Signal Regeneration in an Optically Tunable Wavelength Converter

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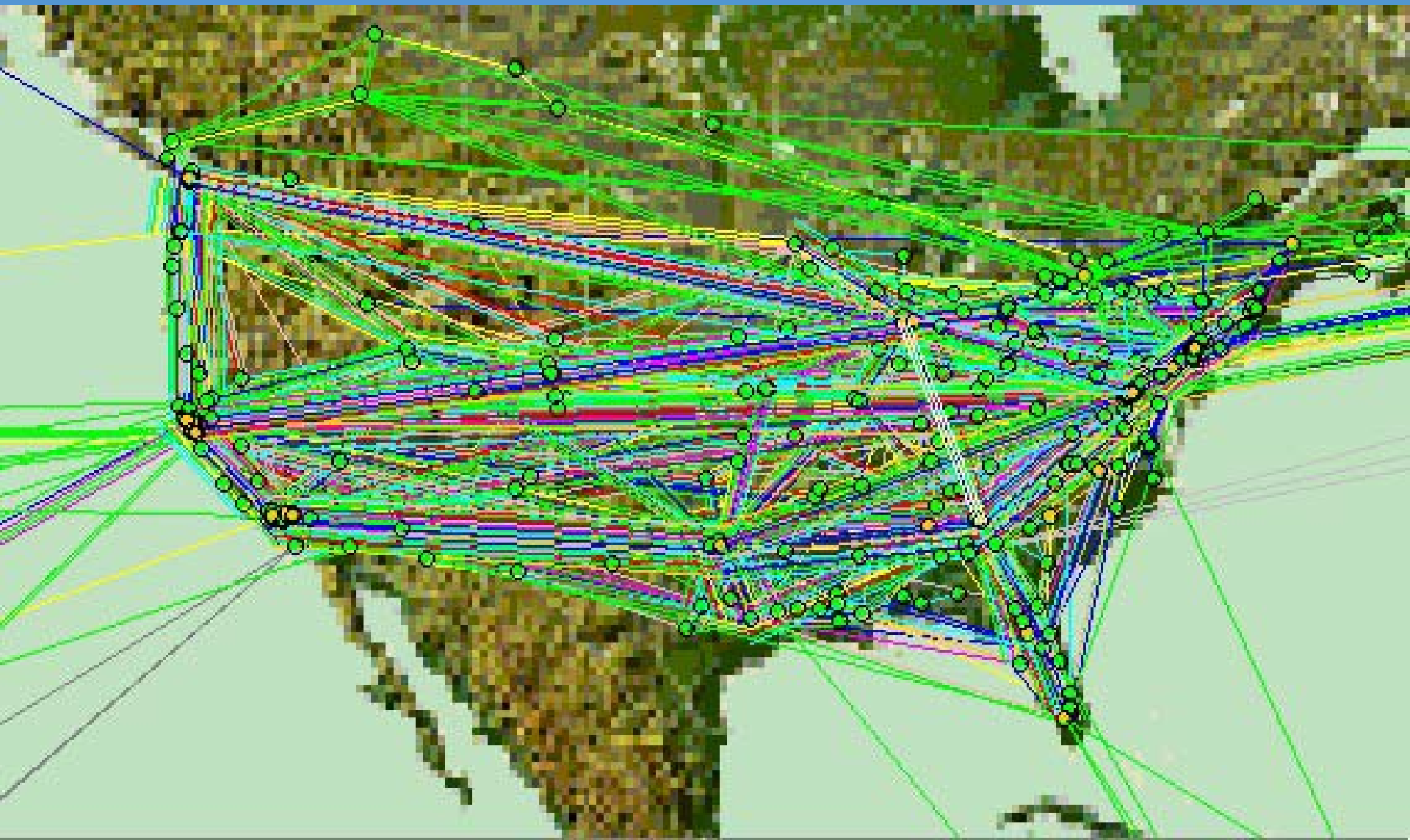
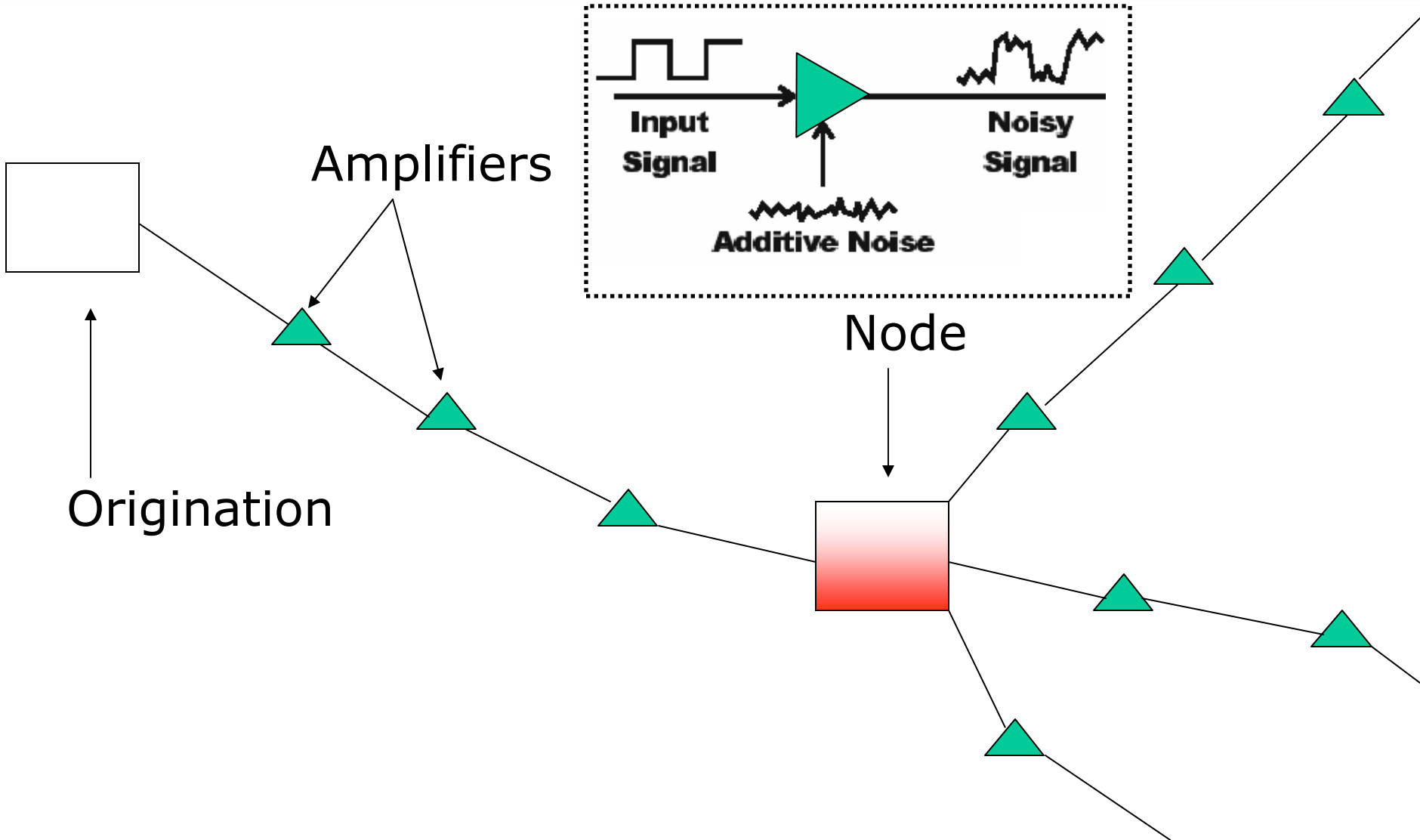
Data Paths of the Nation's 20 Largest IS Providers

