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Dissipative Coherent Structures in Nonlinear and Quantum Optics: Outlook of Symmetry and Its Breaking

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Message from the Guest Editor

Dear Colleagues,

The rapid advance in the study of multidimensional coherent patterns has an interdisciplinary character and bridges the different areas comprising biology and sociology, turbulence phenomena in plasma and hydrodynamics, nonlinear and quantum optics, solitonics, and self-organization phenomena in liquid crystals and Bose-Einstein condensates, and many other fields. That establishes close connections or analogies between micro and macroscale phenomena, in particular, unexpected insights into the quantum mechanics of open systems, field theory, and even cosmology. In photonics and Bose-Einstein condensate, such dissipative coherent structures could provide unprecedented energy (or mass) harvesting and a breakthrough in the information capacity of photonic networks, quantum computing, multimode microresonators mastering, and optical comb generation. Symmetry plays a fundamental role in all these phenomena. Paradoxically, the highly symmetrical coherent patterns can spontaneously emerge from a hierarchical symmetry breaking due to phase transitions and stochastic resonance...

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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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