Orbital angular momentum of fiber optic communication

Overview

This paper introduces the OAM generation and transmission system based on fiber, summarizes the current photonic crystal fiber, ring core fiber, fiber grating and other all-fiber systems that can support OAM modes, and explains some experimental principles. Structured light, especially beams carrying orbital angular momentum (OAM), has gained much interest due to its unique amplitude and phase structures. In terms of communication systems, multiple orthogonal OAM beams can be potentially utilized for increasing link capacity in different scenarios. The stable propagation and generation of OAM modes are necessary for the fields of OAM-based optical communications and microscopies. In this review, we focus on discussing the novel fibers that. Space-division multiplexing (SDM), as a main candidate for future ultra-high capacity fibre-optic communications, needs to address limitations to its scalability imposed by computation-intensive multi-input multi-output (MIMO) digital signal processing (DSP) required to eliminate the crosstalk.

Article Content

Theoretical analyses on orbital angular momentum

Since the first deployment of fibre-optic communication systems three decades ago, the transmission capacity of single-mode fibres (SMFs) has

Transmission and Generation of Orbital ANGULAR

The orbital angular momentum (OAM) of light provides a new degree of freedom for carrying information. The stable propagation and generation of

Orbital Angular Momentum in Fibers

We first introduce the basic theories, including the eigenmode analysis method, mode coupling theory, and spin-orbit mapping of light in fibers. We then give a detailed classification of OAM fibers and

Generation, Transmission and Application of Orbital Angular

This paper introduces the OAM generation and transmission system based on fiber, summarizes the current photonic crystal fiber, ring core fiber, fiber grating and other all-fiber systems

Optical orbital-angular-momentum-multiplexed data transmission under ...

Multiplexing multiple orbital angular momentum (OAM) channels enables high-capacity optical communication. However, optical scattering from ambient microparticles in the atmosphere or

Orbital angular momentum-based quantum communication in optical

Orbital angular momentum (OAM) of photons provides a promising approach to enhance the capacity, robustness, and functionality of quantum communication systems in optical fibers.

Hybrid optical communication systems leveraging orbital

Abstract This study proposes a new hybrid optical communication system that integrates free space optics (FSO) and single-mode fiber (SMF) links.

Orbital Angular Momentum Waves: Generation, Detection, and

Orbital angular momentum (OAM) has aroused a widespread interest in many fields, especially in telecommunications due to its potential for unleashing new capacity in the severely

All-in-Fiber Dynamically Reconfigurable Orbital Angular

The orbital angular momentum (OAM) spatial degree of freedom of light has been widely explored in many applications, including telecommunications, quantum

Optical fiber communications using orbital angular momentum modes

This paper presents a comprehensive review of the research efforts in harnessing orbital angular momentum (OAM) modes for space-division multiplexed (SDM) optical fiber communications,...

Optical Networks of The Future | Orbital Angular

Orbital Angular Momentum (OAM) light waves are currently the focus of much research into the development of new optical solutions in the field of

Orbital Angular Momentum Communications in Commercial Multimode Fiber ...

ABSTRACT: The optical orbital angular momentum (OAM) is regarded as a new dimension for next-generation communication systems for its potential to break the Shannon limit of communication

Quantum orbital angular momentum in fibers: A review

The field of quantum communication is thriving as a complement to conventional telecommunication with its distinctive feature of absolute security. As the core technology for

Optimization of photonic crystal fibers for transmission of orbital ...

Photonic crystal fibers (PCFs) which can transmit orbital angular momentum (OAM) modes are attractive to optical communication due to the large capacity and flexible structure.

Optical communications using orbital angular

Orbital angular momentum (OAM), which describes the “phase twist” (helical phase pattern) of light beams, has recently gained interest due to its potential

1-Pbps orbital angular momentum fibre-optic transmission

First demonstration of orbital angular momentum (OAM) dis-tributed raman ampli fier over 18km OAM fiber with data-carrying OAM multiplexing and wavelength-division multiplexing.

Orbital Angular Momentum Communications in Commercial

ABSTRACT: The optical orbital angular momentum (OAM) is regarded as a new dimension for next-generation communication systems for its potential to break the Shannon limit of communication...

Orbital angular momentum multiplexed deterministic all-optical

Recently, the orbital angular momentum (OAM) of light has attracted wide attention as an important degree of freedom for realizing multiplexing to increase information transmission capacity.

Recent advances in ring-core fiber for orbital-angular-momentum

Orbital angular momentum (OAM) modes constitute a complete basis set for the spatial distribution of electromagnetic fields. By exploiting the orthogonality of OAM modes, optical fiber

Atmospheric turbulence compensation in orbital angular momentum ...

Orbital angular momentum (OAM)-carrying beams have recently generated considerable interest due to their potential use in communication systems to increase transmission capacity and

Numerical study of a dynamic orbital angular momentum modes

We would like to submit the enclosed manuscript entitled “Numerical study of a dynamic orbital angular momentum modes coupler based on D-shaped photonic crystal fibers”, which we wish

(PDF) Generation, Transmission and Application of

For high-speed fibre-optic communication, orbital angular momentum will expand the bandwidth significantly, and technologies for multiplexing and

fphy-2021-773505 1..17

Orbital-Angular-Momentum Mode (De)Multiplexer: A Single Optical Element for MIMO-Based and Non-MIMO-based Multimode Fiber Systems[Conference Presentation]. San Francisco, California, United

Orbital angular momentum lasers

This Review covers the intriguing physics behind orbital angular momentum lasers, summarizing the exciting prospects at the interface between structured light and structured matter.

Orbital angular momentum of light for communications

Structured light, especially beams carrying orbital angular momentum (OAM), has gained much interest due to its unique amplitude and phase

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