UCSB



Noise and Attenuation

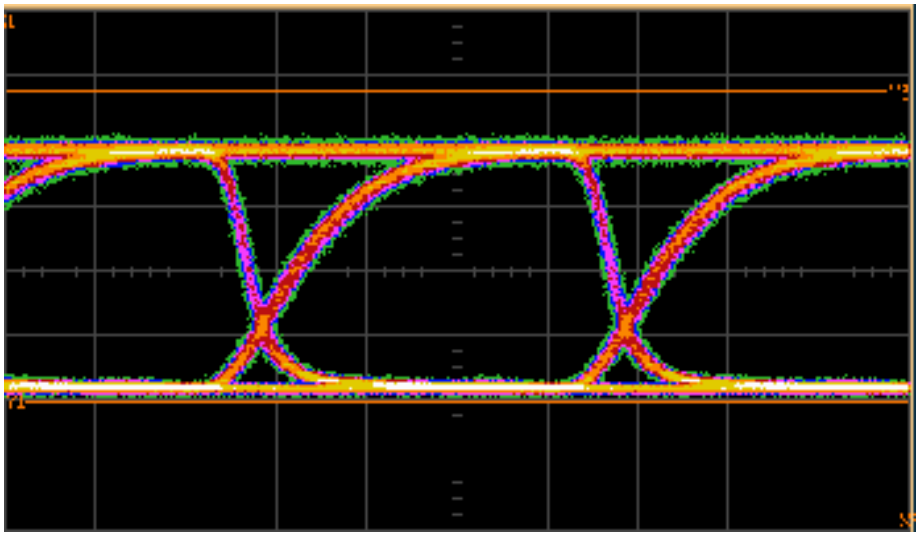


Extinction Ratio (ER)

