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Symmetry and Asymmetry in Nano-Optics, Nano-Photonics and Optomechanics: Theory, Applications, and Reviews

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Message from the Guest Editors

Dear Colleagues,

Symmetry is everywhere in the rapidly developed nano-optics, nano-photonics, and optomechanics. Photonic crystals, for example, the artificial superlattice with C4 or C6 symmetry can support Fano resonance with ultra-high-Quality factors (Q-factor) or even bound state in the continuum (BIC) with theoretically infinite Q-factors. Exploring the symmetry in artificial materials (including artificial superlattice) leads to new physics. For example, by breaking the inverse or C2 symmetry of the unit cell of a photonics crystal with C4 lattice symmetry, chirality can be induced. In optomechanics, symmetry is playing an important role as well. Light-driven motors, which are made of helix structures with Cx (x = 3, 4 or 6) symmetry, can convert spin moments to orbital moments via spin-obit coupling leading to rotation motion.

In this SI, we invite research articles and reviews in the fields of nano-optics, nano-photonics, and optomechanics with a special focus on symmetry and asymmetry-related exploration.

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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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