indices. He then proves that causation cannot be reduced to some non-causal base, and that the best account of that relation should be unashamedly primitivist about the dependence relation that underwrites its very nature. The book demonstrates a distinctive realist and anti-reductionist account of causation by detailing precisely how the account outperforms reductionist and competing anti-reductionist accounts in that it handles all of the difficult cases while overcoming all of the general objections to anti-reductionism upon which other anti-reductionist accounts falter. This book offers an original and interesting view of causation and will appeal to scholars and advanced students in the areas of metaphysics, philosophy of science, and philosophy of physics.
Analytical Mechanics


Fundamentals of Physics I

This collection brings together the five books of the series "concepts of physics". The books cover the following topics: complex numbers, special relativity, the mathematics for quantum mechanics, the Dirac equation, relativity, decays and electromagnetic fields. These are basic concepts of physics, indispensable for its complete understanding.

Introduction to Classical Mechanics

Hundert schmale Seiten reichen, um die Physik der Moderne zu erklären. Wo kommen wir her? Was können wir wissen? Seit ihren umwälzenden Entdeckungen im zwanzigsten Jahrhundert spüren Physiker den Kräften und Teilchen nach, die die Welt im Innersten und Äußersten zusammenhalten. Für jedermann verständlich, hat Carlo Rovelli dieses zauberhafte Buch darüber geschrieben. Es stürmte in wenigen Wochen an die Spitze der italienischen Bestsellerliste und wird derzeit in fast zwanzig Sprachen übersetzt. In eleganten, klaren Sätzen erklärt Rovelli die Physik der Moderne: Einstein und die Relativitätstheorie, Max Planck und die

Moderne Physik A beloved introductory physics textbook, now including exercises and an answer key, accessibly explains electromagnetism, optics, and quantum mechanics R. Shankar is a well-known physicist and contagiously enthusiastic educator, whose popular online introductory-physics video lectures have been viewed over a million times. In this second book based on his online courses, Shankar explains electromagnetism, optics, and quantum mechanics, developing the basics and reinforcing the fundamentals. With the help of problem sets and answer keys, students learn about the most interesting findings of today's research while gaining a firm foundation in the principles and methods of physics.

How Much Inequality Is Fair?

Halliday Physik „Das vorliegende Büchlein soll solchen eine möglichst exakte Einsicht in die Relativitätstheorie vermitteln, die sich vom allgemein wissenschaftlichen, philosophischen Standpunkt für die Theorie interessieren, ohne den mathematischen Apparat der theoretischen Physik zu beherrschen. Die Lektüre setzt etwa Maturitätsbildung und - trotz der Kürze des Büchleins - ziemlich viel Geduld und Willenskraft beim Leser voraus. Der Verfasser hat sich die größte Mühe gegeben, die Hauptgedanken möglichst deutlich und einfach vorzubringen, im ganzen in solcher Reihenfolge und in
solchem Zusammenhange, wie sie tatsächlich entstanden sind. Im Interesse der Deutlichkeit erschien es mir unvermeidlich, mich oft zu wiederholen, ohne auf die Eleganz der Darstellung die geringste Rücksicht zu nehmen; ich hielt mich gewissenhaft an die Vorschrift des genialen Theoretikers L. Boltzmann, man solle die Eleganz Sache der Schneider und Schuster sein lassen.« Albert Einstein (Aus dem Vorwort)

Klassische Mechanik Relativity, apart from quantum mechanics, is the greatest wonder in science, unfolded single-handedly in the 20th century by Albert Einstein. The scientist developed general relativity as a logical sequel to special relativity. This comprehensive book presents explication of the conceptual evolution and mathematical derivations of the theories of special and general relativity. The book follows an Einsteinian approach while explaining the concepts and the theories of relativity. Divided into 14 chapters, the revised edition of the book covers elementary concepts of Special relativity, as well as the advanced studies on General relativity. The recent theories like Kerr geometry, Sagnac effect, Vaidya geometry, Raychaudhuri equation and Gravitation physics vis-à-vis Quantum physics are presented in easy-to-understand language and simple style. In addition to it, the book gives an in-depth analysis on the applications of advanced theories like Vaidya-Krori-Barua solution from author’s own research works. Apart from that, the book also discusses some of the isotropic and anisotropic cosmological models, in detail. The salient topics discussed in the revised edition of the book are extrinsic curvature, detection of gravitational waves, early universe, evolution of a dead star into a white dwarf or a neutron star or a black hole, dark matter and dark energy. This book is intended for the undergraduate and postgraduate students of Physics and Mathematics. KEY FEATURES • Step-by-step derivation of equations • Easy demagogic approach • Review questions to widen the analytical understanding of the students

Fundamentals of Physics Mehr Mathematik, mehr moderne Physik - das charakterisiert die Neuauflage des 'Halliday'. Hauptfachstudenten der Physik finden in ihm den idealen Partner
Online Library Fundamentals Of Physics Mechanics Relativity And Thermodynamics R Shankar

Elektrizität und Magnetismus This well-received book, now in its fifth edition, presents the subject matter in a pedagogically sound manner with focus on teaching problem-solving. The specific needs of these students have influenced the selection of topics for inclusion in the book. The book provides students with a solid understanding of the fundamental concepts with due emphasis on developing skills to solve exercise problems aimed at both testing and extending the knowledge of the students. Divided into 23 chapters, the book comprises topics on four major areas—mechanics, optics, electricity and electronics, and modern physics including quantum mechanics and lasers. In this fifth
edition two new chapters on Acoustics and Heat and Thermodynamics are incorporated to widen the coverage and enhance the usefulness of this text. This book is intended for the undergraduate students of physics as well as for the first-year engineering students of several disciplines.

Über die spezielle und die allgemeine Relativitätstheorie This textbook covers all the standard introductory topics in classical mechanics, including Newton's laws, oscillations, energy, momentum, angular momentum, planetary motion, and special relativity. It also explores more advanced topics, such as normal modes, the Lagrangian method, gyroscopic motion, fictitious forces, 4-vectors, and general relativity. It contains more than 250 problems with detailed solutions so students can easily check their understanding of the topic. There are also over 350 unworked exercises which are ideal for homework assignments. Password protected solutions are available to instructors at www.cambridge.org/9780521876223. The vast number of problems alone makes it an ideal supplementary text for all levels of undergraduate physics courses in classical mechanics. Remarks are scattered throughout the text, discussing issues that are often glossed over in other textbooks, and it is thoroughly illustrated with more than 600 figures to help demonstrate key concepts.

Hidden in Plain Sight A beloved introductory physics textbook, now including exercises and an answer key, explains the concepts essential for thorough scientific understanding In this concise book, R. Shankar, a well-known physicist and contagiously enthusiastic educator, explains the essential concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Now in an expanded edition--complete with problem sets and answers for course use or self-study--this work provides an ideal introduction for college-level students of physics, chemistry, and engineering; for AP Physics students; and for general readers interested in advances in the sciences. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics.
Revisiting Aquinas’ Proofs for the Existence of God.

Fundamentals of Physics II A stimulating, modern approach to analytical mechanics Analytical Mechanics with an Introduction to Dynamical Systems offers a much-needed, up-to-date treatment of analytical dynamics to meet the needs of today's students and professionals. This outstanding resource offers clear and thorough coverage of mechanics and dynamical systems, with an approach that offers a balance between physical fundamentals and mathematical concepts. Exceptionally well written and abundantly illustrated, the book contains over 550 new problems-more than in any other book on the subject-along with user-friendly computational models using MATLAB. Featured topics include: * An overview of fundamental dynamics, both two- and three-dimensional * An examination of variational approaches, including Lagrangian theory * A complete discussion of the dynamics of rotating bodies * Coverage of the three-dimensional dynamics of rigid bodies * A detailed treatment of Hamiltonian systems and stability theory Ideal for advanced undergraduate and graduate students in mechanical engineering, physics, or applied mathematics, this distinguished text is also an excellent self-study or reference text for the practicing engineer or scientist.

Technology and Mathematics The novel Don Quixote, written in the late sixteenth and early seventeenth century by Miguel de Cervantes Saavedra, is widely considered to be one of the greatest fictional works in the entire canon of Western literature. At once farcical and deeply philosophical, Cervantes' novel and its characters have become integrated into the cultures of the Western Hemisphere, influencing language and modern thought while inspiring art and artists such as Richard Strauss and Pablo Picasso. Based on Professor Roberto González Echevarría's popular open course at Yale University, this essential guide to the enduring Spanish classic facilitates a close reading of Don Quixote in the artistic and historical context of renaissance and baroque Spain while exploring why Cervantes' masterwork is still widely read and relevant today. González Echevarría addresses the novel's major themes and demonstrates how
the story of an aging, deluded would-be knight-errant embodies that most modern of predicaments: the individual's dissatisfaction with the world in which he lives, and his struggle to make that world mesh with his desires.

