



# University of Central Florida

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## Branched Chain Optical Isolator for Silicon Photonics Applications

### Introduction

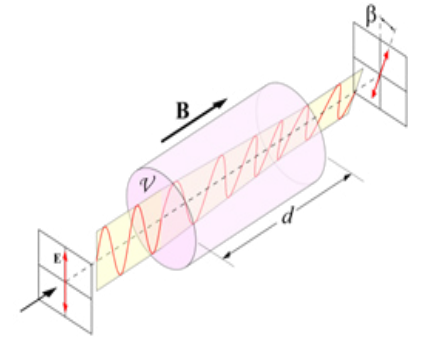
Conventionally, the capability of lasers integrated with silicon photonics is compromised by low power and poor thermal performance, and suffers additional losses from noise caused by unwanted reflections back into the laser cavity. This new branched chain optical isolator developed at the University of Central Florida improves performance of lasers integrated into silicon photonic chips and can provide optical isolation using the same chip materials. This advances the capabilities of silicon photonic circuits to that of silicon electronic chips, and in other material systems, eliminates the need for external optical isolators to reduce cost and package size. The new optical isolator increases the practicality of silicon photonic circuits that integrate high-quality lasers or other components. This increased practicality is especially beneficial to silicon photonic circuit development now underway for use in applications such as defense, high-speed optical data transmission, RF photonics, and sensing.

### Technical Details

The innovation, an integrated optical isolator and laser, is capable of providing high power and low noise silicon photonic chips. The optical isolator is fully integrated in the Si photonics platform, and the laser is based on a heterogeneously integrated III-V chip to provide high single mode power. Featuring a III-V high power chip and SOI mounting, III-V waveguide design and silicon waveguide mode matching, and silicon photonic Y-branch absorbing optical isolator, the optical isolator provides between 100 mW and 1 W of single mode lasing power coupled into the silicon waveguide. Optical isolation prevents optical feedback into the laser, and is used to achieve low noise.

### UCF Inventor

Dennis Deppe, Ph.D.



### Benefits

- Supports performance-enhanced silicon photonics by providing high power and low noise

### Applications

- Silicon photonics:
  - Defense
  - High-speed optical data transmission
  - RF photonics
  - Sensing

### Tech Fields

Optics & Lasers

### Keywords

Si photonics, silicon photonics, optical isolator, branched chain optical isolator

### Patent Application Pub. No

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**If you or your company are interested in this opportunity, Contact:**

John Miner | 407.882.1136 | John.Miner@ucf.edu | Tech ID# 32611

UCF Office of Technology Transfer | 12201 Research Parkway, Suite 501, Orlando, FL 32826