

## Mode Division Multiplexing Exploring Hollow-Core Photonic Bandgap Fibers - DTU Orbit (09/11/2017)

### 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  $\mu\text{m}$  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 ( $3.3 \times 10^{-3}$ ) are confirmed for both data channels when they propagate simultaneously.

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