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Recent Developments and Applications in Nonlinear Optics

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Message from the Guest Editor

Dear Colleagues,

This Special Issue of Symmetry is devoted to recent developments and applications in nonlinear optics.

One of the most important developments in nonlinear optics is the soliton effect. In nonlinear optics, an optical soliton refers to an optical field that does not change during propagation in consequence of a delicate balance between group velocity dispersion and nonlinearity effects. Optical soliton pulses are very useful for transmitting high-data-rate information in long-distance optical fiber communications. Therefore, optical solitons represent a substantial exploratory field. In order to reveal soliton solutions with governing equations in nonlinear optics, many integration methods have been proposed. One such method is Lie symmetry, which has been described in a number of excellent textbooks and has been applied to a number of physical and engineering models. The Lie symmetry method is exceptionally algorithmic. This method systematically combines famous methodologies for constructing soliton solutions in optical fiber communications.

This Special Issue of Symmetry features articles about all aspects of Lie symmetry analysis in nonlinear optics.

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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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