

Bibliography

Mathematical Background and Reference

- Cahn, Robert N., *Semi-Simple Lie Algebras and Their Representations*, Benjamin/Cummings, Menlo Park, California, 1984. Written by a physicist, for physicists.
- Carrier, George F., Krook, Max, and Pearson, Carl E., *Functions of a Complex Variable*, McGraw-Hill, New York, 1966. An excellent practical introduction to methods of complex variables and contour integration.
- Gradshteyn, I. S. and Ryzhik, I. M., *Table of Integrals, Series, and Products* (trans. and ed. by Alan Jeffrey), Academic Press, Orlando, Florida, 1980.

Physics Background

- Baym, Gordon, *Lectures on Quantum Mechanics*, Benjamin/Cummings, Menlo Park, California, 1969. A concise, informal text that is especially rich in nontrivial applications.
- Fetter, Alexander L. and Walecka, John Dirk, *Theoretical Mechanics of Particles and Continua*, McGraw-Hill, New York, 1980. Includes several chapters on continuum mechanics and useful appendices of mathematical reference material.
- Feynman, Richard P., *QED: The Strange Theory of Light and Matter*, Princeton University Press, Princeton, New Jersey, 1985. A transcription of four lectures given to a general audience, presenting Feynman's approach to quantum mechanics, including Feynman diagrams. Highly recommended.
- Feynman, Richard P. and Hibbs, A. R., *Quantum Mechanics and Path Integrals*, McGraw-Hill, New York, 1965. An introduction to the use of path integrals in nonrelativistic quantum mechanics.
- Goldstein, Herbert, *Classical Mechanics* (second edition), Addison-Wesley, Reading, Massachusetts, 1980. Chapter 12 introduces classical relativistic field theory.
- Jackson, J. D., *Classical Electrodynamics* (second edition), Wiley, New York, 1975.

- Landau, L. D. and Lifshitz, E. M., *The Classical Theory of Fields* (fourth revised English edition, trans. Morton Hamermesh), Pergamon, Oxford, 1975. Contains a succinct development of electromagnetic theory from the Lagrangian viewpoint.
- Landau, L. D. and Lifshitz, E. M., *Statistical Physics* (third edition, Part 1, trans. J. B. Sykes and M. J. Kearsley), Pergamon Press, 1980. An insightful if concise textbook of statistical mechanics, containing the original pedagogical exposition of Landau's theory of phase transitions.
- Reichl, L. E., *A Modern Course in Statistical Physics*, University of Texas Press, Austin, 1980. A complete textbook of statistical mechanics.
- Schiff, Leonard I., *Quantum Mechanics* (third edition), McGraw-Hill, New York, 1968.
- Shankar, Ramamurti, *Principles of Quantum Mechanics*, Plenum, New York, 1980. A very clear presentation of the basic theory.
- Taylor, Edwin F. and Wheeler, John Archibald, *Spacetime Physics* (second edition), Freeman, New York, 1992. An elementary but insightful introduction to special relativity.
- Taylor, John R., *Scattering Theory*, Robert E. Krieger, Malabar, Florida, 1983 (reprint of original edition published by Wiley, New York, 1972). A very clear development of scattering theory for nonrelativistic quantum mechanics.

Relativistic Quantum Mechanics and Field Theory

- Bailin, D. and Love, A., *Introduction to Gauge Field Theory* (revised edition), Institute of Physics Publishing, Bristol, 1993. Develops the theory entirely from the path integral viewpoint.
- Balian, Roger and Zinn-Justin, Jean (eds.), *Methods in Field Theory*, North-Holland, Amsterdam, 1976. Proceedings of the 1975 Les Houches Summer School in Theoretical Physics, including lectures on functional methods, renormalization, and gauge theories.
- Berestetskii, V. B., Lifshitz, E. M., and Pitaevskii, L. P., *Quantum Electrodynamics* (second edition, trans. J. B. Sykes and J. S. Bell), Pergamon, Oxford, 1982. An excellent reference for QED applications.
- Bjorken, James D. and Drell, Sidney D., *Relativistic Quantum Mechanics*, McGraw-Hill, New York, 1964. Develops Feynman diagrams using intuitive arguments, without using fields.
- Bjorken, James D. and Drell, Sidney D., *Relativistic Quantum Fields*, McGraw-Hill, New York, 1965. Redevelops Feynman diagrams from the field viewpoint, using canonical quantization.
- Brown, Lowell S., *Quantum Field Theory*, Cambridge University Press, New York, 1992. A careful treatment of the foundations of quantum field theory and its application to scattering processes.

