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Spin Hall Effect in Photonic Materials

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Message from the Guest Editor

The aim of this Special Issue is to explore novel directions and applications for the SHE of light in photonic materials. As a photonic analogue of the SHE in electronic systems, the photonic SHE warrants unique potential for exploration of the physical properties of novel photonic materials and nanostructures, such as in determining the material properties of magnetic and metallic thin films, or the optical properties of atomically thin two-dimensional metamaterials, with unprecedented spatial and angular resolution—a feature than can be achieved by combining SHE with quantum weak measurements and quantum weak amplification techniques. Moreover, photonic SHE opens up a new pathway for controlling spin states of photons and for developing next-generation photonic spin Hall devices as fundamental constituents of the fast-growing field of photonic precision metrology and sensing, and future spin-based photonics applications. The Special Issue welcomes contributions from a broad range of interdisciplinary fields, ranging from photonics devices, to metamaterials, quantum weak measurements, orbital angular momentum of light, or spin-based photonics. to mention but a few examples.

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Message from the Editor-in-Chief

We get more and more evidence that quantum theory is the correct description of nature. It was born a century ago by explaining a few paradoxical results that could not be understood in the framework of classical physics. Today, quantum physics leads technological revolution in metrology, communication, computation, and the design of novel materials. Still it needs more solid foundations, and we need to develop a deeper understanding of how it can be used for new applications.

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