

**Abstract**

An experiment on gain enhancement in the long wavelength band erbium-doped fiber amplifier (L-band EDFA) is demonstrated using dual forward pumping scheme in double-pass system. Compared to a single-stage single-pass scheme, the small signal gain for 1580 nm signal can be improved by 13.5 dB. However, a noise figure penalty of 2.9 dB was obtained due to the backward C-band ASE from second stage and the already amplified signal from the first pass that extracting energy from the forward C-band ASE. The maximum gain improvement of 13.7 dB was obtained at a signal wavelength of 1588 nm while signal and total pump powers were fixed at - 30 dBm and 92 mW, respectively.

**Keywords:** Erbium-doped fibre, optical amplifier, L-band erbium-doped fiber amplifier, two-stage erbium-doped fiber amplifier, amplified spontaneous emission.