

## Design and optimization of Erbium doped fiber amplifier for pumping with 980nm laser using different techniques

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The EDFA is used in the optical transmission systems because it has the maximum gain and low pump power and its performances are better in comparison with other similar amplifiers. Performance can be increased when we determine the EDFA characteristics. We made an Erbium Doped Fiber Amplifier system consists of a pumping 980 nm laser (10, 35, 70mW), 1550 nm laser signal with variable power (from -30 dB up to 3 dB) for calculating the saturation power of this fiber. We made a design to determine the max gain for a specific erbium doped fiber and calculate the saturation for this fiber in two different configuration techniques (co- propagation and bi-directional). We found that for pumping power 10 mW, we got better gain in bi-directional, about 37 dB for a low signal (-30 dB) which then decreased to about 7 dB when the signal increased to (3 dB). The worst case for co-propagation at the same pumping power made the gain only -17.5 dB for a low signal (-30 dB) which then increased to about -6 dB when the signal increased to (3 dB). The best case is when pumping power is 70mW; where the gain starts with about (48, 51.8 dB) and ends to (15.8, 19 dB) for co-propagation and bi-directional respectively. From our results, we also concluded the saturation power.

### Biography

Ahmed Hamdy Mahmoud, has completed his B.Sc. in Electrical Engineering (Specialization: Optoelectronics), in Cairo, on 1 July 2002, and he has completed a Diploma in Industrial Laser applications and communications and optical systems, awarded by The National Institute of Laser Enhanced Sciences, Cairo University. He is now a researcher in The Engineering Applications of Laser Department, The National Institute of Laser Enhanced Sciences, Cairo University.

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