

# Optical Orbital Angular Momentum: Thirty Years and Counting

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In 1992, Professor Allen's paper published in *Physical Review A* indicated that laser light with a Laguerre-Gaussian amplitude distribution has an orbital angular momentum (OAM). Since then, conceptual studies on OAM of photons have been attracting continual attention in physics and optics communities. In recent years, we have witnessed the birth and fast development of many break-through technologies driven by the concept of OAM, from advanced light-field manipulation to super-resolution imaging, classical and quantum optical communications, and many others.

In this connection, we are honored to organize a theme issue to pay our respect to Professor Allen for his pioneering study on OAM, as well as the great achievements by other scientists and scholars in this field. This special collection focuses on optical orbital angular momentum and its role in optical science and applications. One review article and nine original ones are assembled in *Advanced Photonics* and its sister journal *Advanced Photonics Nexus*. The topics of these contributions include torsion pendulum driven by OAM of light, time-varying OAM, optical interconnects for OAM modes, retrieval of OAM spectrum, free-electron lasers for OAM generation, reconfigurable structured light modes, OAM multiplexed optical holography, phase aperture for transforming vortex beam, and OAM modes in a Janus optical parametric oscillator.

We hope the readers, whether early career or established scientists, will enjoy the collection of articles in this joint theme issue and find them helpful and inspiring.

A list of the articles is provided here:

- [Torsion pendulum driven by the angular momentum of light: Beth's legacy continues](#), Etienne Brasselet, University of Bordeaux, CNRS

- [Generation of time-varying orbital angular momentum beams with space-time-coding digital metasurface](#), Jensen Li, Hong Kong University of Science and Technology
- [Propagation of transverse photonic orbital angular momentum through few-mode fiber](#), Qiwen Zhan, University of Shanghai for Science and Technology
- [Tailoring light on three-dimensional photonic chips: a platform for versatile OAM mode optical interconnects](#), Jian Wang, Huazhong University of Science and Technology
- [Single-shot Kramers–Kronig complex orbital angular momentum spectrum retrieval](#), Siyuan Yu, Sun Yat-sen University
- [Self-seeded free-electron lasers with orbital angular momentum](#), Gianluca Geloni, European XFEL GmbH
- [Reconfigurable structured light generation and its coupling to air-core fiber](#), Jian Wang, Huazhong University of Science and Technology
- [Multiparameter encrypted orbital angular momentum multiplexed holography based on multiramp helicoconical beams](#), Xiao Yuan, Soochow University
- [Characteristics of a Gaussian focus embedded within spiral patterns in common-path interferometry with phase apertures](#), Ying Gu, Chinese PLA General Hospital
- [Generation of high-efficiency, high-purity, and broadband Laguerre-Gaussian modes from a Janus optical parametric oscillator](#), Yong Zhang, Nanjing University; Min Xiao, Nanjing Univ./Univ. of Arkansas