

ALL-OPTICAL POLARISATION CONTROL IN FIBRE RAMAN AMPLIFIERS

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All-optical polarisation control based on nonlinear effects (Raman and Brillouin-based polarisation pulling (RBPP and BPPP), photo-refractivity, and four-wave mixing) have been recently paid much attention in the context of applications in fibre optic communications. Raman-based polarisation pulling is enhanced in low PMD fibres and so control of the signal state of polarisation (SOP) is accompanied by an increased Raman gain. However, RBPP suffers from an increased polarisation dependent gain (PDG), *viz.* an uncontrollable output gain variation caused by its dependence on the input signal SOP, which makes difficult an application of the advanced modulation formats using polarisation multiplexing (POLMUX) of the input signals. To make POLMUX along with a high Raman gain and suppressed PDG possible, we suggest herein a technique for de-correlation of pump and signal SOPs based on a two-scale periodically spun fibre Raman amplifier (SFRA) [1–3]. The practical implementation of the obtained results can be in an extension of the transmission distance and reducing complexity of the fibre Raman amplifier-based un-repeated high-capacity transmission systems.

1. *Sergeyev S.* // Optical Materials Express. 2012. V. 2, P. 1683–1689.
2. *Sergeyev S.* // Opt. Express. 2011. V.19, P. 24268–24279.
3. *Sergeyev S. V.* // XV International Conference "Laser Optics-2012" (St.Petersburg, Russia; June 25–29, 2012), section R8.