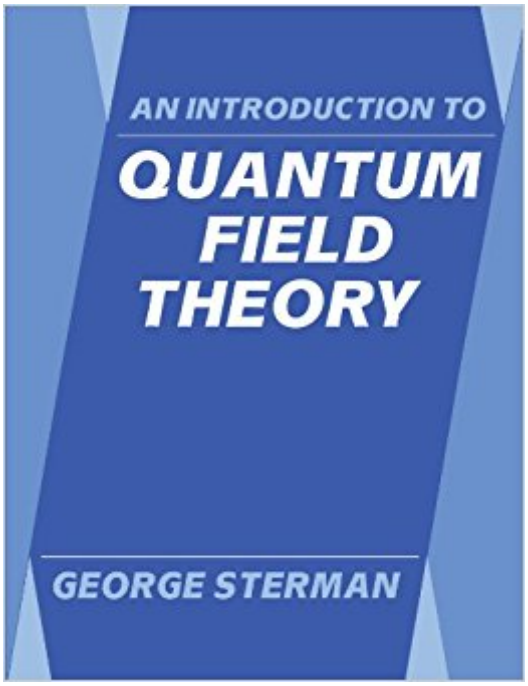
An Introduction To Quantum Field Theory



Synopsis

This is a systematic presentation of Quantum Field Theory from first principles, emphasizing both theoretical concepts and experimental applications. Starting from introductory quantum and classical mechanics, this book develops the quantum field theories that make up the "Standard Model" of elementary processes. It derives the basic techniques and theorems that underly theory and experiment, including those that are the subject of theoretical development. Special attention is also given to the derivations of cross sections relevant to current high-energy experiments and to perturbative quantum chromodynamics, with examples drawn from electron-positron annihilation, deeply inelastic scattering and hadron-hadron scattering. The first half of the book introduces the basic ideas of field theory. The discussion of mathematical issues is everywhere pedagogical and self contained. Topics include the role of internal symmetry and relativistic invariance, the path integral, gauge theories and spontaneous symmetry breaking, and cross sections in the Standard Model and the parton model. The material of this half is sufficient for an understanding of the Standard Model and its basic experimental consequences. The second half of the book deals with perturbative field theory beyond the lowest-order approximation. The issues of renormalization and unitarity, the renormalization group and asymptotic freedom, infrared divergences in quantum electrodynamics and infrared safety in quantum chromodynamics, jets, the perturbative basis of factorization at high energy and the operator product expansion are discussed. Exercises are included for each chapter, and several appendices complement the text.

Book Information

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Customer Reviews

"...I would not hesitate to use this book [for] a graduate course on particle physics or quantum field theory." Meinhard Mayer, Physics Today"...useful for an introductory course in quantum field theory to graduate students. Furthermore it provides a good introduction to the theory of perturbative QCD for research scientists who are interested to work in this field." Paolo Nason, Cern Courier

Starting from introductory quantum and classical mechanics, this text develops the quantum field theories that make up the `Standard Model' of elementary processes in a systematic presentation emphasizing theoretical concepts as well as experimental applications.

It's the best QFT book I've ever used. It is not a reference book but the best textbook to learn fundamental concepts in QFT.

chapters 1 through 8 provide a good introduction to scalar field theory,path integrals,feynman diagrams and vector fields and gauge theories. the discussion on the standard model is not so good and the chapters on renormalization were not clear to me as a beginning student.the book requires one to go over the material very carefully,and should not, in my opinion, be used as a reference for a particular topic as every chapter draws heavily on the previous ones. however it is certainly suitable as a text for a 2 semester graduate course.

Magic (Creating Magick with The Universal Laws of Attraction Book 1) Delirious, A Quantum Novel (Quantum Series Book 6) Quantum Thermodynamics: Emergence of Thermodynamic Behavior Within Composite Quantum Systems (Lecture Notes in Physics) Quantum Space (Quantum Series Book 1) Quantum Incident (Quantum Series Book 0)