



From Special Relativity to Feynman Diagrams : A Course in Theoretical Particle Physics for Beginners /

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This book, now in its second edition, provides an introductory course on theoretical particle physics with the aim of filling the gap that exists between basic courses of classical and quantum mechanics and advanced courses of (relativistic) quantum mechanics and field theory. After a concise but comprehensive introduction to special relativity, key aspects of relativistic dynamics are covered and some elementary concepts of general relativity introduced. Basics of the theory of groups and Lie algebras are explained, with discussion of the group of rotations and the Lorentz and Poincaré groups. In addition, a concise account of representation theory and of tensor calculus is provided. Quantization of the electromagnetic field in the radiation range is fully discussed. The essentials of the Lagrangian and Hamiltonian formalisms are reviewed, proceeding from systems with a finite number of degrees of freedom and extending the discussion to fields. The final four chapters are devoted to development of the quantum field theory, ultimately introducing the graphical description of interaction processes by means of Feynman diagrams. The book will be of value for students seeking to understand the main concepts that form the basis of contemporary theoretical particle physics and also for engineers and lecturers. An Appendix on some special relativity effects is added

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