Cervantes' "Don Quixote" There are lots of problems in the foundation of the fundamental theories of the Modern Physics - General Relativity and Quantum Mechanics, both the theories are developed on non-scientific and non-philosophical foundations, the founders have preferred their own views rather than the true scientific principles, this led both the theories into the wrong path, it is on the wrong path for over a century. An unbiased, scientific and critical analysis of the foundations of these theories have been performed by the author, the findings are unbelievable, there are two great epicycles in the form of Relativity and Quantum Mechanics. How these epicycles got created and continued to keep developing for almost a century, and the cures of these great epicycles have also been found by the author. All these findings are presented in a series of books - "A New Revolution in Physics", the series consists of 10 books. This is the first book of this series- "Why a New Revolution in Physics is Essential and Why it is Inevitable". The reasons are pointed out in short why a new revolution in physics has become essential and why it cannot be stopped, a brief history of development of these theories has been discussed and some of the crucial non-scientific steps have been pointed out which led the theories of the Modern Physics to the non-scientific path, the wrong steps are made absolutely clear so that they cannot be neglected scientifically anymore. A new theory is presented in the last book of the series, in the 10th book - "The Concepts: The Dawn of a New Physics - The Quassical Physics", which presents a new theory of physics which is consistent with the scientific and philosophical ideas of the Classical Physics and completely obliterates the fundamental theories of the Modern Physics - the theories of Relativity and the Quantum Mechanics and the other theories based on these theories. This looks impossible, but every argument and every claim in these books are based on strict scientific principles and empirical findings of the experiments which have been performed from per-Newtonian to the
present modern era. The essence is, the Classical Physics has been emancipated from the abstract mathematics, the heart of the Classical Physics - the causality/the determinism has been re-established. This is a revolution being awaited for a century, a must read for anybody interested in fundamentals of Physics, a must read for the mainstream physicists.

Klassische Elektrodynamik Edited and introduced by Robert Arp, Revisiting Aquinas’ Proofs for the Existence of God is a collection of new papers written by scholars focusing on the famous Five Proofs or Ways (Quinque Viae) for the existence of God put forward by St. Thomas Aquinas (1225-1274) near the beginning of his unfinished tome, Summa Theologica.


Sieben kurze Lektionen über Physik Explains the fundamental
concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Provides an introduction for college-level students of physics, chemistry, and engineering, for AP Physics students, and for general readers interested in advances in the sciences. In volume II, Shankar explains essential concepts, including electromagnetism, optics, and quantum mechanics. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics.

David Halliday; Robert Resnick: Physik. Teil 2


Fundamentals of Physics II Linking physics fundamentals to modern technology-a highly applied primer for students and engineers

Reminding us that modern inventions-new materials, information technologies, medical technological breakthroughs-are based on well-established fundamental principles of physics, Jasprit Singh integrates important topics from quantum mechanics, statistical thermodynamics, and materials science, as well as the special theory of relativity. He then goes a step farther and applies these fundamentals to the workings of electronic devices-an essential leap for anyone interested in developing new technologies. From semiconductors to nuclear magnetic resonance to superconducting materials to global positioning systems, Professor Singh draws on
wide-ranging applications to demonstrate each concept under discussion. He downplays extended mathematical derivations in favor of results and their real-world design implication, supplementing the book with nearly 100 solved examples, 120 figures, and 200 end-of-chapter problems. Modern Physics for Engineers provides engineering and physics students with an accessible, unified introduction to the complex world underlying today's design-oriented curriculums. It is also an extremely useful resource for engineers and applied scientists wishing to take advantage of research opportunities in diverse fields.

Modern Classical Physics Fundamentals of Physics is a component of Encyclopedia of Physical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. The Theme on Fundamentals of Physics provides an overview of the modern areas in physics, most of which had been crystallized in the 20th century, is given. The Theme on Fundamentals of Physics deals, in three volumes and cover several topics, with a myriad of issues of great relevance to our world such as: Historical Review of Elementary Concepts in Physics; Laws of Physical Systems; Particles and Fields; Quantum Systems; Order and Disorder in Nature; Topical Review: Nuclear Processes, which are then expanded into multiple subtopics, each as a chapter. These three volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers, NGOs and GOs.

Fundamentals of Biomechanics As seen on "60 Minutes" a "brilliant and sobering" (Paul Kennedy, Wall Street Journal) look at the history and human costs of pandemic outbreaks The World Economic Forum #1 book to read for context on the coronavirus outbreak "Well-written, highly entertaining and relevant."--Financial Times, "Best Books of 2020: Readers' Choice" This sweeping exploration of the impact of epidemic diseases looks at how mass infectious outbreaks have shaped society, from the Black Death to today. In a
clear and accessible style, Frank M. Snowden reveals the ways that diseases have not only influenced medical science and public health, but also transformed the arts, religion, intellectual history, and warfare. A multidisciplinary and comparative investigation of the medical and social history of the major epidemics, this volume touches on themes such as the evolution of medical therapy, plague literature, poverty, the environment, and mass hysteria. In addition to providing historical perspective on diseases such as smallpox, cholera, and tuberculosis, Snowden examines the fallout from recent epidemics such as HIV/AIDS, SARS, and Ebola and the question of the world's preparedness for the next generation of diseases.

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