



Renormalization of the Regularized Relativistic Electron-Positron Field

By Cora Uhlemann

GRIN Verlag. Paperback. Book Condition: New. Paperback. 68 pages. Dimensions: 8.0in. x 5.8in. x 0.1in. Bachelor Thesis from the year 2011 in the subject Mathematics - Miscellaneous, grade: 1, 0, Technical University of Munich, language: English, abstract: This thesis is motivated by questions arising in the field of Mathematical Quantum Electrodynamics, the attempt of a proper mathematical description of Quantum Electrodynamics (QED). QED is the relativistic quantum field theory of electrodynamics, which unifies Quantum Mechanics and Special Relativity in a consistent manner. From the mathematical point of view, QED is an abelian gauge theory with the symmetry group $U(1)$ (phase factors) and the gauge field mediating the interaction between the charged spin-1/2 fields is the electromagnetic field. Aim of this thesis is the renormalization of the regularized relativistic electron positron field together with a Coulomb interaction. The idea of the renormalization procedure is to compare the normal-ordered Hamiltonian with the original one. Choosing a conventional normal ordering, the change in Hamiltonian is given by a quadratic term. The choice of a suitable normal ordering amounts in a non-perturbative redefinition of the electronpositron states. This allows for the interpretation of change in the Hamiltonian as a certain renormalization. The proper...



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