

## **Enhanced structure of a double-pass erbium-doped fiber amplifier for multiple wavelength amplifications.**

### **ABSTRACT**

We demonstrate an enhanced double-pass erbium-doped fiber amplifier for multichannel amplification. The multichannel selection is formed by combining a demultiplexer and a multiplexer together in the fiber-loop mirror. The structure is able to filter out the amplified spontaneous emission that saturates the amplifier gain in the small signal regime. The maximum average gain of 47.2 dB is obtained with a gain enhancement of 12.8 dB at a -50-dBm signal power per channel. The noise figure penalty is almost negligible for a signal power per channel of less than -15 dBm.

**Keyword:** Amplification; Amplifiers (electronic); Erbium; Fiber lasers; Fiber optics; Optical waveguides.