



Relativistic Quantum Mechanics and Field Theory

By Franz Gross

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Relativistic Quantum Mechanics and Field Theory By Franz Gross

An accessible, comprehensive reference to modern quantum mechanics and field theory.

In surveying available books on advanced quantum mechanics and field theory, Franz Gross determined that while established books were outdated, newer titles tended to focus on recent developments and disregard the basics. *Relativistic Quantum Mechanics and Field Theory* fills this striking gap in the field. With a strong emphasis on applications to practical problems as well as calculations, Dr. Gross provides complete, up-to-date coverage of both elementary and advanced topics essential for a well-rounded understanding of the field.

Developing the material at a level accessible even to newcomers to quantum mechanics, the book begins with topics that every physicist should know-quantization of the electromagnetic field, relativistic one body wave equations, and the theoretical explanation of atomic decay. Subsequent chapters prepare readers for advanced work, covering such major topics as gauge theories, path integral techniques, spontaneous symmetry breaking, and an introduction to QCD, chiral symmetry, and the Standard Model. A special chapter is devoted to relativistic bound state wave equations-an important topic that is often overlooked in other books.

Clear and concise throughout, *Relativistic Quantum Mechanics and Field Theory* boasts examples from atomic and nuclear physics as well as particle physics, and includes appendices with background material. It is an essential reference for anyone working in quantum mechanics today.

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Editorial Review

From the Publisher

Offers a broader perspective by including numerous examples from atomic and nuclear physics as well as particle physics. Covers gauge theories, path-integral techniques and bound states. Considerable emphasis is placed upon applications to practical problems.

From the Inside Flap

In teaching advanced quantum mechanics and field theory, Professor Franz Gross found that the texts which had dominated the field since the 1960s had become out of date. Newer texts presented recent developments well but tended to ignore basic material essential to a complete understanding of the subject. To prepare young physicists for research, a new modern text, with a broad coverage of both elementary and advanced topics was needed. *Relativistic Quantum Mechanics and Field Theory* was designed to address that need. A textbook for a second-year, graduate-level course in physics, it offers an original, modern approach designed for students learning advanced quantum mechanics for the first time. To that end, it begins with a presentation of subjects every PhD physicist should know: quantization of the electromagnetic field; relativistic one body wave equations; and the theoretical explanation for atomic decay. Once the foundation is laid, subsequent chapters introduce major topics needed to prepare the student for advanced work. These include: gauge symmetry; functional methods (path integrals); spontaneous symmetry breaking; and an introduction to QCD, chiral symmetry, and the Standard Model. Even these advanced topics are developed in such a way that the information is easily accessible and that questions frequently asked by beginning students are addressed. *Relativistic Quantum Mechanics and Field Theory* contains examples from atomic and nuclear physics as well as particle physics. In addition, this volume includes an original chapter on relativistic bound state wave equations, an important topic omitted from most textbooks in the field. Throughout, considerable emphasis is placed on applications to practical problems and calculations. Four appendices include important material in a convenient place for ready reference.

From the Back Cover

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Nick Zapata:

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