- Coleman, Sidney, *Aspects of Symmetry*, Cambridge University Press, Cambridge, 1985. Informal lectures on a number of topics involving gauge theories and symmetry, given between 1966 and 1979.
- Collins, John, *Renormalization*, Cambridge University Press, Cambridge, 1984. A careful development of the technical machinery needed for all-orders proofs of renormalizability, operator product expansion, and factorization theorems.
- Deser, Stanley, Grisaru, Marc, and Pendleton, Hugh, *Lectures on Elementary Particles and Quantum Field Theory*, MIT Press, Cambridge, 1970, vol. 1. Four extremely useful summer school lectures.
- Gross, Franz, *Relativistic Quantum Mechanics and Field Theory*, Wiley, New York, 1993. Includes a number of topics in "advanced quantum mechanics", and an introductory chapter on bound states.
- Itzykson, Claude and Zuber, Jean-Bernard, *Quantum Field Theory*, McGraw-Hill, New York, 1980. A comprehensive textbook.
- Jauch, J. M. and Rohrlich, F., *The Theory of Photons and Electrons* (second edition), Springer-Verlag, Berlin, 1976. An authoritative monograph on QED.
- Kaku, Michio, *Quantum Field Theory: A Modern Introduction*, Oxford University Press, New York, 1993. Contains brief introductory chapters on a number of advanced topics.
- Kinoshita, T., ed., *Quantum Electrodynamics*, World Scientific, Singapore, 1990. A collection of review articles on precision tests of QED.
- Mandl, F. and Shaw, G., *Quantum Field Theory* (revised edition), Wiley, New York, 1993. The easiest book on field theory; introduces QED and some electroweak theory using canonical quantization.
- Ramond, Pierre, *Field Theory: A Modern Primer* (second edition), Addison-Wesley, Redwood City, California, 1989. Contains very nice treatments of the Lorentz group, path integrals, ϕ^4 theory, and quantization of gauge theories.
- Ryder, Lewis H., *Quantum Field Theory*, Cambridge University Press, Cambridge, 1985. A concise treatment of the more formal aspects of the subject.
- Sakurai, J. J., *Advanced Quantum Mechanics*, Addison-Wesley, Reading, 1967. Develops Feynman diagrams without using fields.
- Schweber, Silvan S., *QED and the Men Who Made It: Dyson, Feynman, Schwinger, and Tomonaga*, Princeton University Press, Princeton, 1994. An excellent history of the subject up to about 1950.
- Schwinger, Julian (ed.), *Selected Papers on Quantum Electrodynamics*, Dover, New York, 1958. Reprints of important papers written between 1927 and 1953.
- Sterman, George, *Introduction to Quantum Field Theory*, Cambridge University Press, Cambridge, 1993. An introductory textbook with special emphasis on the essentials of perturbative QCD.

