Sprint 4

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WDM system Introduction

Wavelength Division Multiplexing (WDM) is a fiber-optic transmission technique that combine light with different wavelengths (or colors) into one fiber, and apply with the multiplexer to transmit data. Different colors of light can travel on one fiber at the same time, then signals can be transmitted in an optical waveguide at different wavelengths or frequencies on the optical spectrum. As a result, light can transmit more information than electronics.

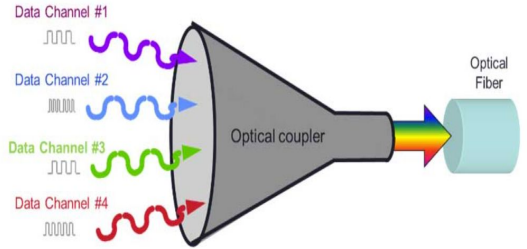
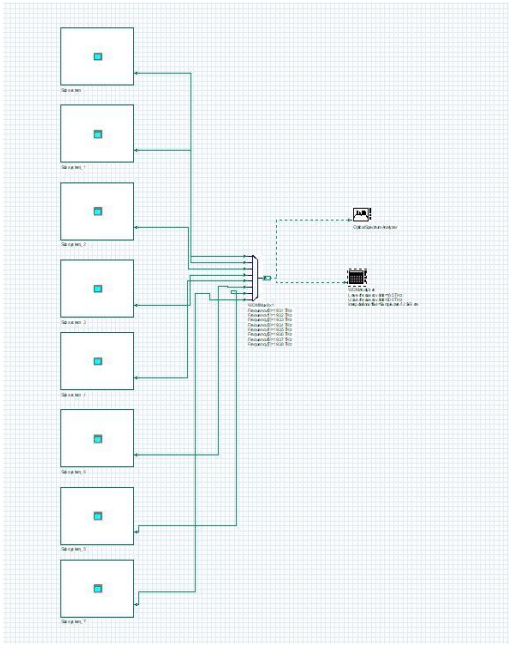


Figure 1: Wavelength Division Multiplexing (VDM)
retrieved from:https://www.ciena.com/insights/what-is/What-Is-WDM.html

WDM System



- The figure shows the combined 8 transmitter subsystems to be 8 channel WDM transmitter
- A WDM system uses a multiplexer at the transmitter to join the several signals together and a demultiplexer at the receiver to split them apart
- Optical Spectrum Analyzer and a WDM analyzer to obtain the signal spectrum and the total power for each channel

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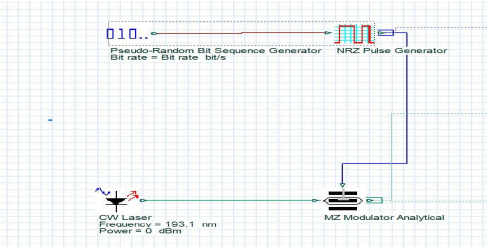
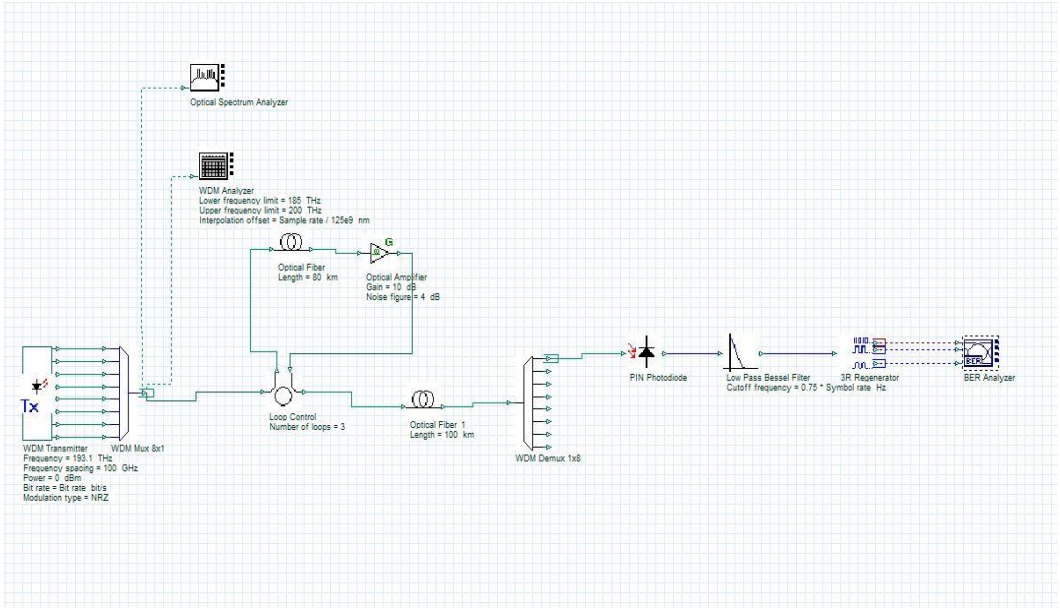
WDM Schematics