ER is the measure of the difference in power (dB) between 1 and 0

Max Power determines 1

Min Power determines 0

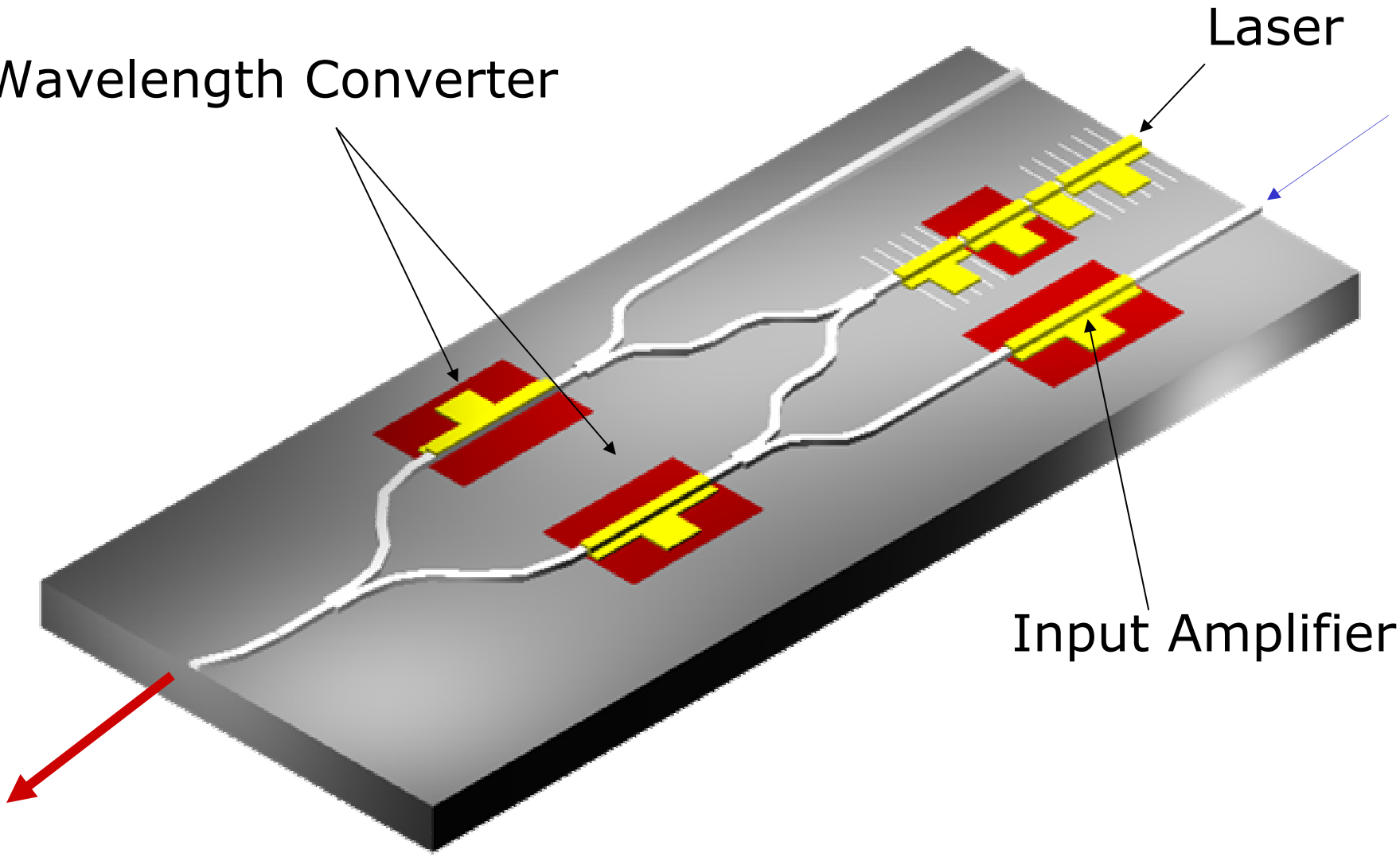


Eye Diagram

