

Reduction of SBS effects in fibre-based optical phase conjugation of high-order modulation formats

Abdallah A. I. Ali¹, Sonia Boscolo¹, Tu Nguyen^{1,2} and Andrew D. Ellis¹

¹*Aston Institute of Photonic Technologies, Aston University, Birmingham B4 7ET, UK*

²*Currently with Infinera PA, 7360 Windsor Dr, Allentown, PA 18106, USA*

We overview our recent progress in mitigating the effects of stimulated Brillouin scattering in the fibre-based optical phase conjugation of high-order quadrature-amplitude modulation (QAM) signals, which are sensitive to the phase noise (PN) arising from residual pump dithering, by discussing two different approaches. The first approach is based on optimising the pump dithering setup in order to achieve the best possible cancellation of the residual phase modulation. We demonstrate an improved counter-dithering scheme which realises a penalty below 0.2dB, thus enabling, for the first time, performance improvement in a 400-km long 256-QAM system. The second approach relies on the use of a suitable PN compensation algorithm in the receiver digital signal processing block to reduce the penalties associated with residual dithering. We demonstrate a new two-stage compensation scheme which achieves large performance improvement relative to conventional PN compensation when it is used with 16-/64-/256-QAM signals at high pump-phase mismatch levels.