

# **Abstract**

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## **Erbium Doped Waveguide Amplifier Gain for Different Concentration Profiles: Effect of Chip Area and Pump Power**

In this paper, the gain of the erbium doped waveguide amplifier (EDWA) is modelled and investigated. The model is derived from a model for straight EDWAs with constant erbium-doped phosphor silicate glass waveguide amplifiers. Different erbium concentration methods are used namely: constant, step-like, diffusion and ion implantation. A comparative study of the optical signal gain, chip area and pump power is done. The optimal design parameters and the optimal doping method leading to maximum gain are then determined.