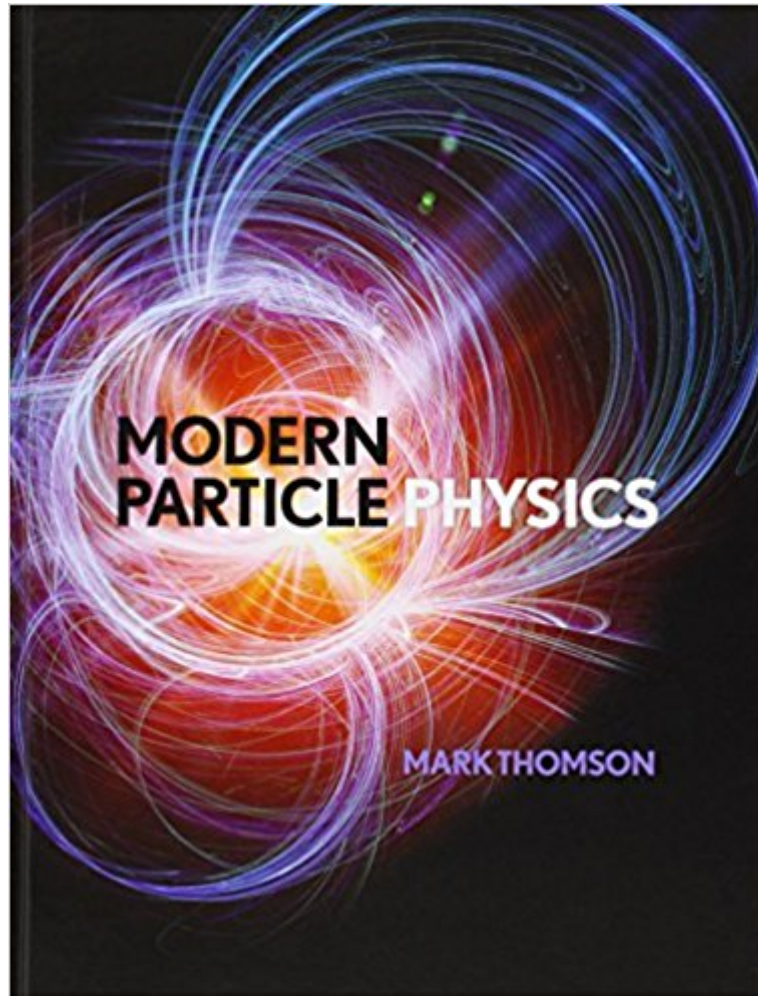




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Modern Particle Physics



Synopsis

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.

Book Information

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Customer Reviews

"This advanced undergraduate textbook provides an excellent introduction to one of the most exciting areas of modern physics. It combines a pedagogical 'from first principles' approach with a comprehensive survey of the latest developments in particle physics, including the recent discovery of the Higgs boson. Thoroughly recommended for both students and teachers alike." James Stirling, Imperial College London

"Professor Thomson has written a great textbook on modern particle physics (including a masterful exposition of the discovery of the Higgs boson) that provides a professional introduction to the field, suitable for upper-division undergraduate as well as graduate

courses. His distinctive presentation style combines clarity with admirable level of rigor. The book is richly illustrated with helpful diagrams and tables, and is destined to be a favorite of both students and instructors alike." Dmitry Budker, University of California, Berkeley"Mark Thomson has written a wonderful new introductory textbook on particle physics ... [it] is well written ... easy to read, with clear pedagogical lines of reasoning, and the layout is pleasing ... as I am teaching an introduction to theory this autumn, I will definitely be using this book." CERN Courier"... gem of a book ... excellent and highly readable ... well structured with useful chapter summaries and many good student exercises with on-line solutions. It is thoroughly recommended." The Observatory"... this book has my highest recommendation. In its effective, clear and comprehensive treatment of so much detailed material, it represents a remarkable achievement on the part of its author, and is likely to become a standard work to put into the hands of new graduate students in particle physics. Their supervisors will do well to buy it too!" Peter J. Bussey, Contemporary Physics

Comprehensive, up-to-date textbook, integrating recent experimental results, including discovery of the Higgs boson, to convey the excitement of the field to undergraduate and graduate students. Physical theory is made accessible with coverage of underlying principles, full mathematical derivations, worked examples of experimental applications, and end-of-chapter problems.

