NANYANG TECHNOLOGICAL UNIVERSITY

Photonics Global Conference 2010

14-16 December 2010, Singapore

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About the Conference

The Photonics Global Conference (PGC) is a biennial event held since 2008. The aim of this conference is to foster interactions among broad disciplines in the photonics family. The conference will provide a platform for international academics, researchers, practitioners and students working in the photonics areas to discuss new developments, concepts and practices, and to identify synergies in research directions that will lead to broader and deeper applications of photonics. Previous conference attracted about 300 delegates from 32 countries. We were highly honored to have 4 renowned plenary speakers Prof. John Pendry from Imperial College; Prof. Arthur Chiou from National Yang-Ming University; Prof. Alan E. Willner from University of Southern California, and Prof. Horst Weber from Technical University Berlin to share with us their insight and perspectives on current trends, convergence technologies and the strategic updates in our previous conference. This year we have Prof. Federico Capasso from Harvard University and Prof. Stefan Hell from Max-Planck-Institute to give plenary talks in Singapore. We are pleased to announce that the Photonics Global Conference will be held in Singapore from 14 to 16 December, 2010. All major areas in photonics technologies will be covered in talks, along with invited/special sessions. This is an opportunity for researchers around the world to exchange ideas and latest research results in areas such as metamaterial, nanophotonics, biophotonics, plasmonics, optical communication devices/systems and related fields. We look forward to your participation so as to make this conference an exciting and fruitful event. Papers presenting original work in, but not limited to, the following technical symposia are invited for submission. All submitted abstracts will be peer-reviewed. The conference proceedings will be distributed to the registered participants in a CD and will also be available through IEEE Xplore. All presented papers with final manuscripts accepted will be EI indexed.

Symposia

Meeting Room 207

Session Name: Radio-over-Fiber

Session Chair: Calvin Chan

16:15--16:45 (conf10a443) ***Invited***

Oral 1-4F-1

Cmos Optoelectronic Mixers For Fiber-Fed Wireless Systems

Woo-Young Choi

InAs/InP QDs with repetition rate from 10 GHz to 437 GHz have been demonstrated. Femtosecond (fs) pulses with pulse duration of less than 300 fs from a single-section monolithic Fabry-Perot (F-P) cavity have been generated in the C- and L-band wavelength range from 1530 nm to 1600 nm. The average output power is up to 50 mW at the room temperature of 180C. We have also discussed the working principles of the developed QD MLLs.

Oral 1-4E-5

Integrated Cu-based TM-pass Polarizer using CMOS Technology Platform

Ng Tien K., Khan Zahed M., Ooi Boon S.

A transverse-magnetic-pass (TM-pass) copper (Cu) polarizer is proposed and analyzed using twodimensional Method-of-Lines beam-propagation model. The transmission mode TM-pass polarizer has a Sicore/Cu-filter/Si-core configuration along the longitudinal direction or direction of wave propagation (see inset in Fig.1 showing the plan view of the structure). The 300 nm wide Si-core sections are the input and output waveguides, while the TM-pass Cu-filter (the two orange strips in Fig.1 inset) consists of two 100 nm × 100 nm Cu strips, separated by 100 nm SiO2 in between. The Si-core/Cu-filter/Si-core structure is protected by SiO2 along the transverse direction as shown in the inset. In the simulation, the Cu-filter is launch with the fundamental mode of the input wave. The wavelength was swept from 0.4-1.6 ?m, and the corresponding complex refractive indexes for Cu at various wavelengths were used to compute the TM0 and TE0 mode transmissivity. Figure 1 shows that the proposed polarizer exhibits a simulated high-pass filter characteristics, with TM0 and TE0 mode transmissivity of >70% and <5%, respectively, in the wavelength regime of 1.2 - 1.6 ?m. The polarization extinction ratio (PER) given by 10 log10 (PTM0)/(PTE0) is +11.5 dB across the high-pass wavelength regime. The simulated images for the TM0 and TE0 modes propagation are shown in Fig.1(b) and Fig.1(c), respectively, which exhibits the corresponding TM0-pass and TE0-reject characteristics at 1.55 ?m wavelength. This configuration is an alternative to the existing corrugated waveguide [1] or photonics crystal waveguide [2] TM polarizer configurations. The proposed TM-pass element can be potentially implemented using the existing Cu Damascene process in silicon foundry technology for applications in optical integrated circuits.

Oral 1-4F-1

Invited Speaker

CMOS Optoelectronic Mixers for Fiber-fed Wireless Systems

Woo-Young Choi

Optoelectronic (O/E) mixers can simultaneously perform photodetection of injected optical signals frequency conversion of resulting electrical signals. Due to this functionality, they can be used for efficient and cost-effective fiber-fed wireless systems. We have realized O/E mixers based on Si avalanche photodiodes fabricated in the standard CMOS process technology and, using these, demonstrated cost-effective fiber-fed 60GHz wireless systems. In this paper, O/E mixer device characteristics and their system performance are discussed.

Oral 1-4F-2

A 60-GHz RoF System in WDM-PON With Reduced Number of Modulators and Low-cost Electronics

Liang Zhang, Xiaofeng Hu, Pan Cao, Yikai Su

We propose and experimentally demonstrate a simple and cost-effective scheme to converge a 60-GHz radio-over-fiber (RoF) system with a wavelength division multiplexedâ "passive optical network (WDN-PON) system. Only 10-GHz electronic devices are used to generate a 60-GHz RoF signal based on frequency-sextupling technology. For n-channel WDN-PON and RoF converged system, only n+1 modulators are required.

Oral 1-4F-3

RoF-based Indoor WiMAX Transmission System

Ming-Hsueh Chuang, San-Liang Lee, Cheng-Chun Chiang, Shu-Chuan Lin, Chun-Liang Yang

In this paper, we use the radio-over-fiber (RoF) technology to extend indoor WiMAX coverage. The RoF-based indoor WiMAX experimental platform can be divided into two kinds of basic architectures: point-to-point and point-to-multipoint. We discuss various setups and optimize the systems to ensure the transmission distance up to 15 meter and sustain 64-QAM modulation.

Oral 1-4F-3

RoF-based Indoor WiMAX Transmission System