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Optical Vortex: Fundamentals and Applications

Guest Editor:

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Message from the Guest Editor

Dear Colleagues,

An optical vortex refers to the spatial modes of light that are featured with axial-phase singularity. This topological structure arises from its helicoidal phase front with topological charge ℓ around the phase singularity. It is also referred to as the optical angular momentum (OAM) of $\ell\hbar$, with respect to the spin angular momentum (SAM) ($\pm\hbar$ per photon) associated with the photon polarization. Light fields carrying OAM have opened new perspectives in the optical research realm due to various fascinating attributes, such as the optical tweezer, optical microscopy and metrology, quantum communication, lasing, etc. The novel OV properties characterized by high-order Gaussian beam modes, such as the Laguerre–Gaussian (LG) modes, Hermite–Gaussian (HG) modes, and Ince–Gaussian (IG) modes, also spawn tremendous research interest in the high-order integer/fractional OAM and its orthogonal space spans. Vortex beam generation techniques have also been developed thoroughly for the past three decades.

We are pleased to invite you to contribute to this Special Issue on the fundamentals and applications of an optical vortex.