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Elementary Particle Physics I

6780/6781

Summer Semester 2000

Literature

Textbooks available in the university library are marked with an asterisk(*)

Introductory Textbooks

☞ **Introduction to Elementary Particles***
D. Griffiths
John Wiley & Sons (1987)

Fun to read. German translation available.

☞ **Quarks and Leptons***
F. Halzen and A. Martin
John Wiley & Sons (1984)

One of the best-known particle physics texts. Includes usefully elementary descriptions of some advanced topics.

☞ **Teilchenphysik: Eine Einführung***
C. Berger
Springer (1992)

Developed from lectures, this book contains a number of basic calculations hard to find elsewhere in such detail.

☞ **High Energy Physics***
D.H. Perkins
Addison-Wesley (1991)

This newer edition of the once-standard introductory textbook remains one of the best sources of information on the experimental aspects of the initial discovery age in experimental particle physics. Its illustrious author participated in the discovery of the pion.

☞ **Elementary Particle Physics***
D.C. Cheng and G.K. O'Neill
Addison-Wesley (1979)

This textbook has very nice introductory descriptions of the basics of particle physics, but ends before the discovery of the bottom quark.

Advanced Textbooks

- **An Introduction to Gauge Theories and Modern Particle Physics**
  E. Leader and E. Predazzi
  Cambridge University Press (1996)

  This two-volume set updates the 1982 edition. Almost *recent enough to know the mass of the top quark.*

- **Elementarteilchenphysik: Phänomene und Konzepte***
  O. Nachtmann
  Vieweg (1986)

  A thorough introductory treatment by an accomplished contemporary particle theorist.

- **Conceptual Foundations of Modern Particle Physics**
  R.E. Marshak
  World Scientific (1993)

  Published posthumously, this treatment includes a historical overview

- **Gauge Theories of the Strong, Weak and Electromagnetic Interactions**
  C. Quigg
  Benjamin-Cummings (1983)

  Despite its age, this book remains valuable due to its clarity.

$*$ **Precision Tests of the Standard Electroweak Model**
  Ed. P. Langacker
  World Scientific (1995)

  A collection of reviews by contemporary practitioners.

Experimental Methods

- **Introduction to Particle Physics**
  R.C. Fernow
  Cambridge (1986)

  The author concentrates on the experimental methods of particle physics. He also includes much information on the definition and physical meaning of measured quantities such as decay rates, cross sections, etc.

General Interest

- **The Experimental Foundations of Particle Physics**
  R.N. Cahn and G. Goldhaber
  Cambridge (1989)

  Descriptions of key particle physics experiments, up to and including the discovery of the bottom quark. Gerson Goldhaber himself made important contributions to the experimental discoveries related to the charm quark.

- **Inward Bound**
  A. Pais
  Cambridge (1989)

  Abraham Pais, a theoretical physicist of great reknown, has written a wonderfully erudite history of the conceptual development of modern physics up through the 1950's. This book provides a key perspective on the ways in which personalities contributed to the revolutionary developments since the discovery of the electron.

- **The God Particle**
  L. Lederman and D. Teresi
  Delta (1994)

  Nobel Laureate Leon Lederman (1989 for the experiment with Schwarz and Steinberger showing that electron-neutrino's are different from muon-neutrino's) presents an autobiographical treatment of his amazing career in experimental particle physics, developing light-hearted arguments which address the meaning of everything.

- **The Ideas of Particle Physics - An Introduction for Scientists**
  G.D. Coughlan and J.E. Dodd
  Cambridge (1991)

  This book provides a general conceptual picture of the present status of our understanding of the structure of matter, writing at a level accessible to people with a general scientific background.

- **The Particle Physics Explosion**
  F. Close, M. Marten, and C. Sutton
  Oxford (1987)

  This "coffee-table" book presents a beautifully illustrated depiction of the development of particle physics in the 20th century.