Final Program

ulco Université Littoral Côte d'Opale
SATT NORD
GDR NANO THz-MIR
cnrs dépasser les frontières
Université de Lille 1 SCIENCES ET TECHNOLOGIES
iemn Institut d'Electronique, de Microélectronique et de Nanotechnologie
ARMIR Association Rayonnement Mesure Industrie Recherche
lpca Laboratoire de Physico-Chimie de l'Atmosphère

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http://9th-thz-days.univ-littoral.fr

Program

JUNE
Monday
12

12H00 : Welcome / registration

13H30 : Opening
Brief information (C. Sirtori, J. Mangeney)

14H00 : Session 1 - Sources (THz and MIR)

Chairman : T. Yasui

14H00 : M1 - S. Houver
«Multi-THz Sideband Generation on an optical telecom carrier at room temperature»

14H30 : M2 - F. Joint
«Development of low power consumption quantum cascade lasers at 2.7 THz for compact and ultra-sensitive heterodyne detectors»

14H45 : M3 - S. Barbieri
«5ps-long terahertz pulses from an active mode-locked quantum cascade laser»

15H00 : M4 - R. Wang
«DFB laser array in the 2.3 μm wavelength range on a silicon photonic integrated circuit»

15H15 : M5 - K. Maussang
«Monolithic Echo-less Photoconductive Switches for High-Resolution Terahertz Time-domain Spectroscopy»

15H30 : * Coffee break *****

DFB laser array in the 2.3 μm wavelength range on a silicon photonic integrated circuit

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The spectral range of 2.3 µm is of interest for gas sensing as many important gases have strong absorption lines in this wavelength range, including NH_3, CH_4, CO, C_2H_2 and HF. Besides, it also attracts interest in bio-sensing applications, such as non-invasive blood glucose measurements. Recently developed short-wave infrared and mid-infrared silicon photonic integrated circuits offer great potential to realize miniature gas and bio-sensors on silicon photonics chips. Low-loss and compact mid-infrared circuits can be fabricated in a CMOS pilot line, which enables high performance passive components such as (de)multiplexer. A compact silicon photonics spectroscopic sensor requires an integrated light source on silicon. However, the development of silicon photonics light sources above 2 µm wavelength still lags behind.

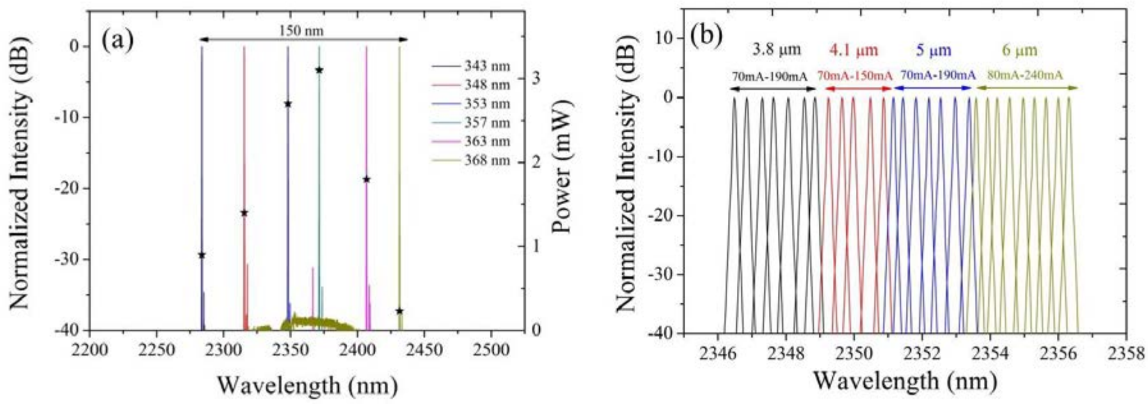

Fig.1. Heterogeneously integrated 2.3 µm III-V-on-silicon DFB lasers with different silicon grating pitchs (a) and device widths (b) in an array.

At Ghent University-IMEC, we developed a heterogeneous III-V-on-silicon platform for optical communication and sensing applications [1]. Here we report 2.3 µm range InP-based type-II DFB laser arrays heterogeneously integrated on a silicon photonic integrated circuit (PIC). An InP-based type-II epitaxial layer stack with "W"-shaped InGaAs/GaAsSb quantum wells is used as the gain medium and bonded to the silicon PIC. Detailed information of the device structure and fabrication process flow can be found in [2]. As shown in Fig. 1(a), the continuous wave (CW) operated DFB lasers can cover a broad wavelength range from 2.28 µm to 2.43 µm by varying the silicon grating pitch. By adjusting the laser device widths, a four wavelength DFB laser array with 10 nm continuous tuning is achieved as shown Fig. 1(b). In CW regime, the DFB laser can operate up to 25 ˚C and emits a maximum optical power of around 3 mW at 5 ˚C.

References
[1] G. Roelkens et al., *Photonics*, **2** (2015) 969.
[2] R. Wang et al., *Appl. Phys. Lett.,* **109** (2016) 221111.