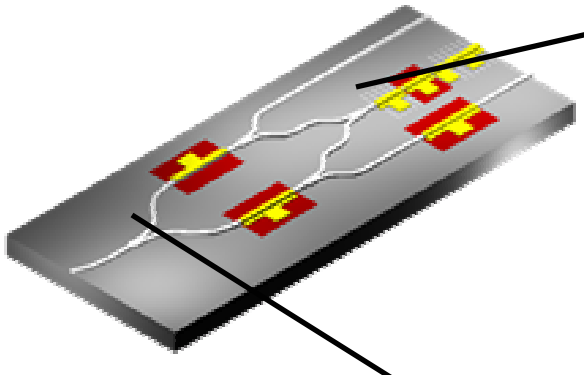
Project Goal

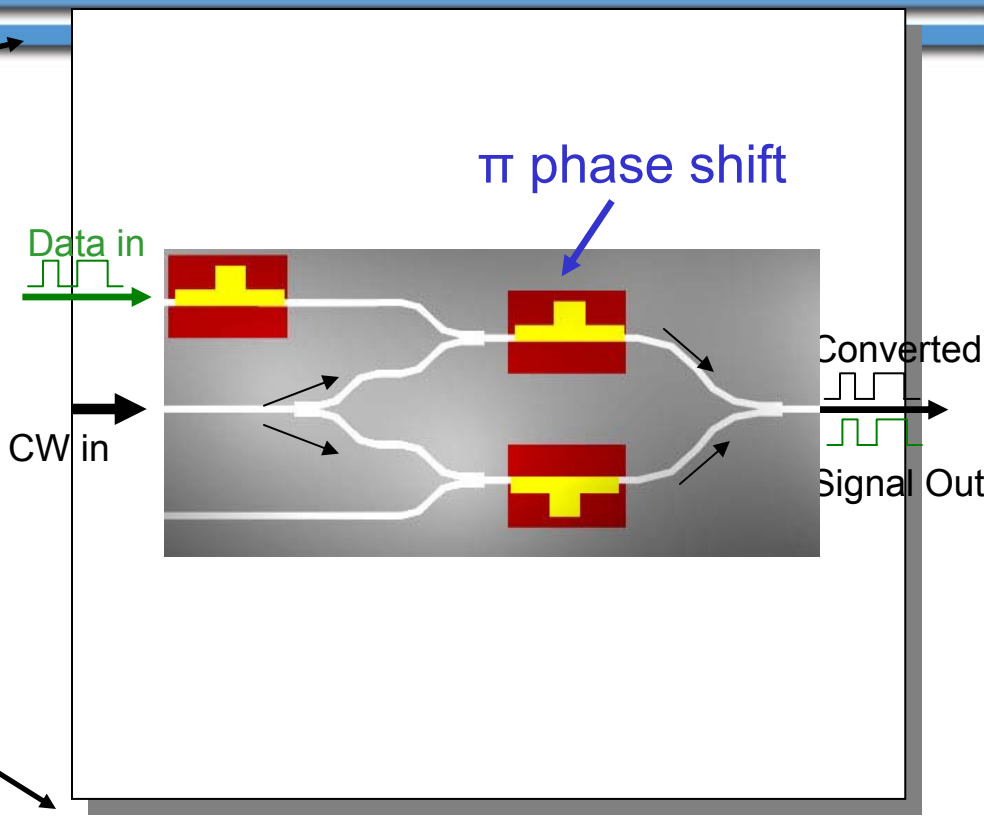
Measure the quality of the regenerated signal based on the Extinction Ratio (ER)

