Proceedings

Nonperturbative QED on the Hopf bundle

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Abstract: We consider the Dirac equation and Maxwell's electrodynamics in $\mathbb{R} \times S^3$ spacetime, where a three-dimensional sphere is the Hopf bundle $S^3 \rightarrow S^2$. The method of nonperturbative quantization of interacting Dirac and Maxwell fields is suggested. The corresponding operator equations and the infinite set of the Schwinger-Dyson equations for Green's functions is written down. To illustrate the suggested scheme of nonperturbative quantization, we write a simplified set of equations describing some physical situation. Also, we discuss the properties of quantum states and operators of interacting fields.

Keywords: Dirac equation; Maxwell's electrodynamics; Hopf bundle; nonperturbative quantization