<<粒子物理学标准模型导论>>

图书基本信息

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前言

In the eight years since the first edition, the Standard Model has not been seriously discredited as a description of particle physics in the energy region ([2 TeV) so far explored. The principal discovery in particle physics since the first edition is that neutrinos carry mass. In this new edition we have added chapters that extend the formalism of the Standard Model to include neutrino fields with mass, and we consider also the possibility that neutrinos are Majorana particles rather than Dirac particles. The Large Hadron Collider (LHC) is now under construction at CERN. It is expected that, at the energies that will become available for experiments at the LHC (~20 TeV), the physics of the Higgs field will be elucidated, and we shall begin to see physics beyond the Standard Model'. Data from the 'B factories' will continue to accumulate and give greater understanding of CP violation. We are confident that interest in the Standard Model will be maintained for some time into the future. Cambridge University Press have again been most helpful. We thank Miss V. K.Johnson for secretarial assistance. We are grateful to Professor Dr J. G. K6rner for his corrections to the first edition, and to Professor C. Davies for her helpful correspondence.

内容概要

本书从介子和夸克的电磁作用和弱相互作用开始，讲到了夸克的强相互作用，内容层层深入。
介绍标准模型的同时，作者非常注重选材的可进阶性，方便读者更深入的研读。

书籍目录

章节摘录

插图：5、The Dirac equation and the Dirac fieldThe Standard Model is a quantum field theory. In Chapter 4 we discussed the classical electromagnetic field. The transition to a quantum field will be made in Chapter 8. In this chapter we begin our discussion of the Dirac equation, which was invented bv Dirac as an equation for the relativistic quantum wave function of a single electron. However,we shall regard the Dirac wave function as a field . Which will subsequently be quantised along with the electromagnetic field. The Dirace quationwillberegardedasafieldequation. Thetransitiontoaquantumfieldtheoryis called second quantisation. The field。
like the Dirac wave function. is complex. W_e shall show how the Dirac field transforms under a Lorentz transformation. And find a Lorentz invariant Lagrangian from which it may be derived. On quantisation, the electromagnetic fields A(x), Fv(x)become space-and time. dependent 0perators. The expectation Values of these operators in the environ- ment described by the quantum states are the classical fields. The Dirac fields(x) alSO become space-and time. dependent operators on quantisation. However,there are no corresponding measurable classical fields. This di骶rence reflects the Pauli exclusion principle, which applies to fermions but not to bosons. In this chapter and in the following two chapters, the properties of the Dirac fields as operators are rarely invoked：for the most part the manipulations proceed as if the Dirac fields were ordinary complex functions, and the fields Can be thought of as single-particle Dirac wave functions. 5. 1 The Dirac equationDirac invented his equation in seeking to make Schr6dinger'S equation for an elec-tron compatible with special relativity.

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