L'atténuation et l'amplification

Consigne individuel puis petit groupe (45 min)

Le signal lumineux s'atténue au cours de la propagation dans la fibre optique par interaction dissipative avec le milieu de propagation. Son amplitude et donc sa puissance diminuent. Il convient donc de l'amplifier… On peut comparer le procédé mis en œuvre au principe de fonctionnement du Laser.

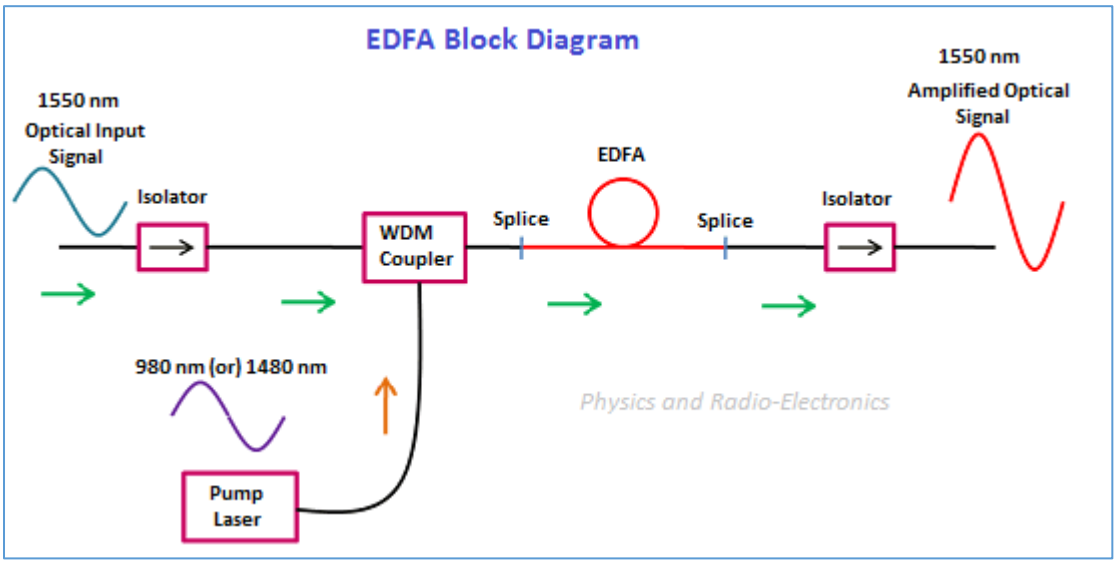
Documents d'aide :

[e-amplificateur.pdf], [g-debit.pdf]
[d-inventions.pdf], [j-laser.pdf]

En petit groupe, on réalisera un poster synthétique qui sera présenté en grand groupe.

https://www.physics-and-radio-electronics.com/blog/edfa-erbium-doped-fiber-amplifier/

EDFA (Erbium-Doped Fiber Amplifier) is an optical device used to compensate optical signal attenuation caused by fibers and components, to increase optical transmission distance. […]
EDFA is an optical amplifier that amplifies the optical signal directly, without the need to first convert it to an electrical signal.



EDFA is used in C-band and L-band. C-band wavelength range is from 1530 nm to 1565 nm. C-band stands for conventional band. It is the most important wavelength band used for long distance optical communication, because the attenuation of optical signal is very low in the C-band. L-band wavelength range is from 1565 nm to 1625 nm. […]
The laser diode produces light of 980 nm or 1480 nm wavelength which is different from input optical signal wavelength. This laser light is mixed with the input optical signal by using a device called WDM (wavelength division multiplexing) coupler. The laser light and optical input signals are sent into the EDFA fiber. When the laser light interacts with the erbium ions, it stimulates them and produces an amplified optical signal of same wavelength (1550 nm) and direction of the input signal. This process is called stimulated emission of radiation.