FACULTY OF ENGINEERING AND ARCHITECTURE

DEPARTMENT INFORMATION TECHNOLOGY
PHOTONICS RESEARCH GROUP

PhD Position on 'Photonic integrated solid-state lasers for scalable quantum systems'

Ghent University – IMEC, Photonics Research Group
Tech Lane Ghent Science Park – Campus A
Technologiepark – Zwijnaarde 15, B-9052 Gent, Belgium

Research project

We are looking for highly motivated PhD candidates to develop novel on-chip laser systems that will enable scalable quantum systems based on trapped ions, cold atoms and solid-state defects.

Current photonic integrated laser systems, such as III-V laser, have shown great promise to realize scalable quantum systems. However, the performance of these laser systems is still far from what is possible using tabletop free-space or fiber laser systems. During this PhD the candidate will research novel solid-state gain materials to integrate with existing photonic integration platforms, such as silicon nitride, to create beyond state-of-the-art lasers for control of trapped ions, cold atoms and solid-state defects. This work will build in part on the novel thin film laser technologies developed at Stanford University and the existing state-of-the-art micro transfer printing capabilities of the photonic research group.

Furthermore, this PhD opportunity is a part of the exciting "LASIQ" project, supported by an ERC starting grant, offering the chance to contribute to a vibrant research team.

Job description

For this project you will be working in a research team led by Prof. Kasper Van Gasse within the Photonics Research Group of Ghent University and imec. The main goal is to allow the PhD researcher to create novel photonic integrated laser systems and develop all the necessary skills in photonic integration needed for a further career as photonic researcher.
The estimated breakdown of the research activity is approximately 40% clean room work and process development, 35% optical simulations (Lumerical, mode solvers, FDTD, inverse design, …) and 25% optical experiments. Depending on the preference of the student this can be adjusted.

Profile

We are looking for enthusiastic students who have obtained a degree in electrical engineering, physics, material science or similar degree.

Application

Apply by sending an email to kasper.vangasse@ugent.be with a resume and a short motivation letter. Applications will be reviewed as received. For additional information also send an email to kasper.vangasse@ugent.be.

About the Photonics Research Group

The Photonics Research Group (about 85 people) is associated with IMEC, and is part of the Department of Information Technology of Ghent University. The group is headed by Prof. Dries Van Thourhout and has been active in photonics device research for many years. The other professors in the group are Roel Baets, Peter Bienstman, Wim Bogaerts, Stephane Clemmen, Alberto Curto, Bart Kuyken, Nicolas Le Thomas, Yanlu Li, Geert Morthier, Gunther Roelkens and Kasper Van Gasse. The main research directions are silicon nanophotonics, heterogeneous integration, optical communication, neuromorphic computing, photonic (bio)sensors and photonic integrated circuits for biomedical applications in the near-infrared and mid-infrared wavelength range.

The Photonics Research Group has been coordinating the network of excellence ePIXnet and is involved in a number of EU-projects, including the H2020 projects ActPhast4R, AQUARIUS, CALADAN, FUN-Comp, Hydroptics, InSiDe, INSPIRE, MedPhab Pilot Line, MIRPHAB Pilot Line, PIX4Life Pilot Line, MORPHIC, NEBULA, Neoteric, TopHit and PhotonHub. The group also hosts two EOS Research projects, INTERREG projects and several ITNs (MICROCOMB, OMT, WON, Phonsi). Furthermore, the group is partner of the Center for Nano- and Biophotonics of Ghent University and leads ePIXfab, the European Silicon Photonics Alliance.

The group has been awarded six ERC Independent Researcher Starting Grants, one ERC Consolidator Grant and two ERC Advanced Investigator Grants.