**Title**

Free-space and Fiber Optical Communications Using Orbital Angular Momentum Multiplexing

**Abstract**

Nowadays, optical communications technologies support the global data networks. One critical issue in its research is the challenge of meeting the needs of ever-increasing data capacity. This talk presents high-speed free-space and fiber optical communications using orbital-angular-momentum multiplexing. First, the basics of orbital angular momentum (OAM) and its traditional applications will be introduced. As another newly explored dimension, spatial division multiplexing (SDM) has been demonstrated with the great potential to tremendously increase the data capacity. The building blocks of OAM-based SDM system will be discussed. Next, we will discuss the potential of using orbital-angular-momentum (OAM) modes for spatial multiplexing in a ring fiber. Several types of ring-core optical fibers for OAM modes will be presented, including multi-core ring fiber supporting thousands of OAM modes, coupled ring-core fiber with large negative dispersion, non-zero dispersion-shifted ring fiber to balance the chromatic dispersion and nonlinearity. Moreover, we will show mode-division and wavelength-division multiplexing of OAM modes with 1.6-Tb/s data capacity through 1.1-km of ring-core fiber. Finally, we will review wavefront-phase-tailoring methods to reconfigurably manipulate and perform different networking functions on multiplexed OAM beams. Specifically, the optical functions of add/drop multiplexing, selective switching and multicasting are reported for OAM beams.

**Biography**

Yang Yue received the B.S. and M.S. degrees in electrical engineering and optics from Nankai University, China, in 2004 and 2007, respectively. He received the Ph.D. degree in electrical engineering from the University of Southern California, USA, in 2012. He is a Professor with the Institute of Modern Optics, Nankai University, Tianjin, China. Dr. Yue’s current research interests include intelligent photonics, optical communications and networking, optical interconnect, detection, imaging and display technology, integrated photonics, free-space and fiber optics. He has published over 200 peer-reviewed journal papers (including Science) and conference proceedings with >8,000 citations, four edited books, >50 issued or pending patents, >100 invited presentations. Dr. Yue is a Senior Member of the Institute of Electronic and Electrical Engineers (IEEE). He is an Associate Editor for IEEE Access, and an Editor Board Member for three other scientific journals. He also served as Guest Editor for eight journal special issues, Committee Member and Session Chair for >50 international conferences, Reviewer for >60 prestigious journals.

**Photograph**

