



Abstract

T and C Symmetry Breaking in Algebraic Quantum Field Theory [†]

Vadim Monakhov

Faculty of Physics, Saint Petersburg State University, Ulyanovskaya Street, 1, 198504 Saint Petersburg, Russia; v.v.monahov@spbu.ru

[†] Presented at the 1st Electronic Conference on Universe, 22–28 February 2021. Available online: <https://ecu2021.sciforum.net/>.

Abstract: We have developed a quantum field theory of spinors based on the algebra of canonical anticommutation relations (CAR algebra). The proposed approach is based on the use of Grassmann densities in the momentum space and their derivatives with respect to the construction from these densities of both basis Clifford vectors of spacetime and the spinor vacuum. We have shown the existence of two vacua: normal and alternative. We have proven that CPT is the real structure operator in the theory of Krein spaces. C and T operators transform a normal vacuum into an alternative one, which leads to the breaking of these symmetries.

Keywords: CAR algebra; Clifford algebra; Krein spaces; discrete symmetries; Dirac sea; time reversal; charge conjugation; CPT theorem; CTP theorem



Citation: Monakhov, V. T and C Symmetry Breaking in Algebraic Quantum Field Theory. *Phys. Sci. Forum* **2021**, *2*, 15. <https://doi.org/10.3390/ECU2021-09285>

Academic Editor: Herbert Hamber

Published: 22 February 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Supplementary Materials: The supplementary file is available at <https://www.mdpi.com/article/10.3390/ECU2021-09285/s1>.

Institutional Review Board Statement: Not applicable.