High order modulation formats for multi-Terabit optical communication systems

Chao Lu1, Shuangyi Yan1, Alan Pak Tao Lau2, Yuliang Gao2, Qi Sui2
1The Photonics Research Center, Dept. of Electronic and Information Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR, China
2The Photonics Research Center, Dept. of Electrical Engineering, The Hong Kong Polytechnic University, Hong Kong SAR
enluchao@polyu.edu.hk

Abstract: This paper reviews some of the recent progress in research community in increasing the spectral efficiency of optical communication systems through the use of high order modulation formats and coherent detection techniques. Some of the possible ways for moving forward will be discussed.

OCIS codes: (060.4510) Optical communications; (060.4250) Networks

As the backbone for the broadband connectivity, optical fibre communication systems have seen tremendous progress in recent years. This is driven by the significant increase in global internet traffic which has increased by eightfold in the past five years [1]. Research efforts have been made in designing new optical fibre with lower loss and lower fibre nonlinearity and optical amplifiers that may cover spectral range beyond that offered by Erbium Doped Fibre Amplifiers(EDFAs) [2,3]. These shall help to significantly increase the capacity of optical networks. In addition, newer dimensions such as polarization multiplexing and spatial multiplexing are being explored [4,5]. With the recent progress in coherent detection technique, much research effort has been focusing on the use of high order modulation formats with single optical carrier or multiple optical carriers such as optical OFDM and optical superchannels [6,7,8]. In this paper, we review some of the recent progress in research community in increasing the spectral efficiency of optical communication systems through the use of high order modulation formats and coherent detection techniques. Our work in optical signal generation, coherent detection algorithm and parameter estimation will be described [9, 10, 11]. Some of the possible ways for moving forward in this research area will be discussed.

References: