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Symmetries and Topology in Nonlinear Ultrafast Optical Spectroscopy in Solids and Quantum Materials

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Deadline for manuscript submissions:
closed (17 February 2023)

Message from the Guest Editor

The 'spin-conductivity feature' at the topological surface state (TSS) or edge states and the insulating character inside the 2D and 3D topological insulators (TIs) of Bi2Se3 (3D-TI) promise a robust platform for optimizing classical devices toward a new era of quantum information.

In the light of these phenomena and their relevance, we wish to encourage our colleagues from the ultrafast sciences and condensed matter physics (CMP) communities to join efforts with the vision of establishing a Special Issue (SI) on the emerging field of "Symmetries and Topological Nonlinear Optical Ultrafast-Spectroscopy of Quantum Materials and Solids (SNOU-QMS)". The cornerstone questions and curiosities for several experts around the world are: (1) How can we extend ultrafast physics tools, such as the high-order harmonic generation (HHG) process, to explore new avenues in CMP? (2) How can we detect and manipulate topological insulators (TIs), topological orders, Weyl semimetals (WDSMs), quantum spin liquid phases (QSLs)—basically speaking, quantum materials—with lasers?

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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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