

Selective area growth in generic photonic integration for high capacity WDM transmitters

TU/e and III-V Lab provide a joint PhD training environment for three PhD researchers to develop and study generic technologies for next generation WDM transmitter technology. This is in the framework of a recently awarded Marie Curie Initial Training Network project.

http://ec.europa.eu/research/mariecurieactions/about-mca/actions/itn/index_en.htm

The Technical University of Eindhoven is leading in the field of Photonic Integration Technology. It has the world's best equipped university cleanroom for photonic integration. www.tue.nl/nanolab/ The Department of Electrical Engineering is one of the nine departments of the Eindhoven University of Technology and provides BSc and MSc programs in Electrical Engineering. The department has nine research groups and has research collaborations with other departments at the Eindhoven University of Technology as well as with a large number of other universities and companies, both within the Netherlands and internationally. The department has approximately 350 employees and 600 students. The Photonics Integration research group at TU/e is within the COBRA institute. www.tue.nl/cobra/

III-V Lab is an industrial Research Laboratory jointly established by Alcatel-Lucent, Thales and CEA Leti. Under the guidance of its members, III-V Lab conducts R&D activities in the field of micro/nano-electronics and photonics semiconductor components for different application: telecoms, defence, security, safety, space etc. These activities cover the topics including (1) Photonic Integrated Circuits (PICs) for telecoms, (2) Micro/nano-electronic circuits for telecoms: 40Gb/s, 100Gb/s and over, (3) GaN microelectronic circuits for microwave and power applications, (4) High resolution infrared imagery sensors, (5) Quantum cascade lasers (QCLs) and power lasers.

III-V Lab has established experience in industrial research and development and provides an ideal environment for Ph.D candidates who are willing to be trained to work in industries. <http://www.3-5lab.fr/>

Three different PhD positions are offered within the Initial Training Network. Each PhD student position will be based for two years at TU/e in Eindhoven, The Netherlands and also for two years in III-V Lab in Palaiseau, France.

Research Challenges:

To increase the data capacity of photonic integrated circuit transmitters, many wavelengths will be generated and modulated by parallel data channels. To extend the range of possible wavelengths, we propose to vary the bandgap of the amplifier materials using selective area growth technologies. The objectives within this project are to implement selective area epitaxial wafer growth together with generic photonic integration for the first time. This allows for efficient, high capacity and high-speed data transmitter chips.

The PhD student tasks: PhD activity will focus on

- (a) The integration of advanced selective area growth technology (developed by III-V Lab) in the experimental generic integrated process at TU/e (www.jeppix.com) to give designers

the freedom to choose the band gap (emission wavelength) at different locations in the transmitter chip. This allows lasers and electroabsorption modulators to be optimised for the operating wavelengths.

- (b) The development of directly modulated lasers using deep UV lithography (193nm) using TU/e's unique ASML scanner tool (PAS5500/1100) and assess the performance improvements.
- (c) Transfer the experimental generic integration process from n-type substrates to semi-insulating substrates to allow an increase in data modulation rates from <20Gbps to >40Gbps.

Job requirements

- MSc degree in a relevant area of applied physics, optical science or electrical engineering
- A solid background in semiconductor opto-electronics
- Ability to work with experts from a broad range of scientific and technology backgrounds
- Fluent spoken and written English

Applicants may also advantageously have experience in one or more of the following areas

- Clean room technology
- Optical computer aided design software

Conditions of employment

We offer a challenging job at a dynamic and ambitious university through a fixed-term appointment for the period of 4 years. The research in this project must be concluded with the attainment of a PhD-degree. As an employee of the university you will receive a competitive salary as well as excellent employment conditions. A salary is offered starting at € 2083.- per month (gross) in the first year, increasing up to € 2664.- per month (gross) in the last year. Moreover, an 8% bonus share (holiday supplement) is provided annually. Assistance for finding accommodation can be given. The university offers an attractive package of fringe benefits such as excellent technical infrastructure, child care, savings schemes, and excellent sports facilities.

TU/e also offers you the opportunity for personal development by developing your professional skills. We do this by offering every PhD student a series of courses that are part of the Proof Program as an excellent addition to your scientific education.

More information on employment conditions can be found here: <http://w3.tue.nl/en/services/dpo/>.

Information and application

If you are interested in this research opportunity and you would like to informally discuss the project, please contact: Prof. Dr. Kevin Williams (tel: +31 40 247 4331; K.A.Williams@tue.nl) or Dr. Xaveer Leijtens (tel: +31 40 247 5112; X.J.M.Leijtens@tue.nl).

For information concerning employment conditions you can contact Mrs W. van Eck, HR advisor (w.w.k.v.eck@tue.nl).

Application

If interested, please use 'apply now' button at the top of this page. You should upload the following (all in English):

- a cover letter explaining your motivation and qualification for the position;
- a Curriculum Vitae including course grades, research project achievements and list of publications
- contact information for two referees.
- copies of diplomas
- proof of English language skills where applicable

Please keep file sizes small. Please keep in mind; you can upload only 5 documents up to 2 MB each.