



Integration

Monolithic Photonic Integration

The Monolithic Integration effort within the Integrated Photonics Group works with both academia and industry in bridging the gap from Photonic materials and devices to Photonic Systems and applications. The team actively pursues research and development in high speed Photonics, and Photonic Integrated Circuits. The core team is led by Prof. Frank Peters who has many years of experience in academic and industrial photonics R&D groups which include U. C. Santa Barbara, Agilent Technologies and Infinera. Within Tyndall, the team works closely with the photonic materials and devices teams for device development, and with the packaging and communication teams to prove practical working demonstrations.

The main focus of the group is to enable very high information spectral density (ISD) coherent communications. This requires high speed photonic devices to create and receive the signals, as well as optical circuits designed to generate and manipulate coherent comb lines. The group includes expertise in photonic and laser theory, simulations, design, fabrication and characterization; all of which are required to pursue our research. Current areas of active research include coupled lasers on photonic integrated circuits (PICs), generation and manipulation of coherent optical combs, low linewidth and tunable single mode lasers on PICs, high speed optical modulators (both EAMs and MZMs), and high density multi-layer RF connections for packaging of PICs.

To support our research we have developed custom device design and characterization capabilities including: beam propagation analysis, quantum well design for modulators, custom masks design software (PICDraw), multiple photonic probe stations for die level characterization, high speed characterization of photonic devices up to 65 GHz and 56 Gbps.

Contact

- [Frank Peters](#)
Photonics - Integrated Photonics
[+353 \(0\)21 2346654](#)
frank.peters (at) tyndall (dot) ie
- [Patrick Morrissey](#)
Photonics - I-PIC and Photonics Centre Operations
[+353-21-490-3000](#)
patrick.morrissey (at) tyndall (dot) ie

Related Publications

- [On-chip optical phase locking of single growth monolithically integrated slotted fabry perot](#)

[lasers](#)

Optics Express volume **21** issue **14** page **17315** (2013)

Authors: P. E. Morrissey, W. Cotter, D. Goulding, B. Kelleher, S. Osborne, H. Yang, J. O'Callaghan, B. Roycroft, B. Corbett, F. H. Peters

- [Investigation of active filter using injection-locked slotted Fabry–Perot semiconductor laser](#)

Applied Optics volume **51** issue **30** page **7357** (2012)

Authors: William Cotter, David Goulding, Brendan Roycroft, James O'Callaghan, Brian Corbett, Frank H. Peters

- [Monolithically integrated low linewidth comb source using gain switched slotted Fabry-Perot lasers](#)

Optics Express volume **24** issue **8** page **7960** (2016)

Authors: J. K. Alexander, P. E. Morrissey, H. Yang, M. Yang, P. J. Marraccini, B. Corbett, F. H. Peters

- [Coupled Cavity Single-Mode Laser Based on Regrowth-Free Integrated MMI Reflectors](#)

IEEE Photonics Technology Letters volume **28** issue **12** pages **1313 to 1316** (2016)

Authors: Padraic E. Morrissey, Niall Kelly, Mohamad Dernaika, Ludovic Caro, Hua Yang, Frank H. Peters