- The Loop Control: set the number of times the signal propagates
- 1x8 Mux: Join 8 different signals together
- 1x8 deMux: split signals





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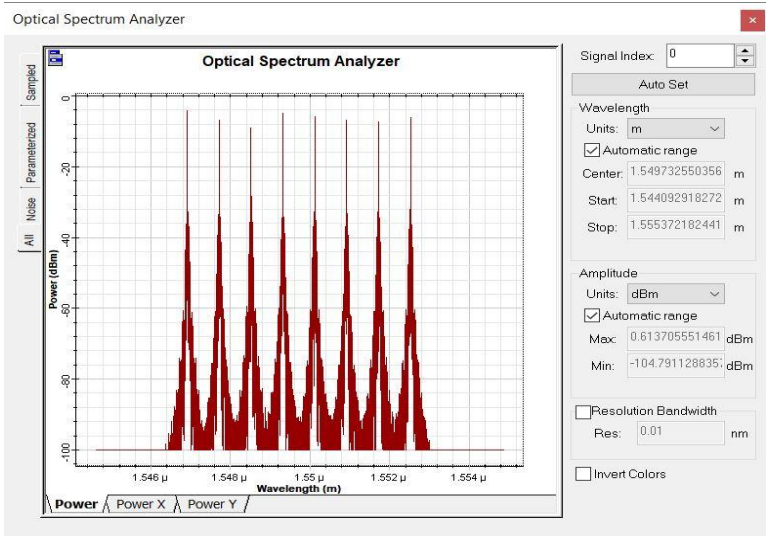
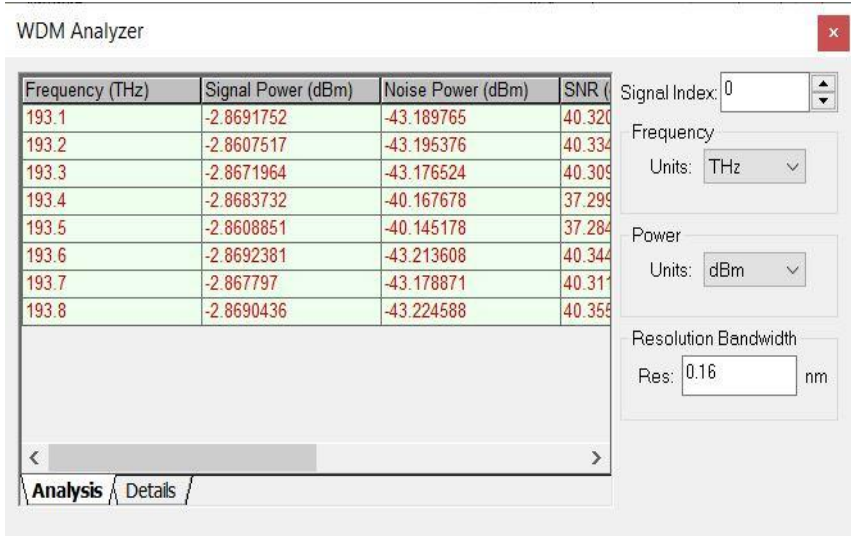
WDM Simulation





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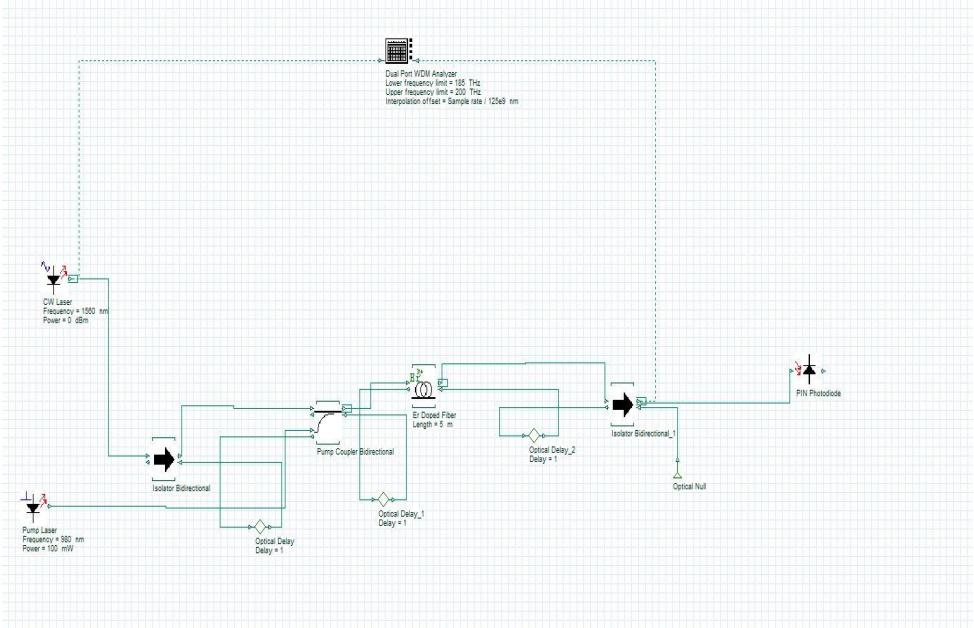
Optical Fiber Amplifier

