

A laser diode pumped optical amplifier in the first telecommunications window

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Abstract :

Thulium doped fluorozirconate fibre has been shown to operate as an efficient amplifier over the wavelength range 800nm to 815nm in the first telecommunications window. Using a Ti:Sapphire laser at 780nm as pump source we have shown 23dB of gain at 805nm with 60mW of launched pump power¹.

In this paper we will present results of the laser diode pumped operation of a thulium doped fibre laser and also amplifier around 0.8 μ m. To date we have shown at least 14dB of single pass gain by the diode pumped operation of the resonantly pumped laser at 805nm lasing off of the two bare ends with 4% Fresnel reflections. This was achievable with 47mW of pump light launched into the single mode fibre from the single stripe diode laser. The optimum launch design, which allowed a launch efficiency of 57%, will be discussed. Full specifications for this diode pumped fibre laser, along with Q-switched operation will be reported.

We will also be reporting on a system demonstration for the diode pumped optical amplifier in the first telecommunications window. With the benefits of the EDFA at 1.5 μ m well known, this is of particular interest. The cheap AlGaAs sources and detectors available at this wavelength make the use of this system as an amplifier for local area networks very appealing.

[1] R.G. Smart, A.C. Tropper, D.C. Hanna, J.N. Carter, S.T. Davey, S.F. Carter and D. Szebesta. : "High efficiency, low threshold amplification and lasing at 0.8 μ m in monomode Tm³⁺ - doped fluorozirconate fibre." Electron. Lett. , 1992, Vol 28, No 1, pp58-59.