I am not usually inclined to write reviews but in this case.. what a wonderful book. This text makes the world of particle physics accessible to those with a college level physics background and a basic understanding of quantum mechanical principles, relativity, and linear algebra. I am in the medical profession but have a degree in physics from 1977. I think that the text is written at an upper level undergraduate level. For those who want to see the math at a basic level this is as good as it gets. The author has gone to great effort to write out all of the mathematical detail which is often lacking in other books. The Higgs boson, gauge theory, electroweak mixing, quantum chromodynamics are all written with great clarity. I am very happy with my purchase.

The previous reviewer seems to be reviewing the Standard Model and not the book. This book, considering to whom it was intended, is the best I've seen. The style and organization of the material makes you realize the author is a gifted teacher, a generous one at that, he just doesn't state results, he guides and illuminates with plenty of alacrity the structure of the theory. His writing is clear and flows, you are not distracted with the jerky style of some authors. Of course you must meet the prerequisites, if you don't, it could be tough going. Someone trying to enter the field in a

serious way should read this book first! The book's appearance, font and spacing, is attractive. For me it was a joy to have read this book.

This book is absolutely incredible. The amount of care that has been put into it can be easily overlooked. The derivations of everything are complete, clear, convincing, and I learn a LOT just from reading through them. As a bonus, the end-of-chapter problems facilitate mastery of the material, not busy-work. Great for any physics majors or anybody with enough mathematical background to follow the author's important mathematical derivations. The first few chapters provide good contextual background, and one could reasonably understand this book having only taken an introductory modern physics course.

OVERALL: I adopted Thomson's book this year for my introductory particle physics course (senior physics majors mostly). I have waited for the completion of my course before offering a review. I have adopted about five texts over the years and have seriously evaluated about eight others. The bottom line is that Modern Particle Physics by Mark Thomson is easily the best book for this course. **PEDAGOGY:** An instructor who invests a great effort into making physics concepts understandable will find a kindred spirit in the author. Professor Thomson always makes the best pedagogical choice in the way he presents the topic. Though his writing style is less engaging than Griffith's the clarity is superior. Furthermore, Thomson very accurately identifies the common points of confusion and provides discussion explicitly designed to remove ambiguities. This makes the book extremely valuable for instructors and I would say that no text does this better. **LEVEL OF DIFFICULTY:** This book is at the highest level that I would attempt for undergraduates. This is the best book for a student's first encounter with the Dirac equation. With this book the students will learn to do the famous perturbative QED calculations. There is no reason that I can see to delay this learning until graduate school. Undergraduate students have the requisite mathematical skills. Critically important, the book delays employing trace theorems and uses the helicity basis for calculations early on. This allows the students to "see" the physics inside of Feynman calculations. The chiral structure of the Standard Model is at the core of the theory and I find that even advanced books fail to convey this concept effectively. Unfortunately, this text could do better along these lines as well; however, the students do have to confront the concept repeatedly in this text so they will make progress. The expositions on experimental analyses are less sophisticated than Perkins which is perfectly fine for an introductory course. **SCOPE OF MATERIAL:** This book covers just about every particle physics topic that should be covered at this level. It is clearly too much for a

single semester course so the instructor will need to plan accordingly. The individual sections are often self-contained enough to allow leaps around the book. FINAL THOUGHTS: The only real problem I have with this book is that I did not write it.

A thorough introduction to Modern Particle Physics if you don't let the formulas intimidate you. Very readable and crammed with examples which would benefit from some worked examples to give an interested/informed person and hint of what the exercises are trying to impart. Otherwise the impact of the examples are largely lost on most students...

This looks like an excellent book with a sensible mixture of both theory and experiment. It covers all the latest issues and I would be happy to recommend it for any senior courses.

Finally, a particle physics text that doesn't suck eggs! Update: After working with this text to prepare my class for this fall semester, I'm even more impressed with it than I was originally. It's extremely well written, at the right level for the intended audience, and thoroughly modern in presentation and outlook. It really conveys the way modern particle physicists approach the field. Just as importantly is what it leaves out: all the ancient approaches to the field - historically relevant and powerful though they may be - that tend to confuse the novice. It also eschews the historical approach to the field that many other texts use to their detriment. For instructors, the solutions manual is fantastic! It's one of the few solutions manuals I've ever seen that is self-contained ... the statement of every problem is repeated right before the solution. No more need to have both the text and the solutions manual open at the same time to figure out what problem is being answered!

Excellent! Simple and clearly explained. Good binding and paper quality. worthed every buck i paid!

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