

## Particle Physics A Very Short Introduction Frank Close

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The Standard Model of Particle Physics

Particle Physics in 30 Minutes: The Standard Model of Physics - A Level Physics **Particle Physics: A Very Short**

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Abstract. Particle Physics: A Very Short Introduction takes us on a journey into the atom to examine known particles such as quarks, electrons, and the ghostly neutrino. Along the way this VSI 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.

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In Particle Physics: A Very Short Introduction, best-selling author Frank Close provides a compelling and lively introduction to the fundamental particles that make up the universe. The book begins with a guide to what matter is made up of and how it evolved, and goes on to describe the fascinating and cutting-edge techniques used to study it.

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**Particle Physics: A Very Short Introduction by Frank Close**

Particle Physics: A Very Short Introduction: 109 (Very Short Introductions) by Close, Frank at AbeBooks.co.uk - ISBN 10: 0192804340 - ISBN 13: 9780192804341 - OUP Oxford - 2004 - Softcover

**9780192804341: Particle Physics: A Very Short Introduction...**

Particle physics is a branch of physics that studies the nature of the particles that constitute matter and radiation. Although the word particle can refer to various types of very small objects, particle physics usually investigates the irreducibly smallest detectable particles and the fundamental interactions necessary to explain their behaviour. By our current understanding, these elementary particles are excitations of the quantum fields that also govern their interactions. The currently dom

**Particle physics—Wikipedia**

Particle Physics: A Very Short Introduction takes us on a journey into the atom to examine known particles such as quarks, electrons, and the ghostly neutrino. Along the way ... More

Beginning with a guide to what matter is and what it is made of this book discusses everything from quarks and electrons to exotic matter and antimatter. The author concludes by speculating as to the number of dimensions that might be in the universe, and what the next 50 years of research might uncover.

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.

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Quantum Theory is the most revolutionary discovery in physics since Newton. This book gives a lucid, exciting, and accessible account of the surprising and counterintuitive ideas that shape our understanding of the sub-atomic world. It does not disguise the problems of interpretation that still remain unsettled 75 years after the initial discoveries. The main text makes no use of equations, but there is a Mathematical Appendix for those desiring stronger fare. Uncertainty, probabilistic physics, complementarity, the problematic character of measurement, and decoherence are among the many topics discussed. 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.

What is 'nothing'? What remains when you take all the matter away? Can empty space - a void - exist? This Very Short Introduction explores the science and the history of the elusive void: from Aristotle who insisted that the vacuum was impossible, via the theories of Newton and Einstein, to our very latest discoveries and why they can tell us extraordinary things about the cosmos. Frank Close tells the story of how scientists have explored the elusive void, and the rich discoveries that they have made there. He takes the reader on a lively and accessible history through ancient ideas and cultural superstitions to the frontiers of current research. He describes how scientists discovered that the vacuum is filled with fields; how Newton, Mach, and Einstein grappled with the nature of space and time; and how the mysterious 'aether' that was long ago supposed to permeate the void may now be making a comeback with the latest research into the 'Higgs field'. We now know that the vacuum is far from being empty - it seethes with virtual particles and antiparticles that erupt spontaneously into being, and it also may contain hidden dimensions that we were previously unaware of. These new discoveries may provide answers to some of cosmology's most fundamental questions: what lies outside the universe, and, if there was once nothing, then how did the universe begin? 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.

An essential introduction to particle physics, with coverage ranging from the basics through to the very latest developments, in an accessible and carefully structured text. Particle Physics: Third Edition is a revision of a highly regarded introduction to particle physics. In its two previous editions this book has proved to be an accessible and balanced introduction to modern particle physics, suitable for those students needed a more comprehensive introduction to the subject than provided by the 'compendium' style physics books. In the Third Edition the standard model of particle physics is carefully developed whilst unnecessary mathematical formalism is avoided where possible. Emphasis is placed on the interpretation of experimental data in terms of the basic properties of quarks and leptons. One of the major developments of the past decade has been the establishing of the existence of neutrino oscillations. This will have a profound effect on the plans of experimentalists. This latest edition brings the text fully up-to-date, and includes new sections on neutrino physics, as well as expanded coverage of detectors, such as the LHC detector. End of chapter problems with a full set of hints for their solutions provided at the end of the book. An accessible and carefully structured introduction to this demanding subject. Includes more advanced material in optional 'starred' sections. Coverage of the foundations of the subject, as well as the very latest developments.

Nuclear physics began long before the identification of fundamental particles, with J. J. Thomson's discovery of the electron at the end of the 19th century, which implied the existence of a positive charge in the atom to make it neutral. In this Very Short Introduction Frank Close gives an account of how this area of physics has progressed, including the recognition of how heavy nuclei are built up in the cores of stars and in supernovae, the identification of quarks and gluons, and the development of quantum chromodynamics (QCD). Exploring key concepts such as the stability of different configurations of protons and neutrons in nuclei, Frank Close shows how nuclear physics brings the physics of the stars to Earth and provides us with important applications, particularly in medicine. 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.

Following the increasing cost of fossil fuels and concerns about the security of their future supply. However, the term 'nuclear power' causes anxiety in many people and there is confusion concerning the nature and extent of the associated risks.

Unique in its coverage of all aspects of modern particle physics, this textbook provides a clear connection between the theory and recent experimental results, including the discovery of the Higgs boson at CERN. It provides a comprehensive and self-contained description of the Standard Model of particle physics suitable for upper-level undergraduate students and graduate students studying experimental particle physics. Physical theory is introduced in a straightforward manner with full mathematical derivations throughout. Fully-worked examples enable students to link the mathematical theory to results from modern particle physics experiments. End-of-chapter exercises, graded by difficulty, provide students with a deeper understanding of the subject. Online resources available at www.cambridge.org/MPP feature password-protected fully-worked solutions to problems for instructors, numerical solutions and hints to the problems for students and PowerPoint slides and JPEGs of figures from the book.

This book provides a comprehensive overview of modern particle physics accessible to anyone with a true passion for wanting to know how the universe works. We are introduced to the known particles of the world we live in. An elegant explanation of quantum mechanics and relativity paves the way for an understanding of the laws that govern particle physics. These laws are put into action in the world of accelerators, colliders and detectors found at institutions such as CERN and Fermilab that are in the forefront of technical innovation. Real world and theory meet using Feynman diagrams to solve the problems of infinities and deduce the need for the Higgs boson. Facts and Mysteries in Elementary Particle Physics offers an incredible insight from an eyewitness and participant in some of the greatest discoveries in 20th century science. From Einstein's theory of relativity to the spectacular discovery of the Higgs particle, this book will fascinate and educate anyone interested in the world of quarks, leptons and gauge theories. This book also contains many thumbnail sketches of particle physics personalities, including contemporaries as seen through the eyes of the author. Illustrated with pictures, these candid sketches present rare, perceptive views of the characters that populate the field. The Chapter on Particle Theory, in a pre-publication, was termed "superbly lucid" by David Miller in Nature (Vol. 396, 17 Dec. 1998, p. 642). Contents: IntroductionPreliminariesThe Standard ModelQuantum Mechanics. MixingEnergy, Momentum and Mass-ShellDetectionAccelerators and Storage RingsThe CERN Neutrino ExperimentThe Particle ZooParticle TheoryFinding the HiggsQuantum ChromodynamicsEpilogueAddendum Readership: Students, lay people and anyone interested in the world of elementary particles. Keywords: Particle Physics:Quantum Mechanics:Relativity:Quarks:Leptons:Gauge Theories:Higgs Particle:Review. Reviews of the First Edition: "Veltman's life spans the history of particle physics, from Antiparticles to Z bosons. So does his crystal clear book, which tells all you want to know about the strange sub-nuclear world and the stranger scientists that study it ... a thrilling tale about the world's finest things." Sheldon Glashow Nobel laureate Boston University "I must congratulate you! The book you have written is truly a masterpiece. Not only have you explained the physics of the world of elementary particles to the young, aspiring student, but you have made it available to the intelligent layman. On top of that you gave it the humanity it deserves; reading this book brought me back to the most exciting period of my life in which every day brought a new discovery and we all fought for recognition. I can truly say that there is no book like this." Melvin Schwartz Nobel laureate Columbia University "Veltman's ... transparent explanations of the abstract theories of quantum mechanics and special relativity, his lucid accounts of esoteric subjects in particle physics, such as scaling, Higgs particle and renormalizability ... are very impressive. The book will interest anyone who is interested in the view of the physical world held by contemporary fundamental physicists."T Y Cao Boston University "I greatly enjoyed finally reading a book that goes into the details I always wanted ... Veltman has the courage to try a deeper level about what we understand and what is simply fact ... Even if you have read books popularizing physics before

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