By the use of Erbium - Doped Fiber Amplifier (EDFA) and Raman Amplifier, 75-nm spectrum of light and 3-db net gain bandwidth have been observed in an 0ptical Amplifier.

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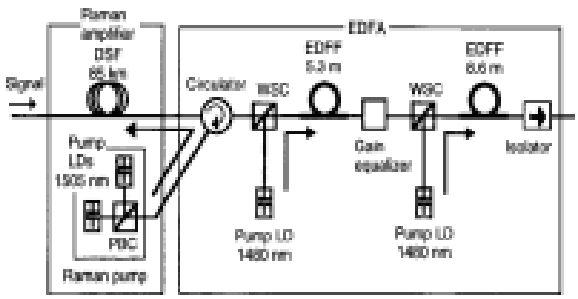
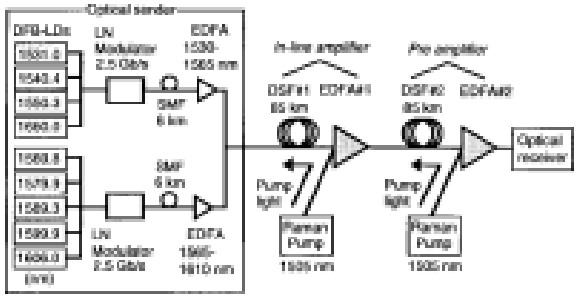
Abstract: The nine different wavelength carrier varying from (1531nm1606 nm) is being used. Is sent through the modulator and EDFA.Then, several error and loss is observed within the fiber which is removed utilizing Dispersion Shifted Fiber of length 85km. An amplifier of 75 nm wavelength and 3db gain bandwidth is observed from the combination of Raman amplifier and EDFA
(Erbium doped fiber Amplifier).

1. Introduction





(b)

Fig. 1. Configurations for (a) transmission experiment and (b) Amplifier

As, amplifier helps to boost the output power of the signal with different amplification methodologies. Each optical fiber has a certain bandwidth. As, multiplexing implies converting the many inputs that arrive into a multiplexer to one. Similarly, the conversion of many visible spectrum to one of several is called Wavelength divisionmultiplexing.

When a sample is open to monochrome illumination, the sample absorbs the light and most of the li

ght is passed down through the s ample. However, some of the ligh t is dispersed. lf the dispersed lig ht has the same frequency as the incident intensity, it is called Rayl eigh scattering.

There is some chance that once t he light incident frequency is not equal to the scattered frequency t hen it is called Raman Scattering. Erbium is basicaIly the rare earth ion. Consequently, it offers in - lin e amplification which means that i t would not require an optical sign al to either be transformed to the electrical signaI.

Since exposed to the electron, an ion is distributed at a frequency o f 980 nanometers. The transition f rom ground to excited state2.Pho ton is the basic electron of visible spectrum.

After which, it starts to deteriorate because state 2 is not the stable region.

As, popuIation inversion takes pla ce which means that it wiI alway s meet the scenario of (n2>n1) su ch that ion leaps to ground level a nd amplification is conducted at 1 550 nm. However, pumping is co nducted in optical fiber so that it i s called optical pumping.Initially, when power is introduced, the gai n rises linerally and as power incr eases the gain reach to a point of saturation, then in some cases it reduces.

The amplifier gain is the ratio of t he output signal to the input signa l power. EDFA's gain depends bo th on the pump power and the wa velength of the pump.

2. Experimental setup

0f the above figure, we can obtai n the high gain bandwidth which often increases the optical fiber potential. The power means the optical fiber transmission capacity . Above experimental amplifier co nfiguration also acquires noise - f ree features.

Figure 1(a) employs nine channel s with specific wavelengths rangi ng from 1501 nm to 1606 nanom eters. Which use 2.5Gb / s, a sin gle mode fiber was also used in a n optical sender LN transducer.

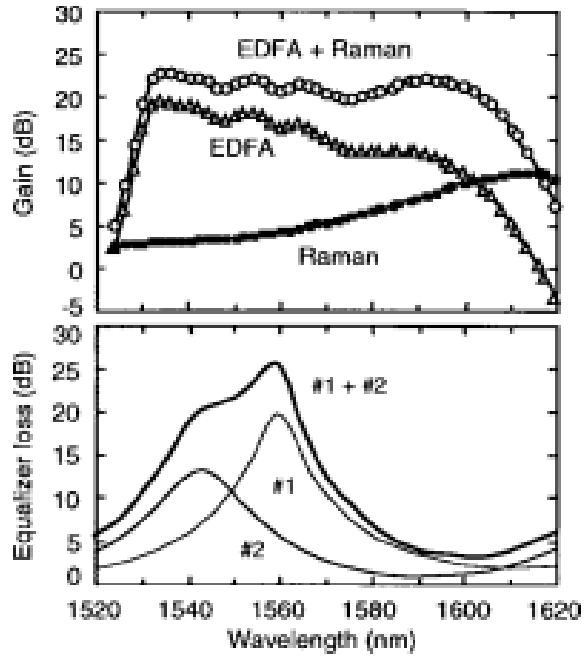
As we know, there will only be on e mode in single mode fiber. The nucleus of single mode fiber has a smaller circumference. As linka ge is also easy in single mode fib er. The signal is passed across a 1530 nm to 1610 nm EDFA which magnifies the signal.

As we know, Dispersion means t he adverse impact of pulse enlar gement due to inter symbol interf erence. As chromatic dispersion is sum of material dispersion and waveguide dispersion.

