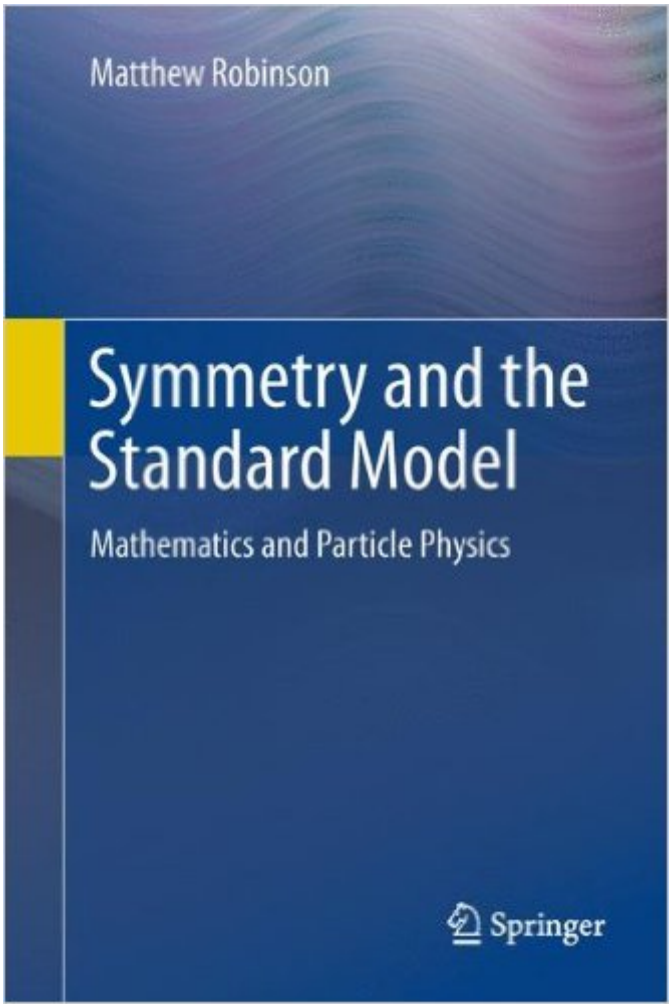
Symmetry And The Standard Model: Mathematics And Particle Physics



Synopsis

While theoretical particle physics is an extraordinarily fascinating field, the incredibly fast pace at which it moves along, combined with the huge amount of background information necessary to perform cutting edge research, poses a formidable challenge for graduate students. This book represents the first in a series designed to assist students in the process of transitioning from coursework to research in particle physics. Rather than reading literally dozens of physics and mathematics texts, trying to assimilate the countless ideas, translate notations and perspectives, and see how it all fits together to get a holistic understanding, this series provides a detailed overview of the major mathematical and physical ideas in theoretical particle physics. Ultimately the ideas will be presented in a unified, consistent, holistic picture, where each topic is built firmly on what has come before, and all topics are related in a clear and intuitive way.This introductory text on quantum field theory and particle physics provides both a self-contained and complete introduction to not only the necessary physical ideas, but also a complete introduction to the necessary mathematical tools. Assuming minimal knowledge of undergraduate physics and mathematics, this book lays both the mathematical and physical groundwork with clear, intuitive explanations and plenty of examples. The book then continues with an exposition of the Standard Model of Particle Physics, the theory that currently seems to explain the universe apart from gravity. Furthermore, this book was written as a primer for the more advanced mathematical and physical ideas to come later in this series.

Book Information

Hardcover: 327 pages
Publisher: Springer; 2011 edition (August 17, 2011)
Language: English
ISBN-10: 1441982663
ISBN-13: 978-1441982667
Product Dimensions: 6.1 x 0.8 x 9.2 inches
Shipping Weight: 1.6 pounds (View shipping rates and policies)
Average Customer Review: 4.9 out of 5 starsÂ Â See all reviewsÂ (10 customer reviews)
Best Sellers Rank: #762,093 in Books (See Top 100 in Books) #101 inÂ Books > Science & Math > Mathematics > Pure Mathematics > Group Theory #126 inÂ Books > Science & Math > Mathematics > Pure Mathematics > Algebra > Abstract #128 inÂ Books > Science & Math > Physics > Nuclear Physics > Particle Physics

Customer Reviews

All things considered, this book is excellent. The author states in the introduction that his goal is actually to teach math, not really physics so much, and as long as you get that it’s a great read. If you are expecting to get a detailed "physicsey" explanation of particle physics though you’ll be pretty disappointed.However, as far as it is a math book, it’s not the typical theorem/proof format that mathematicians use. The author is clearly a physicist (not a mathematician) because while he’s largely explaining math it reads more like physics, with derivations and lots of intuitive explanations of things.The first chapter is a nice summary of basic ideas. The sections on Lagrangians and variational stuff is one of the clearest I’ve seen, with really nice explanations of what’s going on with actions. The special relativity part is really good too - does a nice job of taking an undergraduate understanding of SR and setting up for the more advanced ways of looking at it he gets to in later chapters.The second chapter is mostly a high level summary of all particle physics - it’s called "Experimentalist’s Perspective", but it doesn’t go into how particle physics experiments are done. Just a summary of all the big ideas (leptons, hadrons, 4 forces, and so on). It seems a little out of place for a book mostly on math topics, but it is very well written.The third and fourth chapters are really what make this book great. The third is an introduction to group theory, starting with normal group theory, then lie groups, and then the Lorentz group, which is a Lie group way of looking at special relativity. All three parts are definitely the best summary I’ve ever seen.

Introduction to the Physics of Crystals for Students of Physics, Materials Science, and Engineering (Oxford Physics Series) CONNECTED MATHEMATICS 3 STUDENT EDITION GRADE 8 BUTTERFLIES PINWHEELS AND WALLPAPER: SYMMETRY AND TRANSFORMATIONS COPYRIGHT 2014 Symmetry in Chaos: A Search for Pattern in Mathematics, Art, and Nature Groups and Symmetry (Undergraduate Texts in Mathematics)