

Special Issue

Nonperturbative and Symmetry Methods in QFT: Applications to Actual Physical Problems, in Particular, to Physics of Nanostructures

Message from the Guest Editor

This Special Issue of *Symmetry* is dedicated to articles reflecting progress in the following directions: quantization of gauge theories; symmetries in Hamiltonian and Lagrangian formulations of gauge theories; nonperturbative approaches to strong-field QFT and its applications to nanostructure physics; new solutions to relativistic wave equations and their applications; theory of self-adjoint extensions and its applications to physical problems; challenges in quantum information theory; and development of semiclassical methods in quantum theory. We also seek contributions describing effects of particle creation by strong fields from the vacuum in high-energy physics and astrophysics, spontaneous production of electron-positron pairs by supercritical Coulomb fields, and similar effects in the physics of graphene and other nanostructures. The study of quantum effects in the evolution of particles and fields in curved spacetimes is of particular interest.

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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