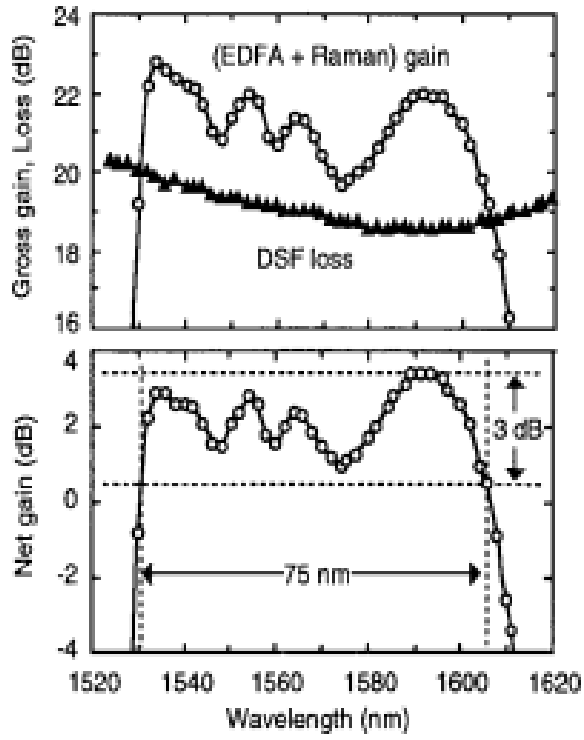
Material Dispersion is determined by the material type and the wav eform design helps determine the dispersion. In – line amplifiers is termed the combination of Disp ersion shifted fiber and EDFA wit h a primitive Raman pumping.

The combination of dispersion shi fted fiber and EDFA with backwar d pumping is referred to as the pr e-line amplifier. The optical cir- culator is used to reinforce the sig nal. The gain equalizer is used to equalize or flatten the loss arising from those in the power of the op tical fiber.

The EDFA comprises two EDFFs in the gain equalizer with them a s the combination of Raman ampl ifier and EDFA gives the Hybrid a mplifier.



(a)



(b)

Figure (2) Characteristics of amplifier gain spectra.(a) EDFA, Raman, and EDFA+Ramangains , (2) gain equalizer loss.

Then a single mode fiber is locate d between the LN modulator and EdFA. As we realize, in a single mode fiber just a single mode is a vailable, the core of the single mo de fiber has a smaller circumfere nce between 2 10 µm, the pairing is easy to smaller, then the signa l is passed through an EDFA bet ween 1530 nm and 1610 nanome ters, which magnifies the stream of data.

IfSignal transmission will occur, s ome error will occur. Since there can be no signal idle

3. Amplifier performance

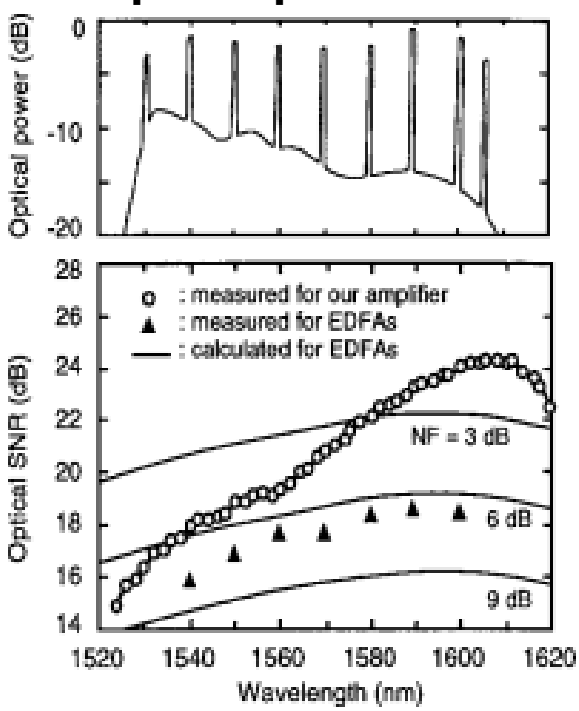


Fig. 3. Output of optical SNR spectra And Power.

The one spectrum was obtained f rom of the Raman scattering and another was acquired from EDFA . The mixture of both spectra was acquired as Net Gain of the requi red optical fiber. Raman gain had a value of 3db for the wavelengt h of 1530 nm and 11.1db for the wavelength of 1610 nm. The loss acquired by the fiber was flattene d with the support of the equalize r used in the fiber.In figure 2, the combination of EDFA and Raman was observed graphi- cally.Therefore the dispersion shi fted fiber loss was observed. By c ombining the gain obtained with t hat of the DSF loss, the net gain was observed. Therefore, the net gain required was 75 nm wavelen gth and 3db bandwidth in both 15 30 nm and 1600 nm.

Transmission Experiment

If the signal is transferred, some error will tend to happen.

Because no signal can be accura tely transmitted.Bit - error rate (B ER) is the error present within the propagation. The bit that has bee n inappropriately transmitted is ca lled bit - error rate..

Here the chart above demonstrat

es the bit error rate of the signal v arying from the wavelength.

4. Conclusion

Thereby, ErbiumDoped Fluoride Fiber Amplifier and Raman Amplif ier have been obtained from the a bove observational study wavele ngth of 75nm and bandwidth of 3 db. The wavelength varying from 1500 nm to 1600 nm is used in th e given optical fiber.

The loss observed in the given fib er is equalized and flattened thro ugh using Dispersion shifted fiber , also referred as gain equalizer. . The combination of both the Ra man amplifier and also the Erbiu m doped fluoride fiber amplifier wi ll form a wider bandwidth modifie d amplifier.

Of contrast, this sort of amplifier i s in demand and used is much m ore technical in our daily existenc e.

5. REFERENCES:

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