

PHD POSITION ON RING RESONATOR MOLECULES

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

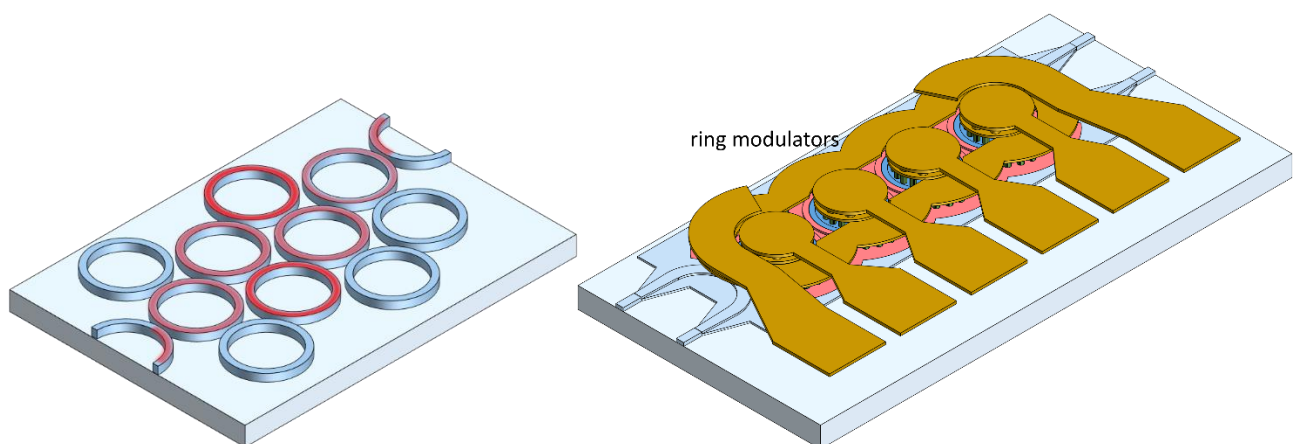
We are looking for a motivated PhD candidate to work on a novel type of silicon photonic structure based on large lattices of coupled ring resonators. Arrays of coupled ring resonators are positioned in between the field of optical filter circuits and the field of photonic crystals. As in optical filters, the transmission of ring lattices can be seen as the interference of many delay lines organized in a complex feedback mesh. But as in photonic crystals, these structures inherit properties like photonic bands and band gaps. Compared to classical optical filters, or filters consisting of only a few ring resonators, ring lattices have many more degrees of freedom, especially if individual rings can be tuned. Compared to photonic crystals, ring lattices can be engineered in more detail, as control over the individual coupling constants is possible, and nanometer-scale feature control is not as critical.

In this project, the fundamental properties of such ring resonator lattices will be studied, coming from the field of optical filters and of photonic crystals. Also, the similarities with electron orbitals of molecules or nanocrystals will be explored.

Ring resonator lattices can be useful for many applications: sensing, spectroscopic measurement structures, but also signal processing. Especially when the rings are combined with active tuning circuits and monitoring, and even with high-speed modulation, they can open up completely new applications. These devices will be fabricated using IMEC's silicon photonics platform and characterized in the measurement labs at Ghent university.

We are looking with a PhD candidate with a background in photonics, applied physics or electrical engineering. You should have a strong interest in fundamental physics, and some background in solid-state physics, molecular physics and quantum mechanics will be very valuable, given the similarities of ring resonator lattices and electronic orbitals. Basic programming skills (python) will be very useful, and an open mind and a multi-disciplinary attitude is a must.

We offer you the opportunity to work in a large, multi-disciplinary research group that covers a broad spectrum from fundamental to very applied research in the field of integrated photonics.



APPLICATION

You can express your interest through this [application form](#).

MORE INFORMATION:

Prof. Wim Bogaerts (wim.bogaerts@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. R. Baets and has been active in photonics device research for many years. The other professors in the group are P. Bienstman, W. Bogaerts, B. Kuyken, N. Le Thomas, G. Morthier, G. Roelkens and D. Van Thourhout. The main research directions are silicon nanophotonics, heterogeneous integration, optical communication, photonic (bio)sensors and photonic integrated circuits for biomedical applications in the near-infrared and mid-infrared wavelength range. More in particular, the silicon nanophotonics work focuses on the design and fabrication of SOI-based photonic devices using standard lithographic techniques compatible with CMOS-processing.

The Photonics Research Group has been coordinating the network of excellence ePIXnet and is involved in a number of EU-projects, including the FP7 projects ActPhast, PLAT4M, Cando, and Pocket and the H2020 projects TOPHIT, TeraBoard, PIX4Life, MIRPHAB and Phresco. Furthermore, the group is partner of the Center for Nano- and Biophotonics of Ghent University and the group has been awarded three ERC Independent Researcher Starting Grants and one ERC Advanced Investigator Grant.