Elementary Particle Physics

- Aitchison, Ian J. R. and Hey, Anthony J. G., *Gauge Theories in Particle Physics* (second edition), Adam Hilger, Bristol, 1989. An elementary introduction to gauge theories, concentrating mostly on tree-level processes.
- Barger, Vernon and Phillips, Roger J. N., *Collider Physics*, Addison-Wesley, Menlo Park, California, 1987. Basic discussion of the application of QCD to high-energy collider phenomenology.
- Cahn, Robert N. and Goldhaber, Gerson, *The Experimental Foundations of Particle Physics*, Cambridge University Press, Cambridge, 1989. Reprints of many original papers, supplemented by introductory overviews, additional references, and exercises. Highly recommended.
- Cheng, Ta-Pei and Li, Ling-Fong, *Gauge Theory of Elementary Particle Physics*, Oxford University Press, New York, 1984. An advanced, authoritative monograph.
- Commins, Eugene D. and Bucksbaum, Philip H., *Weak Interactions of Leptons and Quarks*, Cambridge University Press, Cambridge, 1983. A thorough review of both theory and experiment.
- Field, Richard D., *Applications of Perturbative QCD*, Benjamin/Cummings, Menlo Park, 1989. A useful description of the techniques needed for QCD calculations beyond the leading order.
- Georgi, Howard, *Weak Interactions and Modern Particle Theory*, Benjamin/Cummings, Menlo Park, California, 1984. Advanced, insightful treatment of selected topics.
- Griffiths, David, *Introduction to Elementary Particles*, Wiley, New York, 1987. A good undergraduate-level survey.
- Halzen, Francis and Martin, Alan D., *Quarks and Leptons: An Introductory Course in Modern Particle Physics*, Wiley, New York, 1984. Uses Feynman diagrams throughout, and concentrates on gauge theories.
- Perkins, Donald H., *Introduction to High Energy Physics* (third edition), Addison-Wesley, Menlo Park, California, 1987. A good introduction to phenomena, with relatively little emphasis on Feynman diagrams and gauge theories.
- Quigg, Chris, *Gauge Theories of the Strong, Weak, and Electromagnetic Interactions*, Benjamin/Cummings, Menlo Park, California, 1983. A very nice overview of gauge theories and their experimental tests.
- Ross, Graham G., *Grand Unified Theories*, Benjamin/Cummings, Menlo Park, California, 1984. A clear introduction to gauge theories that unify the interactions of particle physics.
- Taylor, J. C., *Gauge Theories of Weak Interactions*, Cambridge University Press, Cambridge, 1976. A concise treatment of the standard model and related theoretical issues.

Condensed Matter Physics

- Abrikosov, A. A., Gorkov, L. P., and Dzyaloshinskii, I. E., *Quantum Field Theoretical Methods in Statistical Physics* (second edition), Pergamon, Oxford, 1965. A classic, but very terse, exposition of the application of Feynman diagrams to condensed matter problems.
- Anderson, P. W., *Basic Notions of Condensed Matter Physics*, Benjamin/Cummings, Menlo Park, California, 1984. An informal overview of the concepts of broken symmetry and renormalization as applied to condensed matter systems.
- Fetter, Alexander L. and Walecka, John Dirk, *Quantum Theory of Many-Particle Systems*, McGraw-Hill, New York, 1971. A straightforward introduction to the use of Feynman diagrams in nuclear and condensed matter physics.
- Ma, Shang-Keng, *Modern Theory of Critical Phenomena*, Benjamin/Cummings, 1976. An introduction to the use of renormalization group methods in the theory of critical phenomena.
- Mattuck, Richard D., *A Guide to Feynman Diagrams in the Many-Body Problem*, McGraw-Hill, New York, 1967. A clear and easy introduction to the use of Feynman diagrams in solid state physics.
- Parisi, Giorgio, *Statistical Field Theory*, Benjamin/Cummings, 1988. Far-ranging applications of ideas from quantum field theory to problems in statistical mechanics.
- Stanley, H. Eugene, *Introduction to Phase Transitions and Critical Phenomena*, Oxford University Press, Oxford, 1971.
- Zinn-Justin, Jean, *Quantum Field Theory and Critical Phenomena* (third edition), Oxford University Press, Oxford, 1996. A treatise on the application of renormalization theory to the study of critical phenomena.

Corrections to This Book

A list of misprints and corrections to this book is posted on the World-Wide Web at the URL '<http://www.slac.stanford.edu/~mpeskin/QFT.html>', or can be obtained by writing to the authors. We would be grateful if you would report additional errors in the book, or send other comments, to mpeskin@slac.stanford.edu or to dschroeder@cc.weber.edu.