

Abstract

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A Comprehensive Study on EDFA Characteristics: Temperature Impact

In this paper, a comprehensive study on erbium-doped fiber amplifier (EDFA) characteristics under temperature variation has been performed. The rate and propagation equations that characterize EDFA performance pumped at 980 nm and 1480 nm in the forward direction are solved numerically. The Boltzmann distribution between the pump and the gain wavelength is taken into account, and is found to be effective when pumping only at 1480 nm. In addition, a full comparison between the effect of temperature on some of the EDFA characteristics such as the maximum peak gain, optimum fiber length, saturation input power, and saturation output power has been carried out. The temperature variation in the range from $-40\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ is taken into account.