

Theory Of Interacting Quantum Fields

[DOWNLOAD HERE](#)

1;Preface;5 2;Notation;8 3;0 Introduction;21 4;I Symmetry Groups of Elementary Particles;25 4.1;1 Lorentz Group;28 4.1.1;1.1 Euclidean and Minkowski Spaces. Relativistic Notation;28 4.1.2;1.2 Homogeneous Lorentz Group;31 4.1.3;1.3 Inhomogeneous Lorentz Group-Poincar Group;34 4.1.4;1.4 Complex Lorentz Transformations;35 4.1.5;1.5 Representations of the Lorentz and Poincar Groups, Field Functions, and Physical States;36 4.1.5.1;1.5.1 Representation D(0,0);39 4.1.5.2;1.5.2 Representations D(1/2,0) and D(0,1/2);40 4.1.5.3;1.5.3 Representation D(1/2,1/2);40 4.2;2 Groups of Internal Symmetries;43 4.2.1;2.1 Abelian Unitary Group U(1);43 4.2.2;2.2 Charge Conjugation C;44 4.2.3;2.3 Special Unitary Group SU(n);44 4.2.3.1;2.3.1 SU(2) Symmetry;45 4.2.3.2;2.3.2 SU(3) Symmetry;47 4.2.4;2.4 Groups of Local Transformations. Gauge Group;49 4.3;3 Problems to Part I;55 5;II Classical Theory of the Free Fields;57 5.1;4 Lagrangian and Hamiltonian Formalisms of the Classical Field Theory;59 5.1.1;4.1 Variational Principle and Canonical Formalism of Classical Mechanics;59 5.1.1.1;4.1.1 Lagrangian Equations;59 5.1.1.2;4.1.2 Canonical Variables. Hamiltonian Equations;61 5.1.1.3;4.1.3 Poisson Brackets. Integrals of Motion;62 5.1.1.4;4.1.4 Canonical Formalism in the Presence of Constraints;63 5.1.2;4.2 From Classical to Quantum Mechanics. Primary Quantization;68 5.1.3;4.3 General Requirements to the Lagrangians of the Field Theory;72 5.1.4;4.4 Lagrange Euler Equations;73 5.1.5;4.5 Noether's Theorem and Dynamic Invariants;74 5.1.6;4.6 Vector of Energy-Momentum;76 5.1.7;4.7 Tensors of Angular Momentum and Spin;77 5.1.8;4.8 Charge and the Vector of Current;79 5.1.9;4.9 Canonical Variables;80 5.2;5 Classical Theory of Free Scalar Fields;81 5.2.1;5.1 Klein Fock Gordon Equation;81 5.2.2;5.2 Relativistic Invariance of the Klein Fock Gordon Equation;82 5.2.3;5.3 Solutions of the Klein Fock Gordon Equation;84 5.2.4;5.4 Interpretation of Solutions. Hilbert Space of States;86 5.2.5;5.5 C, P, and T Transformations;90 5.2.5.1;5.5.1 Transformation of Charge Conjugation C;90 5.2.5.2;5.5.2 Space Reflection P;92 5.2.5.3;5.5.3 Time Reversal T;93 5.2.5.4;5.5.4 CPT-Invariance;93 5.2.6;5.6 Representations of the Lorentz Group in the Space of States;94 5.2.7;5.7 Lagrangian Formalism of the Scalar Field. Dynamic Invariants;98 5.3;6 Spinor Field;102 5.3.1;6.1 Dirac Equation;102 5.3.1.1;6.1.1 Construction of the Dirac Equation;102 5.3.1.2;6.1.2 Properties of Dirac

Matrices. Conjugate Equation;103 5.3.2;6.2 Relativistic Invariance;106 5.3.2.1;6.2.1 Transformation Properties of the Spinor Field;107 5.3.2.2;6.2.2 On Reducible and Irreducible Spinor Representations;111 5.3.2.3;6.2.3 Transformation Properties of Bilinear Forms .O.;112 5.3.3;6.3 Solutions of the Dirac Equation;114 5.3.3.1;6.3.1 Structure of Solutions in the Momentum Space;114 5.3.3.2;6.3.2 Classification of Solutions. Helicity;117 5.3.3.3;6.3.3 Relations Between Spinors;122 5.3.3.4;6.3.4 Wave Functions of the Electron and Positron. Charge Conjugation;124 5.3.3.5;6.3.5 CPT-Transformation;127 5.3.4;6.4 Lagrangian Formalism;130 5.3.5;6.5 Representations of the Lorentz Group;135 5.3.5.1;6.5.1 Hilbert Space of States;135 5.3.5.2;6.5.2 Representations of the Lorentz Group in the Space of States;137 5.3.6;6.6 Applications of the Dirac Equation;138 5.3.6.1;6.6.1 Dirac Equation in the Presence of External Fields;138 5.3.7;6.7 Massless Spinor Field;141 5.3.7.1;6.7.1 Two-component Massless Spinor Field;141 5.3.7.2;6.7.2 Relativistic Invariance;143 5.3.7.3;6.7.3 Are There Actual Particles Corresponding to the Massless Spinor Fields? Physical Interpretation of Solutions. Neutrino;143 5.3.7.4;6.7.4 Lagrangian and Dynamic Invariants;145 5.3.7.5;6.7.5 On the Mass of Neutrino and Majorana Spinors;146 5.4;7 Vector Fields;148 5.4.1;7.1 Lagrangian Formalism;148 5.4.2;7.2 Representations in the Momentum Space;151 5.4.3;7.3 Decomposition into EAN/ISBN : 9783110250633 Publisher(s): De Gruyter Format: ePub/PDF Author(s): Rebenko, Alexei L. - Malyshov, Peter V.

[DOWNLOAD HERE](#)

Similar manuals: