OBR 4600: An Indispensable Development Tool for Silicon Photonics Research

More Than Just a Reflectometer

Tracks changes in polarization state, measures group delay.

Component Characterization with Unprecedented Visibility

See inside the component and evaluate each interface for RL, IL dispersion, and more.

Accelerate Design Iterations

A full range of measurements in a single scan. Up to 30 meters with 10 micron resolution in just 7 seconds.

Key Specifications

- 0.05 dB resolution and 0.10 dB accuracy
- 70 dB dynamic range
- Very low noise floor -130 dB
- Measures 30 m with 10 micron resolution in less than 7 seconds

Making Silicon Work at the Speed of Light

Optimize Fabrication Methods to Minimize Power Dissipation

Limiting total power dissipation is critical to minimize heating and signal degradation.

Identify the Location of Power Loss Inside the Chip

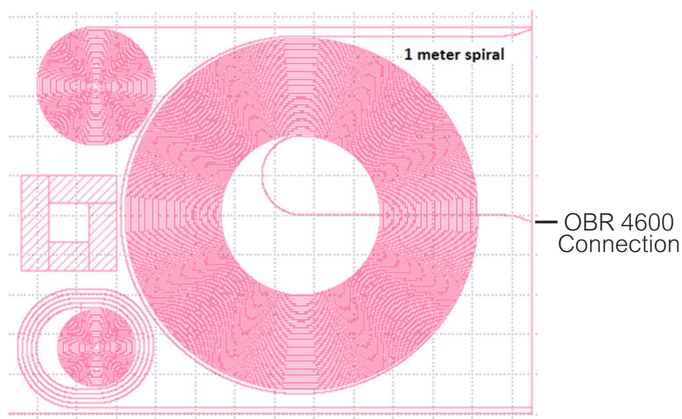
Characterize power loss across interfaces inside the chip with micron resolution.

Polarization Mode Dispersion

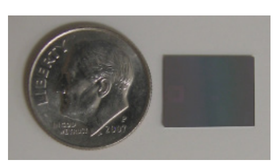
Quantify the impact to polarization caused by imperfections in physical dimensions and characteristics of the light paths.

"Blumenthal and Bowers Optoelectronics Research Groups"

One meter long spiral waveguide delay line manufactured on a $Si/Si_3N_4/SiO_2$ Chip



Spiral Delay Chip - Schematic



Spiral Delay Chip - Actual Size

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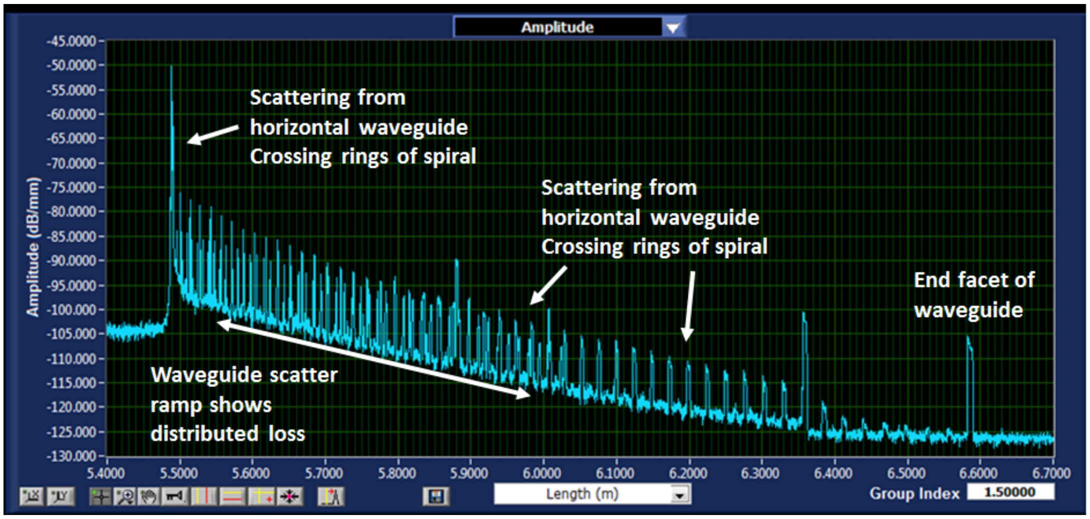
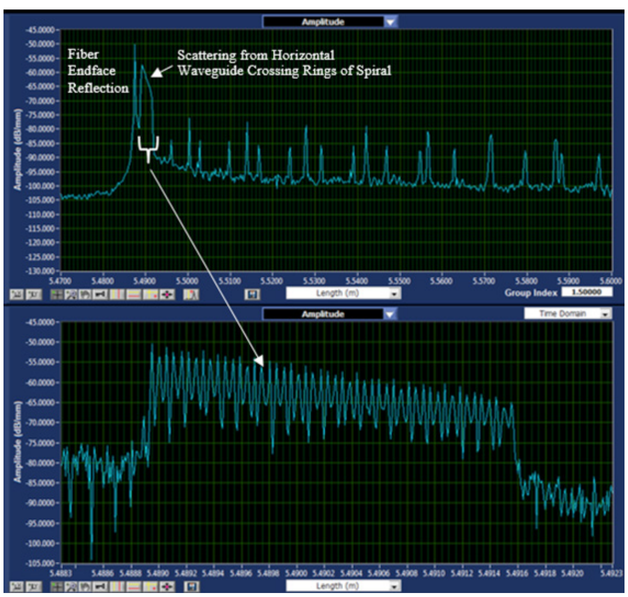
A Spiral Delay Line Fabricated on a Silicon Platform - An Analysis Using Luna's OBR 4600

Total Distributed Loss Across 1 meter Silicon Photonics Spiral Delay Line



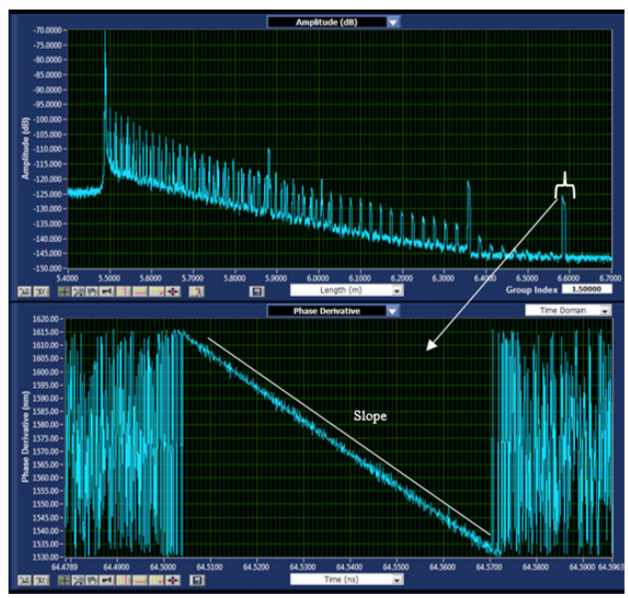
The Si photonics spiral delay chip compacts a 1 meter optical path length into an approximately 1 cm^2 area. The OBR 4600 can be optically coupled to the end of the spiral waveguide and the full 1 meter path length scanned. In the data shown above, the reflection at the chip input facet is at 5.486 meters and the reflection from the end facet is shown at 6.586 meters. The distributed loss across the entire device can be measured and is approximately 30 dB/m. The data taken in a single scan contains a remarkable level of detail with reflective events due to waveguide crossing of the spiral clearly shown with just 50 micron separation. Data from a single scan be reprocessed in different ways to support a variety of analysis.

Return Loss of Fiber and Face Reflection



The high spatial resolution of the OBR 4600 is used to illuminate a reflective event near the entry point of the spiral delay line. The detail in the lower plot reveals that the broad reflective event at the beginning of the trace is in fact a series of 50 individual reflections in the space of 2.5 mm correlating to the input waveguide leg crossing the arms of the spiral path.

Dispersion Measurement through Device



Using the same data set the average dispersion accumulated by traveling through the device can be determined by measuring the slope of the phase derivative. In this case, the average dispersion is equal to approximately 820 ps/nm.

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