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

Guest Editor:

Prof. Dr. Dmitry Gitman
1. I.E. Tamm Theory Division, The P.N. Lebedev Physical Institute, 53 Leninsky Pr., 119991 Moscow, Russia
2. Institute of Physics, The University of Sao Paulo, São Paulo 05508-070, Brazil

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Message from the Guest Editor

Dear Colleagues,

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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Editor-in-Chief

Prof. Dr. Sergei D. Odintsov
1. Institució Catalana de Recerca i Estudis Avançats (ICREA), Passeig Luis Companys, 23, 08010 Barcelona, Spain
2. Institute of Space Sciences (ICE-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

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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Contact Us

Symmetry Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
www.mdpi.com

mdpi.com/journal/symmetry
symmetry@mdpi.com
𝕏@Symmetry_MDPI