

2nd ed. 1989. XI, 155 pp. 7 figs. Softcover DM 34,- ISBN 3-540-51141-5

This text is based on the authors' broad experience in teaching the application of computers to physics. It takes the reader from the introductory simulation of classical mechanical problems to current research in statistical physics. The Ising model, cellular automata, percolation, Eden clusters and the Kauffman model are presented with exercises and programs for hands-on use with the aim of enabling and encouraging the student to write her/his own programs. The second part gives a detailed course on algebraic formula manipulation using the computer algebra system REDUCE, again with numerous examples and exercises. These "lectures for beginners" do not require any previous knowledge of computer languages; a brief introduction to FORTRAN can be found in the Appendix. The corrected second edition has been enlarged in Part Two (where a new program for an 800 * 800 Ising model on the square lattice is to be found) and updated in Part Three to include the most recent developments in REDUCE

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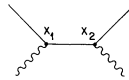
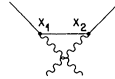
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Finite Quantum Electrodynamics

1989. X, 224 pp. 4 figs. (Texts and Monographs
 in Physics). Hardcover DM 68,-
 ISBN 3-540-51058-3



Contents: Preliminaries. - Relativistic Quantum Mechanics. - Field Quantization. - Causal Perturbation Theory. - Appendix: Spence Functions. - Subject Index.

This is the first textbook on quantum electrodynamics which not only includes full proofs and detailed calculations but is also mathematically rigorous. This is made possible by the author's careful analysis of the role of the concept of causality in QED. The book begins with Dirac's theory in part one, followed in part two by the quantum theory of free fields including a new approach to the concept of exterior fields. The third part is devoted to the study of the S-matrix of QED avoiding ultra-violet divergence. The most important physical results of QED are derived, and significant themes such as unitarity and renormalizability of the theory are discussed. This slim book addresses graduate students in physics.

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