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Special issue: Silicon Photonic Integrated Devices

Guest Editors: Chris Doerr, Haisheng Rong and Michal Lipson

Chris Doerr

Editorial

DOI 10.1515/nanoph-2014-0017

Nanophotonics 2014; 3(4-5): 203

Ari Novack, Matt Streshinsky, Ran Ding, Yang Liu, Andy Eu-Jin Lim, Guo-Qiang Lo, Tom Baehr-Jones and Michael Hochberg

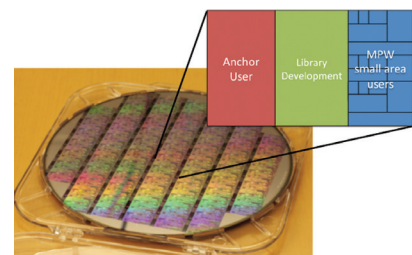
Progress in silicon platforms for integrated optics

DOI 10.1515/nanoph-2013-0034

Nanophotonics 2014; 3(4-5): 205–214

Review article: MPW services will serve to accelerate the development of silicon photonics platforms by providing an economical method for prototyping integrated photonics circuits.

Keywords: silicon photonics; integrated optics; photonics platform; multi-project wafer shuttle.



Po Dong, Young-Kai Chen, Guang-Hua Duan and David T. Neilson

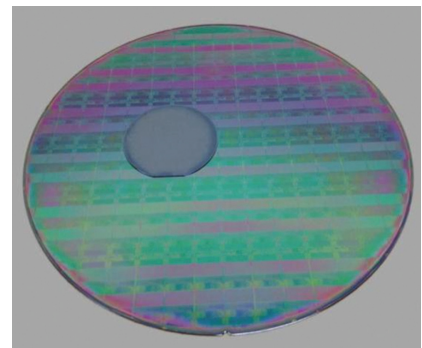
Silicon photonic devices and integrated circuits

DOI 10.1515/nanoph-2013-0023

Nanophotonics 2014; 3(4-5): 215–228

Review article: Silicon photonics technology integrates many optical components on single chips to realize very large-scale multi-function circuits for various communication applications.

Keywords: optical communication; optical interconnect; photonic integrated circuits; silicon photonics.



Graham T. Reed, Goran Z. Mashanovich, Frederic Y. Gardes, Milos Nedeljkovic, Youfang Hu, David J. Thomson, Ke Li, Peter R. Wilson, Sheng-Wen Chen and Shawn S. Hsu

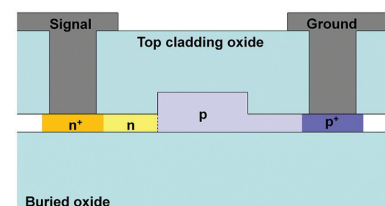
Recent breakthroughs in carrier depletion based silicon optical modulators

DOI 10.1515/nanoph-2013-0016

Nanophotonics 2014; 3(4-5): 229–245

Review article: In this paper we overview the different types of free carrier depletion type optical modulators in silicon.

Keywords: depletion; modulators; silicon photonics.

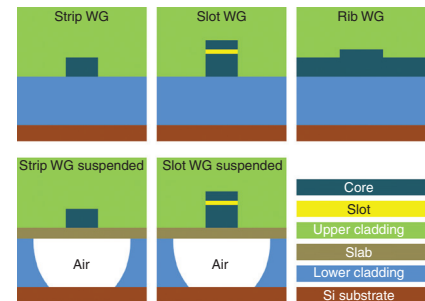


Lin Zhang, Anuradha M. Agarwal,
Lionel C. Kimerling and Jurgen Michel
**Nonlinear Group IV photonics based
on silicon and germanium: from near-
infrared to mid-infrared**

DOI 10.1515/nanoph-2013-0020
Nanophotonics 2014; 3(4-5): 247–268

Review article: In this paper, we discuss the materials properties of the Group IV platform for nonlinear applications. The waveguide-based devices are optimized for four different wavelength ranges from near-IR to mid-IR in terms of both nonlinearity and dispersion.

Keywords: silicon photonics; Group IV photonics; nonlinear optics; dispersion; slot waveguide; micro-resonator; integrated optics; supercontinuum; pulse compression; frequency comb.

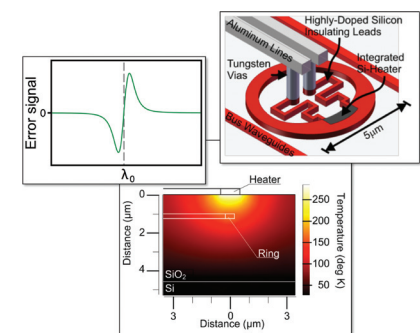


Kishore Padmaraju and Keren
Bergman
**Resolving the thermal challenges for
silicon microring resonator devices**

DOI 10.1515/nanoph-2013-0013
Nanophotonics 2014; 3(4-5): 269–281

Review article: This review article elaborates on the temperature susceptibility of silicon microring resonators in envisioned silicon photonic interconnects, and surveys the field of proposed solutions.

Keywords: integrated photonics; microring resonators; optical interconnects; silicon photonics.

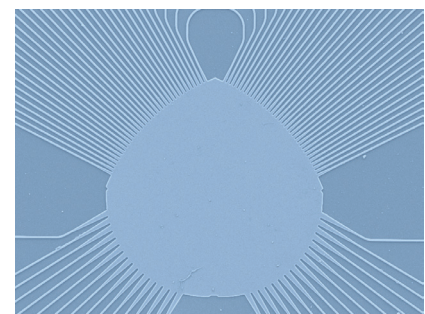


Daoxin Dai and John E. Bowers
**Silicon-based on-chip multiplexing
technologies and devices for Peta-bit
optical interconnects**

DOI 10.1515/nanoph-2013-0021
Nanophotonics 2014; 3(4-5): 283–311

Review article: Silicon-based on-chip multiplexing technologies and devices for Peta-bit optical interconnects are reviewed and discussed.

Keywords: wavelength-division-multiplexing (WDM); polarization-division multiplexing (PDM); spatial-division multiplexing (SDM); hybrid multiplexing; bidirectional multiplexing; silicon; Peta-bit; photonic integrated circuit (PIC).



Steven Spector and Cheryl Sorace-Agaskar

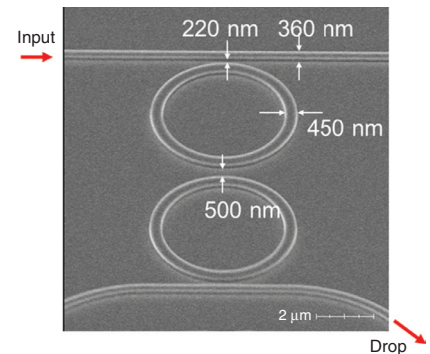
Silicon photonic devices for integrated analog signal processing and sampling

DOI 10.1515/nanoph-2013-0036

Nanophotonics 2014; 3(4-5): 313–327

Review article: This articles reviews the development of silicon photonic devices at MIT Lincoln Laboratory and MIT toward the goal of optically-assisted analog to digital converter.

Keywords: silicon photonics; silicon modulator; silicon photodetector; ring resonator filters.



Raji Shankar and Marko Lončar

Silicon photonic devices for mid-infrared applications

DOI 10.1515/nanoph-2013-0027

Nanophotonics 2014; 3(4-5): 329–341

Review article: In this review, we discuss our group's recent contributions to the field of silicon-based mid-IR photonics, including photonic crystal cavities in a Si membrane platform and grating-coupled high-quality factor ring resonators in a silicon-on-sapphire (SOS) platform.

Keywords: mid-infrared; silicon photonics; ring resonators.

