

图书基本信息

书名：<<规范理论和现代粒子物理导论 第2卷>>

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前言

For a book of its genre , our previous book , An introduction to gauge theories and the "new physics" (1982) was a great success. It was not , alas , sold in airport lounges , but it did run to two additional printings (1983 , 1985) , and to extensively revised editions in Russian (1990) , and in Polish (1991). More importantly , it seemed to achieve the principal goal which we had set ourselves , namely , to present a pedagogical account of modern particle physics with a balance of theory and experiment , which would be intelligible and stimulating for both theoretical and experimental graduate students. We did not try to write a profound book on field theory , nor a treatise on sophisticated experimental techniques. But we did wish to stress the deep , intimate and fruitful interaction between theoretical ideas and experimental results. Indeed , for us , it is just this aspect of physics which makes it seem so much more exciting than say pure mathematics. Our greatest pleasure came from the favourable reaction of students who were working through the book and from those reviewers who caught what we hoped was its essential flavour—the writing creates the feeling of an active progression of ideas arising from the repeated interaction of theoretical prejudice with experimental observation , unlike most textbooks , it is highly readable , and makes everything appear simple and obvious. Well , the last comment is surely an exaggeration but that was our aim. In thinking about a second edition we were faced with a serious conceptual problem. Ten years ago we were in a state of excited expectation. A beautiful theory had been created and led , via the simplest of calculations , to absolutely dramatic experimental predictions; principally the existence and basic properties of the heavy vector bosons W^+ and Z^0 . A host of interesting new phenomena could be studied with no more effort than the calculation of a lowest order Born diagram. Much of the new physics could be discussed and understood from rather qualitative arguments. That idyllic situation is much changed now. After the few years during which the experimentalists were struggling to demonstrate the very existence of these new phenomena , when the world of physics was electrified by the discovery of one single W or Z event , we have moved into an era when LEP is mass-producing millions of Z^0 s!

内容概要

本书分为两册，详细地介绍了粒子物理学的现代理论和实验。

条理分明，表述连贯。

作者以简明直观的方式，阐释隐藏在实验现象背后的深刻的物理原理，同时循序渐进地讲解从事粒子物理研究用到的现代方法。

本书收入了许多粒子物理领域的新成果，还有若干很有特色的议题，例如高阶弱电效应，夸克混合，喷流，深度非弹性轻子—强子散射，简单部分子模型的量子色动力学修正，以及量子色动力学的非微扰理论等。

本书可以作为现代粒子物理学方向的研究生教材，对该领域的科研人员也有很好的参考价值。

本书第一册主要包括电弱相互作用，新的基本粒子的探索及其物理性质的研究，部分子的发现，以及简单部分子模型的构建和预测等。

第二册在介绍了CP破坏之后，主要讲解量子色动力学及其在“硬”过程中的应用，同时也介绍了“软”强子物理和非微扰量子色动力学。

目次：Kobayashi-Maskawa矩阵的确定；混合和CP破坏；正规化，重整化和重整化群简介；规范理论，量子色动力学和重整化群；量子色动力学重整化群应用；量子色动力学中的部分子模型；大现象和强子反应中的喷流；物理中的喷流和强子；低或者“软”强子物理；规范理论的非微扰特征；标准模型之外。

附录1：场论基础；附录2：量子电动力学，量子色动力学和标准模型中的费曼规则；附录3：矢量守恒流和守恒荷；附录4：费曼振幅的算子形式和有效哈密顿量；附录5：S-矩阵，T-矩阵和费曼振幅；附录6：矩阵元的CPT不变性及其推论；附录7：基本部分子 $2 \rightarrow 2$ 过程的表述；附录8：欧氏空间常用记号。

读者对象：理论物理、高能物理和场论等专业的高年级本科生、研究生和相关专业的科研人员。

书籍目录

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