Abstract

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Gain and noise figure optimization of a macrobending EDFA/Er3+-Yb3+ co-doped hybrid optical amplifier characteristics of dual-pumped hybrid EDFA/Raman optical aplifier

In this paper, the gain and noise figure are experimentally studied and investigated for a hybrid amplifier system (HAS) containing a macrobent EDFA as a pre-amplifier in cascade with Er/Yb co-doped amplifier (EYCDFA) as a post-amplifier. The hybrid system is performed under a dual forward pump configuration at 980 nm. The EDFA bending radius is chosen as 4 mm. The affecting parameters to be optimized are the EDFA and EYCDFA pump powers, input signal power, signal wavelength, EDFA and EYCDFA lengths. The macrobent HAS performance is compared with normal HAS with a straight EDFA (without bending) and the other experimental data of recent works showing an improvement in both gain and noise figure. The gain of bent HAS is increased to 68.67 dB and the noise figure is decreased to 4.6 dB, where the corresponding values of the normal HAS are respectively, 64.3 dB and 4.78 dB, at optimized parameters of 15 m EDFA length, 1 m EYCDF length, 500 mW EDFA pump, 100 mW EYCDFA pump and - 40 dBm input signal power at 1530 nm.