

Effect of self-phase-modulation on dispersion compensated absolute polar duty cycle division multiplexing transmission

ABSTRACT

The effect of self-phase modulation (SPM) on 40 Gb/s absolute polar duty cycle division multiplexing (AP-DCDM) is investigated and reported. The study includes the influence of launched power, number of channels and dispersion compensation method. Dispersion post-compensation and combination of dispersion pre- and post-compensation are used to manage the transmission links. At high powers, SPM degrades the pulse recompression process and provides an upper bound on the AP-DCDM transmitted pulse energy. It is demonstrated that the 40 Gb/s AP-DCDM system shows a 4.1 dB improvement and less than 1 dB penalty in terms of SPM tolerance in comparison to 40 Gb/s 4-ary and on off-keying (OOK) systems, respectively. The SPM effect is stronger in the 100 post-compensated link than that in the combination of pre- and post-compensated links. Dispersion pre-compensation of 18 22 is found as the optimum range of pre-compensation ratio for AP-DCDM system, which makes optimisation of the launched power possible.