- A fiber optical device used in transmitting data in fiber optic communication systems.
- Amplify optical signals directly without converting into electrical signals.
- Boost optical signals.

Optical Amplifier Schematics



- CW Laser: Light source
- Erbium Doped Fiber:

  Optical fiber
- Isolator Bidirectional: Separate transmit and receiver channels
- Pump Coupler Bidirectional: Combine and split signals

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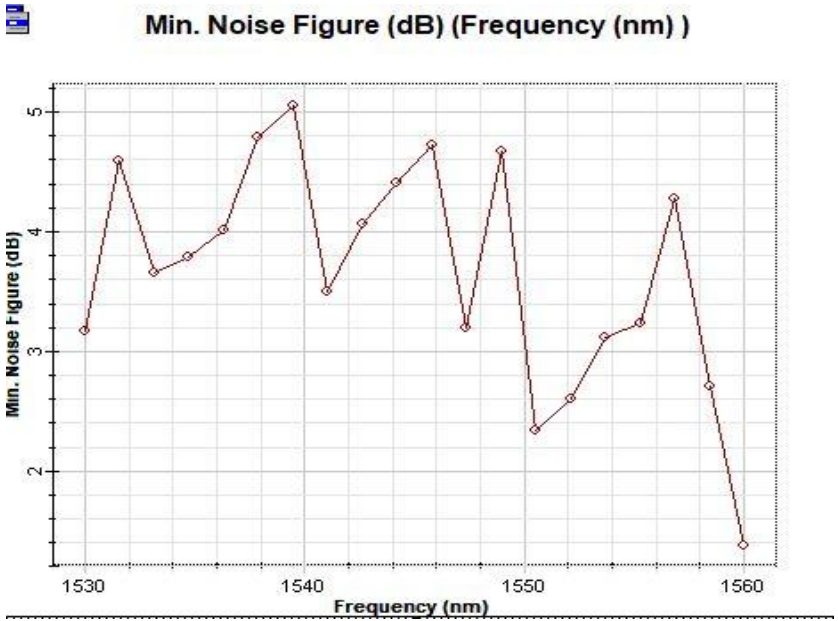
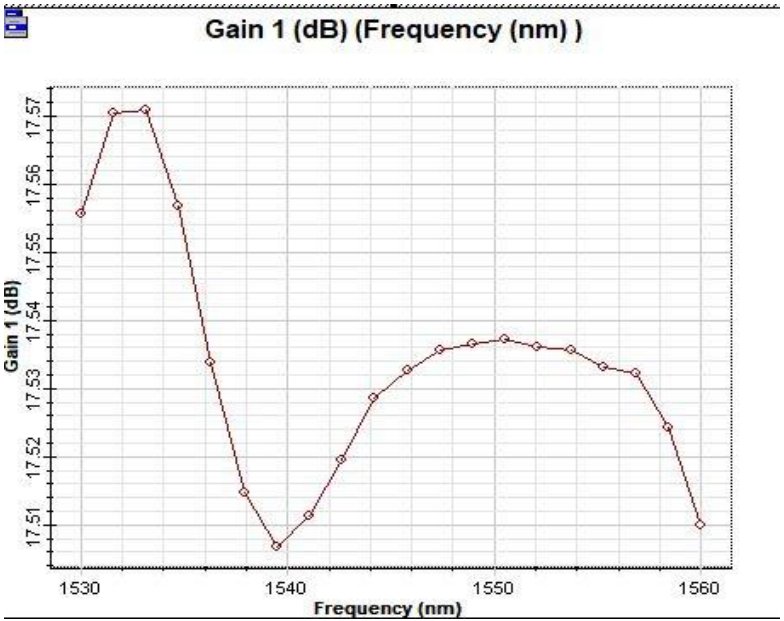
Optical Amplifier Simulation





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