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場所: 湘南校舎　12号館5階　第1会議室

講演要旨 Abstract

『Advanced optical modulation format and its all-optical signal processing』

創造科学技術研究機構

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Nowadays fiber-optic communication systems form the high-capacity transport infrastructure, enabling and supporting the exponentially-growing broadband “Big Data” services and advanced Internet applications. The demand for higher per-fiber transport capacity at lower per end-to-end information bit cost has led to advent of optical networks with ultra-fast capacity, high energy and spectrum efficiency. Among enabling technologies, advanced optical modulation formats become critical to the design of modern optical fiber communication systems. The talk will focus on the advanced optical modulation format and its all-optical signal processing.

In the first part, we will review several proposed flexible optical high-order quadrature amplitude modulation (QAM) transmitter schemes, including the scheme based on monolithically-integrated quad Mach-Zehnder in-phase/quadrature (IQ) modulator for generating quadrature phase-shift keying (QPSK), minimum phase-shift keying (MSK), eight-ary phase-shift keying (8PSK) and 16QAM, and the scheme using two cascaded conventional IQ modulators showing the ability to synthesize QPSK, 16QAM, 32QAM and 64QAM. Both of these schemes show the re-configurability and flexibility in the system design and the feasibility has been experimentally demonstrated successfully.

As one of the key technology for future transparent optical networks, all-optical signal processing plays a crucial role to achieve network functionalities in all-optical manner. We will review several projects for the all-optical signal processing of advanced modulation formats, including: i) all-optical “phase multiplexing” based on four-wave mixing in highly nonlinear fiber; ii) all-optical “phase erasure” technique through the degenerated four-wave mixing; and iii) a pump-phase-noise-tolerant wavelength conversion/exchange scheme for high-order QAM signals based on cascaded second nonlinearities in Periodically Poled Lithium Niobate (PPLN). The future plan of our research work will be addressed in the end of the talk.