The Device



Saying it another way





- Incoming data disturbs phase balance
  ⇒ data conversion

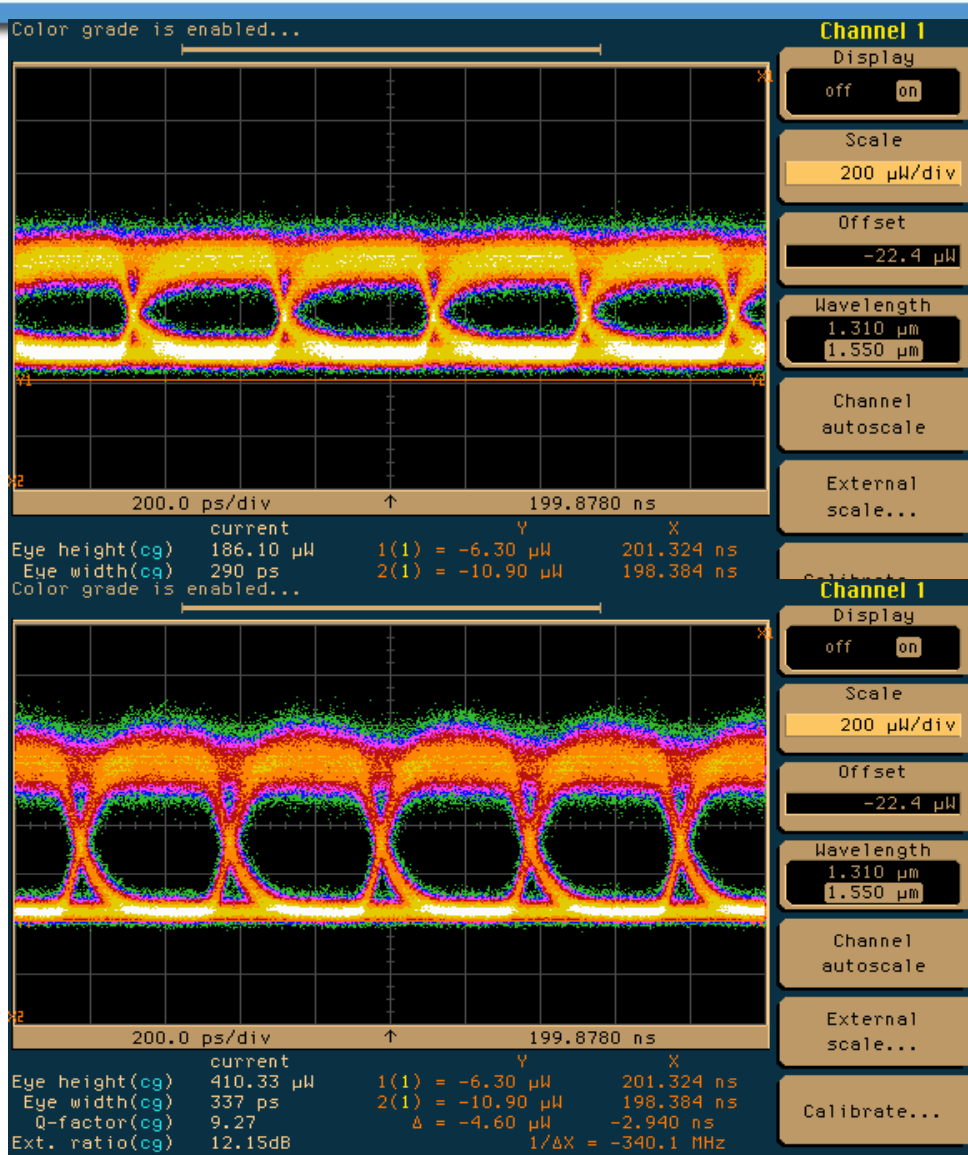
Example of Results

Power in = 6 dBm

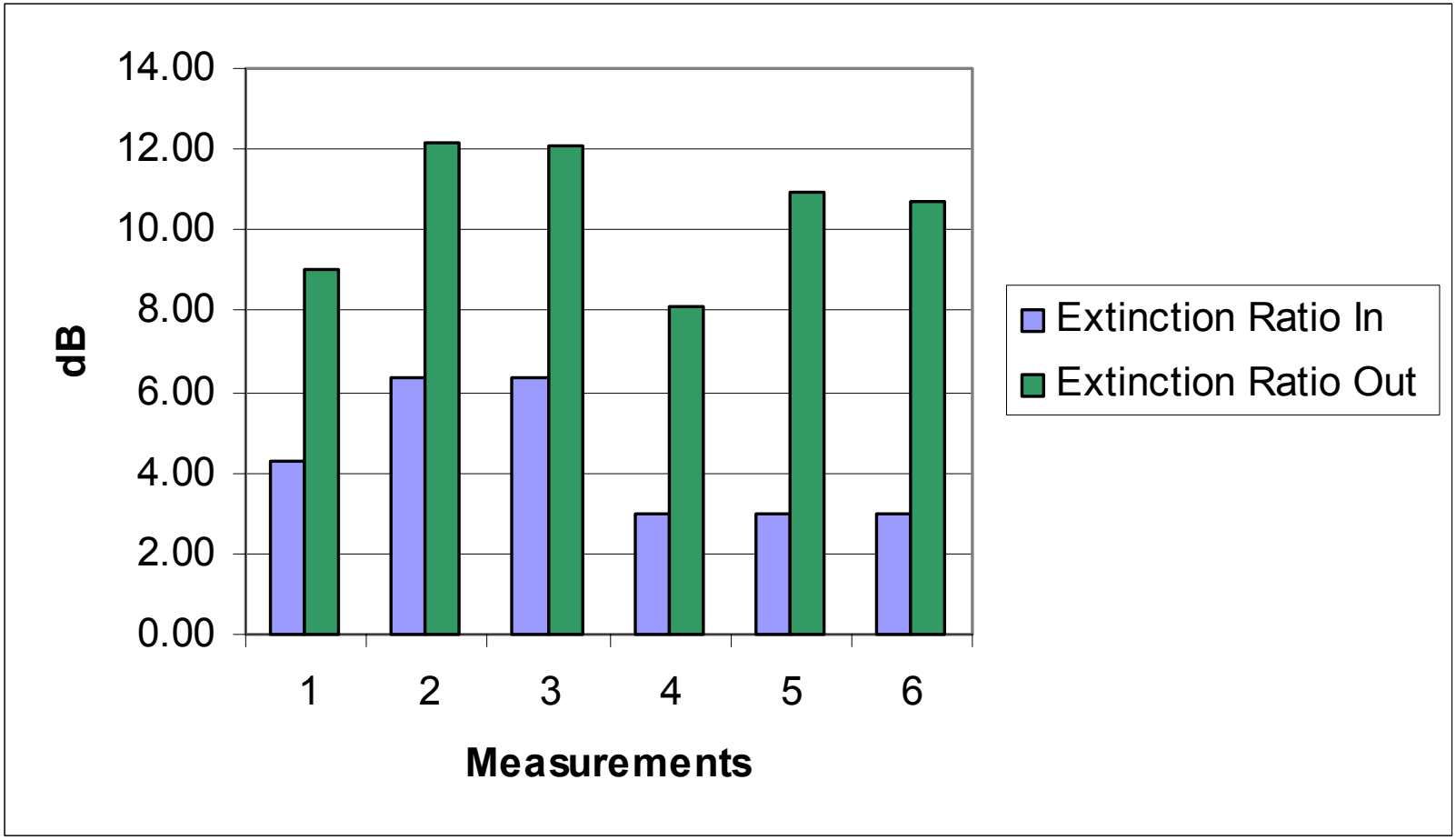
ER_{in} = 6.33 dB

Power out = -4.4 dBm

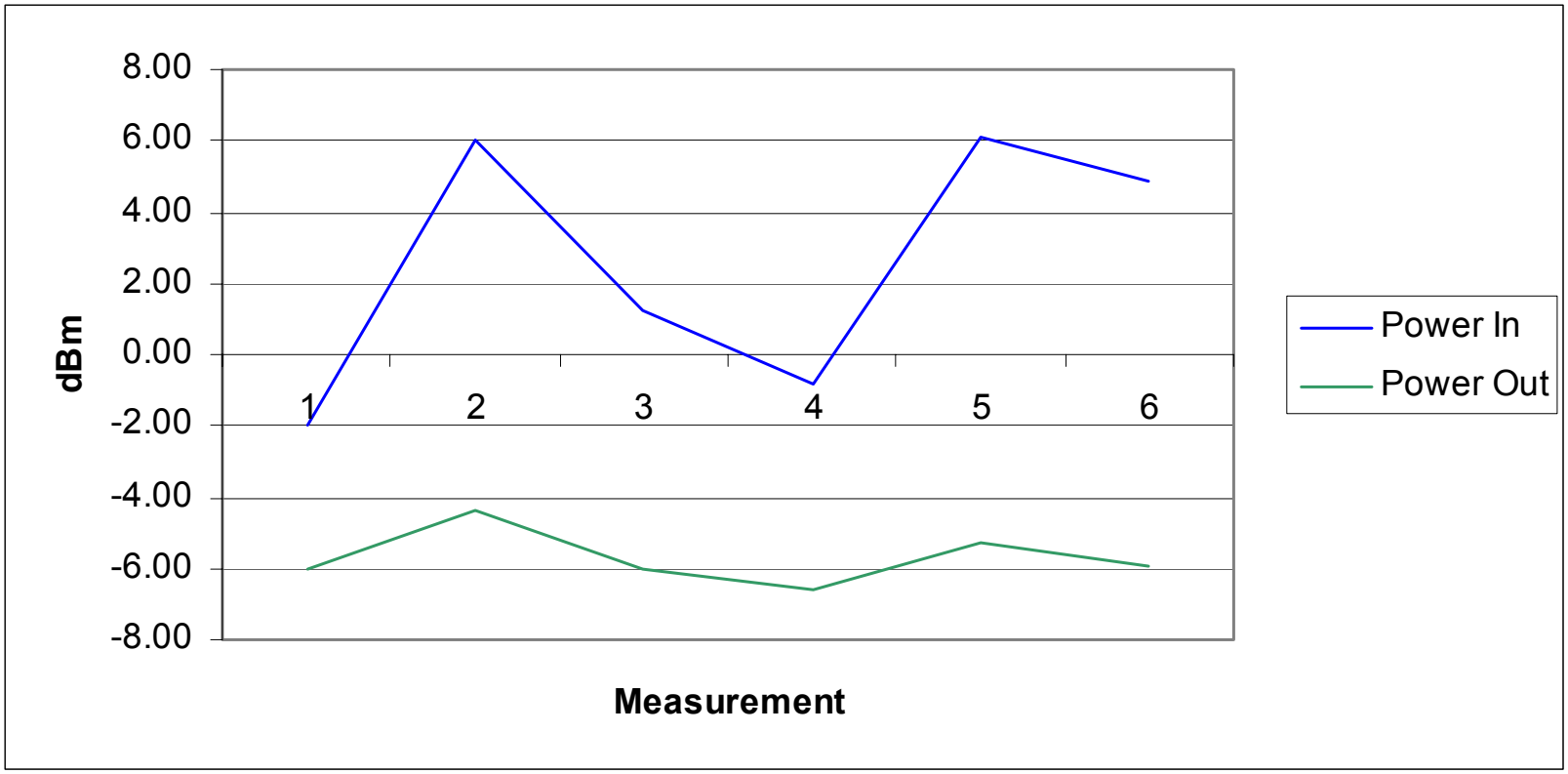
ER_{out} = 12.15 dB



Compiled Data



