

<<超对称和弦论>>

图书基本信息

书名：<<超对称和弦论>>

13位ISBN编号：9787510005138

10位ISBN编号：7510005132

出版时间：2009-8

出版时间：世界图书出版公司

作者：戴恩

页数：515

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

前言

As this is being written, particle physics stands on the threshold of a new era, with the commissioning of the Large Hadron Collider (LHC) not even two years away. In writing this book, I hope to help prepare graduate students and postdoctoral researchers for what will hopefully be a period rich in new data and surprising phenomena. The Standard Model has reigned triumphant for three decades. For just as long, theorists and experimentalists have speculated about what might lie beyond. Many of these speculations point to a particular energy scale, the teraelectronvolt (TeV) scale which will be probed for the first time at the LHC. The stimulus for these studies arises from the most mysterious - and still missing - piece of the Standard Model: the Higgs boson. Precision electroweak measurements strongly suggest that this particle is elementary (in that any structure is likely far smaller than its Compton wavelength), and that it should be in a mass range where it will be discovered at the LHC. But the existence of fundamental scalars is puzzling in quantum field theory, and strongly suggests new physics at the TeV scale. Among the most prominent proposals for this physics is a hypothetical new symmetry of nature, supersymmetry, which is the focus of much of this text. Others, such as technicolor, and large or warped extra dimensions, are also treated here. Even as they await evidence for such new phenomena, physicists have become more ambitious, attacking fundamental problems of quantum gravity, and speculating on possible final formulations of the laws of nature. This ambition has been fueled by string theory, which seems to provide a complete framework for the quantum mechanics of gauge theory and gravity. Such a structure is necessary to give a framework to many speculations about beyond the Standard Model physics. Most models of supersymmetry breaking, theories of large extra dimensions, and warped spaces cannot be discussed in a consistent way otherwise.

内容概要

The Standard Model has reigned triumphant for three decades. For just as long, theorists and experimentalists have speculated about what might lie beyond. Many of these speculations point to a particular energy scale, the teraelectronvolt (TeV) scale which will be probed for the first time at the LHC. The stimulus for these studies arises from the most mysterious - and still missing - piece of the Standard Model: the Higgs boson. Precision electroweak measurements strongly suggest that this particle is elementary (in that any structure is likely far smaller than its Compton wavelength), and that it should be in a mass range where it will be discovered at the LHC. But the existence of fundamental scalars is puzzling in quantum field theory, and strongly suggests new physics at the TeV scale. Among the most prominent proposals for this physics is a hypothetical new symmetry of nature, supersymmetry, which is the focus of much of this text. Others, such as technicolor, and large or warped extra dimensions, are also treated here.

<<超对称和弦论>>

作者简介

作者：(美国)戴恩(Michael Dine)

书籍目录

Preface A note on choice of metric Text website Part 1 Effective field theory : the Standard Model , supersymmetry , unification 1 Before the Standard Model Suggested reading 2 The Standard Model 2.1 Yan9—Mills theory 2.2 Realizations of symmetry in quantum field theory 2.3 The quantization of Yan9—Mills theories 2.4 The particles and fields of the Standard Model 2.5 The gauge boson masses 2.6 Quark and lepton masses Suggested reading Exercises 3 Phenomenology of the Standard Model 3.1 The weak interactions 3.2 The quark and lepton mass matrices 3.3 The strong interactions 3.4 The renormalization group 3.5 Calculating the beta function 3.6 The strong interactions and dimensional transmutation 3.7 Confinement and lattice gauge theory 3.8 Strong interaction processes at high momentum transfer. Suggested reading Exercises 4 The Standard Model as an effective field theory 4.1 Lepton and baryon number violation ' 4.2 Challenges for the Standard Model 4.3 The hierarchy problem 4.4 Dark matter and dark energy 4.5 Summary : successes and limitations of the Standard Model Suggested reading 5 Anomalies , instantons and the strong CP problem 5.1 The chiral anomaly 5.2 A two-dimensional detour 5.3 Real QCD 5.4 The strong CP problem 5.5 Possible solutions of the strong CP problem Suggested reading Exercises 6 Grand unification 6.1 Cancellation of anomalies 6.2 Renormalization of couplings 6.3 Breaking to $SU(3) \times SU(2) \times U(1)$ 6.4 $SU(2) \times U(1)$ breaking 6.5 Charge quantization and magnetic monopoles 6.6 Proton decay 6.7 Other groups Suggested reading Exercises 7 Magnetic monopoles and solitons 7.1 Solitons in 1+1 dimensions 7.2 Solitons in 2+1 dimensions : strings or vortices 7.3 Magnetic monopoles 7.4 The BPS limit ' 7.5 Collective coordinates for the monopole solution 7.6 The Witten effect : the electric charge in the presence of 7.7 Electric—magnetic duality Suggested reading Exercises 8 Technicolor : a first attempt to explain hierarchies 8.1 QCD in a world without Higgs fields 8.2 Fermion masses : extended technicolor Part 2 Supersymmetry Part 3 String theory Part 4 The appendices References Index

章节摘录

插图：The strong interactions, as their name implies, are characterized by strong coupling. As a result, perturbative methods are not suitable for most questions. In comparing theory and experiment, it is necessary to focus on a few phenomena which are accessible to theoretical analysis. By itself, this is not particularly disturbing. A parallel with the quantum mechanics of electrons interacting with nuclei is perhaps helpful. We can understand simple atoms in detail; atoms with very large Z can be treated by Hartree-Fock or other methods. But atoms with intermediate Z can be dealt with, at best, by detailed numerical analysis accompanied by educated guesswork. Molecules are even more problematic, not to mention solids. But we are able to make detailed tests of the theory (and its extension in quantum electrodynamics) from the simpler systems, and develop qualitative understanding of the more complicated systems. In many cases, we can do quantitative analysis of the small fluctuations about the ground states of the complicated system. In the theory of strong interactions, as we will see, many problems are hopelessly complicated. Low-lying spectra are hard; detailed exclusive cross sections in high-energy scattering essentially impossible. But there are many questions we can answer. Rates for many inclusive questions at very high energy and momentum transfer can be calculated with high precision. Qualitative features of the low lying spectrum of hadrons and their interactions at low energies can be understood in a qualitative (and sometimes quantitative) fashion by symmetry arguments. Recently, progress in lattice gauge theory has made it possible to perform calculations which previously seemed impossible, for features of spectra and even for interaction rates important for understanding the weak interactions.

<<超对称和弦论>>

编辑推荐

《超对称和弦论(英文版)》：此版本仅限中华人民共和国境内销售，不包括香港、澳门特别行政区及中国台湾。
不得出口。

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>