SEMINAR

Lasers and Electro-optics Society
Hong Kong Chapter

Center for Advanced Research in Photonics
and
Department of Electronic Engineering
The Chinese University of Hong Kong

Date : 11th April 2006 (Tuesday)
Time : 9:15am – 10:15am
Location : Rm 418, Ho Sin Hang Engineering Building,
The Chinese University of Hong Kong

Silicon-on-Insulator based micro-optical integration platform

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Abstract:

SOI rib waveguide technology is an important contender among the planar lightwave circuit (PLC) technologies to overcome the limitations of the current silica-on-silicon technology. Silica-on-Silicon suffers from physical constraints (index contrast) that prevent a further size reduction and therefore higher integration of passive optical components. The inherent high index contrast of the Silicon - Silicon dioxide material system leads to strong optical confinement, which in turn permits a strong miniaturization of waveguides, bends and devices.

Additionally, well established electronic and micro-machining Silicon processing technologies can be used for the fabrication of integrated optics. Apart from the possibility of miniaturization there are certain features of SOI waveguide technology that offer performance advantages compared to Silica on Silicon. This concerns for example the achievable modulation speed by the thermo-optical effect. The much increased thermal conductance of Silicon allows for orders of magnitude faster modulation, which is of particular interest for systems meant to compensate polarization mode dispersion. Silicon also permits an effective dissipation of heat from hybrid integrated laser diodes and electronics.

The objective of our work is to demonstrate the viability of SOI rib waveguide technology for applications in optical communications, with emphasis on the integration of high performance passive components and III-V based opto-electronics. We develop an LX4 transmitter module for CWDM applications in short-reach networks. The module is based on an SOI optical MUX with hybrid integrated III-V DFB laser sources. The integration makes use of AuSn solder technology. The board concept, design issues, solder technology, and test results will be presented.

About the speaker

Dr Lars Zimmermann obtained his PhD from IMEC and is currently a postdoctoral researcher at the T.U. Berlin working within Prof. K. Petermann's group. His current research interests include the development of silicon-on-insulator planar lightwave circuits, gold-tin based hybrid flip-chip integration technology and the modeling and design of SOI integrated optics. Since 2004 he is the deputy coordinator in the European network of excellence ePIXnet.

*** ALL are welcome to attend ***

For further information, please contact Prof. H.K.Tsang (26098254, email: hktsang@ee.cuhk.edu.hk)