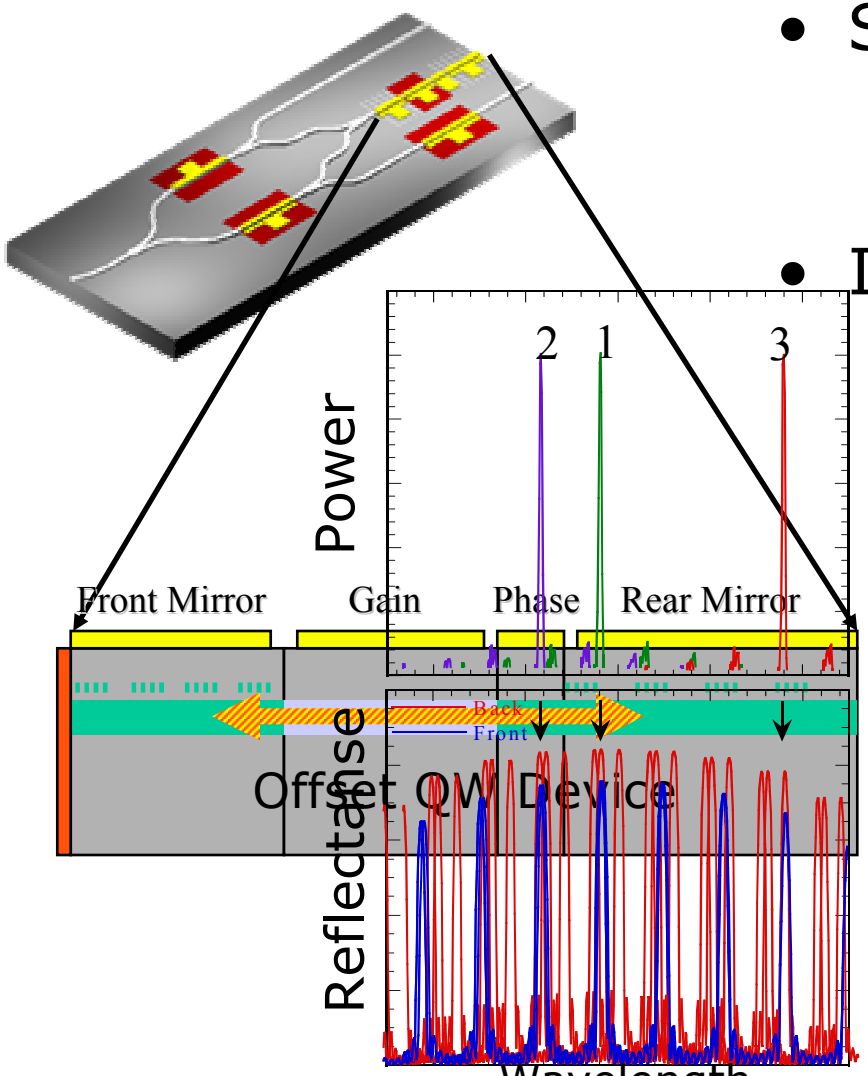
Compiled Data



Conclusion

- The Extinction Ratio does increase
- Some power is lost through the device
- Amplifier is being added to new version of the device

SGDBR Laser – an enabling technology for functional integration



- SGDBR background
  - 4 Section device
  - 5-10X tuning range of DBR
- Ideally suited for integration
  - Does not require facet reflection to lase
  - Consists of passive and active waveguides
    - **No extra fabrication steps required to integrate additional components**
  - Active/passive interfaces designed to minimize reflections
  - Integration of modulators/SOAs successfully demonstrated