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Nota di contenuto	Preface; Contents; Basic Preliminaries; 1. Quantum Field Theory - Why and How; 1.1 Schwinger's Action Principle; 1.2 Free-Field Kinematics; 2. Functional Preliminaries; 2.1 Functional Differentiation; 2.2 Linear Translation; 2.3 Quadratic (Gaussian) Translation; 2.4 Functional Integration; 2.5 Cluster Decomposition; 2.6 Two Useful Relations; 3. Functional Field Theory; 3.1 The Generating Functional; 3.2 A Gauge Digression: SU(N)-QCD; 3.3 Coupled Fermion and Boson Fields; 3.4 Fields at the Same Point; 4. The Generating Functional and the S-Matrix; 4.1 The Generating Functional Operator 4.2 Asymptotic Conditions 4.3 The S-Matrix; 4.4 A Bremsstrahlung Example; 5. Schwinger/Fradkin Representations; 5.1 Formalism; 5.2 Gauge Structure; 5.3 The Bloch-Nordsieck - IR - Eikonal Approximation; 5.4 A Convenient Reformulation; Quantum Electrodynamics; Quantum Electrodynamics; 6. Radiative Corrections of the Photon Propagator; 6.1 Functional Approach to the Photon Propagator; 6.2 Higher-order Radiative Correction; 6.3 The DP Model for a Single Closed Fermion Loop; 6.4 The Extended DP Model, and the Finiteness of Z <sub>3</sub> ; 6.5 Summary; 7. Radiative Corrections to the Electron Propagator 7.1 Introduction 7.2 Formulation; 7.3 Computation; 7.4 Summary; 8. A QED Symmetry-Breaking Model of Vacuum Energy; 8.1 Introduction; 8.2 Formulation; 8.3 Approximation; 8.4 Computation; 8.5 Application

to Dark Energy; 8.6 Partial Summary; Quantum Chromodynamics; Quantum Chromodynamics; 9. Explicit, Non-Perturbative Gauge Invariance; 9.1 From QED to QCD; 9.2 Gluon Summations and Explicit Gauge Invariance; 9.3 Effective Locality; 10. QCD Transverse Fluctuations; 10.1 Introduction; 10.2 A Phenomenological Expression of Transverse Imprecision; 10.3 Bundle Diagrams; 11. Quark Binding Potential  
 11.1 Use of the Eikonal Approximation 11.2 Estimation of the "Model Pion" Mass; 12. Nucleon Scattering and Binding; 12.1 Introduction; 12.2 Formulation; 12.3 A Qualitative Binding Potential; 12.4 Binding Estimations; 12.5 Summary and Speculation; Astrophysical Speculations; Astrophysical Speculations; 13. Inflation as the Precursor of Dark Energy; 13.1 Introduction; 13.2 Computation; 13.3 A Cosmological Speculation; 13.4 Summary; 14. Quantum Tachyon Dynamics; 14.1 Introduction; 14.2 QTD as a QFT; 14.3 Functional QTD; 14.4 Photon Emission and Reabsorption  
 14.5 Kinematic of Tachyon-Particle Reactions 14.5.1 Blocking the reaction  $T + T$ ; 14.5.2 Scattering:  $T + p = T' + p'$ ; 14.6 From Ehrenfest's Theorem to Loop Annihilation; 14.7 NASA's Fermi Bubbles; 14.8 Summary; Acknowledgment; Appendix A Equivalence Example of the DP Model; Appendix B Intuitive Justification of the DP Model; Appendix C Connected Cluster-Expansion Functionals; Appendix D Fradkin's Representations for non-Abelian  $G_c[A]$  and  $L[A]$ ; Appendix E Effective Locality and Transverse Imprecision; Appendix F Tachyonic Photon Emission; Appendix G Relativistic Tachyon Notation  
 G.1 Free Tachyon Equation

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Sommario/riassunto

A monograph, which can also be used as a textbook for graduate students, this book contains new and novel applications of Schwinger's well-known functional solutions, made possible by the use of Fradkin's little-known functional representations, together with recent research work of the author and his colleagues.

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