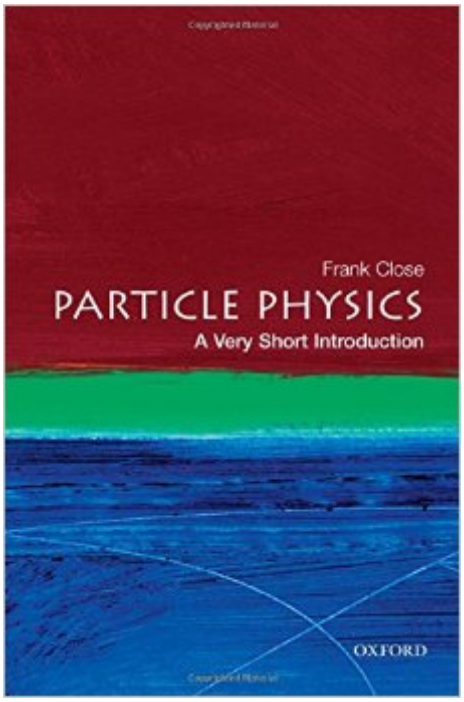
Particle Physics: A Very Short Introduction



Synopsis

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. The author discusses particles such as quarks, electrons, and the neutrino, and exotic matter and antimatter. He also investigates the forces of nature, accelerators and detectors, and the intriguing future of particle physics. This book is essential reading for general readers interested in popular science, students of physics, and scientists at all levels.About the Series: Combining authority with wit, accessibility, and style, Very Short Introductions offer an introduction to some of life's most interesting topics. Written by experts for the newcomer, they demonstrate the finest contemporary thinking about the central problems and issues in hundreds of key topics, from philosophy to Freud, quantum theory to Islam.

Book Information

Paperback: 160 pages

Publisher: Oxford University Press; 1 edition (July 29, 2004)

Language: English

ISBN-10: 0192804340

ISBN-13: 978-0192804341

Product Dimensions: 6.8 x 0.4 x 4.4 inches

Shipping Weight: 5 ounces (View shipping rates and policies)

Average Customer Review: 4.3 out of 5 starsÂ Â See all reviewsÂ (52 customer reviews)

Best Sellers Rank: #148,960 in Books (See Top 100 in Books) #8 inÂ Books > Science & Math > Physics > Nuclear Physics > Atomic & Nuclear Physics #18 inÂ Books > Science & Math > Physics > Nuclear Physics > Particle Physics #240 inÂ Books > Textbooks > Humanities > Linguistics

Customer Reviews

This book is excellent for anyone who would like to learn fundamentals of particle physics, or refresh his or her basic knowledge in the area. Particles are on the forefront of physics, with new ones discovered or proven to exist not long ago, with new theories emerging, or old ones confirmed or found inconsistent, chances are what we know about particles today is somewhat different than what you may have learned in school back.Interesting facts and easy to understand comparisons make this book captivating. It explains the structure of atoms, and subatomic particles, as well as

methods and instruments used to study them. Sometimes the book is repetitive, but repetition is one of the key aspects of learning.Overall, this very short introduction feels very fresh and light to a reader, and the last chapter that focuses on current high priority theories to be proven, gives an excellent outlook of what may await us in the future, giving this book balanced perspective.

As far as the "A Very Short Introduction" goes, this book is a little bit of an outlier. It lacks the novel approach that we tend to see in the series, which encourages us to buy them. Despite that minor oddity, Close's "Particle Physics: A Very Short Introduction" is a wonderful member of the series, because it doesn't derive its value from the novelty that typifies Oxford University Press's series. The value of this work comes from the incredibly potent condensation of material that comprises it. In recently doing a survey of basic particle physics literature, I read a number of books, a number of them introductory, and I was surprised to find that the information presented in this book still had a few bits and pieces that the others missed. Therefore, if you are in the business of wanting to know quite a bit of the basics of particle physics, but without fluff, this book is the way to go. Also, the historical treatment is rather satisfying, insofar as developing a context for the scientific content.Presentation may be an issue for some, as Close gives a just-the-facts-ma'am approach. If you are looking for an introduction is a little less stodgy and a bit more fun, I recommend considering the following, instead: "The Brittanica Guide to Particle Physics," "From Atoms to Quarks," or "The Elusive Neutrino: A Subatomic Detective Story." It is a give and take: Close's introduction has more material and the coherency of the presentation cannot be beat, but you give up style. Overall, if I am recommending a particle physics book to an undergrad, Close is the way to go. Otherwise, it really is a matter of taste and what you are looking to get out of the book, especially if entertainment is a value (the one-star review for this book was given for this reason, but, as I said, it is a matter of what you want to get out of the book, so beware).

This is indeed a very short introduction (129 pages of text), but it is also very informative. The book introduces particle physics from the standpoint of experimental evidence, without recourse to any theory. Thus, there are plenty or bubble chamber photographs, but no mention of group theory or even quantum mechanics. I recommend this book to anyone interested in a highly readable overview of particle physics.What is in the book -The book focuses on the particles, protons, neutrons and electrons that make up our physical world, and the quarks that make up protons and neutrons. The book also covers photons and the different types of neutrinos, plus mesons and muons. While not the focus of the book, it also discusses the forms of matter found at high energies

in accelerator experiments Ã¢Â Â“ the different types of quarks (the strange and charm, top and bottom) as well as the up and down quarks that make up protons and neutrons. Anti particles are discusses as are the possibilities of supersymmetric particles. There is also a brief mention of the Higgs field and the Higgs Boson. Gluons are mentioned, but not the fact that there are different types of them. The book is divided into 10 chapters as follows:Chapter 1 Ã¢Â Â“ Journey to the center of the universe Ã¢Â Â“ A general introduction to the atom and the universe at large.Chapter 2 Ã¢Â Â“ How big and small are big and small Ã¢Â Â“ A discussion of size from the size of quarks inside a proton or neutron as compared to the size of galaxies and the visible universe.Chapter 3 Ã¢Â Â“ How we learn what things are made of, and what we found Ã¢Â Â“ An introduction to x-ray imaging and particle accelerators.Chapter 4 Ã¢Â Â“ The heart of the matter Ã¢Â Â“ The constituents that make up atoms Ã¢Â Â“ electrons, protons and neutrons and the quarks that make up the protons and neutrons. This chapter also includes a discussion of neutrinos and anti-particles.Chapter 5 Ã¢Â Â“ Accelerators: cosmic and man-made. Cosmic rays as a producer of elementary particles and different types of accelerators.Chapter 6 Ã¢Â Â“ Detectors: cameras and time machines. The use of film, cloud chambers, bubble chambers and ore modern devices and how they are used to detect particles.Chapter 7 Ã¢Â Â“ Forces of nature Ã¢Â Â“ A discussion of force particles Ã¢Â Â“ photons, W and Z particles, and gluons, plus a mention of the possibility of gravitons.Chapter 8 - Exotic matter and anti-matter Ã¢Â Â“ The particles found at higher energies in accelerator experiments. (I found this to be the most difficult chapter and the one that I would have liked to have expanded a bit.)Chapter 9 Ã¢Â Â“ Where does matter come from? Ã¢Â Â“ A discussion of the creation of hydrogen, helium and heavier elements.Chapter 10 Ã¢Â Â“ Questions for the 21st century Ã¢Â Â“ Dark matter, Higgs Boson, supersymmetric particles and some questions for the future such as multidimensional space.

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