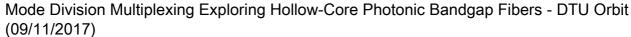
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Mode Division Multiplexing Exploring Hollow-Core Photonic Bandgap Fibers

We review our recent exploratory investigations on mode division multiplexing using hollow-core photonic bandgap fibers (HC-PBGFs). Compared with traditional multimode fibers, HC-PBGFs have several attractive features such as ultra-low nonlinearities, low-loss transmission window around 2 µm etc. After having discussed the potential and challenges of using HC-PBGFs as transmission fibers for mode multiplexing applications, we will report a number of recent proof-of-concept results obtained in our group using direct detection receivers. The first one is the transmission of two 10.7 Gbit/s non-return to zero (NRZ) data signals over a 30 m 7-cell HC-PBGF using the offset mode launching method. In another experiment, a short piece of 19-cell HC-PBGF was used to transmit two 20 Gbit/s NRZ channels using a spatial light modulator for precise mode excitation. Bit-error-ratio (BER) performances below the forward-error-correction (FEC) threshold limit (3.3×10⁻³) are confirmed for both data channels when they propagate simultaneously.

General information

State: Published

Organisations: Department of Photonics Engineering, High-Speed Optical Communication, NKT Photonics A/S, University

of Cambridge

Authors: Xu, J. (Intern), Lyngso, J. K. (Ekstern), Leick, L. (Ekstern), Carpenter, J. (Ekstern), Wilkinson, T. D. (Ekstern),

Peucheret, C. (Intern) Number of pages: 8 Pages: We.B6.2 Publication date: 2013

Host publication information

Title of host publication: 2013 15th International Conference on Transparent Optical Networks (ICTON)

Publisher: IEEE

ISBN (Print): 978-1-4799-0683-3

BFI conference series: International Conference on Transparent Optical Networks (5010941)

Main Research Area: Technical/natural sciences

Conference: 15th International Conference on Transparent Optical Networks (ICTON), Cartagena, Spain, 23/06/2013 -

23/06/2013 DOIs:

10.1109/ICTON.2013.6602964

Source: dtu

Source-ID: n::oai:DTIC-ART:iel/392398974::32168

Publication: Research - peer-review > Article in proceedings – Annual report year: 2013