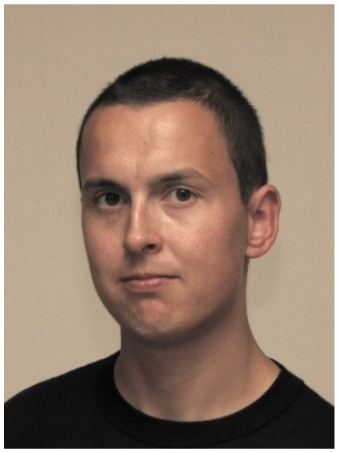

Wim Bogaerts

Ghent University-IMEC, Photonics Research Group

Title:

Programmable Photonics

Abstract:

In the past decades, photonic integrated circuits have become entrenched as a key enabling technology for fiber-optic communication. They make it possible to integrate a combination of optical and electrical functions on the surface of a chip, which can be fabricated with the same technologies used for microelectronics. But photonic chips have also been proven useful for sensors, spectrometers, LiDAR, computing and quantum applications. Only, these applications struggle to really gain traction, and many photonic chip demonstrations are confined to the lab. It takes a lot of effort and time to translate a photonic proof of concept into a product, and one of the obstacles in this process is the lack of rapid chip prototyping capabilities. In digital electronics, we have become accustomed to FPGAs, but a comparable photonic technology does not yet exist. This is where programmable photonics come in. Photonic integrated circuits can be made programmable by making the optical paths reconfigurable through electronically controlled tunable couplers and phase shifters. This way, optical circuits can be defined in software, enabling much more rapid iteration cycles. We will discuss the state of programmable photonics today, the results of recent experiments at Ghent University – IMEC, and where the key challenges are to realize the technology platforms that can truly enable